with brandy, and on awakening he took a slice of bread soaked in water and some essence of beef. During the remainder of the day and the following morning he was simply exhausted through constant talking and want of sleep, but he could swallow easily. At 9 A.M. he wished to go out, and actually reached the door, but was persuaded to return. His exhaustion was very intense, and the albumen in the urine very abundant. At noon of the same day he died.

Thinking that perhaps the pilocarpin had not been pushed sufficiently actively in this case, in the next it was given at short intervals, and with beef-tea injections. The struggle was, however, shorter here, for within forty-eight hours of his admission the man succumbed. It is peculiar as showing the nature of the disease to state that in the first case there was a thorough and intelligent appreciation of what it was; while in the other there was neither wonder nor anxiety, or even, so far as could be learned, any knowledge that the disease was hydrophobia, or that a bite received three months previously had any connexion with the ailment for which he was admitted. Dr. Charteris said that his experience now of three cases under his immediate care, and of two others which he had seen, led him to call the disease "pantophobia"; for dread of everything, from the tiniest draught of air to the most carefully muffled footstep, was as significant as the undoubted terror inspired by the thought or the sight of water. The post-mortem, conducted by Dr. Foulis, and the microscopical observations subsequently made by him and Dr. Middleton, revealed nothing which cannot be observed in any nervous disease attended with great excitement and followed by rapid death—such, for instance, as acute mania or delirium tremens. These investigations will be published. The bite in the cases mentioned was in the fleshy part of the hand, between the thumb and forefinger, and the dogs that caused the injury, so far as can be accurately ascertained, were retrievers.

Four cases of chorea were treated by arsenic in the form of Fowler's solution, given in doses varying according to age, from four to eight drops. Improvement was observed about the eleventh day, and the system was thoroughly free from the malady in four weeks, when the constitutional effects of arsenic were manifested. Cod-liver oil, iron, and a generous diet formed the after-treatment of the patients elected to remain in the infirmary. Two girls of the age of fifteen happened to be admitted with the disease on the same day and were placed in contiguous beds. One was a severe case, the other was mild. After a few days it was observed that the malady in the latter was greatly aggravated, and that she was rapidly becoming worse instead of better. This was attributed, and rightly, to the peculiarly imitative character of chorea, and the patients were separated, one being placed in a private room. This precaution was amply justified by the amendment which ensued. In almost every case of chorea, if carefully investigated, the cause is found to be "fright," although this, on an inquiry, may not be obtained from the patient, but from the mother and other relatives. In Dr. Charteris's wards for the last three years all other drugs have been abandoned, and arsenic has alone been trusted to.

Numerous cases of skin diseases were treated, including erythema, eczema, rupia, ecthyma, sudamina, herpes (labialis and zoster), psoriasis, lupus, scabies, and tinea sycosis. Of psoriasis there were nine examples, and in these chrysophanic acid ointment (one drachm to the ounce) was alone employed. In two of the cases the disease was not confined to its usual sites, but completely covered the body, literally from the crown of the head to the soles of the feet. The peculiar and specific action of the ointment was very gratifying, and in an age of medical scepticism marks an epoch of therapeutic success. A singular circumstance was noted—viz., that the acid rubbed in must have some constitutional action, for if applied only to one side of the body it seems eventually, though more slowly, to remove the scales from the other. This observation, although true in one case, was not so marked in the other, and would require further verification. Generally speaking, in psoriasis the patient's skin can be made clean and smooth in nine days from the commencement of the treatment by the acid, and when, as formerly, arsenic was trusted, it required at least six weeks, and even then the result was by no means so satisfactory.

In conclusion (Dr. Charteris said) there had been in the wards 252 patients during the session; and of these, excluding six who died twenty-four hours after admission, the mor-

talities were twenty-four. Many of those admitted were hopelessly ill, but it seemed inhuman to remove them to the squalid misery of the homes from which they came, and they were allowed to linger amid the comparative comfort of a well-ventilated and well-nursed hospital ward. It would be easy to show a very clean bill of health and an infinitesimal mortality if the physician was foreseeing, and fatal chronic cases unfeelingly dismissed. Such fame—if it were not a desecration of the word to call it so—could only be attained at the sacrifice of conscience and self-respect. And besides, the chronic cases would form the staple of the after-practice of the students, and the knowledge acquired of the varied phases of approaching death was an inestimable boon to them, for they could tell of this to wearied watchers, and dictate little comforts during life's last hours.

They had had an opportunity of studying nearly every disease treated of in ordinary books of medicine, and in many of these they had seen how wide was the field, how hopeful the future of practical therapeutics. Clinical experience showed how few symptoms or signs were in reality significant of any one particular disease, and how slowly but surely the art of healing would be consolidated, not by physiological experiment or laboratory dreams, but by carefully recorded facts and well authenticated recoveries when the proper remedies had been judiciously chosen. They could assist much in the work, more than they at present imagined, if when practitioners they still remained students and jotted down for publication details of cases, whether successes or failures.

THE ANATOMY AND SURGERY OF THE PERITONEUM.¹

By AUGUSTUS J. PEPPER, M.S., M.B., F.R.C.S.

THE serous membranes—peritoneum, pleuræ, and pericardium—are derived primarily from one common cavity, the pleuro-peritoneal. This is formed by the splitting of the ventral lamina of the middle layer of the blastoderm, the outer portion of which forms the abdomeno-thoracic wall (somato-pleure), and the inner portion the muscular and sub-mucous coats of the alimentary canal, together with certain viscera—in part or entirely—of the thorax and abdomen (splanchno-pleure). Subsequently by the formation of the diaphragm, the pleural is shut off from the abdominal cavity; a further stage consists in the separation of the two pleural sacs and the pericardium. The lower part of the alimentary canal, it will be remembered, is derived from an invagination of the epiblast from the surface, in the same way that the buccal cavity is formed above or in front. Thus at one time the alimentary canal consists of three segments, mapped off by two septa; by absorption of the latter continuity is established. The normal remains of the anterior septum we see in the pillars of the fauces, whilst the posterior vanishes, except in certain cases known as imperforate anus and congenital absence of rectum.

I now confine myself chiefly to the consideration of the peritoneum—its anatomy, pathology, and surgery. And to simplify description I propose to make four categories. 1. Developmental anatomy. 2. Acquired pathological conditions. 3. Accidents or injuries. 4. Surgical operations.

First, as to certain points consequent on developmental changes.

A. The opening of the Fallopian tubes into the peritoneal space. The ducts of Müller arise in connexion with the splanchno-pleure layer of the mesoblast, their upper or forward extremities abutting on the adjacent cavity, and later on, when these become hollow, they are continuous with the peritoneum. The practical outcome of this is the possibility of fluids injected into the uterus or infective material formed there, finding their way into the peritoneum and setting up peritonitis.

B. The splitting of the mesoblast, stopping short of the termination of the trunk behind, the peritoneum will not reach to the extremity of the mucous canals, and so we find that the lower part of the rectum and the vagina are free

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from the serous covering; an explanation of the feasibility of performing numerous operations on this the most important surgical region of the body—e.g., the removal of stone, the cure of fistula, the relief from retention of urine, and, last but not least, that combination of “operative audacity and surgical triumph,” the removal of a fœtus from the uterus by elyototomy in the groin.

C. A process of peritoneum accompanies the testicle in its descent from the abdominal cavity to the scrotum, and this becomes obliterated to the extent of the spermatic cord, the closure usually becoming complete at from twenty to thirty days after birth (Birkett); the lower portion, however, remains open, as the tunica vaginalis testis, which may become the seat of hydrocele, hæmatocele, &c. The usual course is for the funicular part of the vaginal process to shrink, firstly at the internal ring, then at the upper part of the testis, and finally throughout its whole length; but not uncommonly it remains partially or entirely open. Let us consider the varieties that are met with. Supposing no closure occurs, then there is a direct passage from the peritoneal cavity into the tunica vaginalis, and along this a piece of bowel or serous fluid may pass, constituting congenital hernia and hydrocele respectively. We diagnose the former in many cases by the history of the sudden development of a swelling reaching at once to the bottom of the scrotum; the latter by the reducibility of the fluid, which had before occupied the vaginal sac.

There may, however, be apparent but not absolute obliteration of the funicular process, and so a possibility of irritating injections (though these are rarely required for the cure of hydrocele in the child) reaching the peritoneum—a mishap you may always guard against by applying pressure at the time over the external ring. Again, should the tube be obliterated only at the top of the testis, a coil of intestine comes down, and does so as rapidly as in the hernia congenita of Haller, and differs from it only in the fact of its being co-extensive with the cord. This is funicular hernia. Or the tube may remain open for a variable extent along the cord—although its continuity with the abdomen is broken, in this case a hernial protrusion must make its own sac, which latter becoming ensheathed by the funicular part of the tunica vaginalis, constitutes encysted hernia, or, as it is often ambiguously styled, infantile. Lastly, a small sacculæ may be the only deviation from the normal, and this may be the seat of encysted hydrocele of the cord.

One word about the so-called diffuse funicular hydrocele. In most text-books it is described as a serous infiltration of the cellular tissue of the cord, which I believe to be erroneous, for pressure at the internal ring would give rise to it; and were this the correct pathology we ought always to find an associated varicocele—a combination not by any means constant. It seems to me that it may be caused by two anatomical states—*a*. Fluid in the whole funicular portion of the tube, but not communicating with the cavity of the abdomen. *b*. Fluid contained in several loculi of the tube from irregular closure at several spots. It would be well to abolish the word diffuse, and to speak only of the several forms of encysted hydrocele—congenital hydrocele comprising two varieties, complete and funicular. In the female the process of peritoneum, if open, forms the canal of Nuck, and may be the seat of hydrocele or hernia.

D. There are several points with regard to the changes taking place in the peritoneum after birth due to alteration in shape and size of the abdominal viscera, to the growth of the pelvis, and to the stretching of certain parts of the mesentery and other folds. Two or three illustrations will suffice.

Enlargement of the spleen in the earlier stage is known to encroach on the thoracic cavity relatively more in the child than in the adult. This is owing to the pleuro-colic fold—which forms a kind of shelf beneath the spleen—becoming gradually stretched as life advances, by the distension of the stomach and colon, for this reason the enlarging spleen in the adult more readily oversteps its natural barrier.

Intussusception of the bowel commencing at the ileo-cæcal valve might with propriety be termed an accident incidental to infancy and childhood. There are two factors in its causation; on the one hand, an irregular peristalsis, with an empty state of the bowel; on the other, the anatomical relations of the peritoneum. In children the whole of the cæcum is freely slung by mesentery, in adults it is more tightly bound down to the iliac fossa. And bearing in mind that in intussusception of the bowel the part first invaginated

is always the most advanced, or, in other words, that the ensheathing portion becomes involuted, we see how in children this portion of the bowel easily leaves its normal situation, stretching its moorings and carrying them with it.

The bladder in children is always to some extent in contact with the abdominal wall; in adults only when distended; for in children the pelvis is but little developed. This bears upon punctured wounds of the lower part of the abdomen, and also on the operation for stone.

As an illustration of abnormal development I may cite the case of congenital defect or absence of the diaphragm.

I pass now to the second division of the subject—acquired pathological conditions. These are practically inflammation and its results. It is strange that although the three main serous membranes have their origin in common, they differ so widely in their behaviour with regard to the common causes of inflammation, each one seeming to identify itself with the viscera with which it is connected. Thus we find that pleurisy frequently follows exposure to cold; pericarditis and peritonitis rarely, if ever, as an immediate result. Pericarditis is mainly dependent on toxæmic conditions, such as that of acute rheumatism, chronic Bright's disease, and pyæmia; whilst peritonitis is almost unknown, except as a sequence of injury, taking the word injury in its widest sense, so as to include not only direct wounds of the peritoneum from without, but in addition the irritation from physical and chemical substances that may find their way from rupture of the underlying structures, such as a hydatid cyst, gall-bladder, and abdominal viscera; as well as diseased states, spreading by continuity, such as cancer of the liver, or typhoid ulceration of the intestine. Many cases are recorded as idiopathic peritonitis simply because a more rigorous search has not been instituted. How easily a minute perforation, or a body of small size (in one case the operculum of a whelk) impacted in the vermiform appendix, may be overlooked in presence of the more staring pathological appearances. It is only recently that I demonstrated in the post-mortem room a hole little larger than the diameter of a pin in the ileum of a patient who had died from perforative peritonitis complicating typhoid fever. This probably would never have been seen had we not carefully flushed the intestine with water, and yet, small as it was, no one could entertain the least doubt as to its having been formed during life—a small, deeply-excavated ulcer on the one side, an excessive amount of lymph on the other, and the aperture itself bounded by a narrow ring of necrosed tissue.

The symptoms and pathological appearances of peritonitis vary greatly in different cases, according to the intensity of the cause, the rapidity of the process, and the general condition of the patient. Thus it may be chronic, partial, and adhesive, as when it occurs in the course of cancer and tubercular enteritis without perforation. It may be latent, as we find after the operation for strangulated hernia in old people, or where the bowel has been acutely nipped for a long time. This, instead of being looked upon as a special kind of peritonitis, should be considered simply as peritonitis in a subject with depressed vital powers. The pathological changes are going on, but the general response is feeble. Finally, we meet with cases in which the inflammation is so rapid that it assumes a purulent form from the first.

I would call attention to two of the more important symptoms of the disease. Firstly, the *Pulse*. In the sthenic form it is said to be rapid, small, and wiry; this is due to reflex contraction of the arteries generally, excited by the irritation of a large number of nerves, together with a powerfully-acting heart. In the asthenic, and in all cases in the later stages, it is rapid, small, and compressible, a paralytic condition taking the place of, or succeeding, the irritative. Secondly, *Tympanites*. This is caused by increased pressure from accumulated gases from within, and paralysis caused by inflammation of the muscular coat from without. It is curious to what extent cellulitis may spread without producing peritonitis. In a case of lithotomy performed at this hospital purulent exudation had extended from the pelvis along the course of the ureter and iliac vessels, and yet there was no peritonitis.

One result of chronic thickening of the membrane is to diminish the liability to acute general inflammation, so that the sac of an old hernia may be opened with much less risk than that of a recent one. This is an instance of the general pathological law—that slowly progressing lesions produce less marked effects than others of even less extent with

rapid onset; for the parts involved appear to accommodate themselves to their altered mode of life. Thus a tumour within the skull for a long time may give but little evidence of its existence; whereas a hæmorrhage as large as a bean may be followed directly by complete hemiplegia. Again, the prognosis in secondary amputations for chronic disease is more favourable than primary ones for accident. We gather from this the indication that major operations of expediency should not be performed on patients immediately taken from active life, but they should be confined to bed for some days prior to surgical interference.

This brings me to the third part of my subject. The peritoneum may be bruised, extravasation occurring in the retro-peritoneal tissue; this in a healthy subject almost invariably leads to absorption, but if the continuity of the serous surface be broken, and especially if the lesion communicate with the air, the danger is manifoldly increased. The treatment of a simple, incised wound consists in passing the ligatures through the entire thickness of the abdominal wall, so as to bring the divided edges of the peritoneum together, in order that the inflammatory lymph may seal the wound from within. It has been objected that the needle-punctures may of themselves set up peritonitis; but surely this possible drawback is more than counterbalanced by the advantage gained. A slight amount of local peritonitis is advantageous in order to prevent discharge from the wound if it occurs from finding its way into the peritoneum. In lacerated wounds where adhesion by the first intention is impossible, it is best to leave them freely open to admit of the escape of pus and débris externally, there being less danger than would at first sight appear of noxious matter making its way into the abdomen; remember that in the natural condition there is no such thing as a peritoneal cavity; it is only a potential space, and the atmospheric pressure on the abdominal wall tends to prevent the separation of the parietal and visceral layers. Penetrating or perforating wounds, such as a bayonet-thrust, on account of the small intestine being loosely slung by the mesentery, may happen without injury to the coils of gut, these being pushed aside by the advancing body.

There are certain portions of the viscera less liable than others on rupture to extravasate their contents into the peritoneum. The best example is the duodenum in its second and third parts; for although this portion of the bowel, on account of its anatomical relation to the spine, is exposed to greater chances of injury from blows, still as its posterior surface is free from serous membrane, peritonitis from its rupture is less likely to occur than from rupture of other parts of the gut. The same argument applies, though with less force, to the cæcum and ascending and descending colon.

Large vessels may be severed and a loss of blood sufficient to cause death may occur without there being dullness on percussion, the extravasation being found diffused widely in the sub-peritoneal tissue; and yet as a matter of routine we percuss the flanks in severe abdominal injury, knowing that if the blood be poured into the cavity of the peritoneum to a fatal extent, it will mainly find its way into the more dependent parts.

Surgical operations about the abdomen are planned where possible so as to avoid implicating the peritoneum, it being found that under these circumstances the risk is much diminished. This it is which gives lumbar colotomy the superiority over Littré's operation, in spite of minor drawbacks.

Since the introduction of a rational system of antiseptics surgeons have become less timorous and unsparing with the use of the knife. I emphasise the word "rational," because antiseptics are not infallible. They cannot prevent contagion being carried by the unwashed hands of obliging assistants, or by a forceps, on which, perhaps, cling products of decomposition of blood, &c., from a former operation. There are certain operations which must be done through the peritoneum, such as gastrotomy, for establishing a fistulous opening into the stomach; gastrotomy for relief in certain cases of acute obstruction of the bowels, and for Cæsarean section. There are more which are done behind it—e.g., the perineal, rectal, and supra-pubic operations for stone; rectal and supra-pubic puncture for retention of urine; ligature of the main arteries of the abdomen; the removal of a calculus from the pelvis of the kidney, and the removal of a foetus from the uterus in cases of extreme pelvic deformity in lieu of the older and probably more dangerous procedure. Finally, there are the so-called tappings through the peritoneum, for ascites, for ovarian cyst, for hydatids,

for excessive tympanites, and for accumulation of fluid in Douglas's pouch, the last operation performed through the vaginal wall.

One word of advice and I have done. Never pass a trocar into the abdomen without having previously introduced a catheter into the bladder, and without having made yourself sure, by percussion, that no part of the bowel lies in your path by reason of an elongated mesentery.

ON IRREGULAR GOUT, WITH REMARKS ON THE PATHOLOGY OF GOUT.

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GOUT presents itself in so many different forms that it is often difficult to recognise it when we meet with it, and many cases of real gout are no doubt frequently overlooked because the disease has not been found in its accustomed seat.

One patient suffers from bronchitis, another from psoriasis; one may have gravel with or without albuminuria, another may have gout in his big toe. It may present itself as asthma, or again as neuralgia of the face. One may be alarmed by his having to be treated for apparent gonorrhœa, while another may have diarrhœa with piles and tenesmus—all of which diseases may be but local exhibitions of constitutional diathesis.

Frequently I have found that some of the skin diseases we meet with are entirely dependent upon the gouty diathesis. One patient had been suffering from psoriasis for three or four years, had had the usual remedies prescribed, but without success. Finding that his brother had suffered from gout, that his father had died of apoplexy, and had often been laid up with gravel, I treated the case as one of gout, and the patient gradually improved. I really looked upon this case as essentially gout of the skin, considered that the gravel the father suffered from was dependent upon the same cause, and that in all probability the apoplectic attack was owing to chalky deposit in the walls of the arteries of the brain, in consequence of which these walls were impaired, ultimately gave way, and apoplexy was the result.

I have treated several cases of eczema in the same way whenever I have been able to find that there was any tendency to gout.

A patient of mine, who had suffered for several years from severe attacks of this complaint confined to the big toe, who had been a heavy drinker, and had lived well, one night, when the pain in his toe was excruciating, was tempted to put his foot in a vessel containing cold water to relieve the pain. This did certainly relieve his pain, but soon afterwards his breathing became extremely difficult. I had to be sent for, and found that he had all the ordinary symptoms of asthma. Having been told of the manner in which he had treated himself, I naturally looked upon the asthma as dependent upon gout, and applied local remedies to try, if possible, to cause a return of the disease to the toe, but without avail. This gentleman continued to have severe attacks for two years, but he found that when he abstained from excessive eating and drinking, and took a reasonable amount of exercise, the pain to a certain extent was relieved. One day, when jumping out of a cab, he fell, and was laid up for weeks, for his old friend had returned to his big toe, took up its residence there, and frequently gave tokens of its presence whenever the owner of the toe acted unwisely.

How often we meet with patients who have suffered for days from many of the premonitory symptoms of gout, who have been, as it were, relieved of the gout by the passage of large quantities of gravel, in many instances calculi, and in one of my own cases the appearance of gravel alternated with gout in the big toe: a hint that we should treat such symptoms as gout whenever we have any suspicion of gouty diathesis, or where the habits of the patient tend to make us think that it might have been acquired.