current employed did not alter the frequency of the heart-beat.

On cutting a long slit in the right ventricle and stopping the auricular canula, the blood from the coronary vessels flowed out of the ventricular opening. The quantity escaping during a stimulation of fifteen seconds was about one-half that collected during the same period just before stimulation.

A similar result can be obtained in a heart that does not beat.

In one animal, the primary fall in the outflow was followed during continued stimulation of the vagus by an outflow greater than that before stimulation was begun. After stimulation, the outflow returned to that noted before stimulation. This would indicate, perhaps, the widening of the coronary arteries by dilator fibres. But I cannot yet be certain of the presence of vaso-dilator fibres. It is believed that experiments now making will determine this question and will give additional information regarding the origin, course and properties of the vaso-constrictor fibres for the heart now shown to be present in the vagus nerve.

Clinical Department.

ANOTHER CASE OF FRACTURE OF THE HUMERUS FROM AN UNUSUAL CAUSE.¹

A SPIRAL FRACTURE FROM TORSION.

BY GEORGE H. MONKS, M.D.

IN the "Boston City Hospital Medical and Surgical Reports" for 1895,² I gave at length the history of the case of man who had fractured his right humerus while engaged in that test of strength in which two adversaries sitting opposite to each other at a table, grasp each other's hands, and, while the elbows rest upon the table, each tries to push his opponent's hand down. The case did not present any peculiarities except that the cause was an unusual one, and it was for this reason that I reported it. The fracture had evidently been due to extreme torsion of the shaft of the humerus.

Judging from the scanty literature on the subject, fractures of the humerus from this cause must be extremely rare. I was therefore much surprised, as

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

ANATOMY AS A SUBJECT FOR STUDY IN UNIVERSITY EXTENSION.—The *Academische Revue* states that the University Extension Movement in connection with the University of Vienna is meeting with much success. The first courses now being given number twenty-four, and in the first week 1,916 auditors were registered. The largest attendance (350) is in the course in anatomy, offered by Professor Zuckerkandl. Each course is composed of six lectures, and the fee for attendance on the course is only about twenty cents. A small appropriation (about \$2,000) has been made by the government toward the expenses of the movement. Vienna, perhaps, is the first German University to inaugurate University Extension.

well as interested, to have called to my attention recently a second case of fractured humerus from the same cause. The man, a bar-tender, twenty-four years old, was engaged with a friend in the above-described sport, when the right humerus broke near the middle of the shaft. For this injury he was admitted to the Boston City Hospital on the same day (September 11th). Soon after he entered the hospital delirium tremens developed, and later pneumonia; and the patient died on September 19th, eight days after the accident. Dr. M. F. Gavin, to whose service the man had been assigned on entering the hospital, kindly allows me to

¹ Read before the Surgical Section of the Suffolk District Medical Society, November 6, 1895.

² Also reported in Boston Medical and Surgical Journal, March 21, 1895.

publish this case. An autopsy was performed soon after death, and I was asked to make an examination of the injured bone. An incision was made on the outer side of the arm from the shoulder to the elbow and reaching down to the bone. In the vicinity of the fracture much extravasated blood was found, and some of the muscles were lacerated. Apparently none of the vessels or nerves were injured. The bone itself was removed entire. It was cleaned, and then boiled for about forty-eight hours, after which it was dried and carefully examined. The bone was apparently of average size and strength. There was a fracture at the junction of the lower and middle thirds. The accident had broken the bone into three pieces, the upper piece constituting about three-fifths of the entire length of the bone; the lower piece, the remaining two fifths; the third piece being a vertical splinter about three inches long from the inner aspect of the bone. When these three fragments were placed together they fitted accurately. The principal line of fracture was a spiral one. The drawing shows this spiral line of fracture (indicated by an unbroken black line) on the four aspects of the bone.

This line commenced above on the inner aspect of the bone (Fig. 1) and crossed around the back of the bone (Fig. 2) obliquely downwards and outwards; and, still pursuing the same spiral course around the outer side (Fig. 3) and front (Fig. 4), it finally returned to the inner aspect of the bone (Fig. 1), where it ended at a point about three and a half inches below where it started. Thus a complete spiral was made about the bone. This spiral was complicated by two other lines of fracture on the inner aspect of the bone which were vertical and close together, and which completed the separation of the small fragment already referred to. The vertical sides of this fragment are indicated in the figures by the dotted lines.

The case seems to be interesting not only on account of the unusual cause, but also because of the spiral nature of the fracture, such a fracture being just what would be expected from a severe twist (torsion) of the bone.

The first case of fracture, to which I have referred, I considered, at the time of examination, to be a transverse fracture; but this was after a clinical examination only, and at that time I did not have in mind the probability that a fracture which followed torsion of the bone, would be spiral in character. Dr. F. B. Lund has kindly called my attention to the fact that several cases of fracture of the humerus have been reported during the attempt by Kocher's method of torsion to reduce old dislocations of the shoulder, and that the forces at work during this procedure are analogous to those employed in the sport to which I have referred; for while the lower end of the bone is strongly rotated outwards, the upper end is either rotated inwards by the muscles or resists the outward rotation. It would be interesting to know whether fractures which have occurred during the use of Kocher's method, were, what might be called "spiral" or not.

A SOCIETY MEETING DEVOTED TO BICYCLE SADDLES.—A meeting of the French Society of Public Medicine and Professional Hygiene was recently held in a *vélodrome*, and devoted to a personal trial and judgment of the various forms of bicycle saddles.

SUB-TENDINOUS EXOSTOSIS.

BY E. G. BRACKETT, M.D.

THE following case is reported to illustrate a condition not well recognized, but one which, in the writer's opinion, exists more often than is suspected, it being one not easy to detect until the underlying parts are disclosed, but capable of causing very great discomfort, or even disability.

The history of the case is as follows: W., age sixteen, a year and a half ago while jumping, felt a sudden strain at the back of the heel, which was followed by a swelling on the outside of the tendo-Achillis, which was tender to the touch and caused pain in walking, but not during rest. This swelling was noticed on either side of the tendon, but greater on the outside. For a year and a half, she has practically been going about on crutches, occasionally making an attempt to use the foot in walking, each attempt, however, being followed by an increase of the symptoms, swelling and sensitiveness, which at times were so great as to completely prevent walking. The swelling persisted during this time, but at times varied in size, apparently due to the collection of fluid.

Examination shows on the outside of the heel, a hard, elevated mass, one-quarter of an inch in thickness and one-half to three-fourths of an inch in diameter, extending as far as the tendo-Achillis, tender to pressure; pressure on the tendon also gives pain. Foot cannot be flexed much beyond ninety degrees. Standing with the leg straight gives no pain, but any attempt at walking causing acute pain at the back of the heel.

Under ether an incision was made over the side of the tumor on outer side of heel, extending upward over the tendon, and disclosing a hard, bony growth on the upper portion of the os calcis. The tendon was split and the growth was found to occupy the upper portion of the posterior surface of the os calcis, conical in shape, and presenting a sharp prominence which was situated just under the centre of the tendon about half an inch above its insertion. The tumor was chiselled off, uncovering cancellar tissue.

Examination by Dr. Nichols showed a tumor about the size of a robin's egg, of the consistency of bone, covered except at base with a layer of shining irregular cartilage. When sectioned, growth was found to consist of a layer of dense cartilage disclosing tissue resembling normal bone. The trabeculae consist largely of cartilage. Margins of the areolar spaces lined in many places with a thin layer of small, round cells, osteoblasts, and contain in many places large numbers of small, round, spindle-shaped cells like new granulation tissue, that contain large numbers of multi-nuclear cells, myeloplaxes. Diagnosis, exostosis cartilaginaria.

The history of the case after operation presents nothing of particular interest. The foot was placed in a right angular position, and patient kept from bearing weight from two or four weeks, after which she was encouraged to use the foot with aid of crutches. The pain disappeared and locomotion was accomplished with comfort.

The site of the growth was such that it offered a mechanical irritation to the tendon in the act of walking, being situated just above the insertion, conical in shape, pressed firmly into the tendon whenever the muscles were put into contraction, and greatest in the last part of the step, when the foot is in part dorsal flexion. The symptoms consisted of pain in the active