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PART I.
ORIGINAL COMMUNICATIONS.

ART. X.—*Lessons from Surgical Practice.* By B. WILLS RICHARDSON, F.R.C.S.I.; Examiner in the Royal College of Surgeons, and Surgeon to the Adelaide Hospital, Dublin.

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Cancer of Right Tonsil with Suppuration; Caries of the Condyles and the Basilar Process of the Occipital Bone; Hæmorrhage into the Larynx and Trachea, causing instantaneous Death by Apnœa.

Louisa T., aged sixty-four years, widow, was admitted into the Adelaide Hospital, on 16th Sept., 1869.

Several years previously she suffered from pain in and partial loss of power over the right arm. These symptoms soon ceased, and her health continued good until Christmas, 1868, when she was seized with shooting pains in the right ear and right side of head and neck. Matter came from the ear, and deafness ensued. The right nostril became "stuffed," and smelling impaired.

Her mother died when she was a girl, but the father lived to very old age. Her brothers and sisters were then alive and healthy.

When admitted to hospital she had a very rapid pulse, and the countenance was expressive of anxiety. The skin was of a dusky hue.

There was no tenderness in any portion of the spine. Its absence, however, would have been a very fallacious negative sign.

A careful examination of the fauces did not reveal any evidence of disease. Relief followed the treatment prescribed, and she left hospital on the 10th March, 1869.

Six weeks before re-admission she experienced difficulty in swallowing, solids particularly, and the painful symptoms recurred that I have described; but her symptoms on the 16th Sept., were as follows :—(1.) Stuffing of the right nostril. (2.) Pains in the right side of the head, and occasionally very severe pains in the vertex, the right side of neck, and in the right arm. (3.) Complete deafness of the right ear, the hearing with the left one being very imperfect. (4.) Tenderness to pressure in the upper and posterior cervical region. (5.) Brownish purulent discharge flowed from the right naris into the pharynx. (6.) The right tonsil was almost the size of a walnut, was of stony hardness and very fixed. The half of the soft palate

corresponding to it seemed to form part of the tonsil, and was much thickened and abnormally vascular. (7.) The uvula, as in tonsilitic abscess, sprang as it were from the tumour, and was pushed over to the left side. Thus the palate, tonsil, and uvula formed a single mass which appeared to be continuous, with a fixed, hard, slightly prominent and defined swelling situated upon the front and right halves of the bodies of the two or three upper cervical vertebræ. The tonsilitic portion of the first described tumour was ulcerated. The laryngoscope as well as the finger proved that the epiglottis was displaced to the left side. Pulse 92. Tongue white and furred. Ordered a mixture of bromine, distilled water, and syrup.

21st Sept.—The dose of bromine was increased.

5th Oct.—Great pain and tenderness in the right side of frontal bone, in front of the coronal suture. Severe pain, also, in the right side of the neck and in the right shoulder. Inability to rotate the head. A small, very hard, and tender gland could be felt a little below the angle of the right side of the lower jaw. Pulse 80. A hypodermic injection, proportioned as follows, was given at the right side of the neck:— $\frac{1}{6}$ gr. acetate of morphia and $\frac{1}{120}$ th gr. of sulphate of atropia, in six minims of fluid.

6th Oct.—Vomited several times after the hypodermic injection. Pain confined to the ear.

7th Oct.—Recurrence of pain, and repetition of the hypodermic injection.

8th Oct.—Vomited once after the hypodermic injection. Ordered one minim of bromine in solution three times daily.

21st Oct.—Neuralgic pains very severe on the evening of the 8th Oct. in the right side of head, face, and neck, necessitating the repetition of the morphia and atropia hypodermic injection. She vomited afterwards, but she had a good night. On this day (21st October) she had headache, a hot skin, and the pulse was 106. Tongue dirty. Ordered the hospital diaphoretic mixture. Bromine discontinued.

25th Oct.—Dyspnœa. Fine crepitating râles in lower and posterior part of each lung, with corresponding dulness on percussion. Pulse 120; skin very hot; tongue yellow and moist. Ordered the turpentine stupe to posterior part of chest morning and evening.

1st Nov.—The crepitating râles in the lungs were coarser, and

the dulness had not extended. Excruciating pain in vertex, right side of neck and right shoulder. The hypodermic injection was repeated.

2nd Nov.—Several vomitings followed the hypodermic injection of the day before, but pain was much relieved.

3rd Nov.—The pharyngeal tumour was larger, redder, and the ulceration of its surface had extended. Ordered a biborate of soda lotion for the mouth.

9th Nov.—She had comparative ease until the night of the 8th, when the breathing became difficult. Fig. 1 represents the tumour



Fig. 1.—Cancer of Right Tonsil. Louisa T., aged 64 years.

as it appeared on that day. The gland below the angle of the right side of jaw was bigger, very hard, and immovable. Pain only in the vertex. Pulse 120, and small. Ordered to breathe the vapour of bromine mixed with steam from hot water.

15th Nov.—Tumour deeply ulcerated on its surface.

11th Dec.—The tumour gave way, and, according to the nurse,

some pus was discharged. An extensive chasm was formed thereby. Barely a trace of the soft palate was to be seen, and the right tonsil had completely disappeared. Pulse 110, and very small.

15th Dec.—The voice and hearing had improved since the tumour gave way. The pharyngeal excavation enlarged by ulceration. The spinal tumour, which had appeared to be continuous with the tonsillitic one, was again visible. It was oval in form, and most prominent corresponding to the third cervical vertebra. Disgusting fetor from the mouth. Two or three very hard glands below the gland near the angle of the jaw. Submaxillary glandular region indurated and swollen. Pulse 116, and weak. Being annoyed by a cough, she was ordered a polygala mixture with camphorated tincture of opium.

19th Dec.—Pulse 120, and weak. The wall of the pharyngeal excavation was secreting dirty-looking matter, but fetor was subdued by a permanganate of potash mouth wash. The tumour in relation with the upper cervical vertebræ had doubled in size since the 15th. Submaxillary glandular region harder, more tumified and fixed. A small indurated gland under the skin below this part, a little above the right cornu of the *os-hyoides*. Voice and hearing improved.

23rd Dec.—Features more pinched. The ulcerated margin of the excavation had become of stony hardness. She suffered greatly from thirst.

27th Dec.—Skin icteroid in colour, and there was a good deal of discharge from the left nostril.

5th Jan.—Pulse 130. Countenance more anxious. Eyes and cheeks sunken.

11th Jan.—Pulse 124. Was seized with a rigor the previous night, which was followed by a very hot skin. Left cheek wore a hectic blush. Tongue dry and brown, but she was unable to protrude it. Great pain in the cervical vertebræ when the neck was stirred.

12th Jan.—She was suddenly seized with hæmorrhage at one o'clock a.m. The blood flowed from the nostrils and mouth. It also passed into the larynx and trachea, causing almost instantaneous suffocation.

Previous to the *post-mortem* examination, I thought it possible that the oval tumour might have been a post-pharyngeal abscess. It proved, however, to be a semi-solid tumour, and was amalgamated with the upper constrictors of the pharynx.

I regret that I was unable, for reasons unnecessary to mention, to make a careful microscopic examination of the parts engaged in the disease, and therefore must limit myself to their description as they appeared to the unassisted eye.

The post-mortem.—The right half of the soft palate and the greater part of the uvula had disappeared, the remainder of the uvula being attached to the left half of the soft palate.

There was not a vestige of the right tonsil or of the right palato-glossus and palato-pharyngeus muscles. On the ulcerated floor of the excavated tonsilic space several arteries were exposed, one of which, a little larger than a crow quill, had been opened by ulceration, and was the source of the fatal hæmorrhage. Contiguous to these vessels there were several indurated glands, the largest having a long diameter of half an inch.

In front of the bodies of the first, second, and third cervical vertebræ there was an oval firm swelling, its greatest diameter being three-quarters of an inch. This tumour was amalgamated with a portion of the superior constrictors of the pharynx. The upper portion of the superior constrictor to the right of the swelling was destroyed by ulceration.

The cervical vertebræ were healthy, excepting the anterior lips of the superior articulating surfaces of the atlas, which were slightly carious. Nearly all the circumference of the right condyle of the occipital bone was stripped of cartilage, and the condyle itself was rarified and undermined by carious action. A very small portion of the left condyle of this bone was still continuous with the process from which it sprang; the remainder of it was detached and reduced in size by caries, a few fibrous bands forming its only connexion with the bone.

The margin of the foramen magnum anterior to the condyles was roughened by commencing caries, and the same action destroyed the lower half of the basilar process.

Although Louisa T. at an early period of her clinical history had symptoms that might be referred to irritation of the spinal cord, yet they rapidly subsided, and she enjoyed "good health" for some time. The next symptom was the enlargement of the right tonsil, and this was followed by symptoms again referable to irritation of the upper portion of the spinal cord.

Bearing in mind the history of the tonsilic enlargement, its stony hardness, the stony hardness of many of the glands in the neck, the stony hardness of the margin of the pharyngeal

excavation, the complete destruction of the tonsil and of half the soft palate, I have been led to believe that the tumour formed by the tonsil was a malignant one, in which suppuration had occurred when it was fully developed.

Double Complicated Hare-lip; Failure of Union from first Operation; Subsequent Partial Union by Granulation; Excellent Results from second Operation by Langenbeck's Method.

There are few surgeons of experience in hare-lip operations who have not occasionally had cases of hare-lip in which there was failure of union after one or even more operations. To me it is surprising that writers who have met with cases of this kind should have so frequently confined themselves to the reporting of those in which union occurred, and have withheld all information regarding the others.

Acting upon the principle that it is our duty to lay before the student the shortcomings as well as the triumphs of nature, I record the following case, in which, from some mysterious cause, she failed to assist art after a first operation; but successfully and rapidly assisted our efforts after the second.

CASE.—Mrs. B. brought to me her infant Charles, aged five weeks, to have its hare-lip remedied by operation, which she wished to have performed at once, the deformity being to her eyes so hideous.

The labial and osseous tubercles, formed by the intermaxillary bone and the central portion of the lip, projected obliquely from the tip of the nose, and were twisted to the left side, exposing the deep oral chasm, and hiding from view almost the whole of the left half of the lip (Fig. 2).

The nasal septum was obliquely directed to the left side, thus giving the oblique direction to the tubercles attached to it.

The hard palate and the velum being engaged in the division, the buccal region, nasal fossæ, and pharynx formed a single, relatively speaking, large cavity.

Suction being impossible, spoon-feeding was substituted for it; a troublesome process, on account of the upward regurgitation of the food.

The child seeming to be in good health, I performed the operation, assisted by my colleagues, on the 27th November, 1869. It was then six weeks old.

Having dissected the labial tubercle off the osseous tubercle, and

partially divided the neck of the latter with one of Butcher's cutting hare-lip forceps, I forced this tubercle into its normal position between the separated maxillæ. It was not deemed advisable to pare its sides or those of the maxillary gap, the tubercle being merely sufficient to fill it.

The sides of the labial tubercle having been pared to a triangular shape, with its base above, and each side of the lip "freed," the edges of the cleft were then pared to the ordinary curves. They were brought and maintained together with a couple of twisted sutures. However, before the uppermost needle was inserted, the labial tubercle was pushed upwards that the tip of the nose might be depressed as little as possible, and that it might also assist in forming the lower part of the nasal septum. Its apex was secured between the edges of the cleft by the upper needle. The red edges of each side of the lip were secured in contact with a very fine silk interrupted suture. Collodion was applied to the lip and over the sutures.

30th Nov., 11½ o'clock, a.m.—The upper needle passage was widely ulcerated, and rendered the needle useless; consequently it was withdrawn. No union whatever between the edges of the cleft. I again secured them in apposition, but on this occasion with a fine silk ligature passed beyond the ulcerated needle openings. The truss known in England as Hainsby's was then put on.^a Indeed, were it not that the mother urged for an immediate operation and could not brook delay, I would have waited until I

^a Sir William Fergusson mentions that Hainsby's truss was brought under his notice many years ago by Hainsby himself, who designed it to apply to the face of his own child, who had been operated on twice unsuccessfully, once by the practised hand of Mr. Liston. Long prior, however, to the period referred to, his friend, Dr. Dewar, of Dunfermline, had advantageously applied a similar contrivance to several bad cases of double hare-lip which came under his care.—*A System of Practical Surgery*. By Sir William Fergusson, Bart. Fifth edition. London, 1870.

The hare-lip cheek compressor so ingeniously perfected by those gentlemen is a very old invention. De La Faye mentions that "Verduc and La Charrière recommend the use of a *serre tête* for approximating, by compressing the jaws, the divided soft parts and retaining them approximated; it is a kind of steel circle, slightly elastic, that ladies use. The spring was passed over the head and the two ends were applied to the jaws." He also mentions that M. Quesnay preferred whalebone. Quesnay, instead of passing the whalebone over the head, adapted it to the nape of the neck, the ends being applied to the lip at the alæ of the nose. He assisted the action of the whalebone with plaster and bandage. Quesnay cured a hare-lip with his apparatus, in which one of the needles had failed, and left at the lower part of the cleft a tear scarcely allowing of the insertion of another needle.—*Mémoires de l'Académie Royale de Chirurgie*. Tome Premier. A Paris, 1761.

had procured my truss, which had been mislaid. However, as the result proved, it was powerless in favouring immediate union after this operation.

2nd Dec.—Union had also failed to take place between the lower portions of the sides of the cleft. The lower needle, likewise, had lost its command over the lip from ulceration of its passage. I removed it and brought the edges together with a silk interrupted suture. The use of the truss was continued.

4th Dec.—The ligatures had lost command of the lip from rapid ulceration of their tracks. It was now ascertained that union to the extent of only the eighth of an inch had occurred between the left half of the lip and left side of the labial tubercle. The intermaxillary bone remained between the upper maxillæ.

Four soap plaster straps of sufficient length to allow of their terminating on the cheeks, and having a width of half an inch, excepting where they crossed the lip, and were reduced to a width of a quarter of an inch, were applied in the following way:—The centre of each strap was applied to the lower and back part of the head, from which the downy hair had been removed, and the ends were brought forward so as to cross one another over the cleft, and with traction sufficient to bring its edges together. The use of the truss was continued. After the case had been managed thus for a few weeks, the lower portion of the left side of the labial tubercle, which had ascended a little, completed its union, by means of the granulating process, with the corresponding part of the left edge of the cleft. In January, 1870, the case was in this way reduced to a single cleft at the right side. The intermaxillary bone had cut an incisor tooth, which, projecting forward and irritating the lip, was extracted. In consequence, however, of the almost complete failure of primary union, I determined to postpone operating upon the remaining cleft for a few months. The child, accordingly, returned to the country with its mother, who was instructed to apply the truss for a few hours every day, with the view of partially closing the cleft by its action upon the cheeks, and thereby place the lip in a better condition for assisting the sutures of the second operation.

6th June, 1870.—I operated by Langenbeck's method* on the

* This is a modification of Malgaigne's operation, which consists in separating a strip from each edge of the cleft by carrying two incisions from above downwards, towards, but not through, the free margin of the lip. The two upper thirds of the strip are then cut away, and the lower third pressed downwards and united, forming

lip. The left edge of the cleft was simply pared as he directs, and the right edge was cut after Malgaigne's plan. The straight edges of the cleft were retained in apposition with a couple of twisted sutures, and the little piece of lip was secured with a fine silk ligature to the refreshed curved portion of the left side of the cleft. Those steps were barely completed when breathing became difficult, the skin livid, then pallid, and death by apnoea seemed so imminent I at once removed the needles. The smallness of the oral opening, combined with rigidity of the lip from the presence of the twisted sutures, caused those alarming symptoms.

In a few moments after removal of the needles, and the front of the chest had been rapidly rubbed, breathing became again natural, and I was enabled to substitute two silk interrupted sutures for the needles. The truss was then applied.

Immediate union followed the operation, but the truss was used for some days until the cicatrix became very firm.

In August, 1871, I had a drawing (Fig. 3) made of the child's face by Mr. Burnside. It shows an unflattened nose, which I attribute to the gradual ascent of the labial tubercle during the granulating process. Notching has been prevented by the projecting downwards of the little flap brought over from the right edge of the cleft to the part of the left edge that had been prepared for its reception.

The great improvement in the appearance of the child is still more evident when it laughs, for then the central downward projection is very distinctly seen. The upper jaw-bones have come together, the intermaxillary bone being situated between them in front. They have (26th Aug., 1871) cut two teeth, one being just at each side of the intermaxillary bone, but the latter has not cut another tooth since the one that was extracted. The lower jaw has cut six teeth in front. The voice is so improved that the child is beginning to articulate distinctly.

a projection downwards. The objection is, that infants are apt to suck at the small protuberance remaining at the inferior angle of the united fissure, and loss of blood may thus take place. The method of Langenbeck, as Mr. Samuel Lane observes, is perfect in this respect, especially when the fissure is lateral. One side is pared simply, the lower end of the cut curving outwards; the other side is pared almost after Malgaigne's method, and the lower free border, which is not removed, passes over the median line for some distance, and is united with the opposite border. The cicatrix is thus vertical at the upper part and oblique at the lower part, and no contraction of the cicatrix can lead to notching or indentation of the free border of the lip. —Cooper's Surgical Dictionary, eighth edition, Vol. i., p. 870.

Both foreign and English surgeons are much divided in opinion as to the most suitable age for the performance of the hare-lip operation; and some of those who advocate the operation soon after birth in single hare-lip, recommend delay when there is the double deformity.



Fig. 2.—Charles B. previous to operation.



Fig. 3.—Charles B. after second operation.

Non-union after operation, for aught I know, from the absence of positive information on the subject, may be equally frequent

in the ordinary varieties of hare-lip. Sir William Fergusson speaks of non-union only in the single cases; but it is probable his observations are intended to apply to both kinds of cases. "In general," he says, "there is little trouble with single hare-lip, although every now and then, either from scantiness of tissues, or from some more incomprehensible cause, the union is not accomplished."^a

For my part, when the general health of the child appears good, I am inclined to think the operation, even in the double complicated cases, should not be delayed many weeks after birth, and for the following reason:—

Dieffenbach has observed, and in this he appears, according to Mr. Lane, to have been confirmed,^b that more infants are born with double than with single hare-lip; and that the fact of more single than double hare-lip operations being recorded is accounted for by the great mortality in the double cases. This mortality may, to a great extent, be referred to the largeness of the chasm or oral cavity allowing, in the complicated cases, of unwarmed inspired air to pass too freely to the lungs. To my mind this is a cogent argument in favour of early operation in complicated cases, where fatal chest affections, for the reason just mentioned, are so liable to happen.

Amputation by the Circular Method at the Junction of the Middle with the Lower Third of the Thigh; Femoral Artery compressed with the Tubular Presse-artère, one vessel twisted; Carbolic Acid Treatment of the Stump; Recovery; Rapidity of Iodine Absorption.

The notes of this case I record because it was the first in which I used the *presse-artère* on the femoral artery. It may, moreover, be of use statistically in the question as to the comparative safety of amputations through the thigh; at the knee; and excision of the knee-joint.

CASE.—Charles A., aged thirty-one years, was admitted into the Adelaide Hospital, on the 31st May, 1870.

Five years previously an abscess formed in the right side of the neck, and was opened. The sac eventually closed. His health was so far restored, that he remained well for three years, when the right elbow-joint inflamed, suppurated, opened spontaneously,

^a Cooper's Dictionary, p. 501.

^b Ibid., p. 868.

and discharged pus for eighteen months. It then ankylosed. Not long afterwards the right knee became excessively painful, and when moved was the source of intense agony.

Repeated blistering does not appear to have had any influence in arresting the articular disease, for it steadily progressed and caused such impairment of health that he sought for hospital relief.

He had on admission nocturnal perspirations, a rapid pulse, and he was very thin. The kidneys were healthy.

The right elbow-joint was ankylosed nearly at a right angle. The upper two-thirds of the calf of right leg were swollen from the presence of an abscess that was pointing internally. The right knee was enlarged, globular in shape, and fluctuated. The tibia and fibula were partially dislocated outward and backward, the thigh and leg forming an angle, salient internally at the knee. Very slight flexion of the joint caused great suffering; but he could, by means of a sling, and by using great caution, raise the limb *en masse* from the bed.

I opened the abscess at the inner side of the calf and discharged a large quantity of grumous matter.

Ordered cod liver oil; a mixture of infusion of quassia with sulphate of iron; full extra diet.

4th June.—Sweating having increased, the quassia mixture was changed for one containing sulphate of quinine with an excess of dilute sulphuric acid.

6th June.—The pulse had become very frequent.

7th June.—Erysipelas appeared upon the right leg and the lower half of the thigh, and may have been the cause of the sudden rise in the pulse. The redness had not a defined margin. The erysipelatous parts were much swollen, and there were three or four large bullæ, with amber-coloured contents on the inside of the leg; the abscess discharged profusely; fluctuation in knee was more decided; pulse 140; tongue natural. Ordered 8 ozs. wine; XX porter; twenty drops of muriated tincture of iron every second hour instead of the quinine mixture.

8th June.—Pulse 140; skin hot; tongue natural; erysipelatous redness fading; much grumous discharge from the calf. Knee-joint very distended and painful; I opened it, and gave exit to the characteristic matter of struma—viz., the whey-like fluid with flakes of pus. Ordered Liebig's meat essence and whiskey gruel. The joint to be poulticed.

9th June.—Pulse 112; tongue natural; erysipelas more faded;

and the bullæ had broken and dried; knee not so swollen; I opened another grumous abscess that was in the calf of the leg.

10th June.—Pulse 104; tongue natural; erysipelatous redness had nearly disappeared; a good deal of grumous fluid with curdy flakes was coming through one of the openings in the leg; startings of the limb when he was falling to sleep. Same treatment, with the addition of an anodyne nightly.

11th June.—Pulse 130; profuse grumous and purulent discharge from the leg. Wine increased to 10 ounces. Whiskey gruel as usual.

12th June.—Pulse 128; tongue natural; discharge from the leg still profuse but not so grumous; the erysipelatous induration of the thigh less. Recurrence of night sweating. I syringed the abscess cavity with Condyl's fluid.

13th June.—Pulse 113, a degree fuller; tongue continued natural; abscess cavity treated in the same way. Diet and medicine continued.

14th June.—Pulse 104; tongue natural; abscess sac syringed with carbolic acid, glycerine, and water. Same diet and medicine.

17th to 20th June.—Pulse 120; decrease of suppuration. Nightly recurrence of perspiration. Ordered, instead of the muriated tincture of iron, a mixture of sulphate of quinine, sulphate of iron, dilute sulphuric acid, and water.

23rd June.—The greater portion of the leg, and the knee-joint, being to all appearance disorganized, my colleagues agreed with me in opinion that amputation should be performed at once, notwithstanding the persistence of the erysipelatous induration.

I amputated by the circular method, during chloroform anæsthesia, at the junction of the middle with the lower third of the femur. Two arteries only required hæmostatics—the femoral and a smaller vessel. To the femoral I applied my tubular *presse-artère*, and I twisted the other artery. The edges of the wound were secured together by twisted sutures, the needles being long. The end of the stump was covered with a thick layer of carbolic acid cream.* When in bed he was given a full opiate, and the usual mechanical precaution was taken to prevent “stump startings.” Ordered to have 12 ounces of wine and 2 ounces of whiskey in the 24 hours. Full diet, with Liebig's essence, and an egg.

24th June.—Pulse from 96 to 108; tongue natural; end of

* For its composition see the November number of this Journal, 1869.

stump syringed with carbolic acid, glycerine, and water. It was then covered with the carbolic acid cream. Ordered a mixture of infusion and tincture of cinchona, with tincture of veratrum viride. Same diet.

25th June.—Pulse 96 to 104; tongue natural; neither fetor nor discharge from the stump; *presse-artère* in its place. Stump managed in the same way. Mutton chop added to his diet.

26th June.—Pulse 96 to 104; tongue natural; no suppuration; two-thirds of the cut skin agglutinated. Stump syringed with carbolic acid, glycerine, creasote, and water, and then covered with the carbolic acid cream. Same diet and medicine.

28th June.—Pulse 112; I removed, without loss of blood, the *presse-artère* off the femoral artery, being the 122nd hour since the amputation. Two of the twisted suture needles were likewise removed. Stump treated in the same way.

30th June.—Pulse 112; stump more consolidated; suppuration in small quantity from the granulations at the margin of the stump wound, and yet this was the part to which the carbolic acid was almost uninterruptedly applied.

4th July.—Slight suppuration from one of the needle holes. Same management of stump.

16th July.—Pulse 90 to 104; no suppuration since the 4th.

17th July.—Pulse 104; suppuration in small quantity from the inner end of stump wound.

18th July.—Suppuration barely perceptible; he was so improved in general health the wine was reduced to 8 oz. daily.

25th June.—Out of bed every day since the 21st; a small abscess was forming at the inner end of stump cicatrix.

26th July.—Pulse 100; the abscess opened spontaneously.

5th Aug.—Pulse 90; the stump being healed he was sent to the Stillorgan Convalescent Home, where he remained a month.

As soon as the stump had ceased to waste, a pin-leg was procured for him, and he returned home in excellent condition and spirits.

If it be true that a relationship exists between erysipelas and blood poisoning (pyæmia?), the escape of the patient from septic contamination of the system is remarkable, the erysipelatous infiltration of the soft parts implicated in the operation being at the period of its performance only partially absorbed. We had no choice, however, unless amputation at the hip were performed, which we did not consider justifiable. Moreover, he appeared to

be in a state so critical as not to warrant a further postponement of the operation.

I need not fully detail the condition of the knee-joint, and will merely observe that the articular surfaces of the patella and tibia were completely deprived of cartilage, as well as those of the femoral condyles, with the exception of a small portion of the inner condyle. Stalactitic deposits were developed on some parts of their denuded surfaces. They were rarified internally, and resembled coarse sponge in appearance. Two openings in the outer condyle led to cavities in the rarified bone tissue. The femur was diseased for three inches and a-half from the surface of the condyles upwards.

The front half of the outer condyle of the tibia was disintegrated and partially removed. This part communicated with a small cavity in the diseased condyle. Indeed the whole thickness of the bone was diseased down to the tuberosity, which was itself enlarged by "pumice stone" deposit.

The muscles of the calf were disorganized from the knee to near the tendo-achillis.

Experimental Testing on the Rapidity of Iodine Absorption.

Charles A., the above patient, re-appeared at the hospital on the 27th April, 1871, with a large abscess partly corresponding to the site of the right great trochanteric bursa. It was unconnected with the end of the stump. When opened, a large quantity of synovia-like fluid, mixed with pus, was discharged. He suffered from night perspirations, and the pulse ranged from 90 to 112.

After he had been a little time in hospital I commenced injecting the sac with tincture of iodine, and tested the urine to ascertain how soon the iodine could be demonstrated in it.

The re-agents employed were starch and nitric acid.

The urine was tested immediately after each injection; but I will give only the particulars of the occasion on which the iodine was soonest detected in it.

A catheter having been passed into the bladder, one of our pupils held the handle, and occluded the orifice with one finger, that there might be no delay in withdrawing the urine required for each testing. The abscess sac was next injected with $1\frac{1}{2}$ ounce of tincture of iodine.

The first indication of the presence of the iodine in the urine was not apparent until 30 seconds after the injection. In one

minute the violet reaction was more decided; and in one minute and a half it was very decided.

The iodine sometimes rapidly disappeared from the urine. For instance, on one occasion, the violet reaction was extremely decided the fourth minute after the injection, and in one minute more not a trace of iodine could be detected.

The local treatment of the sac with the tincture of iodine caused an apparent diminution of its area. The patient's general health, notwithstanding, appeared to suffer from the hospital atmosphere, and he was sent to the Convalescent Home, whence he returned to his residence in the country.

AMPUTATIONS AT THE KNEE.

The amputations by long anterior flap at the knee-joint, through the femoral condyles, and immediately above them, having received a good deal of attention within the last few years, it may not be out of place to prelude the case of amputation through the condyles, herein described, with a few observations on the history of the long anterior flap amputation of the thigh; the long anterior flap principle having been applied to amputation of the thigh by Benjamin Bell, whose name in connexion with it has been ignored by some recent surgical writers.

Amputation of the thigh by anterior single flap^a being to some extent identified with the Irish School of Surgery—Bell having graduated in the Dublin College of Surgeons—is a further incentive to these observations.

It is but just to mention that Sédillot, several years ago, recognized the value of amputation by single flap, and connected Bell's name with it. Sédillot, however, wrote in favour of generalizing this method, applied by Bell to the thigh only.

In the year 1788 Bell described in the sixth volume of his "System of Surgery," the amputation above the knee by anterior single flap.^b Whether or not he took the hint from James Young's single skin flap operation, published by him in 1678, and which he himself had from Lowdham, whose first flap amputation was by single flap at the leg, I cannot, of course, conjecture.

^a Benedict, Textor, and Jaeger formed, in thigh amputation, the single flap from the outside; Zang and Textor from the inner side; Hey and Little (Sligo) from behind.—Chelius, *System of Surgery*. By John F. South. London, 1847. Vol. ii., p. 909.

^b Le Gras and Fouillay, also, advocated amputation of the thigh by anterior single flap. They were preceded by Bell.—Chelius, *ibid*.

Bell describes the anterior single flap amputation of the thigh as follows:—

“ The patient being placed upon a table, the tourniquet being applied in the usual way at the top of the thigh, and the teguments drawn firmly up and retained by an assistant, the extent of the intended flap should be marked with ink.

“ The extreme point of the flap should reach to the end of the limb, unless the teguments be in any part diseased, in which case it must terminate where the disease commences, and its base should be where the bone is to be sawn. This will determine the length of the flap; and we must be directed with respect to the breadth of it by the circumference of the limb; for the diameter of a circle being somewhat more than a third of its circumference, although it may not be exactly circular, yet, by attention to this circumstance, we may ascertain with sufficient exactness the size of a flap for covering a stump. Thus, a flap of four inches and a quarter in length will reach completely across a stump whose circumference is twelve inches; but as some allowance must be made for the quantity of skin and muscles that may be saved on the opposite side of the limb, by cutting them in the manner we have directed, and drawing them up before sawing the bone, and as it is a point of importance to leave the limb as long as possible, instead of four inches and a quarter, a limb of this size, where the first incision is managed in this manner, will not require a flap longer than three inches and a quarter, and so in proportion according to the size of the limb. The flap at its base should be as broad as the breadth of the limb will permit, and should be continued nearly, although not altogether, of the same breadth to within a little of its termination, where it should be rounded off so as to correspond as exactly as may be with the figure of the sore on the back part of the limb. This being marked out, the surgeon, standing on the outside of the limb, should push a straight double-edged knife with a sharp point to the depth of the bone, by entering the point of it at the outside of the base of the intended flap, and carrying the point close to the bone, should push it through the teguments at the mark on the opposite side. The edge of the knife must now be carried downwards in such a direction as to form the flap according to the figure marked out, and, as it draws towards the end, the edge of it should be somewhat raised from the bone, so as to make the extremity of the flap thinner than the base, by which it will apply with more neatness to the surface of the sore. The flap

being supported by an assistant, the teguments and muscles on the back part of the limb should, by one stroke of the knife, be cut down to the bone about an inch beneath where the bone is to be sawn, and the muscles being separated to this height from the bone with the point of the knife, the soft parts must all be supported with the leather retractor till the bone is sawn."^a

Sédillot, as I have mentioned, considering that amputation by single flap has many advantages, generalized this method,^b and, though not an advocate for the knee-joint amputation, agrees with those who recommend the formation of a long thigh stump. He speaks of the benefit to be derived from covering the stump with the integuments of the knee in amputation immediately above the condyles, an operation advocated also by Malgaigne.^c

I cannot join Sédillot in his disparagement of the retention of the patella in this amputation. The idea of applying the patella to the sawn extremity of the femur in amputation just above the condyles he attributes to Seymanowski, who "has proposed to saw the articular surface of the patella, and apply it against the divided extremity of the femur, without touching the tendon of the triceps, to better secure direct sustentation upon the stump. This procedure," he goes on to say, "an imitation of that of Pirogoff, does not appear to us to deserve much confidence, but the idea is very ingenious."^d

Unlike the portion of os calcis retained in Pirogoff's amputation—an operation, by-the-by, it is said he relinquished—there is, if we may judge by the recorded cases in which the patella had been retained, but small risk of its becoming diseased.

The long anterior single flap, or the long anterior and short posterior flap amputations through the condyles, with retention of the patella, should, when practicable, have the preference over Syme's modification of Hoin's method, for they present the triple advantage of forming a wound, the opening of which is narrow and of easy re-union, of placing the cicatrix quite behind the member, which secures it from injury, and, finally, of covering the condyloid extremity of the femur with the integuments of the anterior part of the knee, which are thick, hardened by habitual pressure, and

^a A System of Surgery. By Benjamin Bell. Edinburgh, 1788. Vol. vi., p. 398.

^b Recherches sur les moyens d'assurer la réussite des amputations. 1848.

^c Manuel de Médecine Opératoire.

^d Mr. William Stokes has had four successful cases of Seymanowski's operation.

better disposed to support the weight of the body.^a The long posterior flap method, on the other hand, leaves a cicatrix that is liable to be drawn under the end of the bone, the worst possible position for it, and the thin skin of the calf is not so well adapted for direct sustentation as the natural kneeling skin of the front of knee.

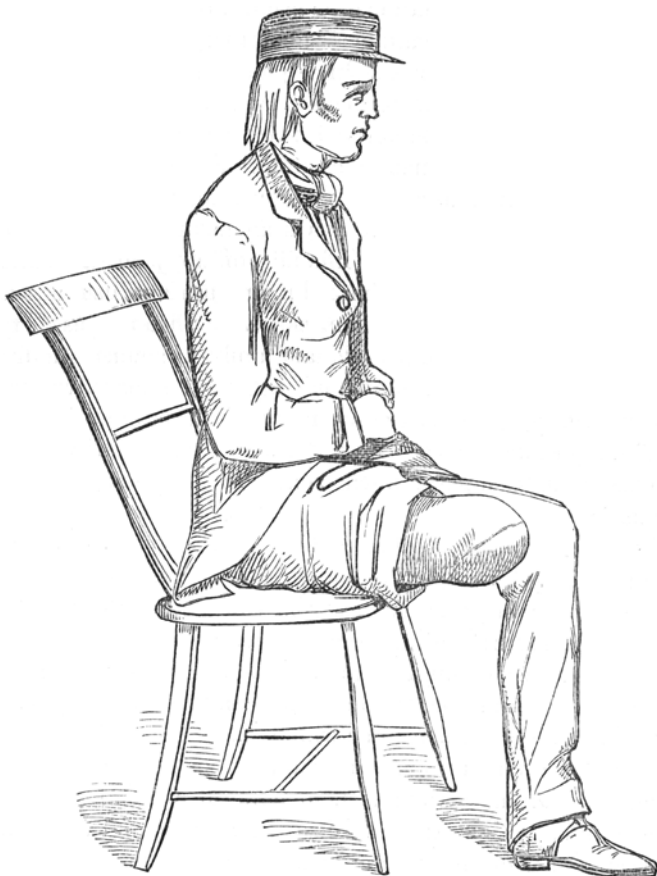


Fig. 4.—Amputation through the Femoral Condyles, and by long posterior and short anterior flap. William Udhe, aged 20 years.

In the thirtieth volume of this Journal^b I recorded a case in which I amputated, in the Adelaide Hospital, through the femoral

^a *Traité de Médecine Opératoire Bandages et Appareils. Par le Docteur C. H. Sédillot. Troisième édition. Tome Premier. Paris, 1865. Page 451.*

^b 1860. Page 318.

condyles, and by long posterior and short anterior flap, without retention of the patella (Fig. 4). Shortly afterwards Mr. John Morgan, then my colleague, performed two similar amputations in the hospital. The three patients made rapid recoveries. But I now think, for the reasons given in this communication, that amputation by single long anterior flap, or by long anterior and short posterior flap, at the knee, through the condyles, or immediately above them, should have the preference. The double flap operation is probably the better of the two, the great length of the single long anterior skin flap rendering its chance of sloughing greater than the shorter (but still long) flap of the double flap method.

The operation by single anterior, or rather anterior skin flap, is attributed to Mr. Carden.^a Be this as it might, James Young's single flap operation was a single skin flap amputation; and in Bauden's elliptical amputation at the knee, the flap is an anterior skin flap taken from the front of the knee and leg.^b The operation by single anterior, or, as Sédillot calls it, superior flap, we may again remind the reader, he endeavoured to generalize in 1848, and, curious enough, his description of its advantages is very similar to the observations of Mr. Carden in favour of the single skin flap. "I call anterior flap," Sédillot writes, "that which is cut in such a manner as to be over the stump during the treatment of the wound. It might also be named superior, which is of little consequence, when we understand the indication to be fulfilled—indication which consists in having a flap that falls over the stump by its own weight."^c Sédillot's mortality from this method has been low. He does not form the flap in every case of skin only, but sometimes cuts a mixed flap, taking care to avoid having too great a thickness of muscle in it. "We seize widely," he directs, "the soft parts of the anterior aspect of the member, and we cut semi-circularly the integuments by an incision which comprises almost the two anterior thirds of the circumference of the thigh, and which ascends sufficiently high at each side that the flap may have a length equal to the third of the diameter of its total circumference. We raise the skin by drawing it *en masse* with the right hand, and we cut the muscles obliquely from below upwards and from before backwards, in order to

^a On Amputation by Single Flap. By Henry D. Carden, Esq., Worcester. British Medical Journal for April 16, 1864, p. 416.

^b Sédillot. Ibid., p. 451.

^c Traité. Ibid., p. 336.

avoid preserving too great thickness of them in the flap. As soon as the deep muscles have been separated from the femur, we divide perpendicularly the integuments and muscles at the posterior part of the member, and we complete the amputation on dividing the bone to the extent of a few *centimètres*,^a to prevent its prominence at the posterior part of the wound."^b This amputation differs but little from B. Bell's. Indeed, the same might be said of Teale's amputation; for, with the exception of the rectangular shape of the flaps, it also is almost a counterpart of Bell's amputation. The dissecting of the muscles from the bone to the extent of an inch by Bell, before the application of the saw, renders the similitude still more striking, a short flap being the practical result of this manœuvre.^c

In many of the cases of amputation at the knee collected and recorded by Mr. Markoe, who has given much attention to this operation, the flap methods most frequently followed, were—(1) The long anterior flap and short posterior flap; (2) The long posterior flap and short anterior flap; (3) The single flap; (4) The lateral flaps.

The circular operation was performed in a few of the cases.^d

Mr. Markoe's observations as to the most suitable cases for amputation at the knee are so much to the point and so thoroughly practical, it may not be inappropriate to introduce them here for the benefit of the junior reader.

According to him the operation is suitable in "all such injuries of the leg as approach so near the knee as to preclude amputation through the leg; all such diseases of the bones of the leg as, without involving the knee-joint, leave no sound portion of tibia available for a stump; and, lastly, a certain number of cases of diseased knee-joint, when there is reason to believe that the end of the femur is but little affected by the destructive actions."^e . . . In cases, on the other hand, where the bone tissue is infiltrated with the strumous products of long continued disease, or where the ravages

^a A centimetre is equivalent to three-eighths of an English inch.

^b *Traité*. *Ibid.*, p. 454.

^c Mr. Wharton, President of the Royal College of Surgeons, has proposed, in the number of this Journal for November, 1868, that Teale's posterior flap should be relinquished, thus rendering the operation an amputation by single rectangular flap. This operation has been performed several times with success in Dublin. *Vide Medical Press and Circular* for 24th May, 1871.

^d *New York Medical Journal*, Vol. vi., 1868, p. 485.

^e *Ibid.*, p. 512.

of inflammation have reached parts far distant from the articular surfaces, or where the soft parts covering the joint are too much involved in the destructive process which has been going on, then the idea of amputation at the joint should be at once abandoned."^a

In doubtful cases the value of anæsthetics cannot be overrated. We are enabled, with their assistance, to explore the joint with impunity at the time of operation, and to decide upon the procedure most suitable when it is laid open and the exact condition of the bones ascertained, the delay being of little moment during the anæsthesia.

In the greater number of the cases given by Mr. Markoe, the amputation was by long anterior and short posterior flap. In some, in which there was no choice, a circular incision was made, and in others very irregular incisions. He, at the date of his paper,^b seemed inclined to prefer the bilateral flap amputation,^c an operation, in our opinion, warranted only in cases in which the condyles are not sawn, and which, according to him, shield, by their projection, the central antero-posterior cicatrix from the risk of pressure.

It cannot be too often impressed upon those who are about to perform the operation for the first time, to leave sufficient covering for the expanded extremity of the femur in the operation through the knee, and even through the condyles. "A miscalculation is easily made on this point, and it is one so vital that the greatest care should be exercised."^d In the single flap, whether anterior or posterior, great length is necessarily given in order to cover the large expansion of the condyles. That this great length is a disadvantage, the numerous examples of sloughing afforded by the records most clearly show. . . . But, whatever operation be selected, let it never be forgotten, that more flap is necessary in this than in any other amputation; and that a prime requisite of success is that the end of the bone should be covered fully, easily, and without tension."^e

Mr. Markoe is in accord with those who advocate the retention of the patella in amputation through the knee, and has not found it give any trouble when drawn upwards in front of the anterior surface of the femur.

He is opposed to the removal of the cartilage from the condyles when it can be preserved, and in no case has he seen anything unfavourable follow from leaving it.

^a New York Medical Journal, Vol. vi., 1868, p. 515.

^c Rossi and Dr. Stephen Smith.

^d Ibid., p. 516.

^b Ibid.

^e Ibid., p. 518.

A curious result has followed Mr. Markoe's analysis of the cases of knee or of condyloid amputations mentioned in two of his papers on the subject (seventy-three cases), cases that occurred in "American hospitals and private practice." Of these twenty-five died, "making the rate of mortality on the whole number thirty-four per cent." . . . Whereas, "in 987 instances of amputation of the thigh, collected from all sources, hospital and private practice, 435 died, a mortality of forty-four per cent., making a difference on the whole number of cases of ten per cent. in favour of the knee-joint amputation. . . . A more precise comparison would be instituted by taking the cases occurring in one institution, when the conditions might be supposed to be nearly identical. Thus taking the recorded cases of amputation of the thigh at the New York Hospital, from the year 1864, we have a total of sixty-one amputations and thirty-three deaths, or fifty-four per cent. Of the knee-joint amputations we have thirty-nine operations and twenty-one deaths, a mortality again of fifty-four per cent., exactly the same as the mortality of amputations of the thigh."^b

Surgeons differ as to the mode of dealing with the tendon of the rectus when the object is to procure ossific union between the patella and the cut section of the femur. The practice which I follow seems to me most calculated for favouring this desirable result.

The sections of the femur and patella having been made with the saw, I prefer dividing the tendon of the rectus muscle. For when the patella is applied to the cut end of the femur, it forms a right angle with the femur, thereby greatly increasing the leverage of the muscle, and consequent risk of displacement of the patella from its new position, unless the tendon is divided.

It may be said that the division of the tendon lessens the command over the stump. This is not apparent in the following case, the girl having, comparatively speaking, great power over it. The origins and insertion of the rectus muscle being more or less approximated by the shortening of the femur in the condyloid and supra-condyloid operations, the section of the tendon may, after all, be of little consequence as regards the function of the stump; whereas, if the tendon is not divided, the chance of displacement of the patella, while ossific union is in progress between it and the

^a He has recently added to the number 91 cases, making altogether 164 cases, of which 53 died, giving a mortality of 35.31 per cent.

^b *Ibid.*, p. 508.

femur, is much increased. This process will be still further facilitated by cutting the bony surfaces perfectly flat and even. If the patella and femur are curved by the saw, as recommended in the condyloid operation, the area of their contact will be less than when they are cut with flat surfaces. The curving of the cut condyles has been advised, that the section may not have a sharp edge. But as the patella is the part destined for the direct sustentation, rather than incur the risk of lessening its surface of contact with the femur, I would round off with the frame saw the portion of femur projecting beyond its circumference.

The lion forceps I have found an efficacious instrument for firmly grasping the patella when in course of being sawn. By seizing the lateral edges of the bone in the two uppermost notches in each jaw of the forceps, held horizontal, it can be securely grasped, and yet allow of the removal of a sufficient amount of the articulating surface.

Amputation through the Condyles of the Femur, by Long Anterior and Short Posterior Flaps; Retention of the Patella and removal of its Cartilaginous Surface; Division of the Rectus Tendon; Tubular Presse-artère applied to the Popliteal Artery; Torsion of the smaller Vessels; Antiseptic Treatment of the Stump; Recovery.

Agnes M'K., aged twelve years, was admitted under my care into the Adelaide Hospital, on the 19th October, 1870.

In the preceding month of May she was attacked by severe pain at the inside of the left ankle, and shortly afterwards an abscess formed and opened a little above the internal malleolus, whence there was a constant discharge of matter. Other openings subsequently made their appearance between it and the knee, the highest one being close to that joint. The chief discharge escaped through the opening at the malleolus.

With the exception of poulticing she had no treatment until her admission to hospital. The left leg was then semiflexed upon the thigh, and the knee immobile from false ankylosis. Between the knee and the malleoli there were seven openings in the skin, communicating with cloacæ situated in the front and internal part of the tibia. The ankle-joint was much enlarged, and, when moved, was the seat of excruciating pain. Loose bone could be felt at the bottom of each of the three upper cloacæ. A probe could be passed directly into the ankle-joint through the lowest opening.

Percussion elicited slight dulness under the left clavicle, and was attributed by my colleague, Dr. Little, to alteration in the shape of the thorax and direction of the spine, caused by the peculiar position in which she had lain since the commencement of her illness. There was no evidence of renal disease. The pulse averaged 112.

Ordered an extra diet with wine, cod liver oil and syrup of iodide of iron.

The propriety of an immediate tentative operation for the removal of the loose bone was discussed by myself and colleagues, but, as she was much worn and debilitated, we concluded that it would be better, from the presence of the acute disease of the ankle-joint, to amputate rather than perform a partial operation.

Very slight improvement ensued upon the medicinal and dietetic treatment prescribed, and the ankle-joint pain was agonizing, although narcotics were freely given hypodermically and by the mouth.

Eventually I amputated at the knee, on 14th December, 1870, by long anterior and short posterior flaps. The anterior flap was formed of the skin of the front and sides of the knee and leg to a couple of inches below the tuberosity of the tibia. It was cut of a semilunar shape inferiorly, and was given sufficient width to cover the face of the stump. After the opening of the joint and division of the ligaments, the short posterior flap was made by cutting downwards and backwards. About an inch of the condyles was removed with the saw. The patella was next grasped with the lion forceps, and its articular surface sawn off with Butcher's saw, the blade of the saw having been previously fixed with its sides horizontal in the frame.

The rectus tendon was cut across just above the patella, for the reason I have given in the prefatory observations. My tubular *presse-artère*^a was applied to the popliteal artery, and three or four smaller vessels were twisted.

As soon as the flaps were washed with a solution of carbolic acid, creasote, glycerine, and water, they were brought together and retained in position with twisted sutures. Finally the stump was covered with a thick layer of carbolic acid cream,^b and she was

^a For the description of this instrument *vide* the Medical Times and Gazette for April 24th, 1869, and November number of this Journal, 1869.

^b The description of its composition will be found in the November number of this Journal, 1869.

given a hypnotic dose of solution of muriate of morphia. Extra diet; Liebig's essence of meat; wine, 6 oz.

The pulse rose in the evening to 120, and she was very restless. The morphia draught having been vomited, she had hypodermically $\frac{1}{8}$ gr. acetate of morphia, and $\frac{1}{120}$ gr. sulphate of atropia.

15th Dec.—Slept several hours after the hypodermic injection; pulse 145; tongue natural; appetite good; stump covered with another layer of carbolic acid cream.

To take three times daily two table-spoonfuls of a mixture composed of infusion and tincture of cinchona, with tincture of veratrum viride.

16th Dec.—Pulse 135. The hypodermic injection was repeated, and caused sound sleep. Stump syringed with a carbolic acid and creasote lotion, and then covered with a layer of carbolic acid cream.

17th Dec.—Pulse 132; tongue natural. She had a good night with the assistance of the hypodermic injection. Stump managed in the same way; ordered a purgative; chicken added to her diet.

18th Dec.—Pulse 120; tongue natural; slept well; no suppuration from the stump, which was managed in the same way. Wine reduced to 8 oz., and the cinchona mixture, with tincture of veratrum viride, was continued.

19th Dec.—Pulse 120; tongue natural. At noon I removed the *presse-artère* from the popliteal artery, being the 121st hour since its application. Not a drop of blood escaped. Some dilute sulphuric acid was added to the cinchona mixture, to check the purgative influence of the veratrum viride. Stump managed in same manner.

28th Dec.—Pulse 90. Same management of the stump, excepting that a couple of adhesive plaster straps were used to assist in maintaining the patella in contact with the femur.

5th Jan., 1871.—Stump nearly healed, and syringe discontinued. Up to this date no suppuration had taken place beneath the flaps, but matter came from the granulations uniting their margins, to which the carbolic dressing was incessantly applied, showing that here, at least, it was powerless to prevent suppuration. The patella felt firmly consolidated with the femur.

26th Jan.—Upon crutches daily since the 23rd January. The patella was immovable.

In April, 1871, I had a drawing (Fig. 5) taken of her by Mr. Burnside, who has accurately represented the shape of the stump.

I saw the girl in July, 1871. The stump was painless, bore

pressure well, and the patella was immovably fixed in its new position. The cicatrix was well above and behind the end of the bone.



Fig. 5.—Amputation through the Femoral Condyles, and by long anterior and short posterior flap; retention of the patella. Agnes M'K., aged 12 years.

It will be seen by the following description of the diseased tibia that amputation was the most likely step to afford satisfactory results in this case:—

The bone is diseased from two or three lines beneath the upper epiphysary junction to the malleoli. There is an imperfectly formed bony case, the surface of which resembles sponge in appearance, and is roughly tuberculated. Excepting anteriorly and

internally it is deficient below. It is perforated by twenty-six openings, the greater number of which are situated along its anterior and internal surface. They are very irregular in shape, one being long and oval. These openings lead down to the old shaft, which has thrown off several loose, thin exfoliations, and one tolerably long and slender piece that might be called a sequestrum. The remainder and greater portion of the shaft from condyles to malleoli is porous, spongy, and rough, and is consolidated behind for its whole length with new bony deposit. It, also, is perforated or rather riddled below with openings, two of which directly communicated with the ankle-joint, the lower epiphysis having been detached during life. The largest of these openings allows the tip of the forefinger to enter it, and matter passed freely through both from the diseased bone to the joint.

The superior articular surfaces of the astragalus are completely deprived of cartilage, and when recent the bone itself was abnormally vascular.

Fracture of Thigh Bone, and its Treatment with the American Apparatus.

Of the numerous appliances that have been invented for the treatment of fractured thigh bone there are few more capable of producing good results, with little trouble to the surgeon, than the one known to European practitioners by the name of the "American" apparatus. When it is used the thigh need not be bandaged—a most important matter in oblique fracture with overlapping fragments, for many of the muscles of the thigh are so disposed that the constriction exercised by the bandage becomes itself a cause of shortening. Indeed, the muscles of the internal and posterior part of the thigh have been compared to cords extended between their osseous attachments. The roller necessarily presses these muscle cords towards the femur, and in this way, by acting antagonistic to the extending and counter-extending forces, tends to approximate their origins and insertions, and to draw the lower fragment of the femur towards the pelvis.

It is remarkable that Nélaton,* the countryman of Desault and

* It is curious that Nélaton should have overlooked the fact that Belloq, so far back as the year 1757, described and illustrated an apparatus for acting on the same principle in the treatment of oblique fracture of the femur as the more modern American apparatus.—*Mémoires De L'Académie Royale De Chirurgie*, 1757, Tome 111, p. 235. It is for its simplicity rather than for its novelty that the American apparatus is to be commended.

Boyer, whose splints have contributed to their fame, prefers the American apparatus to the splints of those celebrated men, as well as to every other apparatus known to him, for the treatment of oblique fracture of the shaft of the femur.

The mechanism for carrying out the American method of treating fracture of the shaft of the thigh bone varies a good deal, as will be seen in Hamilton's work on "Fractures and Dislocations." I have found that Dr. Hartshorne's^a apparatus, with some modifications of my own, thoroughly counteracts the tendency to overlapping of the fragments. Its cost, moreover, is very trifling.

Dr. Hartshorne uses two splints, and dispenses with the perineal band, which I retain.

In addition to the transverse bar which carries the extending screw, his apparatus has a second bar that is connected with a foot-piece to which the foot is secured, whereas in Fig. 6 there is but one bar, that in which the extending screw plays. Dr. Chapin^b uses two separate extending screws; but one screw with a double hook acts better. Fig. 6 is then constituted as follows:—

(1.) An external splint (pine wood) of sufficient length to extend from the axilla to some inches below the foot. Its width should be such that the holes for the ends of the perineal band may not be too near one another. The holes should also be only a short distance from the upper end of the splint that the anterior portion of the perineal band may not press the groin, and favour swelling of the limb. The splint is secured to the trunk by means of a couple of saddle girth bands, each provided with leather straps and buckles, and to the short splint by three leather straps with buckles, as well as by the transverse bar. The upper end of the splint should have a cushioned cap.

(2.) A short internal splint (pine wood) to extend from the perineum to the same distance below the foot as the external splint. Its upper end should likewise have a cushioned cap. Some of the American apparatuses have no inside splint, in which case the transverse bar should be immovably fixed to the outer splint. I use, however, the inner splint, because it prevents the long one from shifting its position, and thus assists in rendering the apparatus as firm and as steady as a box splint.

(3.) A birch-wood rectangular bar of the following dimensions:—Length, 12 inches; width from before backwards, 2 inches; vertical depth, $1\frac{1}{2}$ inches. From four to six holes are drilled in it at a

^a Of Philadelphia, U.S.

^b Of Massachusetts.

distance from one another a little more than the width of the

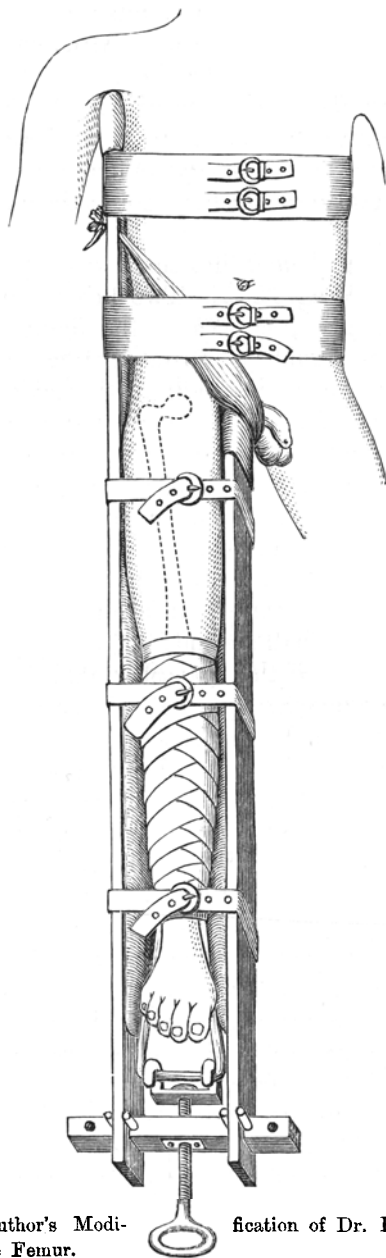


Fig. 6.—The Author's Modification of Dr. Hartshorne's apparatus for Fracture of the Femur.

modification of Dr. Hartshorne's apparatus

substance of the splints. They are for birch-wood pegs, which secure the parallelism of the lateral splints, and maintain them at the requisite distance from one another. Although not represented of this proportion in the illustration the bar should have the width from before backwards I have mentioned, to enable the male extending screw to turn steadily in it. This screw, including its ring handle, should be at least 14 inches long.

(4.) A female screw (iron) which is securely fixed in the transverse bar.

(5.) In the apparatus I used first there was but one swivel hook attached to the extending screw. Two hooks either soldered or riveted to a single plate, as seen in the figure, are preferable. Each of these hooks should be separated from one another by a space a little greater than the width of the ankle at the malleoli. The hooks form one piece with a narrow transverse iron plate, from the ends of which they rise, and which is secured to the extending screw by means of a swivel joint. It will be seen by the illustration that each side of the adhesive plaster loop diverges from the malleolus to its corresponding hook; therefore, when the extending screw is acting, the sides of the loop are prevented from unduly pressing the skin over the malleoli. On the other hand, should but one hook be used, the sides of the loop must converge to it, so that the greater the extension made with the screw, the greater the compression of the soft parts covering those processes, and the greater the risk of sloughing. To prevent this, wadding must be freely used under the strapping and a piece of wood broader than the sole of the foot secured between the sides of the loop. The double hook obviates the necessity of these precautions, with the exception of the use of wadding. This, however, is not to be used to an amount that would render the area of the adhesion of the strapping to the leg not sufficiently extensive to enable the strapping to resist the strain to which it is submitted by the action of the extending screw.

(6.) It is scarcely necessary to observe that a properly covered and stuffed perineal band, suitable pads, wadding, and scored splint form part of the apparatus.

Mode of applying the Apparatus.—Although the method of applying the adhesive plaster strapping and loop to the leg is described in Hamilton's,* and in many other works which treat of

* Ibid.

fractures, I will, nevertheless, explain it here for the convenience of the junior reader.

The limb having been sponged with vinegar diluted with water and dried, the hollows of the leg are filled with wadding. Five superimposed straps of soap plaster, having a width of two inches, and sufficient length to form an eight inch loop below the sole of the foot, are then applied to its sides. The ends of these straps should be placed at corresponding points a little above the knee at each side. The straps are secured to the leg with straps of soap plaster, according to the ordinary way of strapping.

The leg thus prepared, and the perineal band placed *in situ*, the saddle-girth straps are laid under the body, and the leather ones under the fractured limb, with the intervention of a pad long enough to extend from the buttock to the heel. The lateral splints are now applied, either wadding or pads being interposed between them and the soft parts. The transverse bar is at the same time secured by the pegs in the square openings made for it in the splints. The latter should pass a sufficient distance beyond the sole of the foot that the extending screw may be screwed home to its ring handle before it can act upon the loop. If this precaution be not taken, longer splints may subsequently be required, unless the plaster loop can be sufficiently shortened to enable the extending screw to act upon the limb. In hospital practice having to change the first applied splints for longer ones would be of little moment, but in private practice such evidence of miscalculation had better be avoided.

The ends of the perineal band when passed through the holes at the axillary end of the long splint are then tied. All the straps are next buckled.

When necessary, a scored splint and an underlying pad are to be secured on the front of the thigh by a couple of straps.

Unless the case be such as to require previous co-aptation of the fragments, this may be left to the influence of the extending screw, the hooks of which are passed into the plaster loop, the screw turned, and extension gradually effected.

A few turns of the screw morning and evening, for a couple of days, cause the patient but little annoyance, the muscles appearing

* I generally place the pad upon a splint of the ordinary thickness, and having a width proportioned to that of the limb and nearly the same length as the pad.

to offer less resistance when thus overcome than by a more rapid extension.

The following advantages may be claimed for this modified American apparatus :—

(1.) Facility of application.

(2.) Limb can be accurately measured without being disturbed.

(3.) Traction is made in the natural axis of the limb.

(4.) There being no bandages to become loose, it rarely requires re-adjustment after the first few days. It is, therefore, admirably suited for provincial practice, when, as too often happens, long distances have to be travelled, and visits at short intervals may be impossible.

(5.) Whenever the fragments are capable of being united without shortening, it is thoroughly efficient in producing this result. Speaking of the American apparatus, Nélaton says, that it has over Desault's, Boyer's, Bonnet's, Velpeau's, and Gariel's splints such a superiority, that he has cured without shortening all fractures of the body of the femur, for the treatment of which he has applied it, either in hospital or in town practice.

(6.) The expense of the apparatus illustrated in the figure is but trifling, the straps, transverse bar, and extending screw, costing only a few shillings.

The two following cases of oblique fracture of the shaft of the femur corroborate Nélaton in the high opinion he has formed of the American apparatus. They, moreover, exemplify the wonderful coincidence of accidents, similar in their nature, though unconnected with one another, that are met with at the same, or nearly the same, time in the same hospital, or in the practice of the same individual. The coincidence of unconnected, but similar, diseases I have exemplified in the November number of this Journal for 1869.^a

Oblique Fracture of the Right Femur at its Middle Third.

James M., aged forty-seven years, was admitted under my care into the Adelaide Hospital, on the 18th December, 1870.

A few hours before being brought to hospital, he, while intoxicated, had been leaning against a baluster, lost his balance and fell to the ground, a distance of about six feet. He was stunned by the fall, became insensible, but soon recovered. Our resident pupil,

Mr. Nesbit, visited Mills at 11 o'clock, p.m., and finding the shaft of the right femur fractured, had him removed to hospital.

I saw him soon afterwards. The right thigh was thickened and curved, the convexity of the curve being directed forwards and outwards, the most convex part of the curve corresponding to the middle third of the femur, where there was extreme tenderness to pressure. The foot was everted, and the limb shortened one inch and a half. Crepitus could be developed by imparting very slight motion to the member.

I placed the fractured limb in the apparatus. A piece of scored splint and pad were applied to the front of the thigh, and extension made with the extending screw, but the limb was not completely extended on that occasion.

Ordered a mixture composed of hydrate of chloral, bromide of potassium, syrup of ginger and water. Full diet with XX porter.

19th January.—The limb was in good position, but not being yet of its natural length, the extension was completed by a few turns of the screw without the supervention of pain.

His appetite being bad, he was given a gentian mixture, which, in a few days, was changed for one of quinine.

25th February, being the sixty-ninth day of the accident. The apparatus was removed, and the limb carefully bandaged from foot to pelvis. Œdema had not taken place while it was in the apparatus.

5th March.—No appreciable shortening of the limb could be detected by methodical measurement. He had been using soap liniment for the stiffness of the knee, the result of its prolonged immobility.

15th March.—He was allowed to move about on crutches for the first time since the accident, but vertigo soon compelled him to resume the sitting posture.

It is needless to give all the concluding notes of the case, and I will merely observe that after a few days walking with the crutches the vertigo ceased, and we were enabled to send him to the Stillorgan Convalescent Home. He returned in a month thoroughly restored to health, and with full power over the limb.

John M., aged sixty-five years, having been sent to me by Dr. Newland, of Kingstown, was admitted under my care into the Adelaide Hospital, on the 29th December, 1870.

He was driving a dray, on the 23rd December, when the horse

started and he was thrown to the ground upon his right side. Dr. Newland recognized the nature of the injury, reduced the fracture, and applied Liston's splint.

The man being incapacitated from earning a livelihood, expressed a wish to be sent to hospital, and was accordingly brought to us on the 29th December. During the journey to town the bandages were loosened by the jolting of the cart, and the deformity was reproduced, so that when I saw him the fractured limb was one inch and a half shorter than the left one. The thigh was thickened, very convex forwards and outwards at the middle third, the fracture being situated in this part of the bone.

Having but one extending screw and bar, and these being in use with Mills, I reduced the fracture, and re-applied the Liston's splint until the Messrs. Booth* made another screw and bar for me.

30th December.—Having removed the Liston's splint, the limb was found to have become again shortened. I put it up in the American apparatus and gradually extended it. Scored splint and pad were applied to the front of the thigh.

31st December.—Limb gradually restored to its natural length by completion of the extension.

20th January, 1871.—The thigh straps were unbuckled, and the scored splint removed that the femur might be methodically measured. No appreciable shortening could be detected.

4th April.—The apparatus was removed, being the one hundred and second day since the accident, and a roller was applied to the limb. Methodical measurement could not detect any shortening. The apparatus would have been removed several days sooner, only that tenderness in the site of the fracture persisted to near that date.

8th April.—The limb continued of its natural length, but erythematous redness of the skin of the leg and lower part of thigh having occurred, it was dusted with starch powder. He was given a mixture of infusion of quassia with iron.

4th May.—Had been moving about on crutches for some days, and was allowed to the Convalescent Home at Stillorgan.

Before he left hospital the limb was carefully measured, by Dr. Samuel Knaggs and Mr. Charles Ball, both of whom agreed that it was not appreciably shortened.

* 63, Stephen-street, Dublin.

Wathen's Cutting Forceps for Starch Bandages.

Those who have had frequent occasion to cut starch bandages with M. Seutin's^a scissors can scarcely have failed to learn practically that it is by no means a satisfactory starch bandage cutter, the bandage being liable to get partially wedged between, instead of being cut by, the blades. This defect of the Seutin scissors has led many surgeons to substitute the knife and director for it; but these also are unsatisfactory, the knife generally becoming blunt before the division is completed. An awkward slip of the knife, too, may be the cause of some unforeseen accident. For instance, the inventor of the new cutter mentions that a fellow student of his lost an eye while the bandage was in course of being cut with a knife.

In 1869, Mr. J. Hancocke Wathen, of Fishguard, Pembroke-shire, first announced in the *Medical Times and Gazette*^b the invention of the new pliers for cutting either starch bandages or glue splints; and in the number of the same journal for the following February^c the instrument is illustrated and favourably noticed by the editor.

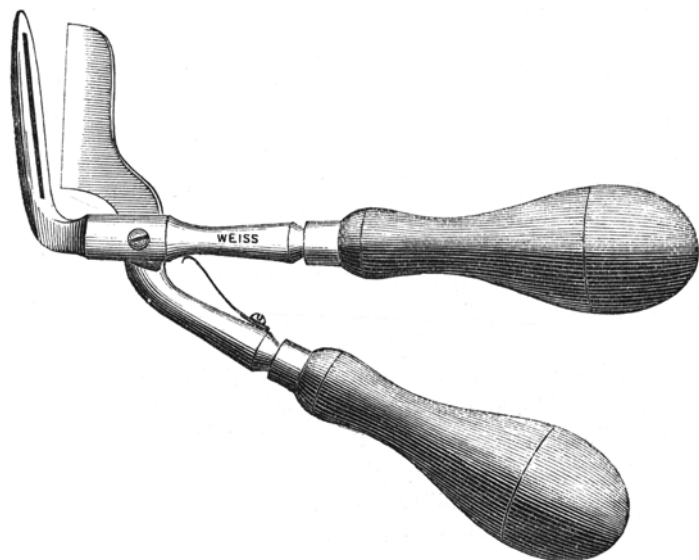


Fig. 7.—Wathen's Starch Bandage Cutting Forceps.

^a Seutin, *Traité de la Méthode Amovo-inamovible*. Bruxelles, 1849.

^b 14th August, 1869.

^c 5th February, 1870.

Having often used Mr. Wathen's instrument and found it unfailing in its action, I am led to take advantage of the following case of fracture to bring it under the notice of those who may not be acquainted with this excellent cutter. (Fig. 7).

The illustration being large and accurate, a detailed description of the instrument is unnecessary. I may observe, however, that the lower blade has a longitudinal chink cut through it. This chink or slit is a little longer than the cutting blade, and merely of sufficient width to allow the blade to enter and move easily in it. When of those proportions the bandage cannot be forced into the chink by the uppermost blade. The latter is thin, being only a little more than a sixteenth of an inch thick at the back. There should be freedom from lateral motion where its shank passes through the stem of the lower directing blade.

If the instrument be constructed of proper material—material such as Messrs. Weiss, Coxeter, or Maw would employ—it will cut with unerring accuracy.*

Since I prepared this paper for the press, Mr. Wathen has informed me that Mr. Reeves, of the London Hospital, told him that the new cutter was "very generally used on the Continent during the late war."

Fracture of both Bones of the Leg; Union without Deformity.

Anne M., aged twenty-seven years, was admitted into the Adelaide Hospital on the 26th December, 1870.

On the evening of that intensely frosty day, when descending her sister's hall door steps, she slipped, was conscious of the right ankle snapping, and then fell.

Just as she came to the ground she experienced what she called "another terrible snap."

She was brought to hospital at 7½ o'clock p.m.

Symptoms.—Abnormal curvature of the right leg, the concavity being on the inside, and most retiring about two inches above the internal malleolus; the sole of the foot looked more inwards than that of the opposite side; slight shortening of the limb at its inner aspect; total inability to move it; extreme tenderness when pressure was made two inches above the internal malleolus at the most retiring part of the curve; and great tenderness about four inches above the external malleolus; very severe pain in the

* It is kept in stock by the Messrs. Fannin, Grafton-street, Dublin.

ankle; coarse crepitus, best marked a little above the joint when the leg was flexed upon the thigh, its upper portion fixed, and lateral motion imparted to the lower fragments and foot.

Treatment.—The limb was restored to its normal shape without difficulty, and was “put up” in a modified box splint.

3rd Jan., 1871.—Limb in good position; blue and olive discolouration of the skin, being the 7th day of the fracture.

18th Jan.—Starch bandage applied.

28th Jan.—The starch bandage being dry, she was allowed to move about on crutches.

13th Feb.—Sudden effusion having taken place into the right knee, which had become exceedingly painful, the starch bandage was removed. It was cut “clean” in a few seconds, and without separation of its layers, with Wathen’s cutting forceps.

I need not detail the concluding notes of the case, and will merely observe that local depletion, mercury, iodide of potassium, and counter-irritation were used before the joint regained its natural proportions, and its motions were restored.

When sufficiently recovered, she was sent to the Stillorgan Convalescent Home, where she remained a month, at the end of which the fracture was perfectly consolidated, and the movements of the knee were unimpaired.

There is much difference of opinion whether the starch bandage should be applied to a recently-fractured limb. For my part, notwithstanding the testimony to be found in some works in favour of its early application, I am not, for many reasons, an advocate for this. I like to be able to see the limb for some days after it has been broken, particularly in the case of females, who are not prone to forgive deformity, however trifling, and such might imperceptibly take place under the bandage.

The Pistol Splint and M. Nélaton’s Splints for the Treatment of Fracture of the Lower End of the Radius.

Having frequently heard the “pistol splint” confounded with M. Nélaton’s apparatus for the treatment of the fracture familiar to us in Ireland, under the name of “Colles’ fracture,” I am induced to reproduce here Nélaton’s illustration of his apparatus, and the description of the way he manages the fracture.

To these points I have almost altogether confined myself, the object being to remove a very prevalent error into which our

students have been led by a much used illustrated surgical work,^a in which the pistol splint is delineated and named Nélaton's splint. Indeed, in the last edition of Cooper's "Surgical Dictionary" likewise, it is stated that "instead of the ulnar splint, M. Nélaton has since used a dorsal splint curved at its lower end in the shape of the handle of a pistol."^b

The following account of M. Nélaton's splints and mode of treating this fracture has been taken from the recent edition of his work. The evidence afforded by this passage is conclusive that down to the period of its publication^c he had not adopted the pistol splint:—

"I apply," he states, "upon the dorsal surface of the carpus and upon the lower fragment of the radius two or three graduated compresses, placed transversely. Other graduated compresses are applied to the palmar surface of the forearm, parallel to the axis of the member; these compresses are folded at their lower end, so as to form a tolerably thick edge, which should be placed at about three-eighths of an inch (*centimètre*) above the transverse prominence formed by the upper fragment (Fig. 8). The compresses thus disposed, I apply two splints, which I secure in position with a roller. It is easy to understand that things being thus disposed, the dorsal splint is in contact with the forearm only above; it presses below upon the graduated compresses that cover the lower fragment, and immediately above these compresses there is a space. As to the palmar splint, it rests upon the graduated compresses that are over the interosseous space; but as these compresses do not descend so far as the hand, there also exists a space between this splint and the lower end of the forearm. The action of this apparatus is easy to understand: the two splints, being brought towards one another in consequence of the constriction caused by the roller, must tend to push the two fragments in contrary directions, by pressing them towards the empty space left between the surface of the member and the splints.

"When the displacement of the fragments is very pronounced, and the end of the ulna forms a very marked prominence at the internal side of the wrist, I add to the above described apparatus the ulnar splint of Dupuytren, which corrects the abduction of the hand, restores the styloid process to its natural level, and replaces the fractured surfaces in contact.

^a Erichsen. Science and Art of Surgery.

^b 8th Edition. London, 1861. P. 730.

^c 1868.

“Dupuytren and Goyrand, imitated in this by other surgeons, sought, by inclining and slightly flexing the hand towards its ulnar edge, to produce a permanent extension upon the lower fragment of the radius, and to exercise pressure upon the dorsal surface of this fragment by means of the extensor tendons of the fingers that pass at this part. But this extension, supposing it possible, appears to me useless; indeed, if the apparatus is employed that we have advised, on remedying the antero-posterior displacement, the shortening disappears, unless there is reciprocal penetration: now, we have said that most often penetration exists only at the posterior part of the surface of the solution of continuity. I have already treated a large number of fractures of the radius with the modified apparatus I have just described, of which I have also given the description in the first edition of this work, and I have almost always obtained consolidation exempt from deformity. In several cases in which the fracture had been overlooked for one or two weeks, the apparatus, applied for twenty-four hours without previous reduction of the fragments, has always sufficed to restore the member to its normal shape: thus have I renounced, for almost all cases, reduction manœuvres; the application of the apparatus suffices for gradually replacing the fragments in their normal relations. In a very small number of cases there remains, however, a slight prominence of the ulna. This is seen in some exceptional cases, in which the lower end of the radius is broken into several fragments; then, it must be admitted, whatever may be the apparatus employed, it is impossible to obtain perfectly regular consolidation.

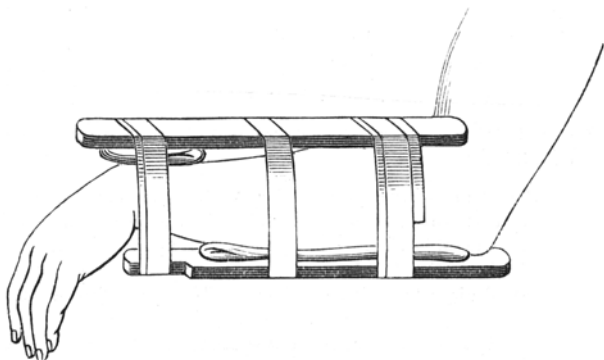


Fig. 8.—Nélaton's Splints for Fracture of the Lower End of the Radius.

“I must point out here some useful precautions. When the

apparatus that I have described is used, (1.) It is necessary to take care that the posterior splint does not press upon the prominence, that the os magnum and the upper ends of the second and third metacarpal bones form at the dorsum of the carpus. Without this precaution, the patients often suffer very violent pain in the compressed point.

"(2.) It is useful to make in the palmar splint, that descends to the palm of the hand, a roundish hollow to receive the thenar eminence; but this is not indispensable.

"(3.) Flexion and extension movements of the fingers should be executed early, in order that their free action may be rapidly restored.

"Is it necessary to say that if the displacement of the fragments is in a direction the opposite to that we have described, the same apparatus is still proper, but it should be applied in an inverse direction, so that a space shall exist between the dorsal splint and the lower fragment of the radius, &c.?"^a

It is quite certain then that Nélaton had not used the pistol splint down to the year 1868. Had he done so, he would scarcely have omitted allusion to it, not only, as I have already observed, in the edition from which I have quoted, but also in the first edition, published in the year 1844.^b

Some writers attribute the pistol splint to Blandin.^c He, however, was anticipated in its invention, as mentioned by Malgaigne, who, in his observations on the different modes of correcting abduction of the hand in "Colles' fracture," states that the attempt has been made to substitute for the iron splint (cubital) of Dupuytren wooden ones, "which should first cover the forearm in the ordinary way, and which at the wrist should bend sharply inward, not by their surfaces, *but by their edges*. M. Blandin (*Gazette des Hôpitaux*, Oct. 8, 1836,) proposed this kind of splint, which was, however, previously known (*Gazette Médicale*, April 9, 1836. P. 234)."^d

^a *Éléments de Pathologie Chirurgicale*. Par A. Nélaton, membre de l'Institut, Professeur de Clinique Chirurgicale a la Faculté de Médecine de Paris; membre de l'Académie Impériale de Médecine, Chirurgien de l'Empereur, Deuxième édition. Tome Deuxième. Paris, 1868. P. 350.

^b *Éléments de Pathologie Chirurgicale*. Par A. Nélaton. Paris, 1844. Tome premier. P. 739.

^c *Précis Iconographique de Bandages, Pansements et Appareils*. Par M. le Docteur Goffres. Paris, 1858. P. 294.

^d *A Treatise on Fractures*. By J. F. Malgaigne. Translated from the French, by John H. Packard, M.D. Philadelphia, 1859. P. 493.

I find that the article in the *Gazette Médicale* to which Malgaigne refers, and in which the description of the pistol splint originally appeared, is an anonymous *critique* on a paper by M. Goyrand (d'Aix), which was published in the *Journal Hebdomadaire de Médecine* the previous February. M. Jules Guérin was at that time the chief editor of the *Gazette Médicale*, but whether he was the author of the criticism, and thereby the inventor of the pistol splint, is not stated. At all events, the *critique* concludes thus:—

“M. Goyrand has employed his apparatus eleven times in two years, and always with complete success; and he thinks that it is everything that could be desired. However, if the fracture were either very oblique or comminuted, we doubt that permanent extension thus practised would be sufficient to assure to the radius its normal length; the fulcrum of the splint, below, appears to us very deficient; and the upper fulcrum is absolutely wanting, unless it is made to abut against the bend of the elbow, which would not be borne by patients. At the same time that this first condition would be wanting, we should add that direct extension of the hand is a forced position which always stretches the extensor muscles a little, some of which are already stretched by the flexion of the forearm upon the arm. Thus in a difficult case, such as we have just supposed, we think that more security and advantage would be derived from using Dupuytren's (cubital) splint, or better still, *two splints, anterior and posterior, bent inferiorly by their ulnar edge.*”^a

Such, as far as I have been able to ascertain, is the history of the pistol splint, which it is clear has neither been invented nor adopted by M. Nélaton, is not the invention of Blandin, but rather of an anonymous writer in the *Gazette Médicale*, possibly of Guérin himself.

Before concluding I may mention that I have used, with excellent results, Nélaton's apparatus on many occasions, but have combined Dupuytren's ulnar splint with it when necessitated by abduction of the hand.

The rapidity with which the fingers recover their movements after the discontinuance of the apparatus is not the least of its advantages.

^a *Gazette Médicale de Paris*. Samedi, 9 Avril, 1836. P. 234. Not italicised in the original.