arm, no examination of the fracture was made on admission; fifteen days afterwards, splinters began to come away by the suppurative process; as late as eight weeks after the infliction of the wound, he dilated one of the orifices to facilitate the extraction of a splinter.

Other surgeons extracted immediately the most easily reached primary fragments, and renewed the examination of the wound, day after day, to extract those remaining, and the secondary as they became loosened; at each examination causing much suffering to the patient.

The foregoing facts and reflections are held to indicate, that in every case of comminuted fracture of the extremities, where an attempt is made to save the limb, extraction of all the splinters of bone is imperatively demanded.—(*To be continued.*)

ARTICLE III.—*On a Peculiarity of the Humerus and Humeral Artery.*

By JOHN STRUTHERS, Esq., F.R.C.S., Lecturer on Anatomy, Edinburgh.

A FEW instances have been recorded in which the humeral artery and median nerve continued downwards in a direction towards the internal condyle, above which, in order to gain their usual position in front of the elbow, they passed around a peculiar process, there developed from the humerus, as if for the purpose of affording them protection.

This singular arrangement has occurred comparatively so often of late in the subjects dissected in my rooms, as to induce me to call more particular attention to it, since it is one of some importance to the surgeon, and is interesting also from the analogy it presents to the usual arrangement of these parts in certain animals.¹

The process, and the ligament by which the protective arch is completed, are represented by Tiedemann (*"Tabulæ Arteriarum,"* Pl. xv. fig. 3. 1822); but, in this instance, the artery which passed through was not the main trunk, but a large interosseous, which had arisen high in the arm. The next notice which I find of this peculiarity is by Dr Knox (*Ed. Med. and Surg. Journal*, 1841, p. 125), who—after reasonably doubting the correctness of a statement, which appears to have been made by Magendie, that there existed a "supra-condyloid" process and foramen in the humerus of the yellow races of Africa—states that approaches to the same structure might be found in "many" European arms; and records an instance in which the arrangement had just occurred to him in "the left arm of

¹ In many animals—amongst the Quadrumana, Rodentia, Edentata, Marsupialia, and more especially the Carnivora—the median nerve and humeral artery pass through an opening in the humerus, which is formed by an arched process crossing obliquely the inner surface of the bone, close above the internal condyle.

a stout muscular middle-aged man," with the deviation of the artery and nerve in order that they might pass around the process. Another instance of this arrangement is recorded by Mr Quain in his recent work on the arteries, and is represented in Plate xxxvi. fig. 3, of his splendid illustrations of the usual and unusual distributions of these vessels.

I first saw this variety in the instance already quoted from Dr Knox, the preparation—showing the artery and nerve passing underneath the osseo-ligamentous arch—being now in my possession; and I have since met with it on seven occasions, in subjects dissected by me, or by the pupils under my superintendence. The first of these I met with four years ago, whilst engaged in practising the operations on the left arm of a female subject. The second and third occurred the following year in both arms of another female subject; and the remaining four during last winter session, being in both arms of two male subjects.

In all of them the protective arch was well formed, and transmitted the median nerve and undivided humeral artery, except on the right side of the last subject, on which the artery held its usual course, the nerve passing through the arch, along with a small muscular artery, which, in size and origin, resembled the inferior profunda. The osseous portion of the arch arose at a distance from the internal condyle, varying from an inch and a quarter to two inches and a half, and nearer to the anterior than the internal border of the humerus. It then curved downwards and inwards, and—in none of the above instances having exceeded three-fourths of an inch in length—gave attachment to the ligament, which, stretching in the same direction, joined the line close above the condyle, and thus completed the arch. In four of the above instances, the process, as now seen in the macerated bones, is from half to three-fourths of an inch in length. In the other three it is

shorter; more especially in that one in which the arch transmitted the nerve but not the artery, whilst on the other humerus, from the same subject, the process is the longest. The latter is represented in the accompanying outline of the lower third of the bone. The process and ligament are seen on their external and inferior aspect, so as to show the size of the opening as it now appears in the preparation.

I believe that this peculiarity of the humerus, when present on one side, will, from its nature, generally exist also on the other, unlike most varieties affecting at least the arteries; although in one of the subjects the difference in length between the processes was remarkable, as also was the difference in the position of the arteries. I may add, that I have on several occasions met with a similar want of correspondence in dissecting these parts in some of the animals in which the arrangement obtains; the bony arch being partly deficient on one side, whilst it was fully formed on the other. One of these was in a full-grown cat; in which animal also I have seen the opening on one side transmit—as in one of the instances above related of its occurrence in man—the nerve only; from which the natural inference may be legitimately drawn. I have also observed, in dissecting the young of these animals, that, at different stages of its development, the process resembles very much the conditions which it has presented in man. It is developed as part of the shaft of the bone, the ossification proceeding from above downwards; and very soon after birth it becomes united below to the lower end of the shaft, not to the epiphysis, of the bone.¹

The above instances of the occurrence of this singular variety in man, having led me to think that it might have been present more frequently than had been noticed or recorded by anatomists, I lately examined the preparations of these parts in the museum of the Royal College of Surgeons of this city; and amongst those which had belonged to Dr Barclay, I found four instances of it, although he has not alluded to the variety in his work on the arteries. Two of these occur in separate arms, both of the left side. One that of a very young child, where the process is long; the other that of an adult, where the ligament also is preserved. The other two are seen in

¹ This account of the formation of the opening in animals, is opposed to the view of those comparative anatomists who believe “that the passage of the artery through a foramen of the humerus, results simply from the extensive development of the inferior extremity of that bone,” by which the vessel becomes at length encircled, in order, merely, that it may not be thrown out of its original and direct course; and tends to confirm the more common view, that the arrangement is one specially for the purpose of affording protection to the parts which the opening transmits; although, on the other hand, a consideration of the habits of the animals in which the arrangement occurs, and the dissection of the parts, do not render it evident that they, more than some others, require such a special means of protection for the nerve and artery. See “A General Introduction to the Natural History of Mammiferous Animals,” &c. P. 89. By W. C. Linnæus Martin.

the preparation of a child. The process is equally developed on both sides, but the ligament has been removed. On the right side, the undivided artery deviates and turns round the process. On the left, as in the other two instances, the radial artery arises above the middle of the arm, and continues downwards along the inner margin of the biceps, and the larger trunk (ulnar-interosseous) is removed to the inner side, and passes around the process.

To the fourteen instances above referred to or related, may be added, practically considered, four recorded by Mr Quain, in which the artery deviated in the same manner from its usual position. In two of these (*op. cit.* p. 259) the main trunk, in the others (as represented in Pl. xxxvi. fig. 4, and Pl. xxxvii. fig. 1) one of two trunks into which the humeral had divided, passed downwards along the inter-muscular septum, which they perforated or crossed at a distance of from two to three inches above the internal condyle.

The number of the above instances is sufficiently great to render the variety one of interest to the surgeon. It will be observed that in one-third of them there was a high division of the humeral artery, and that, whilst one of the trunks occupied the usual position of the vessel, the other was removed considerably to its inner side; and in the remaining two-thirds, that the undivided trunk was so situated, that it could scarcely have been reached by an incision made in the usual course of the artery. Further, at the bend of the elbow—as the pronator teres (or an additional muscular slip, which below joins the pronator) arises, in such a case, as high as from the ligamentous part of the arch—the artery is so overlapped or covered, that, before it could be exposed here, some muscular fibres would require to be displaced or divided; although, it may be remarked, the circumstances usually requiring an operation upon this part of the vessel could scarcely occur, owing to its deep situation.

It may be added, that the bony prominence was very readily felt before the dissection of the parts was begun, in the subjects in which it occurred in my rooms, even in the instance in which it was shortest; and the detection of this—in the preliminary examination, in a case where the operation was about to be performed—would, together with the situation of the pulsation of, and the effect of pressure on, the artery or arteries, at once indicate the existence of the variety in question to one whose attention had been called to its occasional occurrence.