the fact that practically the same number of lice is present on the body during the day. Probably the distractions of the day keep the mind away from the pest, but at night, when everything is conducive to the desire for rest and comfort, the mind is most sensitive to the slightest irritation. Then the crawling of the insects, their sharp stabs, the itchiness of each tiny wound, and the fierce desire to scratch become intolerable. As one man said, "You feel as if you could rive yourself to pieces." Sleep, at best, is broken and uneasy, but is usually impossible. Consequent upon loss of sleep, impaired vitality and mental weariness become very real miseries to the soldier, the value of whom depends upon a high pitch of bodily well-being.

These are the soldier's most acute troubles, primarily due to lice at this front, but it must never be lost sight of that the menace of typhus, possibly more imminent at the Eastern fronts, is still present at the Western.

(To be continued.)

Notes on Military Orthopaedics.

III. THE SOLDIER'S FOOT AND THE TREATMENT OF COMMON DEFORMITIES OF THE FOOT.

BY

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(Continued from page 711.)

PART II.

CLAW-FOOT.

ONE of the surprises the military surgeon meets is the number of men with claw-feet who have been passed into the army; but still more surprising is the fact that many such cases have found their way to the front after the vigorous initial training which the recruit undergoes. Sooner or later, however, these men gravitate to hospital, and very few of them return to the ranks as efficient. A patient with this condition of the foot is quite unfit for military service, and should never be accepted as a recruit. The affection usually begins in early life, and is often not recognized until it has reached what I have termed its second stage; until then serious trouble hardly ever arises.

The etiology of "claw" or "hollow" foot is still uncertain. It is very often associated with a slight contraction of the Achilles tendon in childhood, and in some cases is due to a transitory paralysis of the extensor group of muscles. The short boot also stands in some causal relation to it. The whole question is, however, too vexed to be discussed here.

Clinically the condition presents five degrees or stages. The progress of the development of the deformity from one degree to another, though often continuous, is frequently arrested in one of the early stages; or perhaps the facts may be better stated by saying that progress from the first two stages to the later more severe stages is very slow, and sometimes does not take place.

1. The First Degree of Claw-foot.

The first degree occurs in childhood, and is easily overlooked. There is no visible increase in the height of the arch—in fact, the foot looks normal. The complaint made is that the child is clumsy, especially when running, and frequently stumbles or trips without obvious cause.

It will be found in such a case that the foot cannot be dorsiflexed beyond a right angle with the leg, and that there is commencing contraction of the Achilles tendon and the structures in the sole. The child's tendency to stumble is thus explained, for the fore part of his foot gets in his way as he tries to run.

The treatment in this stage is obviously to stretch the Achilles tendon and the plantar structures and so restore the power of dorsiflexion of the foot at the ankle. This can usually be effected by manipulation, after which the boot in which the patient walks should have no

heel to it, but a bar half an inch thick placed transversely under the tread. In some cases it may be necessary to lengthen the Achilles tendon. This is best done subcutaneously by the following procedure (Fig. 1).

The tenotome is entered on one side near the heel, and one-half only of the tendon is divided. The tenotome is next entered one and a half to two inches further up on the other side, and the other half of the tendon is divided. Now, by forcible dorsiflexion of the foot, the two halves of the tendon are made to slide on one another until the required lengthening is obtained. A rectangular splint is then applied so as to keep the Achilles tendon at rest in the corrected position and to maintain tension on the sole of the foot. This method is always preferable to the other method of complete division of the tendon at one level as the period of convalescence is shortened, and functional power in the calf muscles is more speedily restored.

FIG. 1.—Anatomical diagram to illustrate the two stages of the operation for the lengthening of the Achilles tendon by subcutaneous tenotomy.

2. Degree of Claw-foot.

In the second degree there is definite contraction of the plantar fascia, and the characteristic deformity of the foot is easily observed (Fig. 2). The fore part of the foot is dropped—that is to say, there is flexion at the mid-tarsal joint or exaggeration of the arch of the foot. At the same time the great toe is dorsiflexed at the metatarso-phalangeal joint, and the tendon of the extensor proprius hallucis stands out prominently. Further, if the surgeon places his finger under the ball of the great toe he easily lifts it, and

FIG. 2.—Claw-foot, second degree.

the toe automatically straightens out (Fig. 3). The other toes do not present a similar deformity at this stage, but the Achilles tendon is shortened. Even in this condition the patient may not complain of pain or disability; especially is this the case in the very young. In older folk, such as the recruit, complaints may begin whenever long marches are repeated. The men have to fall out because of pain and fatigue. They have frequently been suspected unjustly, for even at this stage there are no very obvious objective signs. The arch of the foot is not collapsed, but, on the contrary, slightly exaggerated. But if the surgeon makes a careful examination he will

FIG. 3.—Claw-foot, second degree. The surgeon's finger easily replaces the dropped head of the metatarsal bone of the great toe; a case in this stage is suitable for tendon transplantation.

note tenderness beneath the metatarso-phalangeal range, and when the patient is asked to extend his toes the big toe responds to a disproportionate extent.

Treatment at this stage must be drastic. If the patient is to be rendered able to get about with ease and comfort, nothing less than operation will suffice. A radical attack may save the situation, and in a few weeks the soldier may return to duty. The operation consists in dividing and stretching the plantar fascia and then in making an incision over the tendon of the extensor of the great toe (extensor proprius hallucis), and the tendon is severed from its attachment. Two holes are drilled close to each other behind the metatarsal head, forming a tunnel through which the tendon is drawn by means of a catgut

ligature (Fig. 4). The tendon is then pulled so as to raise the dropped metatarsal head into position (Fig. 5), and its lower end is stitched to its upper part just above its entrance into the bone (Fig. 6).

FIG. 4.—Claw-foot, second degree. Operation by transplantation of tendon of the extensor of the great toe. The diagram shows how the tendon of the extensor proprius hallucis is introduced through the tunnel above the head of the metatarsal bone.

This completes the operation, but the foot must be firmly bandaged down to a metal sole plate with a thick roll of wool placed transversely just behind the heads of the metatarsals so as to flatten the arch as much as possible. The whole foot is then fixed in a shoe splint, which is bent to rather less than a right angle. After the stitches are taken out, the foot is put up in plaster of Paris in the fully corrected position, and the patient is allowed to walk in this for from three to six weeks. He should then for a few weeks wear boots with no heels, and a bar across the sole beneath the heads of the metatarsal bones so as to keep the foot dorsiflexed when walking.

3. Degree of Claw-foot.

In the third degree the characteristic deformity is more pronounced (Fig. 7); it is no longer possible with the finger to lift the head of the first metatarsal into normal line owing to the increased contraction of plantar

structures; the operation just described for the second degree would therefore be useless. Further, the other toes also are now dorsiflexed, and the characteristic deformity which at first was visible only in the great toe is now shared by all the toes. The movements of the toes are limited, and they are beginning to become rigid in the position of deformity. Corns and callosities are formed across the ball of the foot owing to the increased pressure of body weight, for in this stage the patient can hardly get his heel to the ground at all. The Achilles tendon and plantar fascia are still more contracted than in the first two stages.

Operative treatment has now to be carried out in two stages.

A. The first stage includes division of the plantar fascia and severe wrenching to flatten the foot as far as possible, but as at this stage all the metatarsal bones are very obliquely placed it is necessary also to remove bone. The operation consists in removing through separate incisions on the dorsum of the foot a half to one inch from the shafts of the first, second, third, and fourth metatarsal bones toward the bases without opening the joints. The fifth metatarsal is retained intact, as it forms a useful splint for the rest of the bones. Removal of the head of the metatarsal should be avoided. The extensor and flexor tendons should be divided.

FIG. 5.—Claw-foot, second degree. Operation showing the tendon of the extensor proprius hallucis passed through the head of the metatarsal bone of the great toe and pulled before fixing.

B. As it is impossible to correct all the cavus deformity in this way, at a later stage the Achilles tendon is divided by the sliding operation, and the foot wrenched into dorsiflexion. The after-treatment and alteration in boots follow the same lines as those already prescribed.

4. Fourth Degree of Claw-foot.

In the fourth stage, in addition to all the deformities already described the foot acquires a well-marked varus deformity (Fig. 8). Callosities are even more tender, and walking is painful and difficult.

Treatment has to be still more drastic. After dividing

and wrenching all tense structures so as to mould the foot towards the correct position, it will be necessary to divide also the flexor and extensor tendons, and then remove the astragalus. This releases the remaining tension on the sole, and the foot can be moulded into shape, so as eventually to carry body weight with comfort to the patient.

5. Fifth Degree of Claw-foot.

The last stage of claw-foot leaves the patient in a pitiable condition. The toes are blue and contracted, the callosities exquisitely tender. The deformity is that of equino-varus (Fig. 9). The patient longs for amputation. This should never be done, and I would recommend as a substitute an operation I have designed and practised with success on many occasions.

In such a case the astragalus should first be removed, and then a flap incision made along the base of the toes on the sole of the foot. A flap should also be raised from the dorsum of the foot, and the heads of the metatarsal bones exposed. The toes and the heads of the metatarsal bones are removed. The result of this operation is excellent (Figs. 10 and 11).

Although the various operative procedures I have described as necessary in the treatment of the later stages of "claw-foot" do not result in producing an efficient soldier, there is every reason that they should be known. The military surgeon has to consider the usefulness of citizens when the war is ended, and operations such as I have described, with

FIG. 6.—Claw-foot. Operation for second degree, showing how the tendon of the extensor proprius hallucis, after traversing the tunnel in the bone, is attached to itself and secured.

FIG. 7.—Claw-foot, third degree.

FIG. 8.—Claw-foot, fourth degree.

FIG. 9.—Claw-foot, fifth degree.

FIG. 10.—Claw-foot, fifth degree. Front view after operation recommended in the text. The toes and the heads of the metatarsal bones, as well as the astragalus, have been removed.

FIG. 11.—Claw-foot, fifth degree. Side view after same operation.

appropriate variation, will be needed for many types of contracted feet following injuries received from the enemy.

HALLUX RIGIDUS, HALLUX VALGUS, AND METATARSALGIA.

The conditions known as hallux rigidus, hallux valgus, and metatarsalgia, or Morton's disease, are all frequently associated with flat-foot; they all have some features in common both as regards the nature of the pain experienced and the alterations required in the boot to relieve mild cases and to complete the after-treatment in cases which have required operation.

THE MARCHING BOOT.

Mobility of the Toe.

This is a convenient point at which to make a digression to discuss the importance of correct position and free mobility of the great toe in marching.

In young children of all races the great toe is directed slightly inwards towards the middle line of the body, in line with the anterior part of the inner longitudinal arch of the foot, to the structure of which attention was directed in the article on flat-foot published on May 20th (p. 709). In races who habitually go barefoot this position of the great toe is preserved in adult life. In civilized races—those, at least, who wear boots—the toes are often cramped into boots of unsuitable shape, so that the small muscles of the foot suffer atrophy from disuse, and the power to spread the great toe inwards in walking is much impaired. In a strong foot which has not been deformed by wearing pointed boots the great toe is spread inwards by the action of the abductor hallucis when balancing on one foot, when the weight of the body is on the fore part of the foot in walking, and still more so when carrying a pack on the shoulders.

Qualities of a Good Marching Boot.

A good marching boot should therefore leave the foot free to adapt itself to altering conditions of balance and strain.

First. The boot should fit comfortably and closely round the heel and ankle so as to avoid lifting of the heel in the boot, which results in chafing, ending in a blister of the heel.

Second. To save the arch from giving way and to avoid flat-foot the heel of the boot should be slightly higher on the inner side than on the outer. (See the article on flat-foot, p. 710.)

Third. The inner side of the boot should be straight right up to the tip of the big toe—that is to say, the inner sides of the two boots should be parallel to each other all the way along to the great toe. There should be no trace of pointedness, for pointedness tends to produce hallux valgus, and helps to cause flat-foot.

Fourth. The sole of the boot inside should be as broad as the foot with the weight of the body on it. In the case of a soldier it should be as broad as the foot is when carrying the weight of the soldier in full marching order—that is to say, the weight of the soldier himself, his pack, and all his accoutrements.

Fifth. The upper of the boot should not compress the fore part of the foot in any way. The toecap should be stiff and deep enough to clear the toes and allow free movement inside the boot. This stiffening should run back on the inner side of the boot to a point behind the metatarso-phalangeal joint of the great toe.

Sixth. The boot should be long enough to allow the foot to extend to its full length when the soldier is carrying his pack and all his accoutrements.

These last points, dealing with freedom of movement of the fore part of the foot, are essential to the full development of the small muscles of the foot on which the soldier's endurance and marching powers depend to so large an extent.

Corns do not develop in a foot encased in a boot which allows free play to the fore part of the foot. The regimental chiropodist is a most valuable asset, but his existence is, *ipso facto*, a confession that the fit of the men's boots is not all it might and ought to be. The man should not be allowed to judge of the tightness of his boot when his foot is cool. On the contrary, boots should be served out when men have come in from a long route march, and their feet are engorged with blood, and therefore at their largest. If this were done, interference with the circulation of the foot by the boot would less often occur. When a foot swells after a march, the

swelling is practically all in the fore part, not round the heel. To serve out boots, therefore, after a route march would not prevent a man from choosing a pair which fitted properly round the heel and ankle.

The present army boot is a great improvement on the boot served out at the time of the South African war, but it is still lacking in two points—namely, the straight inner side and the clear free stiffened arch in the upper of the fore part.

HALLUX RIGIDUS.

Hallux rigidus (Fig. 12) is a condition characterized by limitation of the power to dorsiflex the great toe at the metatarso-phalangeal joint.

If we remember that in straining on tip-toe or in stepping off with the foot in marching this joint must be dorsiflexed, it is evident that any limitation of the movement of dorsiflexion must, in the course of a long or hard march, result in straining the joint so that it becomes painful and inflamed.

As hallux rigidus and hallux valgus are both disorders of the same joint and are often intimately connected, the rigid toe may lead on to valgus deformity and a hallux valgus may become rigid. There is no essential difference in the pathological condition of the joint, but only in the direction of the deformity associated with it.

FIG. 12.—Hallux rigidus.

Treatment.

The treatment of hallux rigidus must be to restore the power of dorsiflexion of the great toe at the metatarso-phalangeal joint.

In the early stages, when the tenderness and inflammation either about the joint or in the joint has not resulted in osseous changes, palliative measures may still lead to recovery.

First the joint must be relieved of strain, so that the inflammation may be allayed. This can be brought about by arranging a bar like a football bar fully one-third of an inch thick and about an inch broad placed on the boot behind the head of the metatarsal bone. This causes the body weight to be borne on the neck of the metatarsal rather than on the tender joint, so assuring rest to the joint. As soon as the inflammatory tenderness becomes less the patient finds that the power to dorsiflex the toe begins to return. This is the moment to begin massage, movement, and hot and cold contrast bathing in order to hurry up the processes of repair.

In more advanced cases, and in cases resulting directly from trauma—as, for instance, dropping a weight on the joint or violently “stubbing” the toe, osseous changes due to formative periostitis occur round the joint. There may be lipping of the base of the phalanx, and usually some nodular thickening of the head of the metatarsal, especially in its upper aspect. This osseous outgrowth forms a mechanical block, preventing hyperextension. The impact of the bones on each other maintains the periostitis, and the condition gets progressively worse. Palliative measures may enable a civilian to go about his business with some degree of comfort, but he cannot do a day's shooting, and palliative measures are of no use for a man who must march.

Operation alone will remove the obstruction to movement and give permanent relief.

The operation follows exactly the lines to be described below for hallux valgus, and need not be described here.

HALLUX VALGUS.

Hallux valgus (Fig. 13) is a deformity of the first metatarso-phalangeal joint, the essential feature of which is that the great toe is deflected outwards, and in extreme cases may lie over or under the second toe.

One consequence of this position of deformity is that the head of the metatarsal and the base of the proximal phalanx form an undue angular prominence on the inner border of the foot. As a result of chafing and pressure by the boot a bursa, or bunion, forms over the thinned inner

part of the capsule of the joint. It may communicate with the synovial cavity.

The continued pressure and friction causes the skin over the bursa to become indurated and horny, and this greatly adds to the pain and discomfort suffered by the patient.

Frequently suppurative inflammation occurs in the bursa (septic bursitis); this may be followed by septic cellulitis with inflammatory thickening of the tissues round the joint or, in cases in which the bursa communicates with the joint cavity, it may lead directly to septic arthritis.

It has been a surprise to many surgeons that soldiers have been able to go through their training and even to serve in France with pronounced hallux valgus deformity. The reason is that the disability is not due merely to the visible deformity but to the addition of the following three conditions:

1. Inflammation of the bursa (bunion).
2. Traumatic arthritis, of the same type as the arthritis in cases of hallux rigidus.
3. Tenderness due to pressure on digital nerves in every respect similar to the tenderness in a classical case of metatarsalgia or Morton's disease.

Of these three causes of disability bursitis is the most common; the dangers of septic bursitis communicating with the joint have already been noted.

Arthritis is much more rare, and is usually of the sub-acute type common in cases of hallux rigidus without the valgoid deformity. It is diagnosed by tenderness and pain on any movement of the joint, even gentle attempts at passive rotation of the toe.

The third variety, comparable to Morton's disease, is marked by acute pain on oblique pressure on the joint between the finger and thumb, and is due to excessive sensitiveness of the digital nerves and adjacent tissues outside the joint. It is not, as a rule, marked by any objective signs other than the valgoid deformity, and in cases of hallux rigidus of this variety there is no visible deformity—only tenderness on pressure on the joint.

It is difficult to make a sharp division between hallux rigidus and hallux valgus. The same types of pain and disability occur in both. It may, however, be said that with a distinct valgoid deformity it is comparatively rare to find rigidity, but that in cases of painful great toe without valgoid deformity—that is, in cases classed as hallux rigidus—arthritis and the resulting rigidity are much more common. Hence the difference in descriptive terminology—but to understand the conditions properly they should be taken together.

Treatment.

In mild cases palliative measures may suffice. First, the weight of the body should be taken off the joint by putting a bar—like a football bar—across the sole of the boot behind the head of the metatarsal. If the boots are specially made, this is worked into the thickness of the sole with a hollow in the sole for the great toe joint. The bar on the sole will, however, keep a man on his feet who would otherwise be disabled by pain in the great toe joint. The boot should, of course, be straight on the inner side, and the upper should spring clear up, leaving room for the large head of the first metatarsal—a feature unfortunately absent from the regulation boot. If the boots are roomy enough, a piece of felt with a hole in it to accommodate the bunion will afford relief.

Such measures, however, are only curative in the milder cases, and are not applicable to the man on service.

Operative Treatment.

Operative treatment of hallux valgus must not merely aim at correcting the deviation, but must also be directed to securing free dorsiflexion of the great toe, otherwise the patient will be left with all the disability of a hallux rigidus.

It follows, therefore, that, apart from the correction of the valgoid deformity, the operative procedure is practically the same in principle in both conditions, and one description suffices for both.

First let it be stated that there are two operations sometimes performed, which need only be mentioned to be condemned. The first is transplantation of the extensor proprius hallucis tendon to the inner side of the metatarsal head in the hope that it will correct the outward deviation. Experience has proved that this operation is generally useless; it is therefore a waste of time to perform it. The second operation—excision of the joint—cannot be too emphatically condemned, as it is liable to end in a stiff joint, bringing with it all the crippling disability of hallux rigidus in its worst form.

Finally, no operation should be performed while there is any inflammation of the bursa or surrounding tissues.

A. In early cases in which there is valgoid deformity but not much enlargement of the head of the metatarsal by bony outgrowths, osteotomy of the neck of the first metatarsal bone, either linear or cuneiform (Fig. 14), associated with tenotomy of the extensor proprius hallucis tendon will suffice.

B. In later stages, with bony excrescences round the joint, more free removal of bone and some form of pseudarthrosis must be performed to secure the free movement of the toe, which is essential to comfort.

1. Free excision of the head of the first metatarsal bone, with interposition of a flap of tissue, or of part of the bursa, is not satisfactory in a soldier, though it has proved satisfactory in civilians who do not have hard walking or marching to do. The reason is that the lower part of the head of the bone is an important part of the weight-bearing apparatus, and must be preserved.

2. The operation to be preferred is resection of the head of the metatarsal bone (Fig. 15), leaving as much as possible of the lower part, taking care to clear away all bony excrescences which obstruct dorsiflexion or full correction of the valgus deformity.

The bursal flap is then interposed as a covering for the raw surface of bone. At one time I used to interpose the whole bursal sac, but nearly twenty years ago several patients developed bursitis in the transposed bursa. The procedure I now adopt, therefore, is to open the bursa and interpose only one wall as a covering for the bone (Fig. 16), or obliterate the bursal cavity.

3. In some cases (more often in cases of hallux rigidus than in those of hallux valgus) it is possible to preserve the articular cartilage of the head of the metatarsal bone.

FIG. 13.—Hallux valgus.

FIG. 14.—Hallux valgus. To illustrate osteotomy of the neck of the metatarsal bone, showing the wedge to be removed.

FIG. 15.—Hallux valgus. To illustrate resection of head of the metatarsal bone by oblique incision through the bone.

This may be done in two ways: The one method is to remove a wedge or slice from the posterior part of the head and then apply the cartilage to the raw surface of bone.

FIG. 16.—Hallux valgus. Showing flap to cover the end of the metatarsal bone in the operation illustrated in Fig. 15

otherwise the traction of this muscle will tend to reproduce the deformity.

Technique of the Operation and After-Treatment.

The skin incision should be a linear incision along the inner side of the joint. The flap incision round the bursa described by Mayo has not proved entirely satisfactory in my experience.

The skin having been freed and retracted, a flap incision is made in the underlying tissues with a second knife. The knife used for the skin may be infected with *Staphylococcus albus* from the skin; it is therefore a wise precaution never to use the skin knife for any deeper dissection, especially in plastic operations where the least infection may destroy the value of the operation.

The joint is thus opened, and the head of the metatarsal freely exposed. The surgeon can then decide how much bone he is to remove and exactly how the wedge is to be made so that the toe will be correctly in line after the operation. He can also decide whether he can usefully retain the articular cartilage or is to dissect out a flap of the wall of the bursa to cover the raw bone.

It should be noted that the sesamoid bones should rarely be removed, as they seem to form an essential part of the tread of the ball of the great toe. The pad of fat between the sesamoid bones is, however, sometimes thickened, red, and tender; if so it may be clipped away.

The whole operation must be carefully carried out with the most scrupulous attention to three points:

1. Preservation of part of the lower or weight-bearing portion of the head.
2. Restoration of free dorsiflexion, or the soldier will not march freely.
3. Correction of the valgoid deformity in cases of hallux valgus.

The valgoid deformity is purposely placed last, for in a sense it is the least important from the point of view of restoring the man's marching power.

FIG. 17.—Splint for hallux valgus after operation.

A hallux valgus splint should be applied at the end of the operation. The splint I use is made of thin metal, as shown in Fig. 17. The hole in the splint fits over the inner side of the head of the metatarsal bone and prevents pressure from occurring at this prominent point. The base of the splint is strapped or bandaged to the inner side of the foot. The toe is then drawn inwards and secured to the narrow end of the splint, care being taken that the alignment is correct.

After-treatment in cases of hallux rigidus and hallux valgus is quite as important as the operation if we are to succeed in restoring function. Three weeks after the operation the patient may walk, provided he has a proper boot. Gradual exercise and the correct bearing of the body weight in a properly designed boot is an essential part of the treatment.

The boot, in the first instance, should be made of soft material with a stiff leather sole. On the sole is put a

leather bar $\frac{1}{2}$ in. thick and $\frac{3}{4}$ in. to 1 in. wide behind the heads of the metatarsal bones. The body weight thus falls for the time on the necks of the metatarsals rather than on the heads. Further, the heel should be made $\frac{1}{2}$ in. higher on the inner side than on the outer side, in order to deviate body weight to the outer side of the foot and relieve strain on the inner side and great toe. This is, of course, also the appropriate treatment for the flat-foot so commonly associated both with hallux valgus and rigidus. The inner border of the boot must be straight, so as to allow the toe to be drawn inwards freely, so that no pressure of the boot will tend to reproduce the valgus deformity.

As a rule, patients shod in this way can walk at once with comfort. Later, an ordinary boot may be altered in the same way. The operation area is too tender to bear the pressure of leather for two or three weeks after operation.

It is while walking in these boots, with the body weight carried on the outer edge of the foot, that the real cure takes place. Under the normal physiological stimulus of walking repair is hastened, and the small muscles of the foot recover strength.

To let the patient get up in a slipper is absurd, for the weight falls then on the head of the metatarsal, and by irritating the new bone formed at the site of operation it sets up a fresh process of osteo-arthritis, which may leave him worse than he was before. The patient must therefore be strictly kept reclining, and never allowed to set foot to the ground till the time has come when he may be allowed to walk in a properly altered boot.

A CASE OF ARTERIO-VEIN ANEURYSM OF THE SUBCLAVIAN ARTERY AND VEIN

TREATED BY EXCISION OF THE SAC AND THE SECOND AND THIRD PARTS OF THE ARTERY.

BY

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ARTERIO-VEIN aneurysm of the subclavian artery and vein has been until this war an unusual condition, and records of its treatment by operation appear to be very rare, if not entirely wanting.

A private of the Cameron Highlanders was admitted to the Middlesex Clearing Hospital, Eastern Command, Clacton-on-Sea, on October 1st, 1915. He had been wounded in Flanders on September 26th, a rifle bullet striking him just outside the axillary border of the right scapula near its inferior angle, and emerging just above the middle of the right clavicle. The wound of entrance was healed and the wound of exit practically healed, but underlying it in the subclavian triangle was a pulsating swelling about the size of a double walnut. There was a very marked thrill, which could be felt and heard even as far as the bend of the elbow. The right arm was entirely paralysed.

A diagnosis of arterio-venous aneurysm of the third part of the subclavian artery and vein and injury to the brachial plexus was made, and as the swelling in the neck was steadily enlarging and the patient was painfully conscious of the loud thrill, it was decided to operate.

Operation.

An angular incision was made: its lower limb ran along the clavicle, while the upper followed the middle line of the sterno-mastoid muscle; a skin flap was turned up which included the wound of exit. The external jugular vein, which was greatly distended, was ligatured in two places and divided. The deep fascia was then incised, but in doing so the sac of the aneurysm, which lay immediately underneath, was opened and a great gush of blood followed. This was restrained by pressure with a finger while the clavicular fibres of the sterno-mastoid were divided.

An attempt was now made to reach the artery on the proximal side of the sac, but owing to the cramped space and infiltrated state of the tissues it failed, and a second