at the present time employed almost universally among proctologists. Even those who formerly favored the clamp and cautery, circular or linear excision, now prefer this method for the majority of cases because it can be quickly and easily accomplished under local anesthesia.

I have previously described the technic of this operation with illustrations (BOSTON MEDICAL AND SURGICAL JOURNAL, April 11, 1907) as it is practiced under local anesthesia, and for this reason it is omitted here.

Clinical Department.

SOME INTERESTING AND UNUSUAL CASES FROM THE ORTHOPEDIC CLINICS OF THE RHODE ISLAND AND ST. JOSEPH'S HOSPITALS.

CASE 1. FRACTURE DISLOCATION OF THE FOURTH CERVICAL VERTEBRA WITH RECOVERY.

CASE 2. ANKYLOSIS OF THE KNEE FOLLOWING LOCAL TUBERCULOSIS.

CASE 3. MADELUNG'S DEFORMITY.

CASE 4. MADELUNG'S DEFORMITY.

CASE 5. CONGENITAL DEFORMITY OF THE PHALANXES.

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AND

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THE following cases are reported because of their unusual nature or because they presented features of especial interest.

CASE 1. FRACTURE DISLOCATION OF THE FOURTH CERVICAL VERTEBRA WITH RECOVERY.

J. M., age fifty, came to the Out-Patient Department of the Rhode Island Hospital, Jan. 30, 1906, complaining of pain and stiffness in the neck and shoulders and of numbness and tingling in the fingers of both hands. Four months previously, while partially intoxicated, he had fallen down a flight of steps, twelve or thirteen in number, landing at the bottom on the back of his neck. He got up immediately and walked upstairs, complaining of no inconvenience at the time. A few days later, however, he noticed pain and stiffness in the neck, radiating to both shoulders, which became progressively worse. The pain was of a tearing nature, worse in the morning and during damp weather. For the past two months the tips of all the fingers had felt numb; the left leg was also weak, and the knee felt as if it might give way under him. Since the accident he had fallen twice, landing on the knees in both cases. He had been unable to work since his injury, and had lost 12 to 14 lb. in weight.

Previous health: Usually well except for a series of peritonsillar abscesses which had appeared at irregular intervals since 1874. The last attack had come about two months before his appearance at the hospital. He had been ill for a week, spitting up large quantities of pus (?).

Physical examination: Showed a prominent kyphos involving the third, fourth and fifth cervical vertebrae. All motions of the head and neck, especially rotation, were much restricted. The thoracic and lumbar spine was rigid in backward but flexible in lateral bending. The skin, especially of the hands, was cold and clammy. General condition of the patient not good. Temperature, 99.8°. Pulse, 140. Heart sounds, clear. Knee jerks very active, but no ankle clonus present. Grasp of the hands fair.

The Roentgen plate in the antero-posterior view showed nothing abnormal. The lateral view, however, showed a dislocation backward between the third and fourth cervical vertebrae with fracture. The interesting thing to note is the small space left for the spinal cord to occupy.

Rectification as a treatment was submitted to the patient, but, in view of the unfavorable prognosis given, was decided against.

April 21, 1907, the patient reported at request, and presented every appearance of health. He still carried his head rigidly, and the kyphos was still present, though less marked. He had worked steadily for the past few months, had gained about 23 lb., had a good appetite, and complained of no discomfort when working. His fingers were somewhat clumsy and not so useful as before the accident, but he had very little numbness in them. Another Roentgen plate showed practically no change in the bony structures.

Dec. 19, 1908. The patient had no pain nor inconvenience connected with his injury. The kyphos had been rounded off and was scarcely visible. There was marked thickening in the region of the kyphos, and movements of the neck were somewhat restricted. Fig. 2 shows the present condition of the vertebral column. The patient is in poor general health. His physician, Dr. T. H. Murphy, of Pawtucket, reports that he is suffering from diabetes, which has progressed rapidly of late.

The above case is remarkable for the severe damage done to the vertebral column, with apparent slight injury to the spinal cord, and ultimate recovery of its functions.

CASE 2. ANKYLOSIS OF THE KNEE FOLLOWING LOCAL TUBERCULOSIS.

M. A., age nineteen, a school teacher, was referred to the Rhode Island Hospital for treatment of an ankylosed knee-joint, and gave the following history:

At five years of age the left knee began to swell without any known cause, and was associated with considerable pain. This continued for three years, during which time the leg became flexed and finally ankylosed. There had been no pain nor tenderness for several years.

Examination: The left knee was moderately swollen and completely ankylosed at an angle of 120°. No bony points around the joint could be made out except the patella, the joint feeling like one continuous bony swelling of fairly regular contour. Shortening as measured along the line of contour of the leg was two inches.

The Roentgenogram shows a unique condition. (Fig. 3.) The femur and tibia appear as though welded together and bent at nearly a right angle. The medullary cavity of the femur and tibia are continuous. The articular surfaces of the lower end of the femur and the upper end of the tibia are wanting, except for slight swellings which mark their normal positions. The patella is seen firmly attached to the front surface of the femur at about its normal position. The fibula, seen in its upper part, is apparently normal. Otherwise the normal structures of the joint are lost.

July 12, 1906. Operation: Excision of the knee was performed, and a wedge-shaped piece of bone about two inches wide at the anterior part of the joint was removed. The leg could now be brought into full extension with complete apposition of the bony surfaces. The leg was put in plaster from the foot to the groin, which was removed forty-one days later. Two months later she was discharged to the

Out-Patient Department, with fairly good union, wearing a light plaster. The knee was kept in plaster for six months, at which time it was deemed safe to allow weight bearing, with an extension shoe. There was $2\frac{1}{4}$ inches shortening in the affected leg.

Nov. 16, 1907, the patient reported at request. The knee is in excellent condition. She has very slight discomfort in walking, but still used a crutch for fear of falling.

Dec. 17, 1908, the patient reported that the knee gave her no inconvenience.

CASE 3. MADELUNG'S DEFORMITY.

W. DeM., age thirteen, came to the Out-Patient Department of St. Joseph's Hospital, Jan. 10, 1908, with the following history: He had been well up to November, 1906, when he had an attack of diphtheria. On recovering from this illness marked weakness was noticed in the muscles of the forearms, and there was unusual prominence of the styloid process of the right ulna. This had grown worse and the wrist and hand seemed to be displaced backward on the forearm. He had difficulty in writing and holding a pen, which was growing worse. The same condition was present in the left wrist to a lesser degree. The grasp of the right hand was decidedly weaker than the left. The radius and ulna were prominent anteriorly, and there was atrophy of the interossei in both hands. Fig. 4 is a Roentgen plate of the hands in a lateral view, and Fig. 5 an antero-posterior view showing the deformity.

Vibration of the flexor muscles of the forearms has restored almost complete muscular power to the forearms and hands, although no change in the deformity has resulted.

CASE 4. MADELUNG'S DEFORMITY.

M. P., age twenty-one, came to the Out-Patient Department of the Rhode Island Hospital, Jan. 21, 1908. When five or six years old she had injured the left wrist in some way, just how she was unable to tell. Nothing was done for it at the time, and she sought advice for the deformity and pain. Pain had been experienced for many years, but of late it had become so severe that she was unable to use the hand. The radius was bent sharply forward at its lower extremity, carrying the hand and wrist with it, while the ulna had continued in a perfectly straight line, making a sharp prominence at its styloid process on the posterior surface of the wrist. The patient did not return for treatment and passed from observation.

These two cases are reported as additions to the literature of this interesting deformity.

CASE 5. CONGENITAL DEFORMITY OF THE PHALANGES.

Fig. 6 shows an interesting deformity of the phalanges which is bilateral. The hands and wrists are normal, except for the forefingers and the proximal phalanges of the middle fingers. In the forefingers, the proximal phalanx has not developed normally but is seen as a small triangular, wedge-shaped body placed between the metacarpal and second phalanx. The epiphysis is not situated in its normal position below the epiphysis of the metacarpal, but lies on the outer side of the finger facing the thumb. The second phalanx of this finger is characterized by the presence of two epiphyses, one placed normally at its proximal and the other, larger and thicker, at its distal end. The distal phalanx is apparently normal, though perhaps not fully developed at its distal extremity.

The proximal phalanx of the middle finger shows a large thick epiphysis, somewhat different in the two hands, with the epiphyseal line broken and irregular in contour.

Medical Progress.

PROGRESS IN THE THEORY AND PRACTICE OF MEDICINE.

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SOME RELATIONS OF PHYSICAL CHEMISTRY TO CLINICAL MEDICINE.

ORGANS OF RESPIRATION.

THE views of physiologists on the subject of respiration have been divided, some holding that respiration is carried out by a definite secretory action of the alveolar epithelium, others believing that the gas exchange in the lungs may be explained sufficiently by purely physicochemical means. The recent work of Bohr¹ seems to establish the possibility of a secretory action of the alveolar epithelium for CO₂.

The experiments were arranged so that the lungs in dogs breathed separately, one lung receiving air, the other a mixture of air and CO₂. The CO₂ tension was determined in both lungs, in the right heart and in a large artery. It was found that the CO₂ tension in the lung breathing the mixture of CO₂ and air was higher than in the blood of the right heart; nevertheless, a passage of CO₂ took place from the blood to the lung. If this proves to be a general fact, and not dependant upon unusual circumstances, it will go far to establish the contention that the alveolar epithelium is a specific factor in the aid of respiration; consequently there seems to be no theoretical reason why the oxygen transfer to the blood should not eventually be proved to have a similar foundation. However this may be, the fact that the alveolar epithelium is involved in the process of respiration adds simply another factor and in no way interferes with the conception of the physicochemical basis for the gas exchange through the lung.

Haldane and Poulton² have formulated the law that the respiration is normally so regulated that the CO₂ tension in the alveolar air remains constant in any individual though it varies somewhat among different persons. The slightest increase in CO₂ tension, even 1 mm. of mercury, results in an enormous increase (80%) in rate of respiration. As the CO₂ tension falls, under diminished barometric pressure, as, for instance, on mountain tops, the alveolar oxygen tension is correspondingly increased and thus the organism compensates for the changes in the constitution and pressures of the atmosphere at high elevations.³ The decrease in the alveolar CO₂ tension is brought about by the hyperpnea caused by the lack of oxygen, and no such decrease in tension occurs when it is compensated by the administration