

STATED MEETING, HELD DECEMBER 3, 1906.

Vice-President, ROBERT G. LE CONTE, M.D., in the Chair.

SUBPHRENIC ABSCESS FOLLOWING APPENDICITIS.

DR. JOHN H. JOPSON presented a man who had walked into the Presbyterian Hospital, three months previously, suffering from acute appendicitis. Operation was performed at once and revealed a generalized peritoneal inflammation with much free pus and a perforated and gangrenous appendix. The appendix was removed and the abdominal cavity freely drained, the patient treated by a modified Murphy treatment,—that is, frequent rectal injections of salt solution and the exaggerated Fowler position. The condition of the man after the first day or two caused no anxiety until several days later when a persistence of temperature of 100° to 102°, without apparent cause, attracted attention. The wound was explored, without revealing a pocket of pus and there was no pelvic collection. Finally, dulness could be demonstrated posteriorly over the lower portion of the right chest, but all other signs typical of a subphrenic collection were lacking. There appeared no other cause for the symptoms, but the man was not physically depressed, and Dr. Jopson was loath to believe that subphrenic abscess was present. At the end of two weeks the chest was tapped without obtaining any fluid. The fever continued and after persisting for four weeks it was decided that there must be a subphrenic abscess. Dr. W. E. Hughes, who also saw the patient at this time, gave as his opinion that there was pus somewhere between the upper surface of the liver and the lower portion of the lung. Before operation could be performed the patient expectorated a large quantity of foul pus, the temperature rose to 104°, respiration and pulse became more rapid and the patient showed evidences of shock and sepsis. There evidently had been rupture into the lung. Dr. Jopson thought the pus had first gone into the general pleural cavity. He decided on account of the shocked condition of the patient to wait 24 hours before operating, but again aspirated, this time in the tenth interspace posteriorly, and obtained several ounces of fetid pus.

He intended operating the next day but the patient suddenly became worse, with dyspnoea and very rapid pulse, there evidently being an acute effusion in the right pleura. Operation was performed the same day under local infiltration anæsthesia, an intercostal incision being made posteriorly between the tenth and eleventh ribs. A pint of cloudy serum was evacuated from the pleura and the opening made in the diaphragm by the needle observed. This was dilated by the finger, and the subphrenic collection drained. Rubber drainage was inserted into both the pleura and the abscess cavity. The drainage furnished by this incision was not considered satisfactory but the patient's condition was bad and it was made to suffice. The man did well after the operation and now only a small sinus remains. The pleura has closed and there is resonance down to the site of incision.

Appendicitis, the etiological factor here, is probably the commonest cause of subphrenic abscess, and this is especially true in children, as Dr. Jopson had emphasized in an analysis of 23 cases of subphrenic abscess in children which he had made several years ago. The diagnosis was obscured by the absence of constitutional symptoms except fever, and the indefinite nature of the physical signs. The pleura was infected at the time of the second operation, possibly by leakage from the point of aspiration, and it was not necessary to protect it by suture or packing, and this rendered drainage of the abscess feasible by local anæsthesia. The experiments of Noetzel apparently show that the pleura is more resistant to infection than muscle or skin, but this resistance is broken in the presence of a pneumothorax. Clinically, the pleura seems to be very susceptible of infection.

DR. WILLIAM L. RODMAN said Dr. Jopson was correct in saying that the majority of subphrenic abscesses are found in connection with suppurating appendicitis. Formerly it was regarded as most frequently caused by perforating gastric ulcer, but Körte, in his masterly review of the subject, showed that the vast majority were due to suppurative lesions of the appendix. He prefers to employ the transpleural route in evacuating the abscesses, and undoubtedly that was the better method in Dr. Jopson's case.

DIFFUSE CAVERNOUS ANGEIOMA OF THE UPPER  
EXTREMITY.

BY ASTLEY PASTON COOPER ASHHURST, M.D.,  
OF PHILADELPHIA.

MAMIE McC., 12 years of age, applied to the Out-Patient Department of the Episcopal Hospital on October 16, 1906. She complained of disability of the right arm. On drawing up the patient's sleeve a cystic swelling was seen on the *extensor* surface of the forearm, just above the wrist. This was thought at first to be a tuberculous cyst, but when the whole upper extremity and thorax were exposed, the following condition was found: The front of the thorax on the right side is the seat of a nævoid formation composed of dilated capillaries or venules, giving the whole right pectoral region a distinctly bluish tinge. The discoloration is abruptly limited at about the mid-sternal line, and below by a line passing transversely through the tip of the ensiform process. The area affected is not raised above the surrounding healthy skin. Posteriorly the nævoid condition is not so marked; but below the angle of the right scapula a mass, about the size of a walnut, can be palpated. It feels like a lipoma. Just over the middle of the right clavicle is an angiomatous mass, somewhat larger than a split pea, dark blue, protruding, and quite hard. Another similar phlebolith may be felt in the anterior axillary fold. In the right supraspinous fossa, at a point corresponding to the free margin of the trapezius muscle, is a somewhat larger bluish mass, which protrudes distinctly from the surface of the skin in this region, is compressible, and is evidently composed of cavernous tissue. An area of bluish discoloration, not raised above the surrounding skin, may be seen below the point of the shoulder, over the deltoid muscle.

The skin of the arm, forearm, and hand presents no abnormalities in structure, but the whole upper extremity is slightly livid, and there is cedema of the fingers and hand. On the *extensor* surface of the forearm, as already noted, there is a cystic, compressible swelling, not circumscribed, about the size of an egg. The *flexor* surface of the forearm in its upper half is

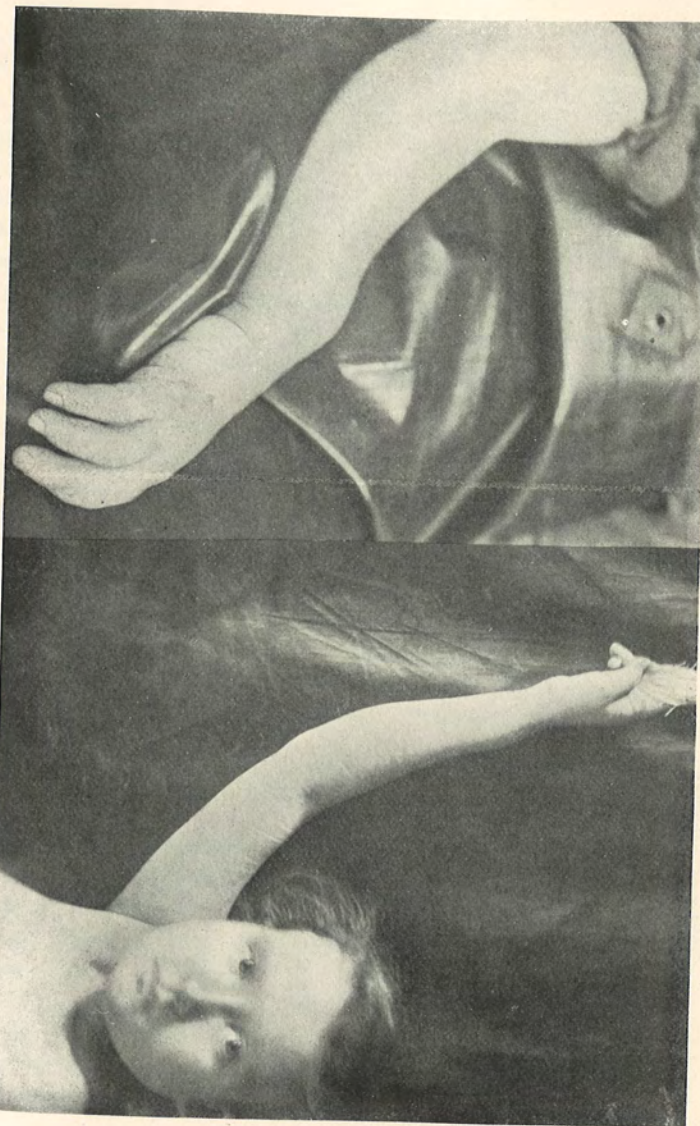


FIG. 1.—Showing increase in swelling when hand is down.

FIG. 2.—Showing decrease in swelling when hand is elevated.

also somewhat enlarged, and is indistinctly cystic. Elevation of the hand above the head causes an almost total disappearance of these swellings in the forearm, while they quickly reappear when the hand is lowered. By compressing the arm below the shoulder the hand and forearm quickly become alarmingly distended, the cystic swelling becomes bluish and very tense, and pain produced.

The circumference of the forearm above the wrist, when the hand is down, is 14 cm., but is only 11.5 cm. when the hand is elevated above the head. The circumference of the forearm below the elbow is 20.5 cm. when the hand is down, 18 cm. when it is raised. The circumference of the arm above the elbow is 19.5 cm. when the hand is down, only 17.5 cm. when it is raised. The measurements of the corresponding parts of the left upper extremity are: Above the wrist, 13 cm.; below the elbow, 19 cm.; above the elbow, 20 cm.

The length of the right upper extremity from the acromion to the tip of the styloid process of the ulna, the elbow being extended, is 41 cm.; that of the left is 43 cm.

The superficial veins of the affected forearm are not visible, even when the hand has been hanging down for some time.

The heart appears to be normal both in location and action. No abnormality in the other thoracic structures has been detected. The axillary, brachial, radial and ulnar arteries pulsate with fair regularity in their normal situations. The radial pulse, synchronous in both arms, varies from 90 to 100 per minute when the angeiomatous arm is raised; and is about 120 per minute when it is dependent.

The cystic swelling above the wrist may be partly lipomatous in character, as it does not entirely disappear when the hand is elevated, some palpable irregularities persisting in the subcutaneous tissues. It is impossible to detect the extensor tendons by palpation.

Skiagraphs were made of the clavicular and cervical regions, and of the forearm. The former was entirely negative; the latter possibly shows some atrophy of the bones of the forearm.

Although the condition in this patient is congenital, it is only within the last few months that she has been disabled. Her family and her previous personal histories are negative. Her arm was always weak, and it was known that there was something wrong with it, but no particular attention was paid to it.

She attended school regularly, and until the close of the session last summer was able to write and figure with her right hand. Of late the fingers and even the hand have become numb; the grasp is so feeble as to be practically absent,\* and though she has resumed her school this autumn, she is no longer able to hold a pencil. There is present almost constantly a dull aching pain, which is considerably relieved by firm bandaging. A flannel bandage is applied with the hand elevated well above the head, and the arm is carried in a sling. General health good.

The following classification of angeiomata, taken from Mauclair and de Bovis, considerably simplifies their description:

External	Superficial	{ Skin and external mucous membrane. Subcutaneous and submucous tissues.
	Deep	{ Intermuscular tissues. Muscles. Orbit and antrum of Highmore. Periosteum and bones. Subsynovial tissues. Glands.
Internal	{ Subserous: meninges, peritoneum, etc. Visceral: liver, spleen, etc.	

These tumors are further classified as circumscribed and diffuse. The angeiomatous condition in the present patient appears therefore to be chiefly of the diffuse subcutaneous cavernous variety; although, as is not unfrequently the case, the neoplasm is really of mixed character, being cutaneous in small areas, as in the supraspinous fossa; and in the pectoral region is of the telangiectatic cutaneous variety, while in the forearm the growth undoubtedly involves the intermuscular planes, and has probably destroyed most of the muscular tissue.

Duplay and Cazin remark that subcutaneous angeiomata

\* At present (February) the grasp is noticeably stronger.

closely resemble cold abscesses in appearance, and it will be remembered that in the present case the swelling on the dorsum of the forearm was at first sight thought to be of tuberculous origin. The best clinical description of the cavernous angioma that I have been able to find is that given by Weinlechner, in Gerhardt's system.

Angeiomata of the extremities are rather unusual, and those of the diffuse cavernous type appear to be quite rare. Of all forms of angioma, including the ordinary mother's mark, the usual location is the head, and the least usual the limbs, as may be seen from the following table:

Head and neck.....	57 per cent. (Kramer), 79 per cent. (Gessler).
Trunk .....	28 per cent. (Kramer), 11 per cent. (Gessler).
Extremities .....	12.5 per cent. (Kramer), 9 per cent. (Gessler).

The question of treatment in these cases is as unsatisfactory as their pathology is obscure. Excision is scarcely possible in the diffuse form, though in cases of circumscribed cavernous angeiomata, whether cutaneous or subcutaneous, it is sometimes feasible, and is usually followed by permanent cure. Amputation at the shoulder joint, the most radical form of treatment available in the present case, might prove a remedy more serious than the disease itself; and in view of the implication of the pectoral and scapular regions might be followed by increase of the angeiomatous condition in the parts that were not removed. The injection of boiling water or other fluids, is a method neither invariably successful, nor entirely safe. Boiling water is much less dangerous than caustic or coagulating fluids, and in the hands of Dr. Wyeth, the originator of the method, has not, I believe, been attended by untoward effects. Other surgeons, however, without his experience, have been less fortunate. Payr has reported eight or nine cases of angioma treated successfully by the introduction of magnesium darts in the growth. The little darts, or tacks, as they have been called, are soon absorbed, but they induce the formation of compact connective tissue with thrombosis and obliteration of the blood spaces. Heide has quite

recently treated a patient afflicted with a diffuse cavernous subcutaneous angioma of the lower extremity by means of electrolysis, and has obtained results which he considered satisfactory. He used a current of from 30 to 40 milliampères, for 3 or 4 minutes at each sitting. He began in the gluteal region, and gradually worked down to the foot; but the foot itself was not benefitted by the treatment, as the angeiomatous swelling could no longer be made to disappear when the foot was elevated. Another result of the obliteration of the cavernous spaces and of the connective-tissue formation was that during the last sittings the hæmorrhage became considerably diminished in amount.

A brief abstract of all the similar cases it has been possible to find in a somewhat extensive search of the literature is appended.

(1) *ABBE* reported the case of a young man with an angeiomatous condition apparently more cutaneous than subcutaneous, involving the whole right upper extremity. The skin was very thin, and the slightest scratch was liable to cause profuse hæmorrhage.

(2) *AUDRY*.—A female, aged 20 years, whose left upper extremity had always been larger than her right, had been troubled with its more rapid growth since the age of 8 or 9 years. The left hand and forearm to lower third of arm were very œdematous, spongy and compressible to touch. Ulcers formed in fingers, and arm was amputated through upper third of humerus, to hinder further infection. Dissection showed that the skin was thickened and elephantiasis-like in character. Beneath skin was a diffuse cavernous angioma, extending to bones, eroding them and destroying muscles and smaller nerves. The arteries were normal. The left scapular region was also affected, but it was more lipomatous in character than the forearm. The skin was nowhere nævoid throughout the upper extremity.

(3) *COLEY* recorded the case of a girl of nineteen years, whose fingers and the extensor surface of whose left forearm above the wrist were the seat of an angioma cavernosum, apparently diffuse and subcutaneous, although this is not stated. The swelling of the forearm was the size of an egg. Over the left scapula was a lipogenous angioma, the size of a cocoanut. All these swellings were adherent to the skin. The hand and forearm were bluish in color. The scapular growth was excised, and found to be an extremely vascular lipoma. An attempt was made to excise the growths from the fingers, but the operation was abandoned on account of hæmorrhage. Good illustrations accompany the report.

(4) *CRUVEILHIER*.—Female, 75 years, paralytic, demented, blind, no history. Left hemiplegia. The left upper extremity was flexed, rigid,

and covered with varicose cutaneous and subcutaneous tumors. Autopsy showed that the subcutaneous tissues and muscles were the seat of a diffuse cavernous angioma; the skin was invaded in some parts, and in these regions bluish masses of varicose veins protruded. Several phleboliths were present.

(5) *HEIDE*.—Boy of 12 years, presented a diffuse angioma of the left lower extremity, involving buttock, back of thigh, popliteal space, fibular surface of leg, and dorsum of the foot. The skin was bluish, and prominent in places (cutaneous), although the main growth was subcutaneous and muscular. The circumference of the limb when dependent was 3 to 4 cm. greater than when elevated above level of trunk. Muscular power was very weak. A small piece of tumor was excised for examination; after cutting through the subcutaneous tissues, the deep fascia was seen, dark blue in color; on excising it the underlying tissue bulged out hernia-like, and looked like a mass of extremely thin walled veins, blackish blue in color. No trace of muscular tissue was visible macroscopically, but under the microscope were observed a few atrophic muscle fibres, their place being taken by fatty and connective tissue. The cavernous spaces were lined with endothelium. The treatment adopted has already been described.

(6) *LAMORIER*.—Man, aged 70 years, the whole right upper extremity being affected, including the pectoral and scapular regions. The skin was bluish black, the angioma was diffuse, and on elevation of the hand the swelling rapidly disappeared from the hand, forearm and arm, and a larger swelling appeared in the pectoral and scapular regions. The condition was congenital, not painful; and autopsy showed all the muscles converted into a splenoid or placenta-like tissue.

(7) *LICHTENSTEIN*.—Man of 36 years, with diffuse subcutaneous cavernous angioma of right hand and forearm. At birth a small nodule was present on finger, and this was operated on in childhood. The angioma gradually extended up the forearm. The hand was œdematous and the forearm was the seat of a distinct swelling. The skin was not discolored except at scar of old operation. A few phleboliths were palpable. Superficial veins were not noticeable. The pulsation in the arteries was normal. There was no pulsation in the tumors. The patient was directed to wear an elastic bandage.

(8) *LICHTENSTEIN*.—A boy aged 7 years. At birth the left upper thoracic region and the left arm were somewhat blue; soon a lump the size of a small pea was noticed on the nipple, and another on the knuckle of the fourth finger. Four weeks before examination these lumps reached the size of large peas, and developed the characteristics of cavernous angiomas. The left upper extremity was shorter than the right by 3.5 cm. The superficial veins were not prominent, but there was present a diffuse cavernous angioma of the hand, forearm and arm; the axilla was full, no axillary folds being present. The pectoral region was bluish, and one small mass was palpable. Above the cavicle there was a bluish line of veins. The skin of arm and forearm was distended when the hand was down, but became flaccid when it was elevated. The

skin was involved, the angeiomatous condition having started apparently as subcutaneous in character, and later involving the cutaneous tissues. The arteries were normal, but the pulse was 80 when the arm was dependent, and only 64 when it was raised. No treatment is mentioned.

(9) RICHET.—A boy of 11 years, with a diffuse cavernous angioma of the subcutaneous variety on the lower two-thirds of the flexor surface of the forearm, involving also, by extension under the annular ligament at the wrist, part of the thenar eminence, in which latter situation the growth was rather of the cutaneous variety. The flexor tendons could not be palpated. The tumor was painful on pressure, and pressure caused it almost to disappear. Elevation of the hand rendered the color of the overlying skin nearly normal, and allowing the arm to hang down made it a deep violet blue, and on the thenar eminence a few varicose veins then became visible. The swelling of the forearm had neither pulsation nor bruit. This condition had lasted only 20 months. Treatment by injections of perchloride of iron was instituted, and when the patient was seen one year later, the swelling on the forearm was firm in consistency, little nodules being palpable wherever injections had been made. The tumor could no longer be made to disappear by pressure, and in the upper part of the forearm there was still evidence of the persistence of the cavernous condition. The skin had become even whiter than on the sound arm.

(10) ROKITANSKY.—Male adult, subcutaneous diffuse cavernous angioma, involving whole right upper extremity, and extending past axilla on to thorax. In certain regions soft bluish masses, feeling like lung tissue, projected from the surface of the limb.

(11) SCHUH.—Young man, subcutaneous diffuse cavernous angioma of anterior aspect of foot, extending up to knee. The growth had extended through everything down to the bone. Skin was scarcely at all affected, but was livid when limb was dependent. Many phleboliths. If the patient stood up the limb grew to an enormous thickness, and became blue and tense; but no varicose veins were visible. All the tissues between skin and bone seemed to have been destroyed by the tumor. It had not increased in the last 12 years, and with an elastic stocking patient was able to walk and even swim.

(12) SCHUH.—Young man, without known cause, suddenly developed growth on hand which rapidly extended up to middle of forearm. The skin was nævoid in places, and very thin. Elevation of limb caused skin to lie in loose folds, and outlines of bones could be easily felt. Phleboliths were palpable. No enlarged superficial veins could be detected. Amputation was refused, and the patient died a year later of phthisis.

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DR. RICHARD H. HARTE said that in a worse case than that shown by Dr. Ashhurst he had used hot water injections after the method of Wyeth, but this produced no effect. He thought at first there was some improvement but the final result was no gain.

DR. WILLIAM L. RODMAN has used hot water injections in four or five well-marked cases of cavernous angioma with improvement in one or two but no cure. He considers the procedure dangerous, as embolism may result, and it does not promise satisfactory effects. His preference is for excision. If one keep well out in the healthy tissue there is no more trouble than in removing a solid tumor.

**FRACTURE OF THE CORACOID PROCESS OF THE  
SCAPULA CAUSED BY MUSCULAR ACTION.**

WITH REPORT OF CASE.

BY ORLANDO H. PETTY, M.D.,  
OF PHILADELPHIA.

The following is my record of the case:

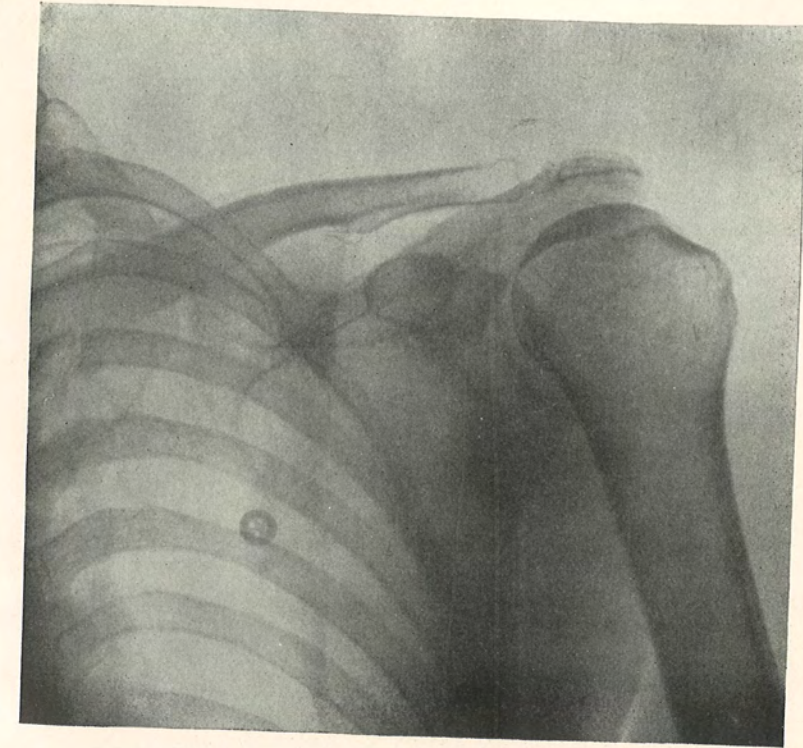
A man, 57 years of age, a trolley car conductor by occupation, while trying to forcibly put a drunken man off of his car, experienced a sudden and severe pain in his right shoulder, which practically rendered his right arm useless. He is sure that he neither fell, nor that his shoulder was struck in any manner. At the onset of the sudden and severe pain he was steadying himself by holding to the hand rod on the rear platform of the car with his left hand, the passenger being on the same level as the conductor, and was pulling with all his strength through his right arm trying to expel the disorderly passenger. During the several hours following the accident that he remained at work, he experienced severe pain in the right shoulder and an inability to use his right arm in ringing up fares or signalling the motorman.

The patient is a well developed, powerfully muscled man. When he presented himself to me, October 15, 1906, he was unable to raise his right arm from his side. He could elevate his shoulder but could not shrug it forward, although he could, with little discomfort, throw his shoulder backward, after it had been pushed forward.

The function of his forearm and hand was unimpaired. Examination revealed nothing wrong in the shoulder joint, clavicle, or acromion process, but severe pain was induced when pressure was applied over the coracoid process, and bony crepitus was elicited in this area.

A fracture of the coracoid process being evident, the right arm was dressed in the Velpeau position, and later in the evening Dr. Fussell saw the case with me and confirmed the diagnosis. As the patient experienced great inconvenience from the Velpeau

FIG. 1.



Fracture of coracoid process of scapula. Tip tilted inward.

position, the dressing was changed, binding the right arm to his side, and leaving his forearm free.

Two or three days later, Dr. Pancoast of the University of Pennsylvania Hospital, took a skiagraph of the injured shoulder, and it revealed a fracture at the middle portion of the coracoid process, with a tipping downward and inward of the distal portion of the process. Dr. Pancoast said there had been many patients referred to him with a clinical diagnosis of uncomplicated fractured coracoid, but that this was the first case to be confirmed by the X-ray findings.

*Result.*—About the middle of the sixth week, crepitus having disappeared and the fracture apparently firmly united, the shoulder was treated by light massage and passive motion. He returned to work at the end of the seventh week. He is still unable to raise his right arm high above his head.

Fracture of the coracoid process of the scapula is not common, and an uncomplicated fracture of this process is a rare condition, while of its fracture by muscular force I could find but three cases mentioned. One of these was evidently discovered in the cadaver during dissection, another observed by Hulme, and the third a brief reference to a case of Stimson. These reports will be fully referred to later in this paper.

It is interesting to note the opinions of the earlier authors upon this fracture.

MALGAIGNE says: "This fracture is excessively rare, and does not occur except in company with other fractures and enormous contusion of the soft parts, so the case is generally of the gravest nature."

In S. D. GROSS'S *System of Surgery*, 1864, we find the following comment: "The coracoid process is sometimes broken in consequence of a severe fall or blow, generally a short distance from its tip, the fracture being usually accompanied with great contusion of the soft parts."

ASHHURST, in Erichsen's "Science and Anatomy of Surgery in 1869," says: "The coracoid process is seldom broken, there not being more than ten or twelve unequivocal cases of this accident on record. It cannot happen except by direct violence." And even in a work as late as Scudder's "Treatment of Fractures," second edition, the coracoid process of the scapula is not mentioned as ever being the seat of a fracture.

Prof. EDWARD BENNETT of Trinity College, Dublin, in 1873, in reporting a case of epiphyseal separation of the coracoid process in a child of



6 years of age, caused by a crushing force, concluded with the following: "This specimen is of particular interest in as far as it completes the series of coracoid fractures in our collection, which contains already several specimens of the fracture associated with the dislocation of the humerus, a specimen of fracture from muscular action and fractures from direct injury in the adult."

J. Wellington Byers, of North Carolina, reviewed the fractures of the coracoid process up to 1885, and collected a score and a half of authentic cases of coracoid fracture but found none caused by muscular action. The following are his remarks on the etiology of the condition: "To class these injuries according to the manner of causation, it will be found that nearly half of them result from falls upon the shoulder, the others resulting from direct blows."

Byers either discredited or overlooked a case of fracture of the coracoid process by muscular action, reported in the *Lancet* in November, 1873, and thus described by HULME:

"T. H., æt. 57, miner. Three weeks previously he was on a bank in the act of passing through a wire fence when he slipped and in falling his left arm caught in one of the wires. He instantly felt a severe pain in the fingers, followed by loss of power in the arm and inability to raise the arm from the side. On examination it was found that the coracoid process of the left scapula was fractured and drawn downward."

R. CLEMENT LUCAS in *Guys Hospital Reports*, 1890, gives five methods of fracture of the coracoid process of the scapula.

(1) Direct violence. (2) By dislocation of the humerus. (3) By extreme flexion of the shoulder joint, when the coracoid process is thrown into forcible contact with the under surface of the clavicle. (4) By downward crushing of the clavicle upon it. (5) By sudden muscular action.

Mr. ARBUTHNOT LANE in 1887 first called attention to the extreme flexion of the shoulder joint as a probable cause of fracture of the coracoid and cited as instances two cases quoted by HULKE in *Holme's System of Surgery*. They are thus described:

"Two cases of fracture of the coracoid process have come under my notice. In both the fracture was caused by a fall forward from a slight height, with the arms stretched forward. There was mobility of the tip of the process with crepitus and pain, but not displacement."

The comments of LUCAS are: "If this account be correct, Mr. Lane's explanation would appear to be the only possible one."

If the opinion of Mr. Lucas explains the two cases observed by Hulke, I think the theory of Lane, that extreme flexion may be the cause of the fracture, applies equally as forcibly to the case I have just quoted, which Hulme attributes to muscular action, for Hulme says that in falling the patient caught his left hand in one of the wires of the fence; this it seems to me would cause extreme flexion of the shoulder. The specimen referred to by Bennett, as being caused by muscular action, is in the museum of Trinity College, Dublin. There being no record of an examination at the time of accident and no history of the case, its etiology can hardly be considered unequivocal.

Stimson, in his work on fractures and dislocations, speaks of the fracture of the coracoid process of the scapula in this manner:

"This may be caused by muscular action or by direct or indirect violence. In the former the causative effort is sometimes comparatively slight, wringing of wet clothes in one case, but more often is a powerful effort made with the arm.

In reviewing the literature I have carefully read all the reports and reviews of the cases that I could find and found no case caused by muscular action, that had a full history of the accident and physical examination confirmed by skiagraph.

Dr. GWILYM G. DAVIS said there is evidence to show that almost any bone in the body may be broken by direct violence, and so may the coracoid process. Dr. Allis has produced this fracture by manipulation of the humerus; the break may possibly be caused by tension of the muscles inserted into the process, the coracobrachialis and short head of the biceps. The injury is probably often overlooked in dislocation of the humerus on

account of the greater injury to the joint. The progress of the head of the humerus upward is stopped by the coracoid process, hence one would expect to find fractures of the process in these cases of dislocation.

DR. ADDINELL HEWSON was inclined to disagree with some of the statements made by Dr. Davis. The capsule of the shoulder joint is thickened at the base of the coracoid process by the coracohumeral ligament and above this is the coraco-acromial, a stout ligament connecting the coracoid and acromion processes. In forcible pushing upward of the head of the humerus, the head strikes the coracohumeral ligament and is thus prevented from striking the coracoid process. The weakest point in the capsule is below the coracohumeral ligament. With the patient holding on the car by one hand and with the other pulling on a man, action on the coracoid process would be exerted by the coracobrachialis, the short head of the biceps and the pectoralis minor. The conoid and trapezoid ligaments fix the body of the process, leaving the side and top to be acted on by the muscles. The ligaments have no effect in staying the action of the muscles. If the humerus be placed at right angles to the body and force is applied from behind, the humerus would be forced against the coracoid, and the short head of the biceps and the coracobrachialis would snap off the tip of the process.

## REPORT OF OPERATIONS.

PERFORMED AT THE PUBLIC CLINICS FOR STUDENTS AT THE GERMAN HOSPITAL OF PHILADELPHIA, DURING THE SESSION OF 1905 TO 1906.

BY JOHN B. DEEVER, M.D.,

OF PHILADELPHIA.

Surgeon-in-Chief to the German Hospital and the American Hospital for Diseases of the Stomach.

TWENTY-SIX clinics were held at which there were 215 patients operated upon, with a total of 244 operations. It was found necessary to perform 52 operations on 23 patients at the same sitting. The mortality was 9 cases, or 4.2 per cent.

APPENDIX.—There were 64 cases of *appendicitis* operated upon, of which 39 were acute. Of the patients with acute *appendicitis* there were 29 males and 10 females. The appendix was found acutely diseased and removed at the same time in 4 patients operated upon for other conditions in which it was involved; of these patients 1 was a male and 3 females. In these 64 cases there was 1 death, that of an acute case in a male. The average duration of the attack for which the acute cases were operated upon, estimating from the onset of the attack up to the time of operation, was, in the 23 cases without abscess, 4 3-10 days, and in the 16 cases with abscess, 8 days. Seven of the 23 non-abscess cases were operated upon in their first attack, 9 of the 16 abscess cases had had no previous attacks.

The incision varied according to the pre-operative findings. Of these acute cases, in 12 the McBurney or gridiron incision was made; in 19 the incision was made either through or at the outer border of the right rectus, and of these, in 2 cases it was necessary to make a counter-incision in the right flank for extra drainage, and in 2 others, a small suprapubic incision for tubal drainage of the pelvis. The 8 remaining cases required extraperitoneal incisions, of which 3 were

assisted by suprapubic counter-incisions, and 1 by a counter flank-incision. In 2 cases the pelvic exudate was drained by a tube emerging from the incision in the right rectus muscle.

In 7 cases there was free pus in the pelvis at the time of operation, in 10 there was an abscess near the cæcum, and in 9 the intestines were covered with lymph or pus exudate.

The appendix was subcæcal in 16 cases, to the outer side of the cæcum in 6, in one of which the organ ran up toward the liver, to the inner side in 3, and in 5 cases to the brim of the pelvis or into the pelvis. In 4 cases the pathological condition was so severe as not to warrant searching for the organ, or removing it even when seen. (In the remaining 6 cases, the position of the appendix was not stated.) The organ was necrotic or gangrenous in 9 cases, perforated in 4, kinked in 2, and the remainder were either adherent, congested, swollen, or covered with inflammatory exudate. When possible the appendix was wholly amputated flush with the cæcum, the resulting gap being closed by two semicircular silk sutures which intertwined at each pole of the organ, and in some few cases in which stump-amputation was performed, the invagination was maintained by a silk purse-string suture. The badly diseased appendices were ligated near their bases with catgut and the stump-surface cauterized with liquified carbolic acid, no invagination being performed.

Drainage was required in 15 of the 39 acute cases, and consisted of gauze in 6 cases, glass drainage tube with gauze in 8, and glass tube alone in 1. In the remaining 19 cases, the wounds were closed with tier sutures of chromicized catgut. The majority of the leukocyte counts maintained a direct ratio with the severity of the case. In many abscess cases in which the urine was examined shortly after admission and previous to operation, there was found a marked toxic nephritis which subsided within a day or two after operation. This deleterious action of the pus upon the economy in general and the kidneys in particular, not to mention the peritoneum, we consider a strong argument against postponing operative measures.

A young woman, whose first attack was two weeks under way on the day of admission, exhibited merely slight abdominal distention and slight rigidity of both recti muscles, but tenderness over the entire lower portion of the abdomen.

On incising extraperitoneally, a large amount of pus mixed with serum was evacuated, and 3 large abscesses were located and drained: one deep in the pelvis, another in the median line, and the third at the lower margin of the liver. As the appendix was bound in the abscess wall, it was not removed.

A man, whose second attack began two days before admission, revealed, on examination, general distention and tympany of the abdomen and board-like rigidity of both recti muscles. There was marked tenderness all over the right side of the abdomen, but especially over McBurney's point. The appendix was bound by plastic exudate to the cæcum, was 9 cm. long, thickened, swollen and congested, and the seat of two perforations. In places it was gangrenous. It was necessary to make a counter-incision in the right flank to permit of additional drainage.

The death occurred in a man whose case was very similar to that just cited, except that he was admitted four days after the beginning of his second attack. Examination revealed a leaky skin and evidences of general septic infection. The abdomen showed general distention and tympany, marked rigidity of both recti but greater on the right side, and general tenderness over the entire abdomen, most marked over the right iliac fossa.

Incision opened up a large retro-cæcal abscess in the vicinity of which the intestines were bound together in a plastic exudate, and elsewhere an extensive purulent peritonitis was present. The appendix was 7 cm. in length, retro-cæcal, gangrenous in its lower third, and perforated. So, too, as in the preceding case, a counter-incision was made in the right flank to obtain free drainage. The patient lingered five days after operation. Post mortem revealed an acute fibro-purulent peritonitis, focal gangrene of the cæcum and distal 15 cm. of the ileum, with parenchymatous degeneration of the liver and kidneys. These last two cases are almost identical in every respect, with the exception that one, the fatal one, was two days further advanced in his attack than the other, but *he died*, while the other recovered. This is another forceful and convincing illustration of the oft-repeated cry that *delay is fatal*. And it shows actually

the damage done to the organs by retention of highly toxic pus, which was spoken of above when estimating its effect on the kidney by clinical examination of the urine.

In 25 cases of *chronic appendicitis*, 10 were in males and 15 in females, with no deaths. The appendix was found chronically diseased and removed in 8 patients at the same time the condition for which the operation was performed was relieved; of these, 1 was male and 7 were females. The time elapsing since the last attack varied from seven days to two years. In one case, that of a physician, the disease had existed for 12 years, until continual pain and soreness over the appendix when walking and after eating, which had existed since the last attack, a year previously, led him to seek relief. This same complaint was given by 8 of the 25 patients, bringing them to operation which almost invariably revealed adherent appendices. In 7 cases there was marked constipation, in 4 of which the appendices were bound down by adhesions. One patient, a female, suffered for a year with symptoms that simulated cholelithiasis, complaining of almost continual pain in the epigastrium, at times radiating to the right shoulder, frequent biliary vomiting after eating, and two distinct attacks of jaundice. Operation revealed a slender cord of omentum, 10 cm. long, between the otherwise normal gall-bladder and the chronically diseased appendix. The appendix of another woman contained 2 ascarides of the variety *oxyuris vermicularis* (thread worm). In a man the appendix was found anomalously placed on the ascending colon, 10 cm. above the cæcum. The other appendices were found to be thickened, kinked, congested, constricted or adherent. The lumina, usually patulous, at times were partially obliterated, or contained faecal concretions.

The McBurney incision was made in 16 cases and in the remaining 9 the incision was carried through the right rectus muscle. The appendix was wholly extirpated by the method mentioned above in 12 cases: the stump was invaginated into the cæcum by means of a silk purse-string suture in 12 cases,

and in the remaining case the organ was simply amputated, and the stump cauterized owing to its difficult retrocaecal position. The abdominal layers were approximated with tier suture of chromicized catgut in all cases except one.

*Carcinoma of the Appendix.*—This was present in the case of a female, aged 23, whose appendiceal history had extended over a period of five years, in which there occurred three attacks. The appendix was kinked and curled about the cæcum, curved on itself, its lumen obliterated, and its proximal part congested and swollen. Microscopical examination revealed carcinoma.

THE STOMACH—*Pyloric Stenosis.*—There were 7 cases of pyloric stenosis, 5 benign and 2 malignant. The benign cases were all due to chronic gastric ulcer, and all recovered from the posterior gastrojejunostomy. There were 4 males, ages 15, 20, 25 and 53, and 1 female, age 57. All complained of chronic dyspepsia.

In addition to the thickening, induration, and cicatrization of the pyloruses, the stomachs were all markedly dilated. Five years previously the oldest male had undergone a pyloroplasty elsewhere; after a year's relief, aggravated symptoms returned. In the female, the gastric mucosa presented a markedly hæmorrhagic "weeping" appearance, and the second and third parts of the duodenum were congested. Note was made that one of these patients on discharge two weeks after operation, could eat solid food without discomfort, and had gained two pounds already during that time.

The 2 carcinomata were in males, ages 50 and 55. In both the fulminating dyspepsia symptoms—6 weeks' duration in the elder with the loss of 35 pounds, and 1 year in the younger with the loss of 30 pounds in the latter 4 months—were strictly in contrast to the chronicity of the benign cases. Posterior gastrojejunostomy relieved the elder of symptoms. The death occurred in the younger emaciated man, who in addition to the stenosis showed perigastric adhesions, secondary carcinoma of the head of the pancreas, and a distended gall-bladder. Pylorectomy,

drainage of the gall-bladder, and posterior gastrojejunostomy were performed.

*Cardiac Stenosis.*—There was one case of cardiac stenosis in the person of a female, aged 43, who suffered ten months from symptoms due to gradual thickening of the cardia. Operation revealed a large, diffuse mass at the cardia, extending down over the greater curvature, and infiltrating the wall sufficiently to prohibit gastrostomy. Jejunostomy, however, gave relief.

*Acute Gastric Ulcer.*—This occurred in a woman aged 37 years, who six months previously had been treated in the medical wards, when at one time she vomited 2,000 cc. of bright red blood; she apparently recovered and was discharged cured. Three days before admission to the surgical ward she had a recurrence of hæmorrhage, vomiting 1,500 cc. of bright blood. On the day of admission she vomited 2,000 cc. bright blood, and two hours after admission 1,500 cc. of dark blood. The patient was extremely anæmic, suffered from air-hunger, thirst and had a rapid pulse. She was treated medically with the hope that her condition would improve and warrant operative interference later; as there was no evidence of improvement and the patient was becoming weaker, gradually declining, it was thought under the circumstances best to do a posterior gastroenterostomy. The patient did not survive long. The mucosa showed multiple ulcers and a hæmorrhagic or "weeping" state.

**LIVER AND GALL PASSAGES.**—There were 8 cases of *cholelithiasis*, all females, in 4 of whom the gall-bladder was removed. Three had had enteric fever; in 1 this disease occurred four months previous to operation; chills in 1.

Jaundice occurred in 3 cases, biliary colic in all, biliary vomiting in 4, and nausea without vomiting in another.

Adhesions existed between the gall-bladder and transverse colon (1 case); liver margin, transverse colon and pylorus (1 case); omentum adherent to gall-bladder and liver (1 case); between omentum, transverse colon and gall-bladder (1 case); no adhesions 4 cases.

Calculi, from 2 to 500 were removed from the gall-bladders in all the cases, and from the cystic duct in 3; from the common duct in one case 4, and in another, 1.

Of the excised gall-bladders, 2 were greatly thickened, 1 was extensively diseased, and the fourth was the seat of empyema. The four remaining gall-bladders were drained by rubber tube, from 20 to 300 cc. of bile of varying consistency being present. A rubber tube drained each of the 2 common ducts from which the gall-bladder and calculi had been removed. Strips of gauze and rubber dam were used in 7 cases.

In a case in which the gall-bladder was ulcerated, 200 cc. of bile-stained pus were evacuated from an abscess below the gall-bladder. The omentum was stitched across the wound in the middle, thus separating the upper wound from the gall-bladder below.

A chronically inflamed appendix was removed from one case.

*Biliary Fistula.*—This was present in a male, aged 23, a sufferer from enteric fever five years previously, from whose gall-bladder 200 calculi had been removed elsewhere 18 months previously, this operation being followed by a biliary fistula, to close which an unsuccessful attempt was made 4 weeks after discharge. The fistula was obliterated by invaginating the edges of the gall-bladder; drainage, 1 piece of gauze.

*Cholecystitis.*—Six operations for cholecystitis were performed on 3 males and 3 females, one of the latter dying 7 weeks afterwards from a pronounced myocarditis. Two patients had had enteric fever. All had been jaundiced, all had cramps or pain in the right hypochondriac region, and one had chills. Adhesions were present in one between the gall-bladder, liver and duodenum, and in another between the gall-bladder and pylorus. In no case were calculi found, and all the ducts were patulous. Drainage in each case consisted of a rubber tube sutured in the gall-bladder, beneath which was placed a gauze strip, isolated by rubber dam.

A chronically inflamed appendix was removed from one case.

*Pericholecystitis.*—A female aged 40 had been relieved of 25 biliary calculi elsewhere, 10 years previously, and a year later similar attacks of biliary colic recurred. A month before admission the previous drainage site opened up, discharged three cal-

culi, pus, bile later, and closed again. The attacks ceased, but discomfort persisted. Operation revealed extensive adhesions between the abdominal wall, omentum, gall-bladder and duodenum, but no calculi. The adhesions were separated and gauze drainage instituted.

*Chronic Interstitial Pancreatitis.*—This occurred in a man aged 55, a sufferer from indigestion with occasional severe vomiting for 21 years. Six years previously he had sudden epigastric pain and since then slight epigastric soreness had persisted, and increased a year before admission, since which time he has experienced progressive loss of strength and flesh, reducing from 200 to 166 pounds in the year's time. On admission he was emaciated and anæmic, with a firm mass in the epigastrium. Operation, consisting in gall-bladder drainage by a rubber tube aided by gauze in rubber dam adjoining the cholecystotomy, revealed a hard nodular pancreas, moderate hepatic cirrhosis, gall-bladder distended with bile but no calculi. Before operation the fæces exhibited free fat and bile pigment, but no undigested muscle fibres.

*HERNIA.—Inguinal.*—There were 8 operations, 6 males and 2 females. Of these herniæ, 2 were bilateral, 3 right and 3 left, and of the right two were irreducible, 1 being strangulated. Half these patients had worn trusses. Primary union followed the 10 Bassini operations.

In one patient, a woman aged 23, the right inguinal hernia was congenital, and perineorrhaphy was performed at the same time.

*Umbilical.*—This woman, aged 42, the mother of 7 children, had had the hernia 10 years in addition to a left inguinal hernia. At operation, the sac of the former was adherent, and contained omentum but no gut. The recti were overlapped.

*Incisional.*—These 2 herniæ, both in women, followed appendiceal abscess operations that required free drainage. One was of 6 and the other of 30 months' duration.

*Fæcal Fistula.*—There were two cases of fæcal fistula. One developed in a student 5 days after the repair of an incisional hernia elsewhere, which in turn 3 months previously had followed an operation for acute appendicitis 3 years ago. Operation revealed a fistula in the cæcum 2 x 3 cm., and this was sutured with silk, over which was sutured an epiploic appendage.

The other patient, a male, was also operated on elsewhere 9 months previously for appendiceal abscess, and developed 9 days later, intestinal obstruction, requiring re-operation. Four days after this second operation, a fæcal fistula developed at the incision of the first operation, in which a glass tube had been used. The second incision had been sewn up, and was already healed. Operation revealed a fistula in the cæcum 1 cm. from the ileocaecal valve. The opening was closed with silk, reinforced by an epiploic appendage. The congested, swollen and adherent appendix was removed and the stump retained in invagination by a silk purse-string suture.

*URINARY ORGANS.—Wandering Kidney.*—There were 5 cases 1 in a male, 4 in females, all on the right side. One patient had suffered for 2 years since being thrown from a wagon, striking on her right side. This kidney, movable to the third degree, was sutured by a modified Edebohl's method.

The second case occurred in a single lady aged 43 who, 5 months previously, had experienced pain and sensation of discomfort in the right side after having lifted her invalid mother. Three months later the patient had an attack of acute appendicitis. At the operation the wandering kidney was anchored by a modified Edebohl's method, and the chronically inflamed appendix removed.

Another patient had complained for 3 years of pain below the right costal margin. The third degree kidney was hammocked with gauze.

Associated with pyonephrosis was a freely movable kidney in a female aged 36, that had existed 18 months. To the ordinary symptoms of dull aching pain in the right side were added, a month before operation, frequent, painful and scalding urination. Examination revealed a movable tumor in the right loin space, excoriation of the external urethral orifice, and retroflexion of the uterus. The Israel incision revealed an enlarged, grayish, lustreless kidney, the pelvis and parenchyma of which were the seats of multiple abscesses. The kidney, with 10 cm. of the ureter, was extirpated.

The fifth patient had been operated on at different places for various abdominal conditions, 11 times during the previous 14 years. One of these operations, 9 years before admission, consisted in anchoring the right kidney with silver wire. The patient

had an attack of Ditell's crisis 7 and another 4 months previous to operation which revealed a small cyst at the lower pole of the wandering kidney. The cyst was evacuated, and the kidney hammocked in gauze.

*Ureteral Calculus.*—Two cases of ureteral calculi, both of whom were females who had suffered frequently from severe attacks of renal colic for 10 years. In each case the right kidney was involved and removed. Operation revealed in one a right wandering kidney, of which the pelvis was diseased and contained a calculus. In the other patient there was a small calculus situate one inch below the pelvis, and immediately beyond it the ureter for a distance of about one inch was the seat of a fibrous stricture; microscopic examination revealed chronic pyelitis with early malignant proliferation. Both patients recovered.

*Vesical Calculus.*—This man, aged 56, during the past 11 years had had numerous attacks of renal colic in the left lumbar region, radiating to the groin and genitals. He had passed a number of calculi, and at one time, 3. The last attack occurred three weeks previous to operation, the patient feeling the calculus passing to the bladder. During urination the stream would stop suddenly. The calculus was removed by suprapubic lithotomy, and the bladder drained by a rubber tube. The pre-operative cystitis from self-catheterization subsided, and the urine was normal on discharge 60 days after operation.

*Dorsal Neuritis.*—This patient, a woman aged 30, had been operated on elsewhere 2 years previously for right wandering kidney. Since the operation the patient had suffered from gripping, dragging pain in the right lumbar region in any position she assumed. The pain radiated down over the right buttock. The diagnosis of chronic neuritis of the lateral cutaneous branch of the last dorsal nerve was made. At operation, after removing the scar, this nerve was dissected out and excised for a length of 5.5 cm. The patient was discharged, cured.

*BREAST.—Carcinoma of the Breast.*—There were 8 cases of mammary carcinoma, 1 in a male, and 7 in females. The right breast was affected in 6, the left in 2. Two of the women gave a family history of cancer, and 1 a history of trauma. Halsted's operation was performed in the 4 favorable, and simple removal of the breast in the 4 unfavorable cases.

The male patient, a tailor aged 48, had had a small lump in the right breast for 10 years. This caused no disturbance until it began noticeably to grow 6 months before operation. Examination revealed a hard, irregular, non-encapsulated tumor the size of an egg, which was adherent and ulcerated. The nipple was retracted. Owing to his occupation, the breast alone was removed.

*UTERUS AND APPENDAGES.—Uterine Fibroids.*—There were 7 cases of uterine fibroids, in 6 of which abdominal and in 1 vaginal hysterectomy was performed; in 4 patients, all past the menopause, the hysterectomies were complete. Of the 2 incomplete, in 1 there was added a left intra-ligamentary cyst and a chronically inflamed appendix; in the other, the diseased right tube and ovary were removed with the uterus. The vaginal hysterectomy was performed in a patient aged 63, with Pryor's clamps. The clinical diagnosis of fibroids were all confirmed by microscopical examination.

*Carcinoma of the Uterus.*—There were 6 cases of carcinoma of the uterus, 2 involving the cervix and 4 the body of the organ. Complete abdominal hysterectomy was done in 5 cases, and vaginal hysterectomy, using Pryor's clamps, in one case. The youngest patient was the case of vaginal hysterectomy for squamous epithelioma occurring in a Polish woman aged 26 years.

In addition to the above cases of hysterectomy for carcinoma there were 5 cases of complete abdominal hysterectomy for infected uteri; one of which was complicated by a papilliferous adenomatous cyst of the ovary and a chronic appendicitis; the appendix was also removed.

*Retro-Displacements of the Uterus.*—Retroversion was present in 4 cases, and was corrected in 1 by Alexander's extraperitoneal, and in 2 by Tuffier's intraperitoneal shortening of the round ligaments, in 1 of the latter both ovaries and the left tube being diseased and removed. In another Mann's operation was performed.

A prolapsed uterus of 2 years' standing caused by a laceration of the perineum, was corrected by ventro-suspension and perineorrhaphy.

*Extra-Uterine Pregnancy.*—This interesting condition occurred in 6 patients, whose ages ranged from 20 to 35. Of these, 3 were primiparæ, 2 had borne children 6 years previously, and

1 had had 3 miscarriages. Two patients experienced sudden, sharp, cutting pain in the pelvis, one of whom fainted. Five of the 6 gestations were right-sided and ruptured, and the other unruptured on the left side. Five were tubal and 1 tubo-abdominal. Three of the patients were irrigated with saline solution and drained by a glass tube in the pelvis, 2 were not drained, and 1, in whom a large cyst was found on the opposite side, was drained with gauze.

*Diseases of the Tubes and Ovaries.*—There were 7 cases of pyosalpinx, 4 bilateral in one of which the appendix was involved; 1 right sided in which the appendix was involved, and 2 left sided. Of 3 cases of chronic right-sided salpingo-öophoritis, the appendix was involved in one; 2 other cases were on the left side. Both ovaries were cystic in 1 case, and the left in another. There were 2 cases of left-sided ovarian cyst, in 1 of which was a small dermoid.

In addition to those operations described above, the following less interesting were performed at the clinics:

Abortion (curettage) .....	1
Abscess, perichondrial (post-typhoidal) .....	1
Abscess, ischio-rectal .....	1
Abscess (peri-urethral) .....	1
Adenitis, axillary, tubercular .....	1
Adenitis, cervical .....	2
Adeno-fibroma, breast .....	1
Adhesions, abdominal .....	2
Arthritis, knee, tubercular (excision) .....	1
Arthritis, carpi, tubercular (amputation) .....	1
Atresia of cervix .....	1
Carcinoma of cæcum (resection, ileo-colostomy) .....	1
Carcinoma of sigmoid (ileo-sigmoidostomy) .....	1
Carcinoma of tongue (unilateral excision) .....	1
Cyst, suprahyoid .....	1
Cystotomy, suprapubic, for tuberculosis of bladder .....	1
Empyema .....	2
Endometritis (curettage) .....	3
Fissure-in-ano .....	5
Fistula-in-ano .....	1
Fracture of tibia and fibula, comp. and commin. (amputation) .....	1
Goitre, cystic (unilateral thyroidectomy) .....	1
Hæmorrhage, secondary following an abdominal section .....	1
Hæmorrhoids (clamp and cautery) .....	4

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Hydrocele (radical) .....	3
Hypertrophy of cervix (amputation) .....	1
Lacerated cervix (trachelorrhaphy) .....	1
Lacerated perineum (Emmet) .....	3
Lipomata .....	2
Myxofibroma abdominal wall and ileum (enterectomy) .....	1
Neuralgia, tri-facial (neurectomy) .....	1
Retained secundines (curettage) .....	3
Sarcoma of back .....	1
Sarcoma of parotid (extirpation) .....	1
Stricture, urethral (dilation and perineal section) .....	4
Supernumerary toe .....	1
Ulcer of leg, traumatic (excision and curettage) .....	1
Urethral caruncle .....	1
Varicocele .....	2
Varicose veins of leg (phlebectomy) .....	2
Total .....	64

The deaths were: Acute appendicitis, 1; Carcinoma of cæcum, 1; Carcinoma of tongue, 1; Carcinoma of pylorus and pancreas, 1; Carcinoma of sigmoid, 1; Cholecystitis, 1; Empyema, 1; Tuberculosis of bladder, 1; Ulcer of stomach 1.

PERFORATION OF BOWEL IN TYPHOID FEVER.

DR. CHARLES F. MITCHELL reported eight cases of typhoid fever operated upon for perforation. He referred to the recent articles by Drs. Harte and Ashhurst on "Intestinal Perforation in Typhoid Fever" (*ANNALS OF SURGERY*, vol. xxxix, page 8), and the monograph by Dr. J. A. Scott, entitled "A Study of Fifty Cases of Perforation in Typhoid Fever" (*University of Pennsylvania Medical Bulletin*, May and June, 1905), which treated every phase of this subject in minute detail.

Seven of the eight cases occurred at the Pennsylvania Hospital; and he was indebted to the surgeons of that institution for the privilege of operating upon and reporting them. The other case was operated upon at the Germantown Hospital.

Three of the cases are mentioned in the article by Drs. Harte and Ashhurst and five were reported by Dr. Scott.

The history of the various cases was as follows:

CASE I.—R. P., aged 28 years; colored; hospital No. 2454; admitted October 31, 1902. Perforation, operation, and death on November 6. Had chancre within two years, used alcohol freely, and had malaria several times. Admitted to medical ward after seven days illness characterized by headache, diarrhœa, and



daily chills for five days. The urine showed hyalogramular casts, and the spleen was palpable. Had moderately severe attack. On October 3, at 3 A.M., he was aroused from sleep by sudden abdominal pain (tenth day of disease) situated in both lower zones. This was the first abdominal pain complained of since his illness began. He vomited his milk; pulse became more rapid; the belly was not rigid, but generally tender. By 5.30 A.M. he vomited greenish mucus. There was moderate tympanites present, most marked in lower zones. Rigidity was now distinct, especially on the right side; slight tympanites. Doubtful movable dulness in the flanks. Breath sounds heard distinctly over abdomen as low as umbilicus. Liver dulness was absent in mid-clavicular line, present in axillary line. Leukocytes at 6.15 A.M., 11,360. Operation at 7.30 A.M. Perforation in ileum six inches above ileocaecal valve the size of a slate pencil. Death from general peritonitis. Autopsy.

CASE II.—A. A., aged 28 years; white; hospital number 138; admitted April 4, 1903, discharged June 25, 1903. Had malaria ten years ago, denies venereal disease. Began to feel badly three weeks ago, worked until two days before admission. Had chills, headache, cough, no epistaxis, no diarrhoea. The abdomen was soft and not tender; temperature about 103.1°. The day after admission he complained of abdominal pain; abdomen was rigid and tympanitic, but relief was obtained by the rectal tube. On April 8 he had two bloody stools and after a week the fever began to remit, while the abdomen became painless and soft. On April 10 there was evidence of rough breathing at both bases, with fine râles, and he complained of sharp pain over the left base on deep inspiration or cough. One week later the temperature touched normal, though he still complained now and then of chest pain. On April 19 (the thirty-sixth day) the temperature rose suddenly, and he had severe pain over the costal region, where an occasional friction rub could be heard. The following morning the expression was anxious, the abdomen was very rigid but not tender. There was no vomiting and the temperature was not altered. Diagnosed perforation, and operation done at noon. No perforation or peritonitis found and no pain was experienced after operation for four or five days. Distinct symptoms of consolidation of the left base subsequently appeared. The patient made a good recovery.

CASE III.—A. G., aged twenty-one years; hospital number 1602. Admitted August 25, 1903. Perforation, operation and recovery. Discharged November 2. Entered the medical ward on the tenth day of typhoid. The temperature was high at the start, but was soon controlled by baths. The abdomen was soft and not tender; spleen readily palpable and tender; active bronchitis. At 6.30 P.M. on August 31 (sixteenth day) he complained of sharp pain on the right side of the abdomen, which was very tender; the recti were somewhat rigid; he had neither chill or vomiting. By 9 P.M. all the symptoms had increased in severity; leukocytes were 9,600. Perforation diagnosed; operation; perforation in ilium found. This patient made a good surgical convalescence; the temperature fell and remained down for seven days after operation. On the thirty-third day the temperature again rose and the patient suffered a true relapse.

CASE IV.—F. P., aged eighteen years; admitted November 9, 1903. Perforation, operation and recovery. Admitted with a history of a mild typhoid of thirteen days' duration. At 12 noon on the fifteenth day of his disease he had sudden severe abdominal pain, tenderness on the right side, spasm of the right rectus, costal respiration, and complete obliteration of liver dulness. At 3.30 P.M. the leukocytes had arisen to 17,600; at 5 P.M. they were 16,500, and at 7 P.M. 13,400. The temperature, which was 100° at the time of the first pain, fell to 99.2 at 1.30 P.M., remained the same at 2.30 P.M. and by 3.30 P.M. had arisen to 103.3°. The operation was performed eight hours after perforation and showed free gas in the peritoneum, the presence of fluid, and a perforation in the ilium. This was a so-called typical case of perforation in which all the symptoms were present and the blood findings conclusive. This patient recovered.

CASE V.—H. C., aged twenty-eight years; admitted October 12, 1904. Typhoid perforation, operation, recovery. Discharged January 4, 1905. Entered ward on eighth day of typhoid, the onset of which was marked by fainting attacks and daily chills until the day of admission. He had some abdominal pain, the belly was normal, the spleen palpable. On the day of admission he had a chill followed by high temperature. No malarial parasites were discovered after a careful search. The temperature range was high, though he responded readily to tubbing, but had frequent chills after being in the water. The baths were

stopped on October 16 and sponges substituted, from which time he had no chills. On October 15, the eleventh day, he complained a great deal of abdominal pain. Nothing, however, developed. On October 25, the twenty-first day, he had a small hæmorrhage which did not seem to affect his general condition. He was delirious at times and very stupid. On October 30, the twenty-sixth day, at 5.30 P.M., he cried out with pain in the right side below the level of the umbilicus but radiating through the abdomen. No rigidity was present and a hot water-bag gave relief. Two hours later there was a slight rigidity of both recti, especially the right. He vomited greenish fluid. The pain continued at intervals and his condition remained the same until between 2 and 3 A.M. The leukocytes at this time were 5,900. At 3 A.M. he had another paroxysm of pain, the abdomen was slightly distended and tender, the liver dulness gone, the flanks clear. There was abdominal breathing, but the right rectus was distinctly more rigid than the left. Operation at 3.30 A.M. Cloudy fluid in abdominal cavity, perforation the size of a lead-pencil eighteen inches above the cæcum, in the centre of an ulcer the size of a five-cent piece found. The patient reacted well and continued to do well until the eighteenth day after operation when a faecal fistula developed. This finally closed and he was discharged on January 4, 1905.

CASE VI.—G. A., aged twenty-six. Admitted August 22, 1906. Operation. Death August 30, 1906. Illness began about one week before admission, with headache, nose-bleed, anorexia and general malaise. The bowels were normal. On admission tongue was slightly coated, tip red, spleen enlarged, rose-colored spots, and iliac tenderness. Widal reaction positive; leukocytes count 8,070. Five days after admission had hæmorrhage of eight ounces, temperature falling to normal six hours after expelling hæmorrhage. The following day, at midnight, after taking his medicine, he vomited several times, broke out into a cold sweat, and complained of pain in right iliac region. The abdomen was tender but there was no distention. Leukocyte count 9,870. On the following morning, August 29, at 8 A.M. the belly was very tender; had cough and vomited several times. Was tender over the whole abdomen but it was more marked over the right side. The temperature at this time was 102°, pulse 128 and thready in character. Operation was done at 12 noon, abdomen opened in

right semilunar line and a perforation found the size of a pin-head in the ilium eight inches above the ilio-cæcal junction. This was closed with linen thread and abdominal cavity flushed out with normal salt solution. Gauze drains were used. The patient did fairly well for twelve hours but suddenly collapsed and died the following day, thirty hours after operation.

CASE VII.—F. M., aged twenty-eight years, admitted October 21, 1906. Perforation; operation. Died October 23. Unable to obtain full history, as patient did not speak English. Sent in with diagnosis of appendicitis; had not been feeling well for two weeks previous to admission but had not been confined to bed. Brought to hospital by ambulance at 11.35 A.M. with only the history of a sudden severe attack of abdominal pain the previous evening. On admission the temperature was 103°, the abdomen extremely rigid and tender all over, liver dulness present. The general appearance of the patient and the history of not feeling well for two weeks suggested the diagnosis of perforated typhoid ulcer instead of appendicitis. Operation was done within two hours after admission and pin-point perforation in ilium about four inches above ilio-cæcal valve found. Opening closed with silk sutures, peritoneal cavity not flushed with salt solution but merely drained with strips of gauze. Patient did fairly well for fifteen hours when a change for the worse set in and he died about thirty-six hours after operation.

CASE VIII.—J. C., twenty-eight years of age. Admitted November 17, 1906. Perforation, operation, death November 27. Family and previous history negative. Eight days before admission was seized with severe headache, complained also of feeling tired but did not go to bed until three days later. Had several attacks of vomiting, nose-bleed, cough; no diarrhoea. On admission temperature was 103.3°, patient seemed very dull, physical examination of chest negative, spleen enlarged but not palpable, abdomen distended but not rigid or tender. Urine examination showed the presence of a small amount of albumin and a considerable number of dark and pale granular and hyaline casts. Condition remained about the same until the morning of the twenty-first when, about 11 A.M., he complained of abdominal pain; there was a little more distention, and slight rigidity of the right rectus was noted. Bladder seemed distended, catheter was passed and seventeen ounces of urine were drawn off. This

seemed to relieve the pain somewhat. Leukocytes 6,450. At 2 P.M. leukocytes were 3,800, temperature 102.2°, pulse 102, breath sounds could be distinctly heard over the abdomen which was exquisitely tender, and there was considerable rigidity of the right rectus. Liver dulness was practically obliterated. At 7 P.M. temperature was 103.1°, pulse 106, respirations 42, tongue and lips dry, had not vomited but had been belching a great deal. The abdomen was greatly distended, liver dulness entirely gone, dulness in flanks, the whole abdomen was extremely tender and both sides were equally rigid. Operation. Abdomen opened in right semilunar line, immediately upon which there escaped a considerable quantity of cloudy fluid which was found to entirely fill pelvis. A perforation the size of a pin-head was found in the ilium about four inches from the cæcum. This was closed with linen thread and the whole abdominal cavity flushed with salt solution. Drains of gauze were introduced. The patient did well for five days following operation, the temperature remaining about 99, and the pulse being fairly strong. On the beginning of the sixth day after the removal of some of the drains he complained of pain in the abdomen, the temperature became elevated and he gradually grew worse, dying on the morning of the seventh day. Autopsy showed that the stitches closing the perforation had failed to hold; the presence in the pelvis of considerable pus, also a double lobar pneumonia.

*Résumé.*—All the cases operated upon were males; their ages ranged from eighteen to twenty-eight years; five of the eight cases being twenty-eight years old. In one case operated upon no perforation was found. This case recovered. Of the remaining seven cases, four died and three recovered, a mortality of 57.1 per cent. The first symptom of perforation appeared in three of the cases on the fifteenth day, and in the other five cases on the tenth, twelfth, twenty-first, twenty-sixth, and thirty-sixth day respectively. Hæmorrhage from the bowel preceded perforation in three of the cases, being very slight in two, while in the third it amounted only to eight fluid ounces. One of the cases that recovered had a slight hæmorrhage.

The time between perforation and operation had been reckoned from the first onset of pain; in the cases that recovered it being 4½, 8 and 10 hours, while in the four that died it was 3, 8, 12 and 15 hours.

The leukocytes were counted in all but one case, and all showed a leukocytosis except in one of the three that recovered, which had a count immediately before operation of 5,900. In the case which had the highest count there were 17,500 leukocytes three hours after the first symptom, two hours later 16,500 and two hours still later or seven hours after perforation had taken place there was a count of 13,400. In the last case, operated on November 21, 1906, at the time of the first sign of trouble the count was 6,450, three hours later it was 3,800, and just previous to operation, or eight hours after the first symptom of perforation, there were 9,000 leukocytes.

None of the cases had more than one perforation; four were pin-head size, one the size of a lead-pencil and one that of a slate pencil. In one case the size of the perforation is not mentioned in the history.

It is interesting to note that the case which had the largest perforation was one of the three that recovered. The last eighteen inches of the ilium was the seat of the seven perforations.

The various operations were done under ether anæsthesia, incision made either through the outer border of the right rectus or through the right semilunar line. Fine silk was used to close the perforations except in two instances when linen thread was used. The abdominal cavity was flushed with salt solution in two of the cases, both of which died. Gauze drainage was used in every case and the wounds left entirely open to permit free drainage.

DR. RICHARD H. HARTE said that the figures presented by Dr. Mitchell were very materially below the general mortality in typhoid perforation. Through Dr. Mitchell's large experience at the Pennsylvania Hospital he has acquired ability of high order in the diagnosis of perforation. An important point of technic following operation has been emphasized by Dr. Mitchell. It is the custom of some surgeons after closing the perforation to flush the abdominal cavity with salt solution. This Dr. Harte believes to be bad surgery as it disseminates septic material. In cases with a small perforation and in which operation is performed reasonably early, irrigation is a mistake, it being applicable only in cases in which extensive soiling of the peritoneum has taken place and where dry sponging would be out of the question. Instead, the cavity should be wiped out and packed

with large quantities of gauze, this being placed between the coils of intestine. Many deaths are due to perforation in typhoid fever and the surgical side should be presented more emphatically to medical men, that more cases may be recognized early and saved. In connection with one of Dr. Mitchell's cases, Dr. Harte mentioned a personal case in which the patient died six weeks after perforation.

DR. JOHN B. DEEVER agreed with Dr. Harte regarding irrigation in infections of the peritoneum. In these cases the best rule is to get in quickly and get out quickly, doing as little as possible. The consensus of opinion now is that irrigation is not so good as was formerly supposed. Dr. Deaver believes that perforation and hæmorrhage in typhoid have as one of the causes cold bathing. When the patient walks to the tub his resistance is taxed; later, while in the water he is chilled, and it is reasonable to believe that hæmorrhage is thus induced. It is a good thing for country patients that tubs are not available. Dr. Muhlenberg of Reading formerly used the Bland method heroically and had many cases of hæmorrhage. Now he employs a let-alone policy and sees but little hæmorrhage. If this be true, why would there not be fewer perforations if too strenuous bathing was not employed?

DR. W. JOSEPH HEARN said that he does not wash out the peritoneal cavity at all in cases of peritonitis, but simply sponges. In but few cases is peritonitis general, and these patients die. The same rule applies here as in burns. If all the skin is destroyed the person dies, if only part is burned he may get well. So in cases of general peritonitis the subjects die. Dr. Hearn has recently operated on four cases of perforative appendicitis, the perforation being near the junction of the appendix with the cæcum. In all, the abdominal cavity was simply sponged out, and he is sure that three of the patients will get well and entertains hope regarding the fourth.

DR. WILLIAM L. RODMAN said that Dr. Mitchell's results were better than the average and show the value of early diagnosis and prompt operation. In the main, Dr. Rodman is in accord with what had been said about irrigation. If gross soiling of the peritoneum be present he irrigates, as in the case of gunshot wounds of the intestine. As a rule in these cases, if operation is performed before intestinal paresis and soiling of the peri-

toneum have occurred, irrigation is not employed. Where visible soiling is present and fæces have passed out of the intestine, irrigation is perhaps best. It is remarkable how often one finds in these cases that no soiling has occurred. Murphy in 1890 demonstrated that soiling does not take place until the intestine is handled, and this observation stands good to-day. In one case of twenty-one perforations of the intestine by a rifle ball no extravasation had occurred, though two of the perforations were large. Operation was performed an hour after the injury. In another case a great amount of extravasation was present, this including an apple core which had passed into the peritoneum. As a rule, then, there is not much extravasation if cases of perforation are operated upon promptly; if there be gross soiling of the peritoneum, irrigation is demanded.

DR. GWILYM G. DAVIS has during the past year operated on eight patients with perforation and one in which the physician desired operation and no perforation was found. Six of the eight perforative cases died, though some lived quite a while after operation. Others were in extremely bad condition and lived but a short time. The non-perforative case also recovered. As to the mode of operation the transverse incision is employed and the operation begun under local anæsthesia. If perforation is found a general anæsthetic is then given. As to drainage and sponging, if the intestine is pulled out and soiling ceases, sponging is regarded as sufficient. If soiling be extensive, sponging requires too much time and causes too much shock. When fæces are spread all over the abdominal cavity, irrigation is employed. The operation requires from nine to twenty-five minutes. One must be governed by the condition of the patient. In some cases the work may be done with exactness, in others one must hurry. When perforation is not found, general anæsthesia is not necessary and the operation does not prejudice recovery. One of these patients had a second perforation some time after the first, for which an operation was done on the opposite side. He recovered. Counting this as an additional case makes 9 cases with 3 recoveries besides the recovery from the exploratory procedure.

DR. MITCHELL, in closing, said that if he had employed local anæsthesia in one case he would not have found the perforation. When the abdomen was opened it was clear and no exudate was

present; protracted search was necessary to locate the opening. In answer to a question of Dr. Rodman, Dr. Mitchell said that ten hours was the longest time between perforation and operation in the cases that ended in recovery.

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