public asylums such abuses can now scarcely exist; but in private asylums, and in the treatment of single patients, they are too common; and I know that both ladies and gentlemen afflicted with various degrees of mental infirmity suffer great aggravations of their malady from the insolence of attendants, who know that the patient's alleged violence will always be considered a justification of the use of violent means of control. In all cases, the practices arising out of such principles are productive of much unnecessary vexation and suffering: but in a case of puerperal insanity it should be our especial care that the patient should never have to recal a time when, to avoid a troublesome attendance, her sufferings were aggravated by all the offensive disregard that is surely and inevitably the accompaniment of bodily restraint; and when she was deprived, in her helpless and confused state, in her madness and her misery, of that careful and temperate superintendence which is always foregone in proportion as restraints are resorted to.

SOME ACCOUNT OF THE
MODIFICATIONS OF THE "BANDAGE AMIDONNE"
OF
PROFESSOR SEUTIN; WITH OBSERVATIONS, ETC.

By J. CROWCH CHRISTOPHERS, Esq., M.R.C.S., London.

ANY modification or combination in the application of a principle, tending to extend its utility, to increase its value, or to ensure its success, naturally claims to share in its merit, and is almost unavoidably associated with its history and description; and any account of its use, wherein this is not contemplated, must, to that extent, be considered as incomplete. Under this impression, I beg to be allowed to fill a blank in the paper published in *THE LANCET* of the 28th of February, entitled, "A Few Observations on the Use of Professor Seutin's Starch Bandage in the Treatment of Fractures;" and to show that I have some claim to the privilege, I transcribe the following from Professor Seutin's work, "*Du bandage Amidonné*," published at Bruxelles in 1840:—

"Towards the year 1837, it (the bandage amidonné) was not only employed throughout Belgium, but it was known and duly appreciated in Paris, and through a great part of France. From that period it engaged general attention, not in controverting its utility, but in perfecting its application, starting with the great general principles its author had already propounded. In this manner certain parties devised several sufficiently important modifications, amongst which it is right to mention those of MM. Velpeau, Mayor, Laugier, Lafargue de St. Emilion, King, Christophers, and Van Meerbeeck."

M. Velpeau was the first to propose a modification of M. Seutin's method, which appeared under the title of "*Note sur un nouveau perfectionnement de l'appareil inamovible*," from which it appears that M. Velpeau had for some months substituted dextrine for starch, which he used as follows:—Take a quantity of dextrine and put it in a vessel, and begin to mix it by adding a small quantity of water very gradually: when it is well mixed, add to it a glassful of brandy, simple or camphorated. One or more unrolled bandages are put into this mixture, and are then applied. The advantages M. Velpeau attaches to the use of dextrine are the following: 1st, that it hardens very slowly, and admits of being altered or adjusted during twenty-four or forty-eight hours after its application, in the same way as a cylinder of soft wax; 2nd, the advantage it has over starch is due to the circumstance, that the starch has to be boiled, and that it is almost indispensable to use it warm; that it must be smeared over the bandage either with the hand or a brush: further, it is difficult to starch the bandage efficiently after it is applied, as certain portions of the bandage must then be left unstarched. Dr. Pigeolet combats each of these positions, and concludes by observing that dextrine is not so readily procured as starch, that it is not so cheap, that it forms a mastic which is not more resisting, though it is harsher, and therefore more likely to punish the skin. The method of M. Mayor cannot strictly be termed a modification of the method of M. Seutin, although the principle, and the result obtained, are somewhat analogous, inasmuch as the patient is able to use the limb in a comparatively short time.

The modification of M. Laugier is very ingenious; it consists in using strips of paper, smeared over with starch, in the place of a bandage, which, when applied, form a kind of pasteboard mould, consisting of one piece. The paper is cut into strips, according to the length and circumference of the limb, varying from an inch and a half to two inches in breadth, and from sixteen to twenty-two inches in length; and a number of the longer strips are also used starched together in a longi-

tudinal direction, to add to the strength of the apparatus, forming, as it were, so many long splints, in imitation of the pasteboard ones used by M. Seutin. The advantages of this modification are the following:—the small cost of the material, the ease with which it can be at all times procured; the solid envelope it forms, composed of a single piece, moulded exactly to the limb, accommodating itself precisely to every irregularity on its surface, combining solidity and tightness with moderate thickness, and allowing the patient to move in bed to employ himself, and speedily to walk. The objections to it are, that it does not exercise sufficient resistance; that it is easily torn in the neighbourhood of the articulations; that the patient is not able to walk so soon as with the starch apparatus, probably because it is not sufficiently solid; that if it be lighter, it acquires this quality at the expense of strength; that it is more costly than starch, as it requires frequent removing, and a paper specially made; that it is difficult to apply, and does not always exercise the amount of compression required; and that it wants elasticity.

The modification of M. Lafargue has for its object the immediate solidification of the apparatus of M. Seutin, for which purpose he employed a mastic, composed of starch and plaster, aided in its action by pieces of wire. To give an idea of his method, I will cite a case of fracture of both bones of the leg in which it was employed; the wire was not used.

The patient being seated on a bed, a bandage, soaked in lotion, was applied from the toes to the instep, with compresses to the leg; a layer of bandage was applied around the leg, and smeared over with a thin coat of the mastic, over which another layer of bandage was placed, and again a layer of plaster. Graduated compresses were applied on each side of the tendo-Achillis, and two splints of pasteboard, previously soaked in water, and smeared with the mastic, were placed on each side of the leg; they were held in position by two layers of bandage spread with the composition: lastly, the whole apparatus was smeared over with it. Two hours after application, the mastic was not dry, though it had set, and was therefore inflexible. The same bandage remained till the cure was effected; all went on well, and the patient recovered without deformity. M. Lafargue saw that the pasteboard interfered with the process of drying, and substituted fine threads of wire, which he placed between the layers of bandage. By this method a fracture is instantly and permanently maintained in position, the apparatus being as firm the moment after it is applied as at any subsequent period, the wires being too slight to exercise any painful influence on the skin, and the patient is able to walk with crutches from the moment the apparatus is perfected. The objections urged against this method are,—First: the plaster and starch alone do not become firm immediately, though they become so more rapidly than when starch is used alone. Secondly: this effect is only obtained when the wire is used. Thirdly: the wire is not always easy to apply, and may either inefficiently confine the parts, or may exercise painful pressure. Fourthly: the plaster and starch make a very disagreeable compound, crumble and strew the bed, and give rise to dust. Fifthly: an assistant is required to mix the mastic as it is used; the moment it is left it is spoiled. Sixthly: this bandage is more expensive than the starch bandage, and the material not so readily met with. Seventhly: it is not so elastic as the starch bandage, whence difficulties arise after setting it. Eighthly: it presents a harsher surface to the skin.

The modification of M. Van Meerbeeck has for its object the rapid desiccation of the starch bandage, and is as follows:—After the fracture is reduced, a bandage is applied over the limb, then two moistened pasteboard splints, without starch, having the form of those devised by M. Seutin, and over them another bandage. The apparatus is then left to become dry, which takes place in a few hours. By this method a dry pasteboard mould is obtained, which may be strengthened by an addition of the same material, or by bandages smeared with starch, and a permanent and solid bandage is thus quickly obtained. It is thought that the above modification will prove useful in hospital and in civil practice.

The two last modifiers of the starch bandage are MM. King and Christophers: their method was published in the *Medical Gazette*, in February, 1839. In that paper, the authors, after deducing, from the consideration of the circumstances attending the formation of the callus, the superiority of the apparatus of M. Seutin in the treatment of fractures, state that it has one inconvenience, owing to its inability spontaneously to contract or to dilate, according to the condition and variation of volume in the parts it encloses.

M. Seutin here describes how this most desirable effect is obtained, and as I think this is more lucidly accomplished in

the paper referred to, I have transcribed its description from that source.

The talented Dr. King, my late lamented friend and master, thus speaks, in a lecture which he delivered at the Blenheim-street Dispensary, in the year 1838. "If we inquire how far the apparatus usually employed for treating fractures answer the indications required, we shall find them, in many respects, defective. The splints, which constitute the chief part of such apparatus, and on which we rely to keep the limb steady and motionless, cannot be made to press equally, and when the limb is surrounded by them, they are usually fastened, so that if any variation occur in its volume, the box they form is in nowise susceptible of enlarging or diminishing accordingly. Whatever padding is employed to fill up the hollows between the splint and the limb, the pressure can never be uniform, and it has the inconvenience of keeping the parts in a state of heat. Pasteboard splints can be made to fit more exactly; but even these cannot be made to wrap round the limb with great nicety. Impressed with these defects, Seutin conceived that a bandage, rolled round the limb with perfect exactness, might be converted into one entire hollow splint, case, or mould, sufficiently strong to prevent motion. He effected this object by applying successive layers of bandage, with a thick coating of paste to hold them together, between each layer, and when the paste is dry, the limb is thus encased in a box or mould, which exactly fits it. It is impossible to deny that this apparatus accords with the principles we have deduced, and fulfils the indications much better than those usually employed; it presses equally on every part, and possesses sufficient resistance to supply, for a time, the place of a bone; it is, however, open to the objection, that it does not expand and contract as the limb may swell or diminish. In some cases I believe it has been necessary to remove it, and the proposal to cut it down in several places, so as to convert it into several splints, first led to the modification we have just now introduced.

"This proposal was made by a medical gentleman whom I was attending for a fracture of the forearm. Very shortly after this, I was called to treat a fracture of the humerus. The limb was in a state of tumefaction, which made me fear the absolute confinement of it in Seutin's apparatus; and I employed straight separate splints, such as the French use. When the callus had become sufficiently strong to admit of some little motion, as the patient complained of the weight of the apparatus, and the cramped position of his arm, I applied the apparatus of Seutin; but as the limb was still tender, and swelled a good deal towards evening, I considered it would be advantageous to slit the apparatus open, along the inside of the arm, so that it might yield, and return upon itself according to the variation in the volume of the limb. It answered the purpose tolerably well, but was not sufficiently elastic to follow the limb in its changes of volume.

"In talking the matter over with Mr. Christophers, who was attending the case with me, it occurred to him, that if it could be made so, it would be a considerable improvement; and the means he suggested, which are as simple as ingenious, I immediately adopted.

"He proposed applying around the apparatus, slit open, a certain number of elastic straps made of Indian-rubber, with buckles, which admit of their being drawn to the requisite tightness.

"They are rather more than an inch wide, and rather longer than is necessary to encompass the limb. Four of these were applied, and converted the apparatus into a case sufficiently elastic to follow the changes in the volume of the limb, and yet of sufficient strength to afford the requisite support. It appears to me that Seutin's apparatus thus modified fulfils, as nearly as possible, and much better than any other, all the indications required; and it must be evident that it will be even a greater boon to the patient affected with a compound fracture than to one whose fracture is simple.

"In case the limb undergo a considerable diminution of volume, it will only be necessary to remove a longitudinal strip of the apparatus instead of opening it by a longitudinal incision; and the strip should of course be removed, or the slit made along that side of the limb on which the nerves and vessels exist, and which can least bear pressure.

"We deem it not improbable that the apparatus thus modified will be found useful in the treatment of many diseases where it is essential to keep the parts motionless, without exercising an unyielding resistance or pressure in the least degree unequal. Mr. Christophers proposes to employ it for that troublesome disease, a varicose state of the veins.

"I cannot help thinking, that, if made light, and applied with care, it will answer the purpose admirably. The results

of our experience of its employment in cases of fracture will appear in the following cases." Here follows the recital of three cases of fracture, treated by this modified apparatus.

Case the first was a fractured humerus, which did remarkably well.

Case the second was a fracture of the femur in a child eleven months old. In this case, the benefit of this apparatus was most marked, for in four or five days from the date of the injury, the child was playing on the floor with its brothers and sisters, without that care which the case appeared to demand.

Case the third was a fracture of the fibula, rather below its inferior third. The apparatus was applied immediately after the accident, ten hours after which the bandage was slit up, and the elastic bands applied. The day following, the limb had swollen, as was evinced by the margins of the apparatus being a little apart, but the patient was free from pain, and appeared comfortable; he kept his bed during four days, and was quite easy. On the fifth day he was able to move from his bed with crutches, the leg being kept in a scapulo-tibial sling; since this time he has been able to take more and more exercise, the swelling has subsided, and the lips of the bandage are in contact. He was perfectly cured. With the narrative of these cases Dr. King concludes his paper.

To this modification, neither Professor Seutin nor Dr. Pigeolet raise an objection, (at least I have failed to find such in their work) though till lately a very serious one existed, which was due to the fact that common Indian-rubber is so affected by temperature, and the animal secretion, that in the one case its elasticity is too much increased, in the other its texture is destroyed. To obviate these inconveniences, I now employ a material that is not affected by temperature, by animal secretion, nor by grease, and the elasticity and resistance of which can be regulated up to the most delicate point. An amount of pressure varying from pounds to ounces, by a simple arrangement, is equally easily obtained. The material I speak of is called "Vulcanized Indian-rubber," a patent preparation of Indian-rubber combined with sulphur. Either boiling water or grease may be poured over it, without in any way interfering with its properties, nor does it become hard by exposure to cold: this preparation has permitted me to make a further modification in the apparatus. I now propose to slit the plastic bandage in two, three, or more places, as the case may seem to demand, and instead of applying the Indian-rubber bands, (which, however, answered admirably,) I enclose the whole apparatus, thus slit into two or many strips, in a case or sleeve of the Vulcanized Indian-rubber, of a thickness equal to produce the amount of pressure or resistance I wish to maintain. The Indian-rubber case is so constructed, that it may be fitted to the size of any limb by means of a lace, which is arranged to correspond with that portion of the limb along which the principal nerves and vessels pass, so that in cases where pressure cannot be tolerated over their course by decreasing the strength of the lace, which is also formed of Vulcanized Indian-rubber, a diminution of pressure is effected through the whole length of the same. The object attained by this modification is, that the pressure produced and the expansion permitted will be equal throughout every part of the apparatus; whereas, when the bands are used, the resistance is greater, and, therefore, the expansion is less, over the identical spots occupied by them than over any other part. It is true I have not seen any inconvenience arise from this circumstance, but the great advantage the Vulcanized Indian-rubber sleeve holds over them, and other methods, in addition to the power it possesses of accommodating itself to the changes of volume in the limb, consists in allowing the section of the bandage into one or many parts the moment it is applied in its wet state, thereby putting aside all risk of injury by pressure, should the limb swell before the bandage dries, a process that occupies some hours, its elasticity being sufficient to keep the slit portions of the bandage in intimate contact with the limb during that period. The extension, however, must be kept up till the bandage is dry and hard, a point I have always seen overlooked in applying Seutin's bandage in this country. Where the sleeve I have described is used, this may be accomplished by a long lath splint acting on the principle of Desault's long splint, and retained in the necessary position by a bandage till this takes place.

In cases where the sleeve cannot be procured, the bands answer well, and with a piece of Vulcanized Indian-rubber any person, in a few moments, can make them. The comfort and advantages to be derived from this apparatus must, I am convinced, be felt, or at least seen, to be duly appreciated.

Some space in the paper of Mr. Markwick, in *The LANCET* of the 28th February, is devoted to the often mooted and

always controverted point, at what period should the "bandage amidonné" be applied?

The modifications I have proposed, and practised, solve this question, or rather, render it a question no longer, inasmuch as the apparatus is so constructed that it will follow any augmentation or diminution of the parts it encompasses; therefore, should swelling arise, or, having arisen, disappear, the apparatus will accommodate itself to both cases, and that, too, without any decrease of support in either. Should the bandage be applied to a limb enormously swollen, and should the swelling suddenly subside, it will be necessary to remove a strip from the whole length of the same, equal in breadth to the diminution of the limb, in order that it may not lay loose in the apparatus, and that correct coaptation may be maintained.

This apparatus would, I think, be invaluable in cases of varicose veins, scrofulous joints, and in that kind of sore legs now treated by strapping, as it is easy to remove, and to re-apply it uninjured, and the only difficulty would be to protect it from the discharge.

In conclusion, I must observe that, in addition to the great saving of time and trouble to the surgeon, and the independence, ease, and comfort it affords the patient, combined with the happy results hitherto attending its use, this apparatus fulfils the divers indications in the treatment of fractures better than any other yet proposed, as well by the facility with which it is applied, as in the small cost of the materials composing it—circumstances that render it worthy the attention of public benevolent institutions, where the alleviation of human suffering is a paramount consideration, and where economy in time is as essential as economy in expenditure.

Upper Montagu-st., Montagu-sq., March, 1846.

CONTRIBUTIONS

TO

THE PRACTICE OF MIDWIFERY.

By J. HALL DAVIS, M.D.,

PHYSICIAN TO THE ROYAL MATERNITY CHARITY; LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN.

PROTRACTED LABOURS COMPLETED BY CRANIOTOMY; WITH ILLUSTRATIVE CASES, AND REMARKS.

A first labour, patient's age forty-two; liquor amnii discharged in three hours from commencement of labour; orifice of uterus obliterated in eight hours from the rupture of the membranes; the pains having continued thirty-one hours from the escape of the "waters," gradually increasing in strength and frequency, then ceased, but not suddenly; head had been impacted in the brim of the pelvis during twelve hours, when delivery was accomplished by the crotchets; rigidity of the perinæum and contraction of the os externum were such as to require the use of the osteotomist; importance of the bandage during, and for a time after, instrumental delivery; atony of the bladder for eight days after, that organ having been distended during the labour.

DECEMBER 18th, 1845, Four P.M.—I was requested by a surgeon in Camden-town to visit a patient, aged forty-two, upon whom he was then in attendance. She was of a stout habit, firm fibre; her previous health had been good. She was in labour of her first child; true pains had first set in at three A.M. on the previous day, (Wednesday;) the membranes broke in three hours after, (six A.M.) At two P.M. of the same day, the orifice of the uterus had become fully obliterated, so that no longer could any portion of the lips of the uterus be felt. The pains entirely left at one P.M., (Thursday,) three hours before my visit, but not suddenly, having latterly gradually lessened in force and frequency.

I found the expression of countenance good; the face congested from the effects of previous efforts; skin moist and hot; pulse 100 and soft; no heat of vagina; a puffy protrusion of scalp; the head impacted, the bones felt slightly overlapping; the sagittal suture coursing from the region of the left acetabulum backwards; obliquely, in the direction of the right sacro-iliac synchondrosis, to which the large fontanelle was directed. The parietal protuberance of the right side most dependent and anterior. I was informed that the bladder had responded regularly. Agreeably to my universal practice, however,—which I was, indeed, the less disposed to forego in this case, on finding the tumour of a distended bladder above the pubes,—I passed a male elastic catheter, and then having drawn off a pint of urine, (from which proceeding the patient expressed much relief,) and ascertained that the rectum was empty, I undertook the delivery by the crotchets.

From a consideration of the duration of pressure which the parts had already sustained, I was indisposed to add any risks, which might fairly be expected to result from their application, to make a trial of the forceps in the first instance; moreover, the impaction of the head, the rigid condition of the perinæum, and great contractedness of the os externum, further forbade their employment. The centre of the presentation was perforated by Smellie's scissors, modified, as I use them, the brain freely evacuated, and a purchase then made by the guarded crotchets upon that part of the head opposite the sacro-iliac junction; the edges of bone were carefully sheathed by scalp. Traction was now made at intervals, no pains being present to assist, and the head was thus gradually brought into bearing upon the perinæum. The head, diminished as it was by the removal of its contents, could not be brought through the contracted os externum, even now, without exposing the perinæum to imminent risk of laceration; that structure was tensely put upon the stretch at each effort of traction. To shorten matters, and to avoid all chance of a rupture ensuing, a few sections were removed from the cranium by the osteotomist, when the delivery was safely completed, of a male child of large size.

A broad bandage, previously loosely applied round the abdomen, was gradually tightened, as the successive parts of the child were extruded. Within an hour after the birth of the child, the placenta not being thrown off, and some hæmorrhage occurring, the hand was passed into the uterus. The placenta was found to be retained by an hour-glass contraction of the uterus, and was only partially detached. It was removed carefully and entire in about ten minutes, the uterus was left permanently contracted, and the hæmorrhage ceased. The bandage was readjusted with a compress, and the patient was ordered not to be removed from her present position, which we carefully arranged before we left, for four or five hours.

Friday, One P.M.—The patient had had some refreshing snatches of sleep during the night; slight tenderness of the abdomen; lochial discharge scanty; pulse 110, not full, nor hard; face flushed; has had occasional chills; has passed no urine; it was drawn off by the catheter. The foregoing state of things, taken in connexion with the patient's habit of body, led to the recommendation of the abstraction of blood, as a precaution against inflammation, which might fairly be anticipated from the pressure which the parts had sustained. Solution of acetate of ammonia and camphor mixture, containing in each dose one-sixth of a grain of tartar emetic and ten minims of ipecacuanha wine, were ordered every four hours; and at night, calomel four grains, Dover's powder ten grains; to be followed by a black draught in the morning. I was afterwards informed by the medical attendant, that his patient had fainted upon the operation of bleeding, rather from the sight of the blood and the fright which the thoughts of being bled had occasioned her, than from the quantity obtained; that, nevertheless, it had not become necessary to repeat the measure; the circulation had afterwards remained at its natural standard; there had been no recurrence of heat nor of tenderness. The tartar emetic had nauseated; the lochia had become free.

Dec. 24th. I found the patient without pain; tongue slightly coated with a white fur; pulse soft, 85; urine drawn off daily. The progress of the patient from this date continued satisfactory. Beyond the occasional exhibition of an aperient, and the daily introduction of the catheter up to the morning of the ninth day, when the bladder responded without difficulty, nothing further happened to require attention. On the 16th of January, my friend favoured me with a call, and reported that his patient was rapidly recovering her strength, and had been able to leave her room in pursuit of most of her ordinary duties for the last week.

Remarks.—The disproportionate size of the child was the occasion of the difficulty in the foregoing case. The age of the patient for a first parturition was unfavourable, and further furnished an obstacle under delivery by the crotchets in the form of a rigid perinæum, with contraction of the external orifice of the vagina, and to an extent so unusual as to require, even after the great reduction of the bulk of the head by a removal of the cerebral substance, the application of the osteotomist, that the delivery might be effected with perfect safety to the maternal tissues.

The previous trial of the forceps, which we sometimes can venture upon, was here not justified; had they been applied, inflammation and sloughing of the vagina, which were fortunately prevented, would in all probability have been the sequel.