epidemic, in which no less than 278 soldiers and a corresponding number of civilians had been attacked, was in fact the flesh-worm disease.

The results of treatment have not been very satisfactory. The cases are not seen in the earliest stage, when emetics and purgatives would do much good; these remedies, however, being comparatively useless after the fourth day from that on which the trichinous food has been consumed. Nevertheless, if diarrhoea and vomiting be absent during the first two or three weeks, it will be advisable to produce purging by full doses of calomel, so as to remove any intestinal trichine which may remain. Moreover, where there is diarrhoea, it seems unadvisable to attempt to check it. The sleeplessness and copious sweats were found by Dr. Rupprecht to be best relieved by the wet-sheet packing; the different preparations of opium proving injurious. With regard to any special remedies for destroying the muscular trichine, nothing satisfactory is known. The picro-nitrate of potash and benzole are those agents which seem to be the most promising, but further experiments are needed before they can be recommended. The sulphocarbonate of soda might possibly prove useful.

XXII. ULCERATION AND PERFORATION OF THE BOWEL.

Ulceration of the bowel may be a result of muco-enteritis, typhlitis or dysentery in the small or large intestine respectively, and it sometimes occurs in the course of acute diseases, such as variola, typhus, or pneumonia, or near the fatal termination of chronic diseases. In enteric fever ulceration of the solitary glands or more frequently of Peyer's patches constitutes the characteristic lesion, as it does also of tubercular disease of the bowel. In the latter affection the ulcers extend transversely round the intestine, while in enteric fever the long axis is longitudinal. Prolonged irritation and pressure by accumulated pus, an intestinal concretion, gall-stone, or by a foreign body which has been swallowed, again, may give rise to ulceration of the intestinal mucous membrane.

The intestine may be perforated owing to disease in the coats of the bowel, or from the extension of ulceration affecting adjacent organs. The first class of cases has been already treated of. The second division remains to be briefly considered—viz., where the perforation occurs from without inwards.

*Hydatid disease and abscess of the liver* not unfrequently end by perforating the bowel; when hydatids or pus, as the case may be, will either be vomited or passed away in the stools. The symptoms
of hepatic disease, the slow growth of hydatid tumours, the occurrence of local peritonitis, and the character of the discharge, will render the diagnosis of these cases comparatively easy. Then, in the same way, abscesses of the spleen and kidney may open into the bowel; although such events are of very rare occurrence.

Calculi from the gall bladder sometimes enter the bowel by direct ulceration through the opposed coats of the reservoir for the bile and the duodenum. This has generally been the case in those instances where an impacted gall-stone has produced obstruction of the bowels, the concretion having originally been too large to pass down the cystic duct.

Ovarian cysts have often emptied themselves by a communication taking place between them and the cæcum, or colon, or rectum. The subsidence of the tumour, together with the passage of the cystic fluid per anum, will point to the true nature of this occurrence.—Many examples of extra-uterine fætation could be referred to, where the sac containing the fætus has formed a communication with the cavity of the rectum. As the fætus decomposes, its soft parts and bones are gradually voided with the stools; while with care the mother will gradually recover.* Indeed, one or two rare instances are known in which extra-uterine pregnancy has twice occurred in the same woman, with this same favourable result.—Ovarian abscess, as well as abscess the result of pelvic cellulitis, may open into the rectum. In both instances fæcal abscess almost invariably results, owing to some portion of the contents of the bowel passing into the purulent cyst. The suppurative process is thus kept up: consequently these abscesses burrow in all directions, opening into the bladder, vagina, groin, and perhaps again into the rectum. The wife of a medical man was long under my care with such an abscess; there being at one time three separate openings in the groin from which pus, urine, and liquid feces used to be discharged. The practitioner may try to effect a cure with strengthening food, tonics, opiates for the mitigation of pain and diarrhoea, cod liver oil, sea air, rest, and carefully adapted pressure; but usually his efforts will fail. The patient either dies from haemorrhage; or she gradually sinks from exhaustion produced by the purulent discharges, the constant pain, and the general weariness.

In cancer of the uterus it is no very uncommon circumstance for the ulceration to extend through the uterine or vaginal walls into some portion of the bowel which has previously become adherent to the diseased mass. In such cases there is often also a fistulous communication with the bladder, so that the poor woman's sufferings are greatly increased by the constant escape of feces and

urine at the vaginal outlet. The rectum, vagina, and bladder become converted into a single cavity; with such distressing consequences as can be imagined. Fortunately such untoward events as these only occur during the last stage of malignant disease—towards the termination of life; since, beyond giving temporary ease by sedatives, nothing can be done to afford effectual relief.

Suppuration in the abdominal parietes, the consequence of inflammation excited by falls, blows, &c., often simulates deep-seated disease. The abscess may open externally, or into the peritoneal cavity, or into some part of the intestinal canal. When the purulent collection tends towards the surface the diagnosis is not difficult; but when the matter burrows among the muscles, and is confined beneath the fascia of the abdominal wall, the case is very likely to be mistaken for peritonitis, malignant disease of some internal organ, or for some affection of the cecum, liver, kidney, spleen, &c. It is important that the true nature of the case should be detected as soon as possible; since all risk is avoided by making an early opening, and so permitting the contents of the abscess to be discharged externally.

XXIII. DISEASES OF THE RECTUM.

The diseases of the terminal portion of the alimentary canal are numerous and important. They often give rise to serious bodily suffering. The sympathy between the uterus and rectum being great, it can hardly be doubted that disease of the latter is at times the cause of barrenness, as well as of symptoms which are erroneously referred to the uterus or ovaries. Affections of the rectum, in almost all instances, cause great mental depression. Indeed, like disorders of the sexual organs, they produce an amount of anxiety greatly disproportionate to their gravity; for it is fortunate that most of them readily yield to well-devised treatment. Although the rectum is some six or eight inches in length, yet the greater number of its diseases may be said to be situated within two inches of the anus. Consequently they are easily detected by a tactile or visual examination, while local remedies can be employed without difficulty.

1. RECTITIS, PROLAPSUS, STRICUTURE, &c.

Unless due to violence, or to the presence of some foreign body, simple inflammation of the rectum is, I believe, a very uncommon affection. Where it occurs, the local and general suffering it gives rise to are considerable; though with a correct diagnosis
relief can soon be given. In former days rectitis may have been more frequently met with; since drastic purges, large doses of aloes or calomel, and the abuse of intoxicating drinks are very likely to provoke it. Moreover, the inflammatory process more rarely extends to the rectum from contiguous parts than might be expected; for during the past twenty years I have very seldom met with such an occurrence, though a large number of severe ovarian, uterine, and vaginal diseases have come under my observation. The chief symptoms of rectitis are a sensation of intense heat around the anus, severe pain shooting up the sacrum and back, spasmodic contraction and excessive sensitiveness of the sphincter ani, tenesmus with the passage of dark-coloured and gelatinous mucus, irritability of the bladder which urinating fails to relieve, and considerable constitutional disturbance. The principal remedies consist of rest in bed, a milk and farinaceous diet, sedative enemata (F. 339), and the repeated use of the hot hip-bath. Where there are dysenteric symptoms, a large dose of ipecacuanha may be administered with the greatest benefit.

The foreign bodies met with in this portion of the bowel will be found to consist either of substances which have been swallowed, such as the stones of fruit, fish bones, coins, &c.; of concretions formed in the intestines, having a gall-stone or some mass of indigestible matter as a nucleus; or of articles forced through the anus, such as pieces of wood, soap, syringe-pipes, gallipots, bottles, ferrules, flannel, &c. The ingenuity of the practitioner will often be taxed in the extraction of these bodies; for he must be careful to act as gently as possible, remembering that all the coats of the rectum may be lacerated without great care. Indurated faeces are to be removed with a lithotomy scoop, or with the handle of a strong spoon, if syringing with warm soapy water will not cause their expulsion.

Irritable ulcer of the rectum, or fissure of the anus, is apparently a very slight affliction, but it gives rise to the greatest suffering. The ulcer is generally superficial, about the eighth of an inch broad, and the third of an inch long; while it is seated immediately within the anus. It may often be exposed by spreading out the anal orifice with a hand over each buttock; but when it cannot be made visible in this manner, a speculum should be employed. The introduction of neither this instrument nor the finger can frequently be borne, however, without the use of chloroform, so intense is the pain which an examination produces. On this account also the ulcer is often a cause of constipation, the patient deferring the act of defecation through fear of the suffering. The faeces in their passage irritate the sore, and produce spasm of the sphincter ani; an acute burning pain resulting
which may last for two or three hours after the bowels have acted.

The disease is more common in women than in men; while in the former it not unfrequently gives rise to ovarian or uterine pain, together with irritability of the bladder. Moreover, it may produce such tenderness of the surrounding parts that sexual intercourse cannot be borne.

In attempting to heal the ulcer care must be taken to avoid fretting it by strong aperients, while at the same time the bowels must not be allowed to get confined. Small doses of castor oil, or of extract of belladonna, or of an electuary of senega and taraxacum (F. 194), may be beneficially ordered; or a dinner-pill containing pepsine and the watery extract of aloe (F. 155) is deserving of a fair trial. With regard to local applications I have found none so beneficial as a combination of mercurial ointment (oz. ½) with belladonna (gr. 20); which may be best applied by forming it into sticks, the third of an inch in diameter and an inch and a half in length, with the oil of theobroma (cocoa butter). Astringent applications are seldom of any service; while I would especially caution the practitioner against the use of the nitrate of silver. I have seen this caustic produce such intense suffering, lasting for hours, that I shall never again sanction its employment. The foregoing means failing to effect a cure a slight operation must be performed; which consists in making a longitudinal incision through the centre of the ulcer and the superficial fibres of the sphincter ani, so as to keep the part at rest while the healing process goes on. The bowels should be previously cleared out by a dose of castor oil; and immediately after the operation one or two grains of the extract of opium ought to be administered so as to induce constipation for about three days. An aperient may then be given; while for some time subsequently the motions had better be kept rather soft, a proceeding often best accomplished by the administration of cod liver oil, with small doses of taraxacum. It only remains to add that if there be (as there often is) a little external pile near the fissure, it ought to be snipped off when the ulcer is incised; otherwise the latter will not heal. Moreover, any derangement of the general health which may be present must be attended to. Another method of treatment much followed in France is forcible stretching of the anus by means of the two thumbs.

**Chronic ulceration of the rectum**, with thickening of its coats, arises as one of the secondary effects of syphilis. It may also be due to the deposit of tubercle, the ulceration not going on to perforation of the coats of the bowel; or it may simply be owing to a depressed state of the general health. The ulceration is to be cured by treating the cause of the morbid action, by rest in
the recumbent position, and by the employment of anodyne suppositories.

An intractable *rodent ulcer* has been met with at the margin of the anus, the sore gradually creeping up the rectum. Excision, or at least complete destruction with potential caustics, ought to be had recourse to. Where an operation is impracticable, an ointment of sulphate of zinc (F. 294), stee with arsenic (F. 381, 399), and cod liver oil are the remedies to trust to. *Chancre* are also sometimes found in the same situation.

**Stricture of the rectum** may arise as a consequence of ulceration or from chronic inflammation of the mucous membrane and submucous connective tissue. It is far more common in women than men, and a large proportion of the cases are of venereal origin, resulting from soft chancre about the anus spreading to this part from the vulva, or communicated by discharges, and extending into the rectum. By some the ulcerations are considered to be due to constitutional syphilis. One case has come under my observation in which the disease was attributed to a very lingering labour; and certainly the pressure of the fetal head, perhaps for three or four days, would seem likely to set up inflammatory action. The stricture may be limited to a ring of condensed tissue, when it is said to be of the annular form; or it may be confined to one side of the bowel, as when it follows the healing of an ulcer; or almost the whole of the gut may be narrowed and indurated. In the King’s College museum there is a preparation showing great thickening of the entire walls of the rectum, the hypertrophy being such that the passage is greatly contracted. Above the stricture the bowel is usually somewhat dilated. In the majority of cases the constriction is within two inches of the anus, so that it is readily reached by the finger; but now and then it is placed higher up, and even at the juncture of the sigmoid flexure of the colon with the rectum, when the careful use of the bougie will be needed to detect it. The disease is essentially chronic, the contraction increasing slowly. It produces constipation, small stools, great difficulty in voiding solid motions, straining and bearing-down efforts, pain in the loins and sacrum, mental depression, flatulence, and a mucous discharge. After a time the mucous membrane may ulcerate; the ulceration giving rise to a burning pain in the bowel, with occasional discharges of blood. This form of stricture must not be confounded with simple spasmodic contraction of the canal, such as may at times arise when the part is irritated by haemorrhoids, ulcer of the anus, &c. It must also be carefully distinguished from constriction due to malignant disease. Fibrous tumours of the uterus, when they fill the pelvic cavity, compress the rectum and prevent the passage of solid feces; so that without an examination an erroneous diagnosis might be made.
The treatment required for the cure of stricture is troublesome and tedious. In some instances dilatation by bougies suffices, if care be taken to pass an instrument occasionally for several months after an apparent cure, and indeed until all traces of indurated tissue have become absorbed. Where the contraction is great, a sponge-tent (F. 426) may be employed at first, bougies being subsequently used. For the relief of a callous annular stricture it will, perhaps be advisable to make four or five slight notches in different parts of the ring, with a straight probe-pointed bistoury; afterwards plugging the part with oiled lint, and at the end of a few days beginning the use of bougies. In all cases the motions should be kept soft by sufficient doses of a simple electuary (F. 194). To relieve pain, suppositories of opium and belladonna (F. 340) answer better than any other remedies.

There are two forms of prolapsus of the rectum. In one, the most common, there is protrusion of only the mucous membrane: in the other, all the coats of the bowel are prolapsed. This disease is not unfrequently met with in children, especially in such as are badly nourished or have a stramous taint. Want of tone in the sphincter ani, constipation, straining at stool, prolonged diarrhoea, the irritation of worms, disease of the urinary organs, stone in the bladder, &c., are its chief causes. The size of the protrusion varies. There may be only a fold of mucous membrane forced down, or the inverted bowel will perhaps be prolapsed to the extent of five or six inches. Moreover, at first, the protrusion occurs only when the bowels act; but after a time the descent may follow any exertion, such as standing, coughing, &c., so that there is almost constant prolapsus. In the latter cases the intestinal mucous membrane gets indurated, and occasionally ulcerated; the sphincter ani becomes exceedingly flaccid, and the surrounding tissues relaxed; while there is a general sense of weight and distress about the body, with pain, which is greatly aggravated on attempts at defecation.

In the treatment of these cases we have to reduce the prolapsus, and to prevent its return by removing the cause. The replacement is seldom attended with difficulty, though a little patience may be needed. In some children directly the bowel is returned it is forced down, and this happens again and again; but the tendency to protrusion can generally be overcome, for the time, by making pressure with a pad of lint and then drawing the buttocks rather firmly together with a broad strip of adhesive plaster. The general health must always be attended to; plain nourishing food being allowed, with bark or steel or cod liver oil as may be necessary. Care is also to be taken that the secretions are natural and that the bowels act regularly; small doses of mercury and chalk, of taraxacum, of magnesia, or of cream of tartar often acting beneficially. After each evacuation the bowel is to be immediately
replaced, the anus well sponged with cold water, and an astringent injection thrown up. The latter may consist of a little alum and decoction of oak-bark (gr. 10 to fl. oz. iij.), or of the tincture of perchloride of iron and water (min. xx.—xl. to fl. oz. iij.). Occasionally a suppository made with from five to twenty grains of tannic acid and thirty of cocoa butter, has seemed to me much more efficacious than the astringent enema. Care is also to be taken that the seat of the water closet is a proper distance from the ground—neither too high nor too low. With regard to young children too, it is often advantageous to make them pass their motions in a recumbent posture, so as to prevent violent straining, and at bedtime rather than in the morning.

When medical treatment does not succeed, recourse must be had to a surgical operation. Different proceedings have been recommended, but in bad cases they are all, with one exception, very apt to fail. Thus, I have known instances where either the nitrate of silver, nitric acid, potassa fusa, or the actual cautery, has been applied to the mucous membrane so as to produce superficial slough; and this treatment proving useless, two or three folds of mucous membrane and skin at the margin of the anus have been excised. In one instance the surgeon had even cut out a portion of the sphincter muscle, with the effect of somewhat constricting the anal orifice; but a few weeks after the operation the bowel came down as badly as before. The really most efficacious plan is that proposed by the late Mr. Copeland; which consists in taking up several small folds of the mucous membrane at different points of the prolapsed bowel with the forceps, and very tightly ligaturing their bases. The ends of the ligatures are then to be cut off, the intestine returned, and a dose of opium administered. The patient keeps in bed for some days, while the ligatures come away; and he must not be surprised should the bowel afterwards descend occasionally, as it may do so until the several ulcers have contracted and healed. I have found this simple proceeding act very favourably in females, without inducing any bad after-consequences. It is apt to be followed by retention of urine, but the catheter will only have to be used for a day or two.

Polyps of the rectum is more common in children than in adults. The pedunculated growth arises from the mucous membrane, and it may be either soft or follicular, or firm and fibrous. The chief symptoms are uneasiness about the fundament, a frequent desire to go to stool, and a mucous discharge which is more or less mixed with blood. The growth generally descends when the bowels act, and has to be replaced. Sometimes a polypus becomes the cause of intussusception, dragging down the part of the bowel from which it arises into the part below, and this having occurred may afterwards be increased. I have only met with some three or four examples of rectal polypi in women and children, and in these cases I have removed the growth with a blunt pair of scissors. But
I think, as a rule, that it may probably be safer to apply a ligature and then to cut off the tumour below it; since if haemorrhage did happen in any instance there would certainly be a difficulty in checking it.

A villous tumour, very similar to that which occurs in the bladder, has in a very few instances been found growing from the mucous membrane of the rectum. Such a growth may attain the size of a cricket-ball, and when extruded from the bowel will look like a foul cauliflower mass. Its pedicle may be narrow, or the attachment to the side of the gut at times consists of a broad base. These tumours give rise to bearing-down pains at stool, and purulent discharges; but they are chiefly remarkable for their excessive vascularity, and consequently for their tendency to bleed. In the four or five cases which have been recorded, a permanent cure seems to have resulted from the removal of the tumour by ligature. On subsequently examining the mass, immersed in water, it is seen to present innumerable papillary projections, which branch out in a dichotomous manner.

The functional affections of the rectum give rise to as much mental and bodily suffering as the diseases attended with change of structure. Simple neuralgia of this part may persist for many weeks, without altogether subsiding for a day. The passage of the motions aggravates the pain; and though there may be a frequent desire to go to stool, yet little or no faecal matter follows many of the attempts at evacuation, since there is usually troublesome constipation. In some cases the patient points to one spot as the seat of a fixed pain; though on an examination no breach of surface can be detected. The treatment consists in improving the general health by nourishing food, with pepsine (F. 420) to aid digestion, if needful; in administering quinine or zinc, steel, and cod liver oil; in keeping up a regular action of the bowels by simple enemata (F. 188); and in relieving the perverted or augmented sensibility by suppositories of opium and belladonna (F. 340).

An irritable sphincter muscle causes symptoms somewhat resembling those due to an ulcer, but of less severity. There is pain in defaecation; while if the finger be introduced into the bowel the muscle will grip it tightly, the sphincter being felt like a firm and hard ring. Nervous women seem most liable to this spasmodic affection, often suffering from it rather severely during the time that the catamenia are on. A cure may generally be effected by improving the nervous tone, by using mild laxatives, by employing an ointment of belladonna and iodide of potassium (F. 307) around the anus, and by the occasional passage of a bougie.

The opposite condition to the foregoing, or atony of the rectum, may arise with a healthy or a morbid condition of the sphincter.
The impaired power of the muscular coat of the bowel deprives the patient of the force necessary to completely expel the stools; so that the feces frequently accumulate until there is great distension. Complaint is made of constipation, tenesmus, a sense of weight and fulness, and often of forcing pains. On making an examination a hard mass of fecal matter will be felt blocking up the bowel; which mass will have to be removed by the scoop. The re-accumulation may be best prevented by tonics containing zinc and extract of nux vomica (F. 409). If any aperient be needed, one or two grains of the extract of Barbadoes aloes, with the same quantity of quinine, should be taken at dinner.

Pruritus of the anus is a troublesome affection not uncommonly met with in patients suffering from hemorrhoids, dyspepsia, or intestinal worms—particularly the oxyuris vermicularis. Old people often complain of it; while it also afflicts many women towards the end of pregnancy, or such as have uterine disease, or those who have recently got over "the change of life." The itching is aggravated by warmth; it is worse at night than at other times, and it often prevents sleep. The friction resorted to for relief causes the tissues about the anus to become thickened and furrowed.

The treatment which will be found most successful consists in the use of cold bathing or sponging; daily exercise in the open air; a diet free from seasoned dishes, coffee, and all kinds of alcoholic stimulants; and a cool bedroom, with a mattress instead of the enervating feather bed. A regular action of the bowels is to be maintained; and hence it may be necessary to order an electuary of sulphur and taraxacum (F. 194), or small doses of rhubarb and blue pill (F. 171), or simple enemata (F. 188). The best local remedies are tobacco water (F. 205), or a lotion of corrosive sublimate and prussic acid (F. 263), or a wash of borax with morphia and glycerine (F. 268), or the application of a piece of lint dipped in the liquid extract of opium, or the use of the vapour of chloroform. In obstinate cases the physician will have to administer arsenic with some bitter infusion (F. 52), or iodide of iron and saffrparilla (F. 32), or tar pills or capsules (F. 36). An examination should always be made so as to detect, and subsequently to remove, any local cause which may be present; and more especially to make sure that the irritation is not due to the presence of pediculi.

The rectum and anus, like other organs of the body, may be absent or malformed. These congenital imperfections have been well described by Mr. Curling, Mr. Ashton, and many French and German authors; but the most complete account of them is to be found in the excellent work of Dr. Bodenhamer.* They are

but rarely met with. Thus; at the Dublin Lying-in Hospital, during the seven years' mastership of Dr. Collins, there were born 16,654 children, in only one of whom was there an impervious condition of the gut. And again, at the same institution 13,933 children were born during the seven years commencing November, 1847, out of which number three had imperforate anus and one an occluded rectum (Drs. Johnson and Sinclair). In some cases the child is born with every appearance of healthy conformation; but in others the defect is at once appreciable. Hence, the accoucheur should always be careful, in examining the new born infant before it is dressed, to see that the anal aperture appears well-formed.

The chief varieties of these congenital vices of conformation, are the following:—

1. *Preternatural narrowness of the anus.* In most cases the contraction can be overcome with small sponge-tents and bougies. If, however, the symptoms are urgent and the contraction very great, the aperture should be enlarged by making three or four notches with a probe-pointed bistoury. A tent of oiled lint must be introduced, and subsequently the orifice ought to be kept sufficiently dilated with bougies.

2. *The anus imperforate with the rectum normal.* There is either a persistence of the membranous septum of fetal life, or a prolongation of skin over the aperture of the bowel. In either case, the meconium distends the part and therefore marks the site for an operation. This consists in making a crucial incision, removing the angles of the flaps, and subsequently introducing a bougie every day until the parts are healed. Where the septum appears to be thin, a puncture with the bistoury might suffice.

3. *The anus entirely absent with partial or complete non-development of the rectum.* An incision may be made at the site of the normal situation of the anus, and if the bowel be reached it is to be gently drawn down, opened, and its edges secured to the margins of the external wound. If, after penetrating to the depth of an inch, the gut cannot be detected, the practitioner should wait a few hours; since the rectum will perhaps be forced down as it gets distended with meconium and is no longer kept back by resisting tissues. When these attempts to reach the bowel fail, colotomy in the left groin, or less preferably in the left loin, is the only resource.

4. *The anus absent, but having its office fulfilled by a preternatural opening in an abnormal situation.* Frequently no interference is required in early life. Subsequently, the patient may be anxious for an attempt to be made to procure an outlet for the faeces at the natural site, but any operation for this
purpose is attended with danger. Sometimes the unnatural orifice is in the vagina, in the male urethra, &c.

5. The anus normal and opening into a cul-de-sac; from the upper part of which extends the rectum contracted to the size of a small cord, or having its walls thickened and firmly glued together, or being entirely absent. The diagnosis is very difficult, and always uncertain. Colotomy in the left loin will generally be found the only available resource.

6. Anus, rectum, and colon absent. In some of these cases there has been an opening in the abdominal walls, or in the loins, communicating with the cæcum or with the small intestines.

2. FISTULA IN ANO.

An abscess not unfrequently forms in the loose areolar tissue around the rectum, either as the result of local irritation or of some constitutional affection. It may be deep-seated, the pus quickly increasing in quantity, and having a tendency to burrow backwards; this form being accompanied by severe throbbing pain, and considerable disturbance of the system. The superficial abscess gives rise to much less suffering, is small, and soon points externally. The treatment of either variety consists in the application of poultices, rest in bed, and in letting out the pus immediately fluctuation can be detected. After this evacuation the part may thoroughly heal, and complete recovery follow. But more frequently, owing to the constant action of the sphincter and levator ani muscles, the wound merely contracts, a fistulous passage by the side of the rectum resulting.

There are two forms of fistula,—one complete, in which a probe can be introduced from the external orifice upwards into the bowel; and the other a blind external fistula, where the mucous coat of the rectum is not perforated. The external aperture in either kind is often small, and not easily detected; it is generally placed near the anus, but sometimes is one or two inches distant; and it may be concealed in a furrow, or can be found in the centre of a little button-like eminence. The complete fistula is much the most common; while it proves the most annoying, inasmuch as flatus and intestinal mucus and fluid faecal matter pass along its track, giving rise to great discomfort as well as to painful spasmodic contractions of the sphincter. The irritation of these foreign matters occasionally produces recurrent attacks of inflammation and suppuration; so that the sinus, instead of remaining simple, has one or more tracks branching from it. Fistula in ano often co-exists with phthisis, being probably due to tubercular inflammation of a portion of the rectum, followed by ulceration and perforation. Suppuration is set up in the connective tissue by the irritation of feculent fluid; and in a short time the abscess
bursts externally, the opening and sinus subsequently remaining patent.

Some few fistulae will heal kindly when attention is paid to the general health, when the parts are frequently bathed with tepid or cold water, and when some astringent lotion (F. 264) is daily injected along the sinus. But, in the majority of cases, a cure can only be effected by dividing the tissues which intervene between the external and internal opening, including the fibres of the sphincter ani. The performance of this operation is not forbidden by the presence of tubercle in the lungs, provided the pulmonary disease be neither far advanced nor running a rapid course. As a rule, I always recommend a consumptive patient who is improving under treatment and gaining weight, to allow the beneficial action of remedies to be as little interfered with as possible; and I regard an anal fistula as one of those complications which can only exert an injurious influence, while the operation required for its cure may be said to be simple and harmless.

3. HÆMORRHIOIDS.

The tumours known as hæmorrhoids [Aịpua = blood + ῥῶ = to flow], or piles, are divided into two varieties,—the external, or those situated outside the sphincter muscle; and the internal, or those within it. In many cases the two kinds are found co-existent. They are rarely met with until adult age, and are generally believed to be more common in women than in men. As sedentary occupations tend to produce them, this opinion is probably well-founded. Amongst their other causes may be mentioned pregnancy, abdominal tumours, habitual constipation, and all diseases that retard the return of blood from the rectum; also the frequent use of drastic purgatives, which tend to produce congestion of the bowel; together with a torpid action of the liver, disorders of the urinary organs, straining to pass hardened faeces, over-rich living, insufficient exercise, an hereditary tendency, and a long residence in tropical climates.

External hæmorrhoids consist either of a knot of varicose veins, or of one or more cutaneous excrescences. In the first case, the veins may contain fluid blood; but more frequently their contents have coagulated, so that we find one or several tense and purple and teasing swellings. Generally speaking these sanguineous tumours are due to the rupture of one of the hæmorrhoidal veins, with the formation of a very delicate cyst round the extravasated clot. The presence of this cyst is best made out by soaking it in water; when the contents will be found to remain unchanged, the little currant-like clot not diminishing in size. When such piles are painful, great relief can be afforded by incising them and squeezing out the clots. With regard to the cutaneous excrescences, they consist chiefly of hypertrophied skin
aud connective tissue. They are seldom single, while not unfreq-
ually there is a more or less prominent ring of them at the
margin of the anus.

The treatment of external piles is directed either to the miti-
gation of the heat and tingling and discomfort, or to the complete
removal of the tumours. Generally, the latter can only be
effected by excising the growths with a pair of curved scissors;
allowing the wound to heal in the ordinary manner. The opera-
tion is seldom followed by much bleeding: yet if any artery be
seen pumping out blood it should be secured. Moreover, the
integument at the base of the pile must not be cut too freely, or
causes of contraction of the anus will follow upon the comple-
tion of cicatization. But in very many instances great, if not
permanent, relief may be given by more simple measures. First,
by regulating the bowels, taking care that a daily evacuation is
produced without any straining or irritation. This may easily be
done by adminstering some aperient confection (F. 194); or by
giving a dinner-pill containing the extract of Barbadoes aloe,
with a little pepsine or nux vomica (F. 155, 175); or by the use
of simple enemata (F. 188). Then, the anus should be thoroughly
sponged with cold water every night and morning, as well as after
each action of the bowels; while if the tissues be relaxed and
indolent, some tannic acid, or alum, or solution of subacetate of
lead, can advantageously be added to the water. The application
of the ointment of galls and opium often affords comfort. The diet
ought to be regulated, plain nourishing food being allowed; but
alcoholic stimulants, coffee, and highly seasoned dishes had better
be interdicted. Plenty of walking exercise is also important.
Supposing that the piles are inflamed, the morbid action may be
controlled by hot bathing and the use of poultices; or very often
the application of ice acts more speedily and effectually. And,
lastly, if the tumour be swollen and sensitive, the evacuation of
the contained clot, as before mentioned, is the plan to pursue.
Although this proceeding is very simple, yet the patient should
keep the recumbent posture for some hours afterwards to avoid all
risk of haemorrhage.

Internal haemorrhoids are of three kinds. Most frequently we
find them in the form of spongy vascular growths, having a red
granular appearance, and a soft elastic texture like that of erectile
tissue. A second variety is made up of the lower branches of the
plexus of haemorrhoidal veins, which branches are dilated and
often plugged with coagula. While a third kind consists of pen-
dulous tumours, composed of fibro-areolar tissue.

Internal piles are either single or multiple. They protrude
during defecation; but in time, as the sphincter becomes dilated
from their pressure and relaxed by the attacks of haemorrhage,
they are found to be constantly down save when the patient is in
the recumbent posture. Where they only appear externally at
the time the bowels are moved, they especially require to be re-
placed directly after the stool; since if this precaution be neg-
lected, they are apt to become congested and inflamed owing to
the constriction of the sphincter. The bleeding varies from a
mere tingling of the evacuations, to the escape of many ounces;
and though the blood is occasionally venous, yet much more com-
monly it is arterial. Sometimes the flow seems to take place
periodically, in which case it may serve to relieve congestion
of internal organs—particularly of the liver. When it is remem-
bered that haemorrhoids are symptomatic of disordered digestion,
hepatic congestion, or of some disease interfering with the circu-
lation,—and that they produce constant uneasiness, irritability of
the bladder, an annoying mucous-purulent discharge, with frequent losses
of blood,—it is not surprising that patients afflicted with them be-
come thin and low-spirited, sallow and anaemic.

In the treatment of internal as of external piles it is of great
importance to remove and prevent congestion of the abdominal
viscera, to insure a healthy action of the bowels, and to look care-
fully to the general health. Sometimes the injection of half a pint
of cold water every morning proves useful; while some astringent
(matico, tannic acid, alum, or tincture of perchloride of iron) may
be added to it, if there be haemorrhage. When the patient is
unable to replace the protruded piles, the practitioner must do so
for him; first puncturing them freely, if they are painful and
swollen. In a few instances, where there has been delay in seeking
advice, the amount of constriction has been such, that strangulation
and mortification have occurred; so that nothing could be done
but poultice the tumours until they have sloughed off, while the
suffering has been relieved by full doses of opium.

A radical cure must be made in those cases where the piles
are large and painful and bleed freely, and where the constitution
is suffering from them. This may be effected by cauterization,
excision, or the ligature. Prior to either operation any derange-
ment of the liver which may be present ought to be relieved;
while the bowels are to be thoroughly cleared out with a dose of
podophyllin or calomel, followed by castor oil.

Cauterization only acts favourably if the growths are small,
vascular, and florid. The tumours being well protruded, every
part of their surface is to be painted either with nitric acid, the
acid solution of nitrate of mercury, or with potassa fusa; taking
great care to avoid touching the skin, and afterwards oiling the
parts well before replacing them. The eschar usually separates
in a few days; while provided the contraction produced by the in-
flammation and cicatization be sufficient, a second application of
the caustic will be uncalled for.

Excision is a very effectual proceeding, and possesses many
advantages; though it is open to the great objection of being often
followed by dangerous haemorrhage. To remedy this, some sur-
geons have employed the écrasur; but the chain of this instrument can seldom be adjusted without difficulty, hæmorrhage has followed its use, and in some cases anal stricture has subsequently occurred owing to undue contraction of the cicatrix. With the same object of preventing hæmorrhage Mr. Henry Smith has invented a clamp (an improvement on the instruments previously used), by which the base of the tumour can be held and compressed for a few minutes, while the free portion of the tumour is excised. The divided surface being carefully dried, strong nitric acid or the actual cautery is applied; and the parts being oiled the clamp is taken off, and the patient put to bed where he remains for two or three days.

The operation by ligature is that commonly practised; for though the cure is rather tedious yet it is certain, while it can be accomplished without much pain or any danger. As regards the latter point it is simply sufficient to say, that Mr. James R. Lane has performed this operation in 427 cases with two deaths. The ligatures are applied in this manner:—The pile being well forced out (by the use of a warm water lavement, if necessary), the surgeon draws it down with a pair of pronged forceps, makes a deep groove with the scissors at its base, and then encircles it tightly and securely with a ligature of waxed twine. If the tumour be large, it is better to tie it in two portions by means of a double ligature passed through its base with a curved needle. The operation is to be repeated on all the piles separately, so that each may be fairly strangulated. After tightening the ligatures the bulk of the piles can be cut off, and the parts replaced within the sphincter. Any redundant masses of skin at the verge of the anus had better be then snipped off. A full dose of opium should be subsequently given, ice may be applied if there be much pain, constipation is to be maintained until about the fourth morning, and the patient ought to be kept in the recumbent posture until the ligatures come away on the sixth or seventh day. In a very few instances tetanus has followed upon this operation, which should therefore be postponed if cases of this fatal disease have been at the time at all more frequent than usual after other surgical proceedings. Examples of erysipelas and pyæmia have very rarely been met with.

4. CANCER OF THE RECTUM.

Malignant disease in this situation may be of the scirrhous, medullary, or colloid form. The early symptoms are not well-marked, little suffering arising until a difficulty is experienced in passing the stools. Consequently, when the practitioner is consulted the coats of the bowel are generally found extensively infiltrated with cancer, producing considerable contraction. Severe lancinating pains are then complained of, the nights are
almost sleepless, and there are frequent attacks of haemorrhage; while there is an abundant offensive and purulent discharge, together with considerable debility and loss of flesh. If the disease be situated at the upper part of the rectum, it may escape detection unless the examination be carefully made; but in most cases by the time advice is sought the growth has extended downwards within easy reach of the finger, and then the gut has also become firmly fixed. In women, as ulceration goes on, a communication is often effected between the vagina and rectum.

The treatment consists in palliating the severe suffering which is always produced, sooner or later by this affection. The bowels must not be allowed to get blocked up, and yet opium in some form is absolutely necessary. In many instances, however, the constipating effect of this drug will be overcome by combining the extract of belladonna with it, as is done in F. 339, 340, 343. So also the hypodermic employment of morphia and atropine (F. 314) is less frequently productive of constipation, than the exhibition of the morphia salt alone by the mouth. Indian hemp,aconite, chloroform, and ether may all be useful in various combinations (F. 315, 317, 330, and 337). In this disease, as well as in stricture of the rectum, obstinate constipation, &c., a tolerably regular action of the bowels can oftentimes be maintained by injecting into the rectum five or six ounces of linseed or olive oil, gently warmed by standing the bottle in hot water. The oil must be retained to be really efficient. At the end of some twenty-four or even forty-eight hours it will produce a soft motion, this effect being repeated daily for perhaps a week. Then when the constipation recurs, the oil is to be employed again. Where there is such a rare occurrence as almost complete closure of the bowel by the disease, before the powers of life have become much deteriorated, existence may be prolonged for a few months, sometimes with comparative freedom from suffering, by making an artificial anus in the left loin.

Epithelial cancer sometimes attacks the anus, and may extend up the rectum. In a remarkable instance which had resisted the application of potential caustics, and which had returned after the performance of excision by Prof. Siebold, Mr. Curling repeated the latter operation. This gentleman took care to cut wide of the affected tissue, while he removed nearly the whole of the sphincter muscle on the right side. When I last heard of the case seven years had gone by since the operation, without any relapse: though for the last of these years there had been a tumour of a doubtful nature high up in the pelvis.*

London, 1863.
PART IX.

DISEASES OF THE LIVER.

The liver, situated chiefly in the right hypochondriac and epigastric regions, is the largest gland in the human body; measuring some twelve inches in its transverse diameter, and about seven in its antero-posterior. Its weight in healthy adults is generally allowed to be from 2 to 4 lbs. avoirdupois; though remarkable differences are to be found in the statements of authors on this head. According to calculations made by Dr. Frerichs from some eight hundred observations, the actual weight varies from 1·8 to 4·6 lbs. avoird.; the relative weight fluctuating between the one-twenty-fourth and one-fortieth of that of the body. The liver is increased in size during the progress of digestion; partly because there is a greater afflux of blood to it at this time, and partly owing to the deposit of amorphous matter in the hepatic cells.

The following vessels are found in the liver,—large and numerous lymphatics, biliary ducts, together with branches of the portal vein and of the hepatic artery and of the hepatic veins. The branches of the biliary ducts converge into two large trunks (one from the right and one from the left lobe) which leave the liver at the transverse fissure; these trunks by their union constituting the hepatic duct. The latter then joins with the cystic duct, forming the ductus communis choledochus; this channel opening into the descending portion of the duodenum by an orifice common to it and the pancreatic duct. The portal vein and hepatic artery are the afferent, while the bile ducts and hepatic veins form the efferent vessels. The portal vein carries to the gland the blood from which bile is to be secreted; while by the hepatic artery aerated blood is supplied for the nutrition of the capsule, for the coats of the ducts and bloodvessels, as well as for the other parts of the organ. The bile ducts take away the biliary secretion which has been separated or manufactured by the hepatic cells from the portal blood; while by the hepatic veins the residue of blood is returned into the general circulation through the inferior vena cava.

The four operations conducted by the liver, as well as the nature of the bile, have already been noticed (vol. i. p. 150). It only
remains, therefore, to add that the secretion of bile (the most significant function of this gland) is increased by rich abundant food, spices, and alcoholic drinks; by indolence and heat. Conversely, it is diminished by a light diet, with the avoidance of all alcoholic fluids; by exercise and early rising; by residence in a temperate climate. Mercurial, podophyllin, taraxacum, and rhubarb; the chloride of ammonium; the mineral acids, and benzoic acid are supposed with more or less reason to excite, iodide and bromide of potassium, the preparations of opium, and carbonate of soda taken while digestion is going on, to repress the secretion.

The diseases which lead to enlargement of the liver are congestion, hypertrophy, inflammation and abscess; fatty degeneration, and particularly lardaceous or amyloid disease; various new formations, but especially hydatid tumours and cancer. Hepatic enlargement is simulated in cases of spinal curvature; in congenital malformations and transpositions of the gland; by displacement downwards from the continued use of badly-made stays, or stays habitually laced too tight around the lower part of the chest; by diseases of the thoracic viscera (e.g. pleurisy with effusion, dropsy of the pericardium, and intra-thoracic tumours) causing depression of the diaphragm with enlargement of the chest at the expense of the abdomen; by abscess of the diaphragm, as well as in those rare cases where this muscle becomes the seat of tumour or cancer; and lastly, in diseases of the abdominal viscera, when the liver and other organs are pushed upwards so as to lessen the size of the thorax.

Diminution of the liver takes place in cirrhosis, acute atrophy, and in those diseases of the gland or of distant organs which lead to chronic atrophy.

I. CONGESTION OF THE LIVER.

The hepatic circulation is affected by so many different agencies, that hyperaemia, congestion, or the undue accumulation of blood in the capillary vessels of the liver is a morbid state frequently met with. Moreover, it is the initiative step in almost all the structural diseases of this organ.

The simplest form of this condition is that which results from some obstruction to the circulation of the blood through the hepatic and the portal veins—passive congestion. Examples of this variety are met with in cases of valvular affections of the heart, as in instances of mitral obstruction and mitral insufficiency, and more particularly where there is incompetence of the tricuspid valves; in those morbid states of the lungs which impede the passage of the blood through the pulmonary artery, such as emphysema, collapse, &c.; as well as in the diseases that diminish the size of the thoracic cavity. Violent exercise, particularly if
taken soon after meals, gives rise to temporary engorgement of the liver; and to this may be due that stitch in the side which compels the sufferer to rest for a few minutes. Under the influence of congestion the liver is found after death enlarged in every direction, with its capsule tightened or distended, and its parenchyma rendered tough. On making a section of the gland, dark red patches may be seen, consisting of the gorged hepatic veins; around which are lighter-coloured parts corresponding to the delicate branches of the portal vein.

During life, obstructive hyperæmia of the liver is attended with headache and a disinclination for exertion; frequent flushings of the face, with coldness of the extremities; and muscular pains about the loins and limbs. Complaint is made of a sense of constriction and weight in the right hypochondrium; and there will often be slight jaundice, nausea, giddiness, and dyspepsia. The urine is scanty, high-coloured, sometimes loaded with urates, while it frequently contains bile-pigment with traces of albumen; the bowels moreover are confined; the colon is distended with offensive flatus, and the hemorrhoidal veins probably become enlarged. In all forms of hepatic sickness there is so frequently an aggravated attack of retching between 4 and 6 o’clock A.M. that this occurrence may almost be regarded as a pathognomonic symptom. With aged people there are at times attacks of delirium with sleeplessness. During health, percussion affords a dull sound, from the sixth right rib down to the costal margin; whereas, in the state under consideration the area of the dulness becomes much more extended. Palpation, too, will detect the increase in size. Moreover, when any pulmonary or cardiac affection has been the first step in the production of the hepatic congestion, there will be all the symptoms of such primary disease; which also often subsequently ends by producing general dropsy, &c.

Our treatment can only be palliative. In the early stages saline purgatives (F. 141, 143, 150, 152) act favourably by causing a drain from the portal system, and frequently very great relief is afforded by a mild mercurial aperient given every two or three days. At a later period, these must be combined with the employment of a mineral acid, or of ammonia, ether, &c. (F. 147, 161, 162). Benzoate of ammonia (F. 49) is serviceable if the urine be deficient in quantity or in acidity. Where the heart or lung affection which gives rise to the hepatic congestion is not far advanced the careful use of the sulphur springs of Harrogate (F. 466), the waters of Carlsbad (F. 496), or those of Kissingen (F. 493), or of Marienbad (F. 497), will frequently afford considerable relief.

Passive congestion usually leads to a diminished excretion of bile; the secreting cells remaining active, but the passage of the bile from the lobules and through the small gall ducts being delayed, owing to the compression which is exerted by the loaded
bloodvessels. The ducts consequently become gorged with bile—
biliary congestion. The same condition necessarily results from
obstruction of the common excretory duct of the liver and gall
bladder. Supposing this congestion to be kept up for any length
of time, the cells of the gorged lobules get impaired and their power
of reproduction diminished; since not only is their nutrition inter-
fered with, but they become atrophied when their functions are not
duly called into play, just as all tissues do.

In active congestion serious structural changes arise in propor-
tion to the intensity of the hyperæmia, and the frequency of its
recurrence. This state is brought about by causes which increase
the functional activity of the gland. The chief of these are,—the
presence of morbid matters in the blood, and especially of malarial
poison; the suppression of habitual discharges, such as a hemor-
rhoidal flux, or of the catamenia at the critical period of life; a
long residence in hot climates, particularly in marshy districts;
deranged nervous influence, examples of which may be seen in
hyperæmia from mental excitement; and probably atony of the
bloodvessels, owing to disease of their coats. As has already been
remarked, the liver always contains more blood, and its secreting
cells are more active during the process of digestion, than at other
times: hence excessive eating and drinking, irritating articles of
food, alcoholic drinks, &c., must unduly stimulate this gland;
excesses of this kind are particularly liable to induce hepatic con-
gestion in hot climates. The symptoms induced resemble those
set up by passive congestion; save that they are somewhat less
severe, and only of short duration. Strong healthy individuals,
residents in a temperate climate, and who take plenty of active
exercise, may counteract the evil effects which flow from a too
rich and abundant diet; while those of sedentary habits who
pamper themselves, are sure to suffer. The cure of these cases
is to be effected by the removal of the cause. Great benefit
will be derived from the use of horse-exercise, hunting and
shooting, daily walking, &c.; from the employment of laxatives
containing rhubarb, aloes, and sulphate of soda, &c. (F. 144, 145,
148, 172); from recourse being had, when necessary, to the
mineral acids (F. 377, 378); and especially from the disuse of
beer and ardent spirits, with the adoption of a simple diet, con-
sisting partly of fish, poultry, rice, fresh vegetables, light claret,
soda water, and tea.

Extravasated masses of blood (apoplexy of the liver) are now and
then found in the hepatic tissue or beneath its capsule, as the
result of great congestion induced generally by morbid changes in
the blood. These cases of hæmorrhage may be met with in scurvy,
in purpura, in ichæræmia, and especially in the malarious fevers of
tropical climates. The extravasations are often numerous; while
the blood will be found in masses varying in size from that of a pea to that of a hen’s egg, or it may be infiltrated through the parenchyma converting the tissue into a pulpy mass. The effusions are probably directly due to some disease of the coats of the vessels—such as fatty degeneration, leading to rupture.

The effusion of serum into the substance of the liver (hepatic edema) is said by Dr. W. Thomson to have been often observed, uncombined with marks of acute inflammation. It cannot be a common condition, however, since very few authorities make any mention of it. In a case of fatal remittent fever reported by Dr. Morehead, the liver was found of a dark olive colour, reaching two inches below the right ribs, and touching the point of the eighth left rib. It weighed 4 lbs. 4 ozs.; while on cutting and pressing it, six ounces of serum freely flowed from the surfaces. The parenchyma broke down readily under the finger; and the incised surfaces presented a dark olive colour, with brown intermixture, but not the mottled redness of congestion.

II. HYPERTROPHY OF THE LIVER.

Hypertrophy of the liver is characterized by an increase in the secreting cells, causing enlargement of the entire gland. There is no growth foreign to the natural structure to be found in the organ, but simply an excess of the normal tissue.

The hepatic cells may be either increased in size or multiplied in number; while in proportion to the increase the volume of the liver will become enlarged, perhaps to more than double its natural bulk. This hypertrophy not uncommonly arises from long-continued congestion, such as is met with among the residents of tropical climates or of malarious districts; while it can likewise occur in consequence of disease in other parts of the system. Thus, it has been sometimes found in leucocythemia, in phthisis, in dysentery, and in saccharine diabetes. Partial hypertrophy may be of a compensatory nature; that is to say, a portion of the gland having been rendered comparatively useless by disease, the healthy part has its cells enlarged so as to prevent systemic derangement.

The functions of the liver are seldom interfered with in true hypertrophy. But its correct diagnosis is important lest active remedies should be improperly used. If any good can be effected in these cases it is only by regulating the diet, and enjoining residence in a temperate latitude.

III. INFLAMMATION OF THE LIVER.

The inflammatory diseases of the liver, though often met with in temperate climates, are particularly common in tropical regions. In describing them, I shall speak first of hepatitis—or inflammation of the substance of the gland, or of the peritoneal investment of the liver, or of both combined: secondly, of cirrhosis, or that slow form of inflammatory action which affects the areolar or connective tissue; thirdly, of syphilitic hepatitis; and fourthly, of the diseases of the bloodvessels. The subject of inflammation of the gall-bladder and bile-ducts will be considered subsequently.

1. HEPATITIS.

The term hepatitis [from ἕπατος = the liver; terminal -ίτις] seems better than that of suppurative inflammation as proposed by Dr. Budd, inasmuch as the morbid action does not necessarily end in suppuration and abscess. However, the name is not very important, provided the nature of the affection be generally understood.

Causes.—Europeans residing in tropical climates, who live too freely, are liable to suffer from hepatitis. Excessive eating and indulgence in alcoholic drinks, and continued exposure to external heat, are the most general causes; or it may occur from exposure to a chilling wind while heated: not uncommonly it is associated with dysentery, and it has been attributed by Dr. Budd to transmission of morbid products from the inflamed mucous membrane of the large intestine, but it may arise quite independently of dysentery. The morbid action may be induced by some mechanical injury; though it is seldom that this is a cause. The disease is now and then due to ichorhæmia from suppurative inflammation of the portal vein, or of the veins of the systemic circulation. Ulceration of the intestines, of the stomach, of the gall-bladder or gall-ducts, are all causes of suppurative hepatitis; and perhaps a hot climate alone, by deranging the functions of the gland, may give rise to it. So again, marsh fevers will originate it. Spirit-drinking often produces adhesive inflammation and induration of the liver (cirrhosis); but not the suppurative form.

Pathology and Morbid Anatomy.—In a few cases the coats of the liver and the capsule of Glisson become inflamed (Perihepatitis), without the tissue of the gland being implicated to any extent. Perihepatitis may be a part of general peritonitis; occasionally it is the result of an extension of pleuritic inflammation on the right side; or it will ensue from disease in the liver itself, such as abscess, hydatid cyst, and cancer. Suppuration rarely follows: while the other results are very seldom serious unless the coats of
the portal or hepatic veins get attacked, the inflammation generally soon terminating in resolution. Sometimes opacity and thickness of the capsule remain, together with adhesions between the opposed surfaces of the peritoneum.

Far more commonly, however, the substance of the liver is the seat of the inflammation. In a few instances the morbid action is diffusely extended over the whole organ (Hepatitis diffusa parenchymatosa); a form which may lead to softening and acute atrophy, or to general induration. The inflammation, however, is more frequently circumscribed (Hepatitis vera circumscripta, suppurativa); and then abscess is a common result. The series of changes which take place in inflammation of the liver, as this disease is usually met with, have been so clearly described by Dr. Morehead, that I shall give a condensed account of that which he has sketched from actual observation.* In the first stage of parenchymatous hepatitis there is vascular turgescence; and could the gland be examined, the pathologist would find the structure redder and softer than natural, while blood would ooze freely from it when cut. At this period the inflammation often terminates in resolution; but if it proceed, then interstitial exudation of coagulable lymph soon follows in different parts of the organ, inflammation of the entire substance being very rare. When the lymph maintains the liquid form in which it is exuded, there is hope of complete recovery by reabsorption and resolution. Supposing, however, that it coagulates in the interstices of the parenchyma, then one of three conditions must ensue:—Either the liquid portion will be absorbed, and the solid lymph become organized into fibrous tissue; or the exuded lymph instead of undergoing organization, may re-liquefy, be absorbed, and disappear; or the lymph degenerates into pus, the tissues where it has been deposited soften and melt down, while the whole gets more or less circumscribed by membrane of low organization,—in short, hepatic abscess has formed. Then, more lymph exudes from the inner surface of the investing membrane, undergoes certain changes, and is converted into pus; the sac becomes distended, the bulk of the liver is increased, and tumefaction takes place; adhesion of apposed serous surfaces follows; and the circumscribing wall becoming thin on one side by the liquefying process, pointing and rupture succeed. This is just what happens in the case of an ordinary phlegmonous abscess; in which the central parts of the lymph (those most remote from the living tissues) change into pus, while the peripheral portions (those adjacent to the living structure) get organized into membrane. In the liver the abscesses are seldom single, though sometimes several small ones coalesce. They may also be superficial, or deep-seated; but most frequently they are of the latter kind, and have their seat in the right lobe. Granting that diffuse suppuration of the liver is

just possible, this occurrence must be very rare; since Dr. Morehead asserts that he has no knowledge of it.

Symptoms.—At the onset there is tenderness over the gland, which will always be most marked when the peritoneal investment is affected. Then, as the morbid action progresses, we find high fever, with a hot skin and great thirst and scanty urine; the fever sometimes assuming a typhoid character. There is also fulness of the right hypochondrium from enlargement of the gland, with increased dulness on gentle percussion; more or less severe pain in the region of the liver, aggravated on pressure or deep inspiration or coughing; and an inability to lie on the left side. Moreover, there will be occasionally a yellow tinge of the conjunctivae, but rarely complete jaundice. More or less dyspnoea, sympathetic cough and vomiting, and troublesome hiccup are generally present. The fever, pain, tenderness about the liver, and general disturbance, are often greater in this capsular inflammation than when the glandular structure is the seat of mischief. Where the pain is of a sharp lancinating character, it is supposed to indicate inflammation of the serous and fibrous coverings of the gland; where dull and tense, the parenchyma is the part affected. Again, where the convex surface of the organ is the seat of the inflammation, the chest symptoms will predominate; where the concave, the stomach derangements will be the most marked. It is well known that in hepatic affections, the right collar bone and shoulder become the seats of gnawing and aching sympathetic pains; while sometimes also (probably when the left lobe of the liver suffers) pain is referred to the left shoulder. According to Annesley, pain in the right shoulder is a sure indication that the disease is in the right lobe. Andral has noticed that in some instances the only pain has been in the head; and this has been sufficiently intense, constant, and long continued to attract exclusively the patient’s attention.

The formation of hepatic abscess is chiefly signalized by the occurrence of chills—perhaps of unmistakable rigors, of hectic fever, gastric disturbance, pain or tenderness, and tension of the abdominal muscles on palpation; with a feeling of weight in the region of the liver, and a dry cough. The physical signs of enlargement of the gland will be present; and a distinct tumour may perhaps be made out. While the hectic fever increases, the patient emaciates: there is progressive prostration, and either diarrhoea or dysentery sets in. In many instances, however, the disease runs a more insidious course; there may be only lassitude and extreme disinclination to exertion with loss of appetite; an occasional feeling of chilliness and a sense of discomfort or uneasiness about the liver, acute symptoms only setting in as an abscess approaches the surface. A few remarkable cases have occurred, where the symptoms during life have been so obscure that suppuration has not been suspected; and yet a large abscess
has been found on post-mortem examination, or even several collections of pus.

Terminations.—The most favourable termination of hepatitis is of course by resolution. Where this happens the pain and fever gradually abate, and the patient is soon well. The inflammation may, however, as has already been shown, be so severe and extensive as to lead to diffused suppuration, although much more frequently it ends in the formation of circumscribed abscesses, or possibly in gangrene.

Abscesses of the liver not uncommonly attain a considerable size; and, in extreme cases, have contained several pints of pus. The prognosis is always unfavourable. Now and then hepatic abscesses will possibly undergo a spontaneous cure, in consequence of absorption of the liquor puris and degeneration of the pus corpuscles. Such abscesses have burst into the peritoneum, and given rise to fatal peritonitis. In a few instances they appear to have opened into the biliary ducts, so that their contents have passed into the duodenum. Most frequently, however, when the matter gets near the surface of the gland, adhesive inflammation is set up in the portion of peritoneum immediately above it, and lymph is poured out, which glues the organ to adjacent parts—to the abdominal parietes, the diaphragm, stomach, or some part of the intestines; the pus being then discharged externally by a direct opening through the walls of the belly, or indirectly through the lung or stomach or colon, &c., or it may reach the pleural cavity or pericardium, proving rapidly fatal. Recovery is not uncommon when the pus makes its exit through the lung, it is rare when the abscess points on the surface of the abdomen, the most favourable spot for an external opening being the epigastrium.

Very rarely the inflammation terminates in gangrene, or gangrene will follow suppuration. In one of the patients of the Dreadnought Hospital Ship, mortification appeared to be the result of opening an abscess.

Treatment.—Various observers have recognised that the strength of the patient requires to be supported in this disease, rather than to be lowered by bleeding and the administration of mercury. The latter remedy is, however, still used very indiscriminately; and Dr. Abercrombie’s observation remains true, that mercury is employed “with very undefined notions as to a certain specific influence which it is believed to exert over all the morbid conditions of this organ. If the liver is supposed to be in a state of torpor, mercury is given to excite it; and if it is in a state of acute inflammation, mercury is given to moderate the circulation, and reduce its action.”* But it may be laid down as a general rule that neither the abstraction of blood, nor the production of salivation, will exert any favourable influence in hepatitis. And

further, experience seems to prove that every kind of active treatment is contra-indicated; while it ought especially to be avoided when we infer that suppuration has taken place.

Purgatives, in the early stages of those cases not preceded by dysentery, appear to be useful by increasing the circulation through the portal capillaries, and thus diminishing congestion in the capillaries of the hepatic artery. If there be a suspicion of portal stagnation—as will be indicated by a yellow-coated tongue, scanty alvine discharges, a diminished secretion of urine, and a dingy state of the skin—then Dr. Morehead advises the employment of small doses of blue pill with ipecacuanha, or of the extract of taraxacum and an alkali, together with the external application of nitro-hydrochloric acid by means of a compress. Dr. Maclean speaks confidently of the good effects of ipecacuanha given as in dysentery, whether this complication be present or not, in doses of 20 or 25 grains every six or eight hours. Small doses of tartar emetic, $\frac{1}{4}$ grain with 15 grains of nitrate of potash every half hour, have been found efficacious in acute cases. Emetics have been recommended in the early stages; but though they promote the discharge of bile, yet the compression exerted on the liver by the abdominal muscles during vomiting may prove very unfavourable. Moreover, when nausea and vomiting have been set up by antimony or ipecacuanha, it is often difficult to subdue the irritability of the stomach; especially as the disease itself has a tendency to produce sickness. Sedatives will usually be indispensable, and there is no objection to the best agent of the class, viz., opium. Where dysentery is present, it must be checked by ipecacuanha, morphia, and astringents, according to the directions given at p. 137. In all cases at the onset, it will be necessary to restrict the diet; while the patient must be confined to the recumbent posture, and fomentations and poultices should be assiduously applied.

When the inflammation has gone on to the formation of pus, good nourishing food, with tonics (such as quinine and iron, the nitro-hydrochloric acid and bark) will be required. Where there is restlessness and pain, these symptoms should be subdued by opium; the bowels must be regulated by rhubarb, or by rhubarb and aloes; and wine ought to be allowed in proportion to the weakness of the patient. If an abscess approaches the surface and adhesion to the parieties appears to have taken place, it has generally been recommended (after an exploratory puncture) to open it with the knife, or what is perhaps better, puncture it with a trocar. It is doubtful, however, whether this should be done, and great judgment and caution will have to be exercised; while on no account are mere exploratory punctures to be made in search of doubtful purulent collections. Even where the diagnosis is clear, Dr. Budd seems on the whole to be in favour of allowing the abscess to burst of itself. And I suppose that Mr. Waring is
of the same opinion; for in the summary which this gentleman has published of eighty-one cases operated on, there are sixty-six deaths with only fifteen recoveries, and he fears that even this proportion appears too favourable owing to the non-publication of unsuccessful cases. Much greater success, however, appears to attend evacuation of the abscess by means of the aspirator or exhausting syringe, and this method should be first tried in all cases in which it is considered desirable to procure an escape for the pus. Adhesion to the abdominal walls is not absolutely necessary for this proceeding. The sac may be afterwards washed out with a dilute solution of carbolic acid or iodine.

2. CIRRHOSIS.

Induration of the liver, or cirrhosis [from Кірріаус = yellowish], consists of chronic inflammation and hypertrophy of the connective tissue which pervades and covers the liver.

Causes.—The most common cause of cirrhosis is spirit-drinking; a circumstance which has led English practitioners to call this disease the gin-drinker’s liver. When alcohol has been introduced into the system in the ordinary way by the stomach it speedily passes to the liver, and analyses show that a greater proportion of it is present in the liver and nervous system than in any other organs of the body.

It is worthy of notice, that the alcohol consumed in wine and beer is not as destructive as that taken in the form of ardent spirits. Dr. Paris explains this by supposing that in the first case the alcohol is not only more intimately mixed with water, but that it exists in combination with its extractive matter; and consequently that it is incapable of exerting its full effects before it becomes altered in its properties, or, in other words, partially destroyed. A hot climate increases all the vicious effects of alcohol.

Pathology and Morbid Anatomy.—Interstitial hepatitis comes on gradually. At first exudation takes place into the connective tissue of the portal canals and interlobular framework, and the gland is enlarged. As the exudation becomes organized into fibrous tissue there results a diminution in the calibre of the branches of the portal vein, as well as of the hepatic artery and duct. From this strangulation of the vessels atrophy of the lobular structure of the liver ensues; the hepatic cells undergoing fatty or granular degeneration, or becoming completely destroyed in parts of the gland. The liver becomes abnormally firm and subsequently irregularly contracted, the surface being uneven. According to Dr. Lionel Beale cirrhosis is the result of primary atrophy and not of an inflammatory process, the fibroid tissue between the lobules consisting of the remains of vessels and ducts which have collapsed in consequence of atrophy of the hepatic cells which filled their meshes. The diminished flow of the blood through
the portal vein favours congestion of the capillaries of the gastric and intestinal mucous membrane, whence arise hæmorrhages; whilst it also produces engorgement of the capillaries of the peritoneum, and hence ascites results. The cirrhosed liver is much smaller than normal, weighing only 1½ or 2 lbs. It is pale and the surface is extremely irregular, presenting numerous projections which give the organ a "nail-nailed" appearance.

On slicing the gland, it is found hard and tough; while the firm and thickened connective tissue is seen to form thin lines between irregular masses of lobules. At the parts on the surface corresponding to these lines, the capsule is drawn in, the tissue of the liver is also paler than natural, owing to the presence of the broad lines of greyish-coloured tissue, and it is often yellowish from an accumulation of biliary matter in the cells. Hence, a section of the liver has the greyish-yellow colour of impure beeswax; and this disease has, in consequence, been termed by the French, cirrhosis.*

Symptoms.—These are generally few and obscure until the effused fibrin begins to interfere with the flow of the portal blood, and to offer an impediment to the secretion and escape of bile. Slight enlargement of the liver is present in the early stages; but as the fibrous tissue contracts and the lobulesatrophy, the size of the gland becomes diminished, while the spleen gets hypertrophied. Then weight or dull pain in the right hypochondrium, indigestion, flatulence and constipation, occasional feverishness, a dry and rough skin, with an unhealthy sallow look, are the most prominent symptoms. When relief has been obtained by the use of purgatives and an abstemious diet, the patient probably fancies himself well, and pursues his usual occupations; although at the same time he finds that he gets gradually weaker and thinner, and that his complexion remains sallow. After a time there are attacks of diarrhoea, the appetite fails, the urine gets scanty and is loaded with lithates, while the emaciation and debility increase.

At the end of some months, or not until the lapse of one or two years, the increasing contraction of the effused lymph greatly obstructs the circulation through the portal vessels: an exudation of serum takes place from the extreme branches of the veins converging to form the vena portæ, and hence the belly becomes enlarged by dropsical effusion, which gradually increases so as to cause great distention. The veins on the surface of the abdomen get dilated—showing that the current of the portal blood is seriously impeded; and occasionally hæmorrhage from the distended portal system gives rise to an effusion of dark blood into the stomach and intestines. In a few rare instances the attack of hæmorrhage has constituted almost the first symptom of cirrhosis; so that death may really happen from this cause, if the loss of

* See the works of Morehead and Budd, already quoted from.
blood be very great, in the midst of apparent health. When ascites has once occurred, it continues and increases, while in some twelve months or so the patient dies from exhaustion. Or a fatal termination will perhaps occur at an earlier period owing to pneumonia, peritonitis, jaundice and toxæmia, diarrhœa, or some other complication.

Treatment.—Although confirmed cirrhosis is quite incurable, yet it is probable that when the disease is early submitted to treatment its progress can be at least much retarded. At the commencement we shall do considerable good by insisting upon the complete disuse of all alcoholic drinks, by forbidding the employment of coffee and curry and highly seasoned dishes, by supporting the strength with plain animal food, and by checking any complications as they arise. With regard to medicines, it will probably be found that aperients are always needed. Perhaps the most useful are the sulphate of magnesia (F. 141), or the sulphate of soda (F. 143), or the resin of podophyllum (F. 160), or the acid tartrate of potash, with taraxacum (F. 194). An imitation of the Carlsbad waters (F. 181) has often seemed to me to act favourably; and consequently this mixture can be recommended where the patient is unable to drink the real waters at their source (F. 496), or to pay a visit to Marienbad (F. 497). Some authorities recommend cupping or the application of leeches over the liver. Where it is evident that the loss of blood cannot be borne, repeated small blisters may be employed; and considering that gin-drinkers are the last class of people likely to derive benefit from bleeding, it would seem better to have recourse to counter-irritants rather than to active depletion. Supposing there is a well-founded suspicion of any syphilitic taint in the system, iodide of potassium (F. 31) will probably do great good; following up its effects by quinine and the iodide of iron (F. 382), or especially by the waters of Kreuznach (F. 484), or perhaps of Aix-la-Chapelle (F. 483), or of Neuenahr (F. 485).

Where it is evident that the degeneration of the hepatic cells has become far advanced, then active aperients and mineral waters only increase the prostration and tend to hasten the setting-in of dropsy. Attention must then be more directed to the condition of the digestive organs; aiding their action by the nitro-hydrochloric acid (F. 378), or by pepsine and extract of nux vomica (F. 420), or by tincture of rhubarb in some bitter infusion (F. 369). Inunction of the liver with the iodine (or the red iodide of mercury) ointment may sometimes appear to do good. Supposing there be haæmmorrhage, such astringents as turpentine (F. 402), gallic acid (F. 103), or nitric acid (F. 104) will be most likely to check it; very cold drinks being also allowed, while a bladder of ice should be occasionally placed over the abdomen. When ascites has taken place, mild diuretics, purgatives, tonics, and sedatives are the agents with which we may hope to palliate
the suffering and to prolong life for a short time. But if there be urgent dyspnœa or other general distress from the dropsy, the fluid ought to be removed by tapping; a proceeding, however, which does not afford satisfactory results, since the serous effusion is sure to reaccumulate in a week or two.

3. SYPHILITIC HEPATITIS.

SYPHILITIC inflammation of the liver is generally accompanied with other tertiary symptoms of the venereal infection. The disease manifests itself, according to Dr. Frerichs,* in three forms:—(1) As simple interstitial hepatitis and perihepatitis. (2) As hepatitis gummosa; in which white depressions, like cicatrices, are found to contain yellowish nodules of a rounded form and dried appearance, varying in size from that of a linseed to that of a bean. And (3) as waxy, amyloid, or lardaceous degeneration, to be considered in a subsequent section. All these forms will perhaps be found coexisting in the same liver, or either may be present independently of the others.

The symptoms produced by the first two varieties are seldom very striking; for while one portion of the gland is being rendered unfit to perform its functions, other parts become hypertrophied and take on extra work. The diagnosis, however, is made somewhat easy by the presence of the syphilitic cachexia, and the other indications of constitutional infection. The spleen is also generally found enlarged in these cases. Sometimes there is albuminuria.

The remedies consist of iodide of potassium (F. 31), the mercurial vapour bath (F. 131), and rest from all mental or bodily labour. Where there are symptoms of renal disease, the iodide of iron (F. 32) had better be alone trusted to.

IV. DISEASES OF THE HEPATIC BLOODVESSELS.

The hepatic artery and its branches may be involved in disease affecting the liver generally,—as in cirrhosis, cancer, tubercle, &c.; or this vessel will be the sole seat of morbid action, as is seen in atheroma of its coats, aneurismal dilatation, and obstruction of its canal. In many instances it is impossible during life to do more than guess at the exact nature of the affection. As regards aneurism of the hepatic artery the chief indications are,—the presence of a pulsating tumour, pain from irritation of the hepatic plexus of nerves, and jaundice from the compression exerted on the biliary ducts. Generally, death takes place suddenly from rupture and internal haemorrhage.

The portal vein is now and then affected in different ways. Blood-coagula are at times found obstructing its channel; being formed under the same circumstances as those which give rise to thrombi in other parts, or from some disease confined to the liver and interfering with the circulation through it. As a general rule, these clots are the cause, not the result, of inflammation of the venous coats. The obstruction for the most part comes on some time after disease (cirrhosis, chronic atrophy, chronic peritonitis, &c.) has given obvious proof of its presence. The abdominal veins get prominent and dilated, there is diarrhoea with rapid wasting, the spleen becomes perceptibly enlarged, and a large quantity of ascitic fluid is rapidly poured out. The more sudden and complete the obstruction, the less time there is for the collateral circulation to be established; and consequently the more marked will be the effects. The fatal termination can sometimes be postponed by the use of astringents to check the diarrhoea and haemorrhage, by employing food which will be easily assimilated, and by the operation of tapping. The latter proceeding, however, is not to be resorted to until absolutely necessary.

The portal vein collects the venous blood from the digestive organs, and carries it to the liver. Inflammation, ulceration, or suppuration of the viscera in which the roots of this vein have their origin, is most frequently the cause of suppurative disease of the vein itself. This affection may also, however, have its source in inflammation of the bile ducts, especially where the latter morbid process is due to gall-stones. The prominent features of suppurative portal phlebitis are headache, violent fever, great prostration, rigors, profuse sweating, pains in the epigastrium or the right hypochondrium, biliary diarrhoea, enlargement of the liver and spleen, and jaundice. These effects are followed frequently by the symptoms of peritonitis, and occasionally by metastatic purulent deposits in the liver or lungs, or joints; while they terminate in fatal exhaustion or coma. Remedies are of little avail; though quinine and opium may be employed to subdue the rigors and pain, while the patient’s strength is supported by milk and raw eggs, solution of beef (F. 2), and demulcent drinks (F. 19).

With regard to adhesive inflammation of the portal vein but little is known. For frequently this condition cannot be distinguished from the other inflammatory diseases of the liver during life; while as it is not fatal like the suppurative form, recent examinations have not been made. The changes found after death, and which show that it has at one time existed, consist of certain linear fissures over the obliterated branches; together with atrophy of those lobules which are naturally supplied by them.

Rupture of the portal vein, the result of fatty degeneration of its coats, has been met with; so have ossification and calcification; while more commonly some of the branches have been found dilated, in consequence of the obstruction of others.
ACUTE ATROPHY OF THE LIVER.

The hepatic veins commence in the capillaries of the vena portae, the three large branches which result opening into the inferior vena cava. These veins are generally found enlarged after death from valvular disease of the heart. They are very rarely the seat of adhesive inflammation; but when they are so, the morbid action gives rise to thickening of the coats, or to obstruction of the affected branches. Suppurative hepatic phlebitis is rather more common, occurring as the consequence of abscess of the liver. Blood poisoning generally ensues.

V. SUPPRESSION OF THE FUNCTIONS OF THE LIVER.

The secretion of the bile may be more or less completely suspended [Acholia, from 'A = priv. + χολή = bile] owing to acute atrophy, as well as from cirrhosis, fatty degeneration, &c. This subject has already (vol. i. p. 150) been generally treated of; but its importance is such that it requires further consideration.

1. ACUTE ATROPHY OF THE LIVER.

Acute or yellow atrophy of the liver (sometimes spoken of as acute wasting, softening of the liver, diffused hepatitis, or fatal jaundice) is one of the most remarkable diseases to which the human body is subject. It consists, as a rule, of a rapid and complete destruction of the hepatic cells throughout every part of the gland. But it seems impossible to doubt that in a few instances the disintegration of these cells has been less extensive; the secretion of bile being consequently very defective, yet not entirely suppressed.

Causes.—Women are more obnoxious to this very rare affection than men. Pregnancy appears somehow to predispose to it, and it has happened more frequently between the third and seventh months of gestation than at other periods. It has also sometimes followed abortion. It would seem to be most common from about the age of seventeen to thirty.

Among the alleged exciting causes it is necessary to mention grief or anxiety, sudden alarm, and fits of passion; venereal excesses, syphilis, and the excessive use of mercury; drunkenness with dissolute habits; the influence of malaria; and the poison of typhus. Yellow fever has many points of resemblance with the disease under consideration. It is a constant consequence of poisoning by phosphorus, and probably many reported cases have been due to this cause. It occurs also in poisoning by arsenic.

Symptoms.—There may be a preliminary stage, during which complaint is chiefly made of headache, loss of appetite, thirst, drowsiness, mental and bodily depression, irregularity of the...
bowels, and tenderness of the abdomen. At the end of a variable period the conjunctivæ become yellow, and the skin gets slightly jaundiced. These precursory symptoms may last a few days, or upwards of three or four weeks; while they will possibly be altogether absent. When present they often fail to attract serious attention, the patient continuing to follow his usual occupation.

The symptoms which directly arise from acute atrophy of the liver are jaundice, sometimes with formation of petechiae and large ecchymoses; and vomiting, at first of the contents of the stomach with mucus, and then of a matter like coffee-grounds owing to the presence of altered blood. The effects upon the nervous system are manifested at the onset by irritability and great despondency; but soon there is wandering which merges into noisy delirium and convulsions, followed by stupor and deep coma. The pulse is at the commencement infrequent; though as the cerebral disturbance is manifested it rises in frequency to about 120, becoming slow again as stupor sets in, and getting frequent and small as the fatal termination approaches. The tongue and teeth are coated with black sordes; while the abdomen is often tender, pains being complained of about the epigastric and right hypochondriac regions. The extent of hepatic dulness, at first perhaps increased, rapidly diminishes, while that of the spleen increases. There is always obstinate constipation; hard clay-coloured stools coming away under the influence of purgatives, with subsequently evacuations which are black from the presence of blood. The urine is natural in quantity; and it generally flows away involuntarily, or an inability to pass it may necessitate the use of a catheter. On analysis this secretion is found loaded with bile-pigment, and perhaps slightly albuminous; the natural solids being often diminished. A microscopic examination of concentrated urine will generally detect the presence of tyrosine and leucine; the former appearing as long needle-shaped crystals and small star-like bodies, while the latter are seen as finely-marked laminae and globular masses with fringed surfaces and concentrically-thickened walls. Then lastly, the jaundice increases; bed sores form over the sacrum, if life be prolonged beyond a week or ten days; and there are hemorrhages from the nose, stomach, bowels, bronchi, &c.

This disease usually ends fatally within a week from the appearance of the acute symptoms; while sometimes death occurs at the end of eighteen or twenty-four hours. It has been doubted whether recovery ever takes place; but although the cases in which the termination is favourable are very rare, yet it seems certain that some such have been met with.

Pathology, &c.—Examination after death reveals a considerable diminution in the size of the liver, the reduction being often to the extent of one-half or even two-thirds of the normal volume. The capsule is found opaque and puckered, while the parenchyma is soft and friable, flabby and shrunken; the cut surface presents a
dark-yellow hue, the outline of the lobules is invisible, and the bloodvessels are almost empty. Under the microscope either no hepatic cells can be detected but only brown granules of biliary matter with oil-globules, or isolated cells loaded with fat or pigment are discovered. The gall-bladder is usually empty, and the bile ducts are free from any obstruction. In most of the recorded cases the spleen has been congested and enlarged. Sometimes the glandular epithelium of the kidney has been found in a state of fatty degeneration. The muscular fibres of the heart are usually in a state of marked granular degeneration.

"Acute atrophy of the liver," says Frerichs, "belongs to those obscure processes, as to the nature of which various opinions may be advanced, without it being possible for any one of them to obtain a general acknowledgment. The fact of the disappearance in a few days of one-half or one-third part of the original volume of a large gland abounding in blood, without any alteration in the bloodvessels leading to it, has a complete analogy in no other disease."*

Rokitansky and others have referred the destruction of the hepatic cells to the action of an excess of bile in the portal system—to a bilious liquefaction. Buhl looks upon the disease as analogous to typhus. While again, it has been regarded as a diffused inflammation, the destruction of the cells by fatty degeneration arising from the accompanying acute exudation-process.

As no morbid appearances are found in the brain or its membranes to explain the nervous symptoms, they must be referred to changes in the blood. Frerichs attributes the cause of the blood-intoxication to the arrest of the hepatic functions consequent on the destruction of the secreting cells, and to the derangement of the renal secretion so that the elimination of ura is stopped. The former of these causes includes not only the absorption of bile, and the retention in the blood of the substances from which this secretion is formed, "but also the cessation of the powerful influence which the liver exerts over the processes of metamorphosis of matter, and the simultaneous passage of the disintegrated glandular substance into the blood."

From the consideration of the chief points in a case of this affection which was admitted into the Edinburgh Royal Infirmary, Dr. T. Grainger Stewart concludes, in a paper read before the Edinburgh Medico-Chirurgical Society on 5th July, 1865, that acute hepatic atrophy is a blood disease operating independently on the different abdominal viscera. The following are the considerations which seem to this gentleman to point to such an explanation:—

1. At the examination after death the blood was found dark and fluid, while the muscles were dry as they are in typhus fever and other blood diseases. 2. The spleen was soft and pulpy as it is in many febrile blood diseases. 3. The fact that the kidneys and

the liver were affected by a peculiar and identical morbid process indicates that they were influenced by a common cause, that cause being situated in the blood and consisting of a form of fever poison. (4) The appearance and amount and effects of the exudation, being different from what is seen in simple inflammation either of the liver or kidneys, indicate that some peculiar matter was present in the system altering the ordinary processes. (5) The facts that this disease occurs so often during pregnancy, and that it seems to be induced by depressing mental emotions, serve to show that it is of a constitutional origin. And then (6) from all these considerations Dr. Grainger Stewart thinks that we cannot avoid concluding that this peculiar affection is a blood disease; and that it leads to atrophy of the liver by diffuse exudation into the hepatic cells, which is followed by a rapid fatty degeneration.

Treatment.—Our ignorance of the primary nature of this disease, no less than its severity and rapid progress, must necessarily render the treatment empirical and often useless. The favourite remedies are at first drastic purgatives, then the mineral acids, and subsequently diffusible stimulants as depression sets in. Ice may be freely given to check the vomiting. Where the diagnosis is doubtful, and especially where the distinction between acute atrophy and bilious fever remains uncertain, Frerichs recommends large doses of quinine dissolved in acids.

2. ACHOLIA FROM OTHER CAUSES.

Blood poisoning must arise from all diseases which produce complete disorganization of the liver; while it will usually be attended with jaundice, hemorrhages, delirium, coma, &c. On the other hand these symptoms are sometimes absent; for it has been rendered certain by the experiments which disease is constantly performing (as it were) for our instruction, that the constituents of the bile may be retained for a time in the blood without marked injury resulting.

The chief diseases which ultimately lead to destruction of the glandular epithelium, and consequently to complete arrest of the functions of the liver, are—cirrhosis, fatty degeneration, and extensive cancer; as well as those affections which produce an impermeable state of the ductus communis choledochus, or of the hepatic duct. In these cases it not uncommonly happens that severe indications of cerebral disturbance, quickly ending in fatal coma, are suddenly superadded to those other morbid symptoms which may have been long present.

3. CHRONIC ATROPHY OF THE LIVER.

This disease is in no way connected with acute atrophy. It results from all those conditions which tend to arrest the capillary circulation through the gland, and hence to lessen its nutrition.
The causes which diminish the size and functional activity of the liver are numerous. Great mischief can be originated by long-continued compression of the organ; such as may arise from tight lacing, extensive pleuritic effusion, great hypertrophy of the heart, constant distension of the ascending and transverse colon, chronic peritonitis, &c. The various forms of adhesive inflammation—either of Glisson’s capsule or of the parenchyma, occlusion of the hepatic capillaries, obliteration of the trunk of the portal vein, the development of new growths, the cicatrization of abscesses, &c., will also all tend to produce more or less serious and extensive atrophy.

The symptoms that ensue from a persistent defective secretion of bile are developed slowly and insidiously. At the commencement there is usually imperfect performance of the functions of digestion, flatulence, alternately diarrhoea and constipation, pale-coloured stools, a dry sallow state of skin, and a falling off in flesh and strength. Then percussion shows that the dimensions of the liver are gradually lessening, so that sometimes there is scarcely any appreciable dulness. Of course, the digestive derangements lead to increasing debility; the patient, in the course of many months, becomes very anaemic and much wasted; and there will perhaps be fatal exhaustion, &c. Very frequently general dropsy sets in, which soon ends the suffering.

After death, the liver is found flabby and uneven on its surface with its capsule wrinkled; while it is either partially or wholly atrophied, according to the extent of the alterations which have been produced in the larger bloodvessels and biliary ducts. The hepatic cells in the portions of the gland affected are shrivelled up and much diminished in size, of a pale colour, devoid of granular contents, and perhaps loaded with oil or particles of bile-pigment. The capillary vessels appear more or less impermeable, while the trunk and branches of the portal vein are often enlarged. More rarely, the portal vein or the hepatic artery is plugged up.

A carefully directed plan of treatment, when early commenced, can do much to prolong life. The diet should be light but nourishing; being free from rich dishes, sugar, and fermented drinks. Warm clothing ought to be used, and over-fatigue carefully guarded against. To aid digestion recourse may be had to pepsine (F. 420); or to the purified ox-bile with ammonia (F. 170); or to what has answered better in my hands, a daily dinner-pill of ipecacuanha with quinine or rhubarb (F. 44, 384, 385). To combat the anaemia in these cases, it appears to me more advisable to trust to bark and the mineral acids, rather than to ferruginous tonics; for the latter have sometimes seemed to give rise to hepatic congestion, and thus to have increased the mischief. This remark does not hold good, however, with regard to the waters of the various chalybeate springs, which will often be used with much advantage. Consequently we may send the invalid to Harrogate
VI. DEGENERATIONS OF THE LIVER.

1. FATTY DEGENERATION.

The hepatic cells in their normal state always contain a certain amount of oil; the degree varying with the nature of the food which has been digested. But in fatty liver, or fatty degeneration of the liver, the quantity is very much increased; so that the cells may be seen on a microscopic examination to be gorged with oil-globules, which diminish the normal granular matter and quite obscure the nucleolated nuclei.

The causes of this form of hepatic enlargement are usually constitutional. It is a condition that is of frequent occurrence in pulmonary consumption; as well as in fatty degeneration of other important organs—like the heart, kidneys, &c. Persons who live too freely, who indulge in alcoholic drinks, and who lead indolent lives, frequently suffer from it. It has also been met with during the progress of cancer, and of constitutional syphilis; as well as after death from some acute diseases, such as ichorhemia, typhus, small-pox, erysipelas, &c. If we wished to produce a fatty liver, we could hardly take a better lesson than that which is taught by the poulterers of Strasbourg; who keep their geese in small cages, deprived of exercise, in a heated atmosphere, and with a large supply of carbonaceous food.

With regard to the pathology of this affection it appears probable that the accumulation of fat (chiefly olein) takes place only in the secreting cells; there being no deposit in the intercellular spaces of the parenchyma. Frerichs reminds us that appearances are not unfrequently in favour of a deposition in the intercellular spaces, inasmuch as in preparing sections for microscopic examination a number of cells become destroyed, and their fatty contents escaping appear to lie external to the cells. Unless the quantity of oil be considerable, it is often impossible to say that there is fatty degeneration without a minute examination. In the case of excessive degeneration, however, the gland is found of a dull yellow colour; it may be increased in breadth but diminished in thickness; and it is generally greasy and soft and flabby. The weight of the liver either remains unaffected, or it will be slightly increased, or it may be much diminished. The cut surface usually presents a reticulated appearance; there being reddish-brown patches cor-
responding to the hepatic veins, and around them light yellow rings which are conformable with the periphery of the lobules—
the region of the portal vein. This nutmeg-like appearance is not characteristic of fatty degeneration, however, since it may occur in hepatic congestion, &c.

According to Frerichs the alteration in the hepatic cells usually commences at the periphery of the lobules, in the region of the interlobular vessels belonging to the portal vein; while it gradually advances towards the centre of the lobules where the hepatic veins arise.

The general symptoms are often slight. The powers of life wane, but they do so gradually and silently. Unless there be considerable accumulation of fat in the hepatic cells, the functions of the liver are not deranged; so that there is neither pain, jaundice, nor dropsy. If the cells be much loaded, however, they may impede the circulation of blood in the capillaries, as well as obstruct the excretion of bile. Under these circumstances gastric catarrh, indigestion, a sense of weight and fulness in the right hypochondrium, a pasty complexion, a smooth and waxy-looking state of the integuments, sometimes constipation or occasionally diarrhoea with pale clay-coloured stools, anæmia, hæmorrhoids, possibly ascites, and even fatal exhaustion or complete acholia, may result. But it is very seldom that there are these serious symptoms; perhaps because the primary systemic disorder proves fatal before there is time for their occurrence.

The treatment of fatty liver when it occurs as a secondary affection scarcely requires consideration, seeing that it can be of comparatively slight importance where there is phthisis, fatty degeneration of the muscular fibres of the heart, cancer, syphilis, &c. But if this hepatic disease should be diagnosed as the sole affection of the system (which is very rarely accomplished), its cure ought to be attempted; while as we have merely to free the hepatic cells of their excess of fat, the minute elements of the liver not being disorganized, there is every reason to hope for success. The most important remedy is the regulation of the diet; alcoholic drinks, sugar, amylaceous matters, and fat being interdicted. A large proportion of plainly cooked animal food may be allowed, with a moderate allowance of fresh fruits, &c. Torpidity of the bowels is to be overcome by active exercise in the open air: as well as by rhubarb or sulphate of soda, or by the use of the waters of Carlsbad, Pullna, Kissingen, &c. The remedies from which the best results may be expected are the various preparations of iron, chloride of ammonium, chlorate of potash, and (where there is any suspicion of a syphilitic taint) the iodide of potassium; but should either of these drugs appear to induce debility, or to destroy the powers of the stomach, or to take away the appetite, they must be exchanged for bitter vegetable substances.
2. AMYLOID DEGENERATION.

This structural disease of the liver does not demand much attention in this place, since its pathology has already been treated of with as much latitude as the present extent of our knowledge will allow.

The important condition known as amyloid degeneration (the waxy, albuminous, lardaceous, or scrofulous liver) can coexist with fatty liver, or with cirrhotic induration, or with syphilitic cicatrices and gummatous nodules, or it may alone be present. In it, the coats of the small bloodvessels are first affected; and then the glandular structure of the organ is gradually converted into a dense material. Hence results destruction of the gland-cells, with abolition of their functions. The liver is found after death much increased in weight and size, so that instead of weighing from three to four pounds avoirdupois, it may average eight or nine. Its substance is also tough, and somewhat resembles yellow wax; and the cut surface presents only faint traces of lobules. Minutely examined, the cells are found compressed, irregular in form, and with their nuclei atrophied.

This peculiar state of the liver occurs in phthisis much more rarely than fatty liver does; with which, however, it has been sometimes confounded when in an early stage. It is frequently met with in the subjects of constitutional syphilis, even when the osseous system is healthy. But it is perhaps most commonly found in young male adults who have long suffered from protracted suppuration owing to scrofulous or other forms of caries of the bones; whence it was at one time thought to be peculiar to this disease. The infiltration, or degeneration, takes place insidiously; the first indication of its existence being the increased size of the gland. The biliary secretion lessens as the cells degenerate. Then the circulation gets impeded, as well as the escape of bile from the ducts; so that the superficial veins of the abdomen enlarge, a small quantity of fluid collects in the peritoneum, anaemia to a marked degree sets in, the countenance presents a peculiar dusky-sallow hue, while occasionally the skin and conjunctivæ become of a decided yellow tinge. As the enlargement of the liver progresses, so the general health and strength decidedly deteriorate. Various complications also occur; the chief of these being a troublesome persistent diarrhœa, attacks of nausea and retching, loss of appetite, transient attacks of fever, a tendency to inflammation of internal organs, and general irritability with insomnia. Should anasarca set in, with the accumulation of fluid in the peritoneum, there will follow at no long interval emaciation and exhaustion and death.

The disease being constitutional its ravages are by no means limited to the liver. The spleen and kidneys are likewise very
generally involved in the morbid process; while sometimes the lymphatic glands, as well as the gastro-intestinal mucous membrane, are also affected. The renal disorder is more serious and fatal than the hepatic; its existence being rendered certain by gradually increasing bad health, together with the persistent presence of albumen in the urine, as well as of transparent waxy-looking casts of the secreting tubules.

On the subject of treatment it need only be remarked that disappointment has hitherto followed almost all attempts at cure. The disease slowly but steadily advances to a fatal termination. If any good can be done, it is by the use of remedies directed to the relief of the cause. Thus, if there be constitutional syphilis, iodide of potassium or iodide of iron should be employed; or the tincture of iodine alone, with the use of iodine ointment to the abdominal walls, may be deserving of trial. In some instances benefit has temporarily accrued from the employment of iron—especially the perchloride; or from the nitro-muriatic acid and bitter tinctures. Then any suppurative affection ought to be cured; while if there be disease of the bones surgical interference can perhaps be of some avail. In all cases attempts are to be made to prevent the occurrence of complications, as well as to relieve the prominent symptoms. The general health must be attended to; while the system is to be supported by regulated quantities of good wine, by breathing a pure atmosphere, by warm or tepid sea-water baths, and by easily digested nourishing food.

3. THE PIGMENT-LIVER.

After death from severe intermittent, remittent, or continued fevers, the liver is sometimes found to present a blackish or chocolate colour; brown insulated figures being observed upon a dark ground. The cause, &c., of this change of colour has been particularly examined by Frierichs; who says that it is due to the accumulation of pigment matter in the vascular apparatus of the gland. On magnifying fine sections of the hardened tissue, accumulations of pigment are to be seen in the capillary network of the portal and hepatic veins; while the branches of the hepatic artery also contain quantities of black colouring matter. The same melanotic material may often also be found in the parenchyma of the spleen; while the kidneys, brain, and other organs are less constantly implicated. The pigment is carried to the tissues by the blood; and if this fluid be minutely examined, it will be seen to contain small granular masses, together with nucleated pigment cells having black granules in their interior. It is generally believed that the melanotic matter is formed in the spleen; owing to stagnation of the blood in the venous sinuses, arising from the intense con-
gestions which affect this organ during the course of all malarious fevers.

The chief consequence of this pigment formation is an impediment to the circulation of the blood through the liver; so that the gland at first becomes congested, and subsequently atrophied. The non-arrest of particles of the pigment as they circulate through the liver and lungs, allows them to be carried to the brain, in the narrow capillaries of which they accumulate, and they may subsequently induce severe cerebral disturbance.

The occurrence of this condition shows how necessary it is to cure all diseases dependent upon marsh miasmata as quickly as possible; lest the capillaries of the liver get loaded with melanotic matter, leading to their destruction, and of course to atrophy of the gland. When the latter is established (as indicated by gastric catarrh, a greyish-yellow colour of the skin, nausea and diarrhoea, and severe cerebral symptoms or ascites) it will be too late to hope for benefit from the employment of quinine or any other drugs.

VII. HEPATIC TUMOURS.

The most significant new-formations which have their seat in the liver are the hydatid tumours and cancerous infiltrations. There are, however, two or three other growths occasionally met with; but they are of so little importance that they only require a very brief notice.

1. CYSTIC TUMOURS OF THE LIVER.

Encysted knotty tumours, containing a cheese-like substance, have been described by Dr. Budd. They are found in the substance of the gland, varying in bulk from the size of a large pea to that of a small potato; they are of a white or pale yellowish colour; and they have a nodulous form. A minute examination shows that the steatomatous-looking matter is composed of a mass of irregular granules and free oil-globules, while occasionally a few plates of cholesterine can be discovered. These tubera appear to have their origin in inflammation of the mucous lining of the hepatic ducts; in consequence of which morbid process a duct becomes closed at some point, so that no outlet remains for its secretions. The latter therefore accumulate, dilate the affected canal, and at length form the unorganized cheese-like matter.

Sacculated pouches or cysts, containing a glairy fluid, are formed in the same manner as the knotty tumours. Cruveilhier has reported a case where the liver must have been crowded with these irregular cavities, each containing mucous more or less tinged with bile. The signs of pre-existent hepatitis were distinct.
The patient died from exhaustion, his chief symptoms having been jaundice and daily increasing debility.

Simple serous cysts, with clear watery contents, are sometimes found scattered through the liver. They are seldom much larger than small beans, are lined with tessellated epithelium, and they have not seemed to have any connexion with the bile ducts. In several instances coexisting cysts have been discovered in the kidneys.

2. CAVERNOUS TUMOURS OF THE LIVER.

These tumours are not uncommonly found on the upper surface of the liver, especially in the bodies of aged persons. They are developed in the hypertrophied connective tissue. On looking at the gland one or more dark blue coloured and irregular spaces are seen, varying in size from that of a pea to that of a common hen's egg; on cutting into which a tissue is found resembling that of the corpora cavernosa of the penis, containing a quantity of dark blood. According to Rokitansky a connexion can always be traced between the latter and some of the branches of the portal vein; while the structures will be found prominent or collapsed according to the amount of blood contained in their compartments. So far as our experience at present goes, these cavernous vascular spaces give rise to neither local nor general disturbance.

3. TUBERCULOSIS OF THE LIVER.

Tubercular deposits are very rarely discovered in the liver, and probably never as a primary disease. Where they have been found, it has been in connexion with far-advanced tuberculosis of other organs, especially of the abdominal viscera. Hepatic tubercle occurs over all the portions of the gland, in the shape of semi-transparent miliary granules, or as yellow adipose deposits; the patient generally succumbing to the constitutional affection, before there has been time for the stage of softening to set in. Still, small vomicae do occasionally form, and then care will be required to distinguish them from a morbid dilatation of the gall-ducts. Rokitansky* states that this latter condition is almost invariably met with in combination with hepatic tubercle, and is not unfrequently coexistent with tubercular disease of other organs. These dilatations or cavities are of the size of a millet-seed or of a pea, with flaccid parietes; they are filled with viscid, muco-bilious, dirty-green matter; they are scattered throughout the liver; and they consist of swollen capillary gall-ducts. The hepatic tubercles exist at the same time,

and at various distances from the cavities: occasionally a tubercle will be found near one of the latter, but it is not characterized by the symptoms of secondary deposit accompanying the fusion of tubercular matter.

4. HYDATID TUMOURS OF THE LIVER.

Hydatid [from ὑδάτις = a vessel] tumours occur in the liver more frequently than in any other organ. They are occasionally met with, however, in the subperitoneal connective tissue, the spleen, the omentum, the muscles of the heart, the brain, the kidneys, the lungs, and in the bones—particularly the tibia.

Pathology.—These growths consist of a sac, formed by the condensation of surrounding tissue, lined by a bladder or cyst, and filled with a limpid and colourless salt fluid; floating in which numerous small cysts similar to that lining the sac, and varying in their measurements from the size of a small seed to that of a fowl's egg, will usually be found. To these cysts or bladders Laennec gave the name of acephalocysts—bladders without heads [Ἀ = priv. + κεφαλή = the head; and κόστος = a bladder]. The acephalocyst lining the sac is composed of several finely laminated and friable coats possessing the firmness of coagulated albumen. Sometimes this parent cyst contains no floating hydatids, or very few; in other cases it is literally crammed with them; and these again, it is said, may contain a third, and the latter even a fourth generation. To distinguish these different kinds as well as to mark the mode of their increase, naturalists have divided these productions into two species: 1st, the acephalocystis endogena of Kuhn—likewise called socialis vel prolifera by Cruveilhier, the pill-box hydatid of Hüter—which is the kind most commonly developed in the human subject, and in which the fissiparous process of generation takes place usually from the internal surface of the parent cyst, the progeny being sometimes successively included; and 2nd, the acephalocystis exogena of Kuhn—crenata vel sterilis of Cruveilhier—which develops its progeny generally from the external surface, and is found in the ox and other domestic animals. The true nature of these bodies is no longer doubtful. When an acephalocyst is opened, its inner surface is seen to be studded with numerous little elevated opaque spots or granules; which buds or offsets, on being carefully scraped away and minutely examined, will be found to consist of Echinococci [Ἐχῖνος = the hedgehog + κόκκος = a berry], from the cylinder of hooks surrounding the head. The fluid of the cyst also contains echinococci, which can be obtained from the sediment after subsidence has taken place in a conical glass; inasmuch as they are developed in groups on the inner wall of the hydatid vesicles, many subsequently becoming detached and dying.

The relation of hydatids to tape-worms has only been clearly
made out within the last few years. But it is now certain that echinococci are merely the progeny of a minute tapeworm, in a special stage of development,—in short, they are the larval conditions of the Taenia echinococcus of the dog and wolf, a worm about four lines in length, provided with a head having four suckers and a circle of hooks. Consequently, "whilst the mature worm has thus a very limited territory for its place of residence, its peculiar larvae, on the other hand, are found dwelling in a great variety of animals. Amongst the bearers are men, monkeys, sheep, oxen, deer, camels, the giraffe, and other ruminants; also the horse, ass, zebra, several feline animals, and perhaps the squirrel."* This immature tapeworm—the scolex of the taenia echinococcus—is a transparent, colourless, oval-shaped worm; displaying an apparatus of suckorial prominences with booklets at the cephalic extremity; and measuring about the one two-hundredth of an inch in length, and rather less in breadth. In structure, the parasite is a mere integument; the head and neck, which are equivalent to one half, being susceptible of retraction into the other half. The head is a flat disc at the extremity of the neck, having imbedded in its substance an apparatus of small hooks, thirty-four in number, disposed in a circle. Immediately behind this head are the four rounded suckorial processes, beyond which follows the body; while at the extremity of this is a short peduncle by which the animal attaches itself to the wall of the acephalocyst. When the animal is viewed with its head retracted within its body, the circle of hooks is seen through the transparent integument appearing like a ring in the centre of the body.†

**Symptoms.**—When a hydatid tumour forms in the liver, its growth is generally slow. For a considerable period it may give rise to little inconvenience beyond a sensation of weight, and a remarkable feature of the affection is the slight disturbance which it excites. Fever, pain, jaundice, anaemia, loss of strength, &c., if present are only accidental complications. When the tumour is of a large size, it may then be easily felt; it will be firm and elastic; sometimes a peculiar vibration is communicated to the hand when it is smartly tapped, but this is not constant; fluctuation cannot always be made out. If the cyst inflames and suppurates, violent pains result. Where the growth attains a great size it will perhaps compress the portal vein or vena cava, causing ascites and oedema of the legs. It may burst into the peritoneum, setting up peritonitis which is not necessarily fatal; or into the lung, or pleural cavity; or even into the sac of the pericardium, producing instant death. Now and then a communication has

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formed between the cyst and the hepatic duct—whence the contents of the sac have passed through the common duct into the duodenum; or the cyst has opened directly into the intestines, or in a contrary direction through the abdominal wall. In the three latter cases, the contents will often be entirely discharged, and the sac ultimately closing up will leave the patient well. When the tumour bulges into the thorax it interferes with the proper performance of the functions of the lungs and heart, and it may burst into the pleural cavity. If it open into the base of the lung, or into one of the bronchi, the patient becomes so worn out with the constant expectoration of hydatids and puriform matter, while the constitutional disturbance is so severe, that he generally sinks under the mischief. Suppuration of the cyst with fatal pyæmia is not a very infrequent termination.

Sometimes a hydatid tumour gets well without opening; this happening most frequently by the absorption of the fluid contents, and sometimes by the secretion of a thick and putty-like matter within its sac. Whether this secretion result from the death of the hydatids, or whether it is the cause of their destruction, is uncertain. The first view, however, is the most reasonable one.

The echinococcus disease is endemic in Iceland; so that, according to Lenckart, the practitioners (few in number) not unfrequently have upwards of 100 cases under treatment at the same time, while it is the cause of nearly one-sixth of the total number of deaths. Although this is probably an exaggerated estimate, yet without doubt the disease is so prevalent as almost to constitute a plague. For every 100 Icelanders there are 1100 head of horned cattle, while every peasant has on the average six dogs; which dogs have constant access to the water used by their masters for drinking, &c. The ova of the tænia echinococcus are thus swallowed by the human subjects; and passing from the stomach or bowel into the liver, undergo development there.

Diagnosis.—When a large hydatid tumour occupies the right hypochondrium, it need not necessarily be situated in the liver; for it may have its origin in the omentum, or in the subperitoneal areolar tissue, or in the right kidney. One of the largest tumours of this kind that I ever saw was diagnosed during life as arising from the liver; but it was found after death to be seated in the omentum. In the same way, when the tumour fills the left half of the abdomen chiefly, it will often be difficult to say whether it is connected with the spleen, omentum, or left kidney.

From time to time cases of more than ordinary difficulty, as regards diagnosis, are met with. This is especially true when the tumour is so large as to extend low down into the pelvis. Thus, an enormous hepatic tumour has been mistaken for a bony growth from the promontory of the sacrum, obstructing labour at the full time. As delivery by the natural passages seemed to be impossible, the Cæsarean section was performed by Dr. Sadler; the patient
dying a few hours afterwards. At the necroscopy, the obstructing cause was found to consist of an immense hydatid tumour; which not only occupied the whole upper part of the abdomen, but extended downwards to the pelvis where it had been so compressed by the uterus as to assume a bony consistence.* In another remarkable instance the abdomen was opened by Mr. Thomas Smith to extract a supposed unilocular ovarian cyst. The disease was found to consist, however, of a large hydatid tumour of hepatic origin. Fortunately the patient recovered completely.†

Treatment.—Several agents have been supposed to possess the power of stopping the growth of hydatid tumours. The chief of these are iodide of potassium, calomel, and common salt: sulphur baths and electricity have also been employed. Most observers now agree that little benefit is derived from such remedies. But I confess that my faith in the power of full doses of iodide of potassium to cause absorption of the fluid portion of the cysts, and thus to insure the destruction of the hydatids, has been greater than that of most other physicians. And indeed, I should speak more strongly upon this point, were it not for the exceeding difficulty of estimating the value of any drug from its employment in a limited number of cases; a difficulty which is increased when it has to be allowed that the action of the medicine is not uniformly favourable. Now, there can be no doubt that the iodide does frequently fail to effect any good in the disease under consideration. Nevertheless, in some instances patients have expressed themselves as feeling much relieved by this medicine; and in two cases of well-marked hepatic tumour recovery ensued while it was being taken. As one of these subsequently died after parturition, the diagnosis of hydatid disease was verified. The second patient remains well.

When the tumour has attained such a size as to be accessible to operation, surgical interference should be resorted to. Usually the removal of the limpid fluid by means of a fine trocar or by the aspirator, is sufficient, the scolices perishing and the sac contracting. Dr. Fagge and Mr. Durham have treated eight cases by electrolysis with success in all; it is probable that the mode of cure in this treatment is by the expulsion of fluid by the gases evolved, this escaping into the peritoneal cavity; simple acupuncture has also proved successful. Various substances have been injected—iodine, dilute alcohol, carbolic acid—but this is rarely necessary, and should be practised only when simple tapping fails. In case of suppuration of the hydatid, a free incision should be made when practicable, or injection of iodine or weak solution of carbolic acid, or the insertion of a drainage tube may be tried.

5. CANCER OF THE LIVER.

Every form of cancer, not even excepting the gelatiniform or colloid variety, has been met with in the liver. Of the two most frequent kinds, medullary or soft cancer appears to be more common than the scirrhous or hard variety. The disease may invade any part of the gland, either as a primary or as a secondary disorder. Probably in one-twelfth of all cases of cancer the liver is affected.

Pathology.—Hepatic cancer commonly takes the form of distinct and well-defined masses implanted in different parts of the gland; or in some exceptional instances, portions of the liver may be infiltrated with cancerous matter, the diseased segments merging insensibly into the healthy tissue without any distinct line of demarcation. In the first case, the nodules usually vary in bulk from the size of a pea to that of an orange, though they are sometimes much larger; while the smaller they are, the more abundantly do they stud the organ. Frequently they present an appearance as if spherical masses of firm lard were embedded in the parenchyma; though in scirrhous their consistence may be as great as that of cartilage. Very rarely is there a well-defined capsule. Occasionally there is haemorrhage into the cancerous stroma; which, if abundant, may produce rupture of the serous covering of the liver, and cause sudden death. The portal vein and its branches are much more commonly implicated in the disease than the hepatic venous vessels; the lymphatic glands and vessels are often involved; and the bile ducts may be compressed or obliterated.

With regard to infiltrated cancer it is only necessary to say that it seldom occurs without the nodulated form being likewise present, and that extravasations of blood and bile are often found in its structure. In both forms the hepatic cells in the neighbourhood of the disease are usually discovered in a state of fatty degeneration.

Symptoms.—This disease commences in an insidious manner. For a few months there are no active symptoms, but the victim feels that he is losing strength and energy, and getting thin. Probably he attributes his malaise to over work, but for several weeks he fails to take advice. Frequently, indeed, this is forced upon him by his friends, who take alarm at his altered appearance. Even now, if the patient be only cursorily examined by his medical man, the real nature of the case may be overlooked; though if a careful examination of the hepatic region be made there will be found one or more hard lumps, or else a general enlargement and hardening of the gland. When a liver contains numerous masses of cancer, we shall find (in addition to the general indications of malignant disease) that it is generally much enlarged, extending
far below the false ribs, sometimes even to the brim of the pelvis; while its regular form is lost, and uneven bulging prominences can be detected on the surface. The nodulous masses do not give rise to inflammation of the hepatic tissue; but when superficial they often cause peritonitis, which is generally very partial and of the adhesive kind, so that after death the tumours are found adherent to the diaphragm or to the abdominal walls. The remaining symptoms are somewhat obscure: loss of flesh and strength, short attacks of diffused pain and tenderness, disorder of the digestive organs varying from time to time, and great irritability with mental depression, being generally the most prominent. In some cases there is great suffering, in others there is very little pain. Towards the termination petechiae often appear and hæmorrhage from the nose, gums, or stomach may occur. Jaundice occurs more frequently than ascites; while in about one-fifth of all the cases both these conditions will be combined. The formation of gall stones not unfrequently adds to the suffering. The duration of hepatic cancer, except in the case of scirrhous, is usually short; life sometimes closing within six months from the first appearance of the symptoms, while it is very seldom prolonged for two years.

Where the disease presses upon the common duct so as to render it impermeable, the gall bladder may become greatly distended. In one instance it thus acquired the size of the fetal head. The liver itself also gets swollen from biliary congestion, as well as from the disease.

Causes.—Malignant disease of the liver is for the most part a secondary affection; that is to say, it results from the transfer of cancer cells by lymphatics and veins from the breast, stomach, kidney, &c. When primary, it does not occur before the age of thirty-five; while though it frequently spreads to contiguous organs, it only rarely contaminates remote structures.

Treatment.—Our remedies can only be palliative; such drugs as calomel, corrosive sublimate, iodine, and arsenic only serving to impoverish the blood, and to hasten the fatal termination. Relief to the pain must be given by sedatives—especially by conium and belladonna; sleep is to be given by the hydrate of chloral, Indian hemp, &c.; while the digestive organs should be strengthened by mild tonics, and a light nourishing diet. The action of opium is seldom favourable in hepatic cancer, though it should not be withheld when there is much pain or diarrhœa.

VIII. DISEASES OF THE BILIARY PASSAGES.

Under this head we have to consider those diseases which affect the biliary ducts, from their commencement in the glandular.
parenchyma, to their termination in the duodenum; so that this section comprehends the disorders of the hepatic duct and its capillary branches, the cystic duct, the ductus communis choledochus, and the gall bladder. The diseases of these passages give rise to important symptoms in proportion to the extent to which they impede the flow of bile from the liver, and the degree in which the hepatic parenchyma is involved in the morbid process.

1. INFLAMMATION OF THE BILIARY PASSAGES.

The biliary ducts and gall bladder are now and then attacked by different forms of inflammation. Thus, there may be catarrhal inflammation; in which (as in similar affections of other mucous membranes) the secretion of mucus is increased, while it is also altered in quality, becoming viscid or muco-purulent. Occasionally the cystic or the common duct will thus become obstructed with a firm plug of mucus; but as the latter does not get organized, it is carried onwards or breaks up after a time, so that the excretion of bile is again rendered free. The lining membrane of the capillary ducts may also be thickened by catarrhal inflammation; their diminished calibre leading to retention of the secretion, and consequently to dilatation. This disease generally has its origin in catarrh of the stomach and duodenum; the extension of it to the gland taking place through the common duct.—In exudative or plastic inflammation, there is either a firm fibrinous or a croupous product. This forms casts of the tubes, blocking them up and leading to their dilatation. To find these exudations is a very exceptional event. Nevertheless, they have been met with after death from typhus, erysipelas, pyæmia, cholera, &c.—And then, the biliary passages may suffer from suppurrative inflammation, leading to the secretion of pus and a thick kind of mucus tinged with bile. Where the abnormal action is of long continuance, ulceration may be set up. Ulceration of the gall bladder is often found when this reservoir is irritated by one or more gall stones; the concretion and the ulceration not always standing in the relation of cause and effect, because both may originate at the same time from an unhealthy condition of the bile. Moreover, the mischief set up by retained and decomposing bile will possibly induce ulceration without any concretion being formed; ulceration has been found after death from remittent fever.

When ulceration occurs, and especially if from any cause the bile is retained in the gall bladder, the immediate consequences may be perforation, effusion of bile into the abdominal cavity, and fatal peritonitis; or, if adhesive inflammation have previously occurred, abscess will perhaps result and open into the bowel or externally; or closure of the cystic duct may follow, rendering the gall bladder useless and causing the bile to flow continuously
into the duodenum, often without giving rise to any marked results. The case is very different in the latter respect when there is permanent closure of the common duct; inasmuch as this occurrence leads to the gradual destruction of the hepatic cells; to atrophy of the capillary bloodvessels, and to a complete wasting of the lobular substance. Some remarkable cases have been recorded where the patients have thus lived for several months after there has ceased to be any discharge of bile from the liver, since none could be secreted; and in which there has been deep and persistent jaundice, attacks of gastric or intestinal hemorrhage, wasting with hectic fever, and sometimes constipation alternating with diarrhoea. Death has occurred from gradually increasing exhaustion; and strange to say, without the occurrence of any cerebral disturbance.

Inflammation of the mucous membrane of the biliary passages gives rise to symptoms of very variable severity. The gall bladder, cystic duct, and common ducts are more obnoxious to this morbid action than the hepatic ducts; since the latter are less likely to be irritated by gall stones and unhealthy conditions of the bile. When there is merely catarrhal inflammation we find slight tenderness, tightness about the epigastrium and right hypochondriac regions, nausea, a sluggish action of the bowels, mild fever and jaundice if the mucus secreted be sufficiently viscid and abundant to choke up many of the ducts; the symptoms ending in a beneficial attack of diarrhoea as soon as the pent-up bile finds its way into the duodenum.

The biliary passages may all become dilated, from their origin in that plexiform network in which the hepatic cells lie, to the termination of the common excretory duct of the liver and gall bladder in the duodenum. Generally speaking, the expansion is only partial. In either case, it can arise from the habitual accumulation of inspissated bile; from compression of the ducts by tumours or disease of the parenchyma; from inflammatory swelling of the mucous lining diminishing the calibre of the tubes, and so leading to the retention of their secretions as well as of the bile; and from obstruction by calculi, catarrhal or croupy exudations, &c. Owing to obstruction of the duodenal orifice, the ductus communis choledochus has been found enlarged to the diameter of the small intestine. When the gall bladder is unable to get rid of its contents in consequence of occlusion of the cystic duct, the residuary bile may be absorbed; but if the lining membrane continues to secrete mucus, dropsy of the cyst will result from the accumulation, and a large pear-shaped or globular tumour may be found, containing some pints of fluid. Under these circumstances, rupture of the bladder has been prevented by tapping; an operation which can be safely performed provided there are adhesions to the abdominal wall, and even without such adhesions by the employment of the aspirator and a fine needle.
With regard to the treatment of inflammation of the biliary passages, the remedies required in acute cases are rest, restricted diet, and mild aperients. Warm baths are useful, and where there is much pain, fomentations and sedatives will relieve it; if there be fever and thirst, simple diluents are to be freely allowed; while as soon as exhaustion sets in, it must be combated by easily digested restorative food, and ammonia with bark, &c. Supposing we could feel certain that the obstruction was due to a portion of inspissated mucus, an emetic might drive the tenacious plug onwards. In those cases where the catarrhal inflammation becomes chronic, and where some few months elapse without the customary discharge of bile freely returning, the employment of the nitro-hydrochloric acid (F. 378), or a visit to one of the mineral springs had better be recommended. The waters of most service are those of Carlsbad (F. 496), Marienbad (497), Kissingen (F. 493), and the like.

2. ENTozoA IN THE BILIARY PASSAGES.

The proper habitat of the *Ascaris lumbricoides* is the small intestine. But every now and then this worm migrates upwards into the stomach, or downwards into the colon and rectum. Moreover, it may perforate the abdominal walls. Consequently it is not surprising, that in a few instances a lumbricus has found its way, by the duodenal orifice of the ductus communis choledochus, into the gall bladder or up the branches of the hepatic ducts; a journey which it would more easily accomplish, if the opening were stretched by the previous passage of a calculus or hydatid. The consequence has been very considerable irritation of the ducts, as well as obstruction to the flow of bile. Cases of fatal jaundice have occurred from the blocking up of the common duct by a large round worm; rupture of the duct has taken place from the same cause; while if this helminth passes into the branches of the hepatic duct it may not only impede the flow of bile, but set up catarrhal or exudative inflammation, dilatation, and perhaps rupture of the duct, ulceration, or suppuration. Lobstein found a gall stone in the common duct, the nucleus of which was composed of a round worm.

The *Distoma hepaticum* (more correctly, the *Fasciola hepatica*), familiarly known as the liver-fluke, is a flat trematode helminth, rather more or less than an inch in length, and about half an inch broad. It has a perforated oral, and an imperfect ventral sucker; the latter serving as “an anchor or holdfast,” while both are employed as organs of locomotion. The oral disc also assists as “a prehensile organ for taking in the biliary secretion on which the animal feeds;” whilst the pharyngeal sphincter prevents the regurgitation of food after it has distended the stomachal passages.
(Cobbold). The oesophagus is short: it ends in two primary intestinal divisions, which in their course give off numerous secondary branches, and these again subdivide; all these tubes terminating in blind cæcal extremities. The male and female generative organs are placed in the same individual.

The Distoma hepaticum is the pest of grazing cattle when they are confined to marshy or wet grounds. With sheep it produces the disease called the rot; in which affection the liver is sometimes found containing several hundred flukes. It has been estimated that upwards of one million sheep and lambs die annually in this country from the rot, some of the epidemics being much more severe than others. This entozoon has been very rarely found in the human subject. Mr. Partridge obtained one from the gall bladder of a patient who died at the Middlesex Hospital, which Professor Owen considered was in no respect different to the Distoma hepaticum of the sheep. M. Duval also discovered several in the portal vein; and other instances have been reported. As the presence of this fluke in man has never been diagnosed during life, no treatment has been adopted. In sheep, the severe effects of the rot seem to admit of palliation by removing the animals to dry ground, feeding them on beans and peas, &c., and by the free administration of common salt.

The Distoma lanceolatum is much smaller than the Fasciola hepatica, measuring only the third of an inch in length, and about one line and a half in breadth. Instead of being rounded at each end like the latter it has a lanceolate form, the caudal being more obtuse than the oral extremity. It has two suckers. The oesophagus divides into two blind and non-branching intestinal tubes: moreover, each individual has male organs, as well as ovaria and oviducts and a long uterine canal. This species is found in the liver of the ox and sheep, but less frequently than the Fasciola hepatica.

Only three instances are known where the Distoma lanceolatum has been detected in the human subject. Bucholz obtained several from the gall bladder of a prisoner who died of typhus at Weimar. Chabert found a large number in the stools of a girl, which were expelled after a dose of empyreumatic oil. And Dr. Kichner, of Kaplitz in Bohemia, met with the case of a young girl, who died after suffering pain in the liver for some years, and whose gall bladder contained eight calculi with forty-seven specimens of this small trematode helminth. The liver of this patient weighed eleven pounds.

3. GALL STONES.

These concretions are more frequently formed in the gall bladder than in the substance of the liver, in the branches of the
hepatic duct. Solitary calculi, when found in the gall bladder, are globular or oval or pear-shaped; associated gall stones usually have numerous polished facets, the result of pressure and mutual attrition; while when several stones are found accurately fitted to each other, they are said to be articulating. Very rarely, these bodies have the shape of flattened leaf-like concretions, with glistening metallic surfaces; or they may assume the figure of pale-blue six-sided discs. *Gall stones which are formed in the branches of the hepatic duct are small, rough or tuberculated, and of a dark colour—so that they have been compared to black peppercorns; while in a few instances they have been found branched and moulded to the shape of the bile ducts in which they have been developed. And, lastly, gritty sand-like deposits (biliary gravel) are met with in the excretory passages of the liver; consisting either of very minute calculi, or of a powder made up of cholesterine and cholochrome.

* The size of gall stones varies from that of a small seed to that of the common fowl's egg. Solitary calculi are usually larger than those which are associated. Their weight is inconsiderable. When fresh, their specific gravity is greater than that of water or bile; though on being dried it becomes less, so that then they readily float in water. Their shades of colour vary from a pearly white (when consisting of almost pure cholesterine) to a deep black; but perhaps most frequently they are of a reddish-brown tint. According to Frerichs, two forms of structure are met with:—(1) The simple, homogeneous calculi, of a uniform texture, and presenting an earthy or saponaceous or crystalline fracture. They are rare. (2) The compound calculi, consisting of a central nucleus, surrounded by a body or case of greater or less thickness, which in its turn is usually covered by an outer crust.

In the majority of hepatic calculi there is a brown or black nucleus. Dr. Thudichum in his admirable treatise* has shown that this nucleus sometimes consists of casts of the biliary tubes. Rarely it has been formed of some foreign body,—as of a dried-up ascaris, a fragment of a Fasciola hepatica, a plum-stone (the calculus having been developed in an abscess of the liver, the result of a perforating gastric ulcer), and part of a needle three-quarters of an inch long. Now and then four or five nuclei are observed, the result of the consolidation of originally separate calculi. The body, or that part of the concretion between the nucleus and crust, is generally striated, and consists of radiated crystals of cholesterine; or it presents concentric laminae; or it is formed of an irregular mixture of cholesterine, with colouring matter and the products of decomposing bile. The outer crust can often be separated from the body like a shell: it consists of concentric layers, of different

* A Treatise on Gall Stones: their Chemistry, Pathology, and Treatment, p. 60. London, 1863.
thickness; and it may be made up of cholesterine, or of a compound of cholepyrrhin and lime, or of carbonate of lime.

The ingredients of gall stones are,—cholesterine (commonly from 80 to 90 per cent.); cholochrome or colouring matter, combined with earthy and alkaline salts—such as phosphate and carbonate of lime and magnesia; together with biliary and fatty acids. Gall stones arise from a decomposition of the bile, akin to putrefaction. The cholestrine of human bile “is dissolved in the taurocholate of soda. But as soon as the acid of this salt is decomposed the cholesterine is set free, crystallizes, and deposits upon any particle that may happen to be within easy distance, in the manner of all crystals, which like to post themselves upon prominent bodies” (Thudichum, p. 167).

The tendency to gall stones is rarely manifested until between the ages of thirty and forty years; though a few instances are recorded where these bodies have been found during infancy, and even in the newborn child. It is probable that females are nearly twice as liable to gall stones as males, owing to their more sedentary habits. Excess in eating and drinking seems to predispose to the formation of these substances; and so does the habit of taking only one meal daily, in consequence of which the gall bladder is not emptied as often as it should be. Moreover, gall stones are thought by some authorities to occur more frequently in individuals of a tubercular, cancerous, or gouty diathesis, than in persons of a sounder constitution.

Calculi are but seldom met with in the branches of the hepatic duct. In this locality they generally present the appearance of small black seeds. They may give rise to dull pains about the liver, sometimes shooting to the shoulder; to symptoms of intermittent fever; to gastric disturbance, with nausea; while as they, for the most part, only cause temporary obstruction to the flow of a small quantity of bile, there is no jaundice. The hepatic duct is rarely blocked up by a concretion. When it is, the symptoms consist of severe spasmodic pains, vomiting, jaundice, and enlargement of the liver owing to the escape of bile from all the ducts being prevented. Sometimes fatal rupture of the hepatic duct has occurred.

Gall stones may be present in the gall bladder without producing bad consequences. Occasionally, however, they set up catarrhal or plastic inflammation, with pains about the epigastrium and right shoulder and hip; loss of appetite, indigestion, and constipation; while now and then ulceration and perforation have occurred. When the calculi leave the bladder and enter the cystic duct they give rise, unless very small, to well-marked symptoms (hepatic or gall stone colic). There is pain commonly of an excruciating character, the patients throwing themselves about the bed, so as to get relief by change of posture; while the right hypochondriac and especially the epigastric regions are very sensitive
to pressure. Nausea and vomiting rapidly come on, the ejected matters consisting of half-digested food; the bowels are confined, and get distended with flatus; in thin individuals the distended gall bladder can be felt; there may be rigors, but more commonly only a sensation of coldness; while the pulse is almost always retarded. The larger the stone, the greater will be the suffering and the longer its duration. If the stone recede into the bladder, the symptoms all cease; if it remain impacted, we may have dropsy of the gall bladder, and perhaps ulceration or gangrene of the duct: while when it is forced onwards into the common duct, there is a sense of partial relief. The pain returns, however, when the small duodenal orifice is reached, and complete relief is only obtained when the calculus has passed into the bowel. While the calculus is in the cystic ducts there will be no jaundice, but supposing the common duct be long occluded, jaundice must make its appearance, since there is no outlet for the bile. Attacks of the same character are liable to recur time after time, as biliary calculi are usually multiple. Where the obstruction is permanent the jaundice will gradually increase, the liver progressively enlarges, and the gall bladder becomes much distended; while death will ultimately occur unless the stone be forced into the bowel, or unless it induces adhesive inflammation and gets into the intestine or through the abdominal walls after ulceration and perforation have taken place.

At the end of an attack of biliary colic, the feces should always be examined for the calculus; a work which can only be effectually done by washing them on a sieve with large quantities of water. Unless the stone come away, it will be apt to lodge in some portion of the small intestine; where it may gradually become incrusted with fecal matter, and at the end of a few months produce fatal obstruction of the bowels.

Biliary calculi are apt to set up inflammation and ulceration, and so to cause adhesions between the gall bladder and neighbouring parts. In this way gall stones have, as it were, eaten their way through the abdominal parietes, through the coats of the duodenum, and so on. St. Ignatius Loyola, the founder of the order of Jesuits, died in his sixty-sixth year (1556) from the ulceration produced by a gall stone through the walls of the gall bladder into the trunk of the vena porta. Dr. Donkin has related the history of a case where death resulted from the mechanical pressure of a mass of gall stones on the vena porta, leading to obstruction of the portal circulation.

In the treatment of gall stone disease we have first to relieve the pain and other derangements; and secondly, to cause the expulsion of the concretion, as well as prevent the formation of any fresh ones. For the first purpose, a hot water or vapour bath will be useful. Then the abdomen should be covered with the extracts of belladonna and poppies (F. 297), as well as with hot
fomentation flannels or large linseed poultices. At the same time, a full dose of opium or morphia with ether and tincture of belladonna (F. 315), is to be given; or if there be much sickness the officinal opiate enema, to which thirty drops of tincture of belladonna have been added, must be employed; or recourse can be had to the subcutaneous injection of morphia and atropine (F. 314). The inhalation of chloroform or ether, singly or in combination, is also of great service. Ice should be sucked to relieve the vomiting; unless from the patient's condition it be thought better to encourage the sickness, which can be best done by giving large draughts of hot water containing bicarbonate of soda. With regard to the quantity of opium that may be exhibited, no positive rule can be laid down. The dose must generally be sufficient to relieve the pain, but still it is to be given with caution; while care ought to be taken that it is discontinued immediately ease has been procured. Moreover, when full doses have been employed for a few days in succession, fatal narcotism may occur unexpectedly.

The second indication in the treatment—the expulsion of the calculus, is to be carried out by the administration of purgatives. Castor oil, Seidlitz powders, resin of jalap, or the officinal pills of colocynth and henbane generally act well. The only food given during the attack of colic should be milk and broth; under an exclusively fluid diet the biliary passages will be more lax and the secretion more dilute, so that there will be a better chance of the calculus being carried on during the suspension of spasm caused by the opiate. Where there are no active symptoms, and yet it is believed that one or more calculi remain in the gall bladder, and for the prevention of new formations, saline aperients (F. 148, 149), should be persevered with for some time. Remedies for dissolving gall stones are useless. A visit to the springs of Carlsbad (F. 496), Vichy (F. 479), Ems (F. 486), Pullna (F. 497), or Eger (F. 498), may be strongly recommended. In all cases the diet ought to be carefully regulated; stimulants seldom do any good; while such exercise is to be recommended as can be borne without inducing any pain.

IX. JAUNDICE.

Jaundice [from the French Jaunisse], or Icterus [from ἰχρός = a yellow bird, probably the Loriot—Oriolus flavus—because it was thought that sufferers from jaundice were cured by looking at this bird], is a prominent symptom of many varied morbid actions. Like albuminuria, glucosuria, &c., it is not a separate disease; but rather a symbol indicative of changes going on in important internal organs.

Pathology.—The manner in which jaundice is produced has
long engaged the attention of pathologists; and even now further observations and experiments are needed to solve many of the difficulties surrounding this question. According to Dr. Budd, it may be set up in two ways:—1st, by some mechanical impediment to the flow of bile into the duodenum, and the consequent absorption of the retained bile; and 2nd, by defective action on the part of the secreting substance of the liver, owing to which the biliary ingredients accumulate in the blood. Hence we may have jaundice as the result either of obstruction or of suppression.

With regard to the first point there is no dispute, and it is allowed that the greatest number of cases of jaundice are due to the re-absorption of secreted bile. But as to the second hypothesis Frerichs argues that, if it be true, the biliary acids and bile-pigment ought to accumulate in the blood in cases of granular liver, just as urea accumulates in the circulation in granular degeneration of the kidneys. Yet all attempts to detect traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have failed; neither the colouring matter nor the acids of the bile having been found. Moreover, Moleschott kept some frogs alive for several weeks after depriving them of their livers; but no trace of the elements of bile could be detected in the blood, lymph, urine, or muscular tissue. Frerichs therefore suggests that those cases of jaundice which occur without any mechanical obstruction of the excretory ducts of the liver (such as the jaundice of pyæmia, typhus, and snake-bites) are due to an arrested consumption of the biliary acids which have been re-absorbed into the blood, either from the intestine, or directly from the liver. He endeavours to show, that even in health, all the bile formed in the liver does not pass into the ducts, but that a portion of it enters the hepatic veins along with the sugar. The biliary acids thus entering the blood, or which, become re-absorbed from the intestine, are supposed to undergo certain changes from oxidation; which may thus account for the quantity of taurine that has been found in the healthy lung, and for pigments which are naturally voided in the urine. When, however, anything interferes with these normal metamorphoses in the blood, it is thought that the complete change of the colourless bile into urinary pigment is arrested, and that the intermediate substance—bile-pigment—is formed in the blood, so as to colour the various tissues and secretions. Now there appear to be great objections to this theory of Frerichs, and especially that the view as to the bile-acids being changed into bile-pigment is quite untenable. It is probable that in many of the cases of jaundice without obstruction in the biliary passages there is formation of bile by the hepatic cells, and subsequent resorption, the resorption occurring in consequence of interference with the circulation through the liver, which gives time for diffusion of the
bile through the walls of the blood-vessels. There is still, however, much that is obscure in these cases.

Causes.—It need hardly be said that jaundice is due to some derangement of the functions of the liver. The chief difficulty is, however, in assigning the nature or origin of the derangement in different cases, since this gland is affected by so many dissimilar agencies. By far the most common causes, however, are catarrh of the biliary passages and impaction of gall stones in the common duct. Occasionally tumours of various kinds in the liver or in neighbouring parts, or even an accumulation of faeces in the colon, will compress the ducts and prevent the flow of bile. Cirrhosis, amyloid, and fatty degeneration may give rise to jaundice, but this is not common, nor is it certain how the jaundice is induced. Acute atrophy of the liver is almost always attended with jaundice, congestion frequently so, whether active or passive, and resulting from retarded venous circulation by heart disease or lung disease. Intense anxiety, fright, or a powerful emotion may be followed by jaundice, and it may come on in the course of fevers, especially relapsing fever and malignant remittents, while it is a characteristic feature of yellow fever; it may also occur in pyæmia or pneumonia.

The different diseases which give rise to jaundice have been treated of in the preceding pages, and after all, the point which it is chiefly important to bear in mind is this,—that all forms of jaundice may be included under two heads, those due to suppression of the biliary functions, and those which arise from re- absorption of the secreted but retained bile. After jaundice from obstruction has existed some time, however, suppression likewise occurs; owing to the backward pressure exerted on the hepatic parenchyma by the over-distended bile tubes forming an impediment to the circulation of the blood.

Symptoms.—The symptoms come on gradually or suddenly. In the former case, headache and depression, loss of appetite and nausea, constipation and pain about the right hypochondrium are complained of for a few days before the jaundice is developed. With sudden attacks, the jaundice is the first symptom to attract attention. Then in both instances, the skin and conjunctivæ are found of a yellow colour; the urine has the hue of saffron, or a brownish-black tinge, according to the quantity of bile pigment present; and the faeces are whitish, or of a light clay appearance. A peculiar itching of the skin is occasionally a source of annoyance; there may be exhaustion, drowsiness, giddiness, and peevishness; a bitter taste is sometimes experienced, with thirst; the pulse is often slow; while the function of digestion is more or less interfered with, especially as regards fatty articles of food. The addition of nitric acid, drop by drop, to some urine on a white plate, usually produces the well-known play of colours from brown to green, blue, violet, and red, which is characteristic of
the presence of bile-pigment. In some exceptional instances, the
corneæ, or the aqueous and vitreous humours have become jaun-
diced, and then all objects have appeared of a yellow hue. The
duration of jaundice varies from a few days to several weeks—or
even months.

When the disorder is of long continuance, there may be stupor,
delirium, and other indications of cerebral derangement; the
patient also becomes weak and thin from mal-nutrition; and fre-
quently there appears to be a tendency to hæmorrhage—as epis-
taxis, bleeding from the gums, hæmatemesis and melæna, purpura,
&c. Supposing there is obstruction from a gall stone, the most
acute suffering is induced; the pains being paroxysmal, and often
attended with vomiting and hiccup. Should the concretion not
pass through the duct, fatal exhaustion may set in.

Treatment.—The treatment of jaundice will of course depend
upon the nature of the cause which has given rise to it.

To detail all the remedies which may be called for, would only
be to repeat the suggestions thrown out in many of the sections
on the various diseases of the liver. It will therefore suffice to
say that in jaundice from suppression the secretion of bile may be
stimulated by purgatives,—such as mercury, podophyllin and sul-
phate of soda with taraxacum, &c.; by benzoic acid; by the
mineral acids; and by the alkalies, in small doses, taken on an
empty stomach, since they excite the flow of gastric juice, which
in its turn acts upon the liver and gall bladder.

On the contrary, in jaundice from obstruction, attempts must
be made to remove the impediment, and if possible to diminish
the activity of the hepatic cells until this has been accomplished.
Most frequently a gall stone forms the obstructing body, and the
treatment required under these circumstances has been already
described. Recourse is to be had to simple aloetic purgatives,
or to a mixture of the sulphate and carbonate of magnesia, as
well as to mild diuretics. The food ought to be light and capable
of being easily digested; while alcoholic stimulants should be
avoided. Dr. Hawley speaks highly of the use of pig's bile in
cases of long-continued obstruction. Two capsules, each contain-
ing five grains of the prepared bile (F. 170), are to be given
between two and three hours after the meal, when gastric diges-
tion being almost concluded the food is about to pass into the
duodenum. The bile thus taken, seems in a measure to supply
the deficiency of the natural secretion; the persistent absence of
which causes great emaciation with weakness, and ultimately death
from exhaustion owing to the imperfect manner in which the food
becomes assimilated.
PART X.

DISEASES OF THE PANCREAS, SPLEEN, AND SUPRA-RENAL CAPSULES.

I. DISEASES OF THE PANCREAS.

The pancreas [from $\Pi\nu\epsilon = \text{all} + \kappa\rho\varepsilon\alpha = \text{flesh}]$ is a conglomerate body analogous in structure to the salivary glands, though of a softer and looser texture. With its head embraced as it were by the duodenum, and its duct opening into this intestine, the two organs almost seem inseparable when we try to locate disease in one or the other. In length, the pancreas varies from six to eight inches; while its breadth is an inch and a half, and its weight from two to three ounces. From five to eight ounces of pancreatic juice are secreted daily; this fluid being analogous to saliva, viscid and alkaline, and having a sp. gr. of 1.008. Eberle in his treatise on digestion, published at Würzburg in 1834, first showed that the pancreatic juice is capable of taking up fat in a very minutely subdivided condition, and of so forming a kind of emulsion. Then in 1848, Bernard demonstrated that fats are acted upon almost exclusively by the pancreatic juice, which forms with them a complete emulsion, and thus prepares them for absorption by the lacteals; all fatty matters passing through the alimentary canal undigested when the pancreas has been destroyed. Bernard also places the pancreatic juice at the head of the list of those digestive fluids which have the property of converting starch into sugar. There is also every probability that the capability of producing fatty emulsions is increased by the mingling of the pancreatic secretion with the bile, as well as with the intestinal juices derived from Brunner’s and Peyer’s glands, and the follicles of Lieberkühn, &c.

Disease of the pancreas is comparatively infrequent. The symptoms are generally obscure; so that it is commonly impossible to diagnose the exact nature of the affection or its extent, although we can feel tolerably certain that this gland is the seat of mischief from the imperfect way in which the digestion of fatty matters is performed.
The morbid conditions of the pancreas which may be met with are—congestion, hypertrophy, inflammation, suppuration, induration, serous infiltration and softening, fatty and amyloid degeneration, atrophy, simple cystic tumours, obstruction of the duct, hydatid cysts, and either hard or soft cancer. Scirrhous is more common than ecephaloid; the latter has been met with at a comparatively early age. Syphilitic gummata have been detected in the pancreas, in connexion with muscular nodes; while it is not altogether unlikely that the cases of amyloid and fatty degeneration have been associated with a taint of this kind. Calculous concretions (composed of carbonate and phosphate of lime, cemented by animal matter) are not uncommonly found in the pancreatic duct or its branches. Such calculi are usually of a white colour, they range in size from the circumference of a pea to that of a walnut, and they exist either singly or in numbers up to fifteen or twenty. All the foregoing affections are generally accompanied by enlargement and tenderness of the gland; while they often give rise to pain in the epigastrium with fulness or hardness, a sensation of heat and constriction, salivation, nausea and vomiting, loss of appetite, inodorous eructations, mental depression, and debility with emaciation. In not a few cases the vomiting has proved exceedingly obstinate; the matters ejected being large in quantity, transparent but rather ropy, and tainted with a slightly sour or saltish flavour. Occasionally a profuse flow of saliva has been a prominent symptom. Where the common choledic duct is pressed upon by a tumour of the pancreas, or is involved in structural disease affecting the head of this gland, there will be persistent jaundice. Fatty stools have also been noticed in connexion with certain diseases of the pancreas, and when present are almost pathognomonic; for if the pancreatic juice is not secreted in due quantity, or if its flow into the duodenum be obstructed, the oily portions of the food will not be reduced to an emulsion, and hence instead of being absorbed must be discharged with the feces.

The treatment of supposed pancreatic disease can only be conducted on general principles; that is to say, our efforts must be directed to alleviating the most prominent symptoms. As regards those cases where the vomiting is troublesome, drugs seem to be perfectly useless. The pancreatic emulsion might be given if the patient can manage to swallow such a nauseous preparation; but I have had no opportunity of carrying this suggestion into execution. In a case related by Dr. Langdon Down,* in which the stools were persistently fatty, pancreatine was given after each meal with success. In one instance of chronic pancreatic disorder, benefit was derived from the employment of enemata containing a

*Clinical Transactions, vol. ii.
DISEASES OF THE SPLEEN.

little opium and the solution of raw beef (F. 2); together with the introduction of a large seton in the abdominal wall over the seat of the gland. This seton was employed empirically, and in despair from finding all other treatment ineffectual.

II. DISEASES OF THE SPLEEN.

The spleen is of an oblong and flattened form, soft and elastic, very vascular, and of a dark purple colour; while in appearance it more resembles the placenta than any other organ. The spleen is situated in the left hypochondrium. The weight is very variable, but averaging six ounces; its length being about five inches, and its breadth rather more than three inches. It is physiologically liable to great variations in size, and is enlarged during digestion, and when from external cold the blood is present in increased quantity in the internal organs. As the spleen has no excretory duct, it is classed with glands similarly constructed (the thyroid, thymus, tonsils, and supra-renal capsules); but whether the ductless glands have all a common function, whether at one time or other of existence some or all of them assist in the elaboration of the blood, are questions not yet determined.

The spleen is not essential to life, since it has frequently been removed in dogs and other animals without fatal results, and without obvious impairment of health. In man this organ has been partially or completely removed in a few instances by injury or surgical operation, and recovery has followed, but a large majority of the cases in which it has been extirpated for disease or in mistake for an ovarian tumour have proved fatal.

The precise uses of the spleen in the economy cannot be definitively assigned. Mr. Gray's investigations led him to conclude that its function was "to regulate the quantity and quality of the blood." It is probably concerned in the assimilation of the albuminoid constituents of blood, and in it red corpuscles which have completed their term of existence appear to undergo disintegration, while white corpuscles are apparently formed. The association of enlargement of the spleen with excess of white corpuscles in leucocytæmia is remarkable.

The spleen may suffer from congestion and inflammation, from softening, abscess, and gangrene, which are frequently consequent upon embolism; from tubercular, amyloid, and malignant disease; from syphilitic induration and subsequent disintegration, as well as perhaps from the deposition of gummous masses; from fibrinous deposits—the remains usually of embolic blocks; from the formation of serous and hydatid cysts in it; and also from
simple enlargement. Individuals of all ages are liable to the foregoing affections; but they are more commonly met with among the residents of tropical and marshy than of temperate countries. This gland may likewise be congenitally misplaced, and so rendered more than usually liable to injury from pressure, to congestion &c. In a fatal case of rupture of an enlarged spleen reported by Dr. Busb,* the organ was found resting on the internal iliacus muscle in the left iliac fossa.

It can be readily understood that a structure like the spleen—made up of an elastic fibrous framework (trabecular tissue), of Malpighian corpuscles, and of spleen-pulp—may become over distended with blood from slight causes, and especially from such as interfere with the action of the skin, or of the liver, or of the kidneys. But congestion thus produced is seldom of any consequence, unless from its long continuance the elastic power of the organ gets so reduced that the accumulated blood cannot be urged forward. Probably in cases of the latter kind inflammation may be set up, leading either to softening or to permanent induration.—In cases of suppuration, the spleen generally becomes connected with other organs by firm adhesions. The contents of the abscess can thus make their way through the diaphragm and into the left lung, so as to be expectorated; an instance of which, ending in recovery, has been recorded by Dr. Nasse, of Bonn. So also, the pus may be discharged into the stomach, colon, or peritoneal cavity; while in other cases it obtains an exit through the muscles and skin.—I am only acquainted with a very few recorded examples of tubercular deposit occurring merely in the spleen; but genuine tubercles are not unfrequently found scattered through this gland in the bodies of children who have died from tabes mesenterica, as well as of adults who have perished from general tuberculosis.—Cancer occurs very rarely; while where it has been discovered there has usually existed malignant disease of the liver and mesenteric glands.—When the spleen is ruptured from a blow, severe muscular exertion, &c., death generally occurs, in the course of an hour or two, with all the symptoms of internal haemorrhage.

Enlargement of the spleen is readily diagnosed by the spreading out of the tumour from the left hypochondrium, by the external smooth and convex surface which the gland presents, by the hilus or vertical fissure dividing its internal surface, by its being carried down by the diaphragm in a deep inspiration, and by the history of the case. The swelling results very commonly from intermittent fever orague, and is a constant phenomenon of the fit; but chronic enlargement is found as a rule only after several attacks, when it is vulgarly known asague cake. Splenic enlargement in connexion with a syphilitic cachexia is not so very

uncommon in children. An extreme degree of enlargement, often constituting a characteristic feature of this affection, is met with in leucocytæmia. The spleen also may be enlarged in pregnant women; the hypertrophy in the latter being accompanied with a degree of softening, so that there is a predisposition to laceration under any extra strain or sudden excitement. Patients affected with tumid spleen can sometimes be immediately recognised by their peculiar sallow and unhealthy aspect, by the dingy discoloration of the conjunctivæ, and the anaemic appearance of the gums and oral mucous membrane. The sufferers are liable to hæmorrhage from various tissues of the body; so that they must be looked upon as unfavourable subjects for even minor operations. There are also various derangements of the organs of digestion, with irregularity of the bowels, and dark-coloured offensive motions; there is muscular debility; and we often find a general unhealthy state of the system, with a tendency to sloughing sores from slight causes. The gland may be tender on pressure; but severe pain is seldom present unless the peritoneal covering be acutely inflamed. In protracted cases, there will be a tendency to general dropsy. If we prick the finger and minutely examine a drop of blood in leucocytæmic hypertrophy, the nature of the disorder will be rendered certain by our finding a large excess of colourless corpuscles. Where the blood is much altered from its natural condition, as it often is with this cachexia, we can sometimes detect a systolic cardiac bruit; but abnormal precardial dulness with cardiac murmur may likewise arise from an enlarged spleen displacing the heart upwards, and preventing the free descent of the diaphragm and full expansion of the left lung.

As regards many splenic affections the disease seems to have wonderfully little effect on the general health; a feature which lends further support to the physiological doctrine that this gland is not a very important one. In some few cases which have been under my care, the enlargement has been so great that the gland has occupied the entire left half of the abdomen; and in these, general debility has been the prominent symptom. The structure of the spleen may not be otherwise than healthy in such instances of enlargement; or the tissues will perhaps be found indurated and the capsule thickened; or numerous cysts, of variable size, have been seen scattered throughout the gland.

When the enlargement is the result of ague, purgatives with bark or quinine in large doses will be necessary. In other cases steel, or the bromide of potassium may prove the most efficacious remedies. Mercury in any form is injurious; and so is depletion. Under all circumstances, the general health must be supported by good nourishing food; as well as by cheerful mental occupation, with residence in a dry and bracing locality.
III. DISEASE OF THE SUPRA-RENAL CAPSULES.

The supra-renal capsules have long been objects of great interest to the anatomist and physiologist; for though they probably perform some important office in the animal economy, yet at present that office has been but vaguely guessed at. Hence we must be content for the time with believing that they serve in some way to minister to the elaboration of the blood, in common probably with the other ductless glands—the spleen, thymus, and thyroid bodies; though the exact nature of their functions, or the manner in which they perform them, cannot even be surmised. All that we know is, that the comparative size of the capsules depends upon the age: they are larger than the kidneys in the embryo, about an equal size in very young children, and only about the twentieth part as large in the adult. Indeed, in the latter, they are sometimes so small that they can hardly be found, though their minute structure is unimpaired. When healthy, they have a yellowish-red colour, are from one and a half to two inches in length, are rather more than an inch in breadth, while they weigh between sixty and one hundred and twenty grains. They have an outer yellow cortical substance, made up of elongated vesicles imbedded in a fibrous matrix; an inner soft brown medullary structure, and a delicate reticulated stroma of connective tissue, the meshes of which are occupied by a number of large pale-coloured cells with round nuclei. The arteries supplying the supra-renal glands are numerous and of considerable size; while the nerves are abundant, have many small ganglia developed on them, and are chiefly derived from the solar and renal plexuses.

The obscurity which surrounds these organs has not been dispelled by the discovery of Dr. Addison, that certain examples of severe anemia, with a peculiar discoloration of the skin, are due to (or at least are accompanied by) disease of these capsules.* Dr. Addison having observed that cases of marked bloodlessness occasionally came under his care, generally terminating fatally, and presenting certain prominent characteristics, such as excessive and progressive weakness, a feeble and perhaps rapid pulse, faintness on the least exertion, pain in the epigastrium shooting through to the space between the scapulae, a pearly white appearance of the conjunctivæ, loss of appetite, sickness, flabbiness of the frame rather than emaciation, with a brownish or "singular dingy" discoloration of the whole surface of the body; and finding that no adequate cause (as e.g., loss of blood, diarrhœa, chlorosis, purpura, or renal, splenic, strumous, or malignant disease) could be discovered, for these important symptoms, he gradually seems

to have imagined that the fault existed in the supra-renal capsules. Having "stumbled" upon a clue, he set to work to confirm his discovery; and then the more numerous the cases he examined, the stronger his convictions grew.

As in most cases of anaemia, so in the present form (admitted into the nomenclature report of the Royal College of Physicians under the name of Addison's disease; or Bronze skin, or Melasma Addisoni), the disease commences almost imperceptibly with symptoms of failing health and debility. The patient becomes languid and weak, the pulse gets feeble, and the appetite impaired; while the stomach is irritable, the whites of the eyes are pearly, and the body is flabby. From time to time there are attacks of urgent gastric disturbance with vomiting; there are often lumbo-abdominal pains; while at times there are headaches and attacks of vertigo, with other indications of disturbed cerebral circulation. With all or most of these symptoms, for which no adequate cause can be found, Dr. Addison found that a gradual discoloration took place in the skin, most marked usually about the face, neck, superior extremities, penis, scrotum, the flexures of the axillae, and around the navel. Dark stains are usually seen also on the mucous membrane of the mouth. The skin, in the cases which formed the basis of the observations, was seen to be of a dingy or smoky hue, the depth of colour being variable; sometimes slightly marked, and occasionally—as in one instance, "so universally and so deeply darkened, that, but for the features, the patient might have been mistaken for a mulatto." It is worthy of remark that the discoloration gradually appeared to increase; becoming more marked as the other symptoms acquired greater prominence, and as the disorder approached to its fatal termination. In only one of Dr. Addison's recorded cases does the blood seem to have been examined microscopically; on which occasion a considerable excess of white corpuscles (leucocythemia) was found to exist; this however is not constant.

Since the publication of Dr. Addison's researches, cases of renal-capsular disease have been recorded where there has not existed any discoloration of the skin during life. It is now said, therefore, that the discoloration is not a necessary element of the affection, for it appears to occur only when the case has been of long duration; while when present, it implicates the entire surface of the body, though it commences in the parts most exposed (as the face and hands) and is more marked in the axillae, over the pubes, &c., than elsewhere, wherever, in fact, there is a normal tendency to pigmentation, and the same may be said with respect to internal organs. But again, it is certain that there may be the most extensive pigment-deposit in the rete mucosum of the skin, without the slightest trace of disease being found after death in the suprarenal capsules. A man died in University College Hospital in the winter of 1858, whose skin had been gradually darkening for a
few months previously; the "bronzed" condition being most marked on his admission. It was supposed to be an excellent example of morbus Addisoni; till the scalpel and microscope proved that there was no trace of disease in either capsule.

Blumenbach has quoted from Bomare the case of a French peasant, whose abdomen became entirely black during each pregnancy, while Camper mentions the case of a lady who began to get brown as soon as she became pregnant, and before the termination was as black as a negress. After delivery the colour gradually disappeared. I have also a patient whose skin becomes of a notably darker colour during each menstrual period; though at other times it is darker than it was a few years ago, since which time she has gradually been becoming anaemic. It seems to me that some light might possibly be thrown on this subject by carefully weighing and examining the supra-renal capsules in women who die during pregnancy. The opportunity of doing this has only happened once to me. In this case death occurred from flooding due to separation of the placenta, about a week before the completion of the full term of pregnancy; and in this instance the capsules were evidently enlarged, though they looked healthy. Each mammary areola was unusually dark.

Notwithstanding a few exceptional cases, Dr. Addison's views may be said to be established by the accumulated evidence of recent years.

The supra-renal capsules may suffer from many forms of disease. Occasionally these glands are destroyed by some adventitious deposit, the nature of which can hardly be made out: sometimes there is complete atrophy of one organ, with enlargement and softening of the other; sometimes there has been a deposit of tubercle in one, with a collection of pus in the other; while in other instances there has been fatty degeneration of both glands, or sanguineous engorgement, or apoplexy with one or more centres of extravasation. And again, one or both of these bodies have been found infiltrated with cancer. But according to Dr. Wilks,* it is important to remember, that in true melasma Addisoni the organs get enlarged, and changed into a semi-translucent, grey-coloured, soft, and homogeneus material; which afterwards degenerates into a yellowish-white opaque matter, and subsequently softens into a putty-like matter, or dries up into a chalky mass. The other affections of the capsules do not produce Addison's disease; though it is rather difficult to understand how they can fail to do so, if—as Drs. Addison and Wilks have tried to prove—the symptoms of melasma supra-renale are to be referred to some failure of nervous force acting on the heart, induced by the injury to the gaulgionic system of nerves. The duration of life, after the first

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appearance of the symptoms, has varied in the recorded cases from six months to five years; but according to Dr. Wilks the average is about eighteen months.

The treatment of this affection, whatever its true nature may be, is particularly unsatisfactory, almost all the examples having terminated fatally. Until our pathology becomes more perfect, we can do little more than attempt to remedy the prominent symptoms—the bloodlessness and prostration, the lumbar pains and vomiting, the head symptoms, &c.; for which purpose phosphorus, or the various preparations of steel should be tried, combined with the most nourishing kinds of food that can be taken.
PART XI.

DISEASES OF THE PERITONEUM AND ABDOMINAL WALLS.

I. INFLAMMATION OF THE PERITONEUM.

The peritoneum [from περίτενων = to stretch all over] or serous membrane lining the abdominal and pelvic cavities, and investing the viscera, is apt to suffer from acute or chronic inflammation.

1. ACUTE PERITONITIS.

Acute inflammation of the peritoneum is a serious disease, accompanied with pain and swelling of the abdomen, and severe symptomatic fever. It may attack individuals of all ages, and of every rank in life; though it is perhaps seen most commonly among the poor, since they are most liable to the conditions which give rise to it, and cold and damp will induce it in systems enfeebled by bad living. The average annual number of deaths from peritonitis, registered in England during the ten years 1857-66, has been 1554; the greatest mortality (1736) having occurred in 1864.

Causes.—Peritonitis is not often primary and idiopathic. It may be due to mechanical violence, perforation of the stomach or intestines, hernia or strangulation, rupture of the urinary bladder, the bursting of hepatic abscess, &c. It may also arise from extension of inflammation of the organs invested by it, the liver, spleen, stomach or intestines; from disease of the ovaries and uterus; from gonorrhoea in the female by extension of the inflammation along the Fallopian tubes; from pelvic cellulitis; as well as from the contamination of the blood by morbid poisons—especially perhaps by that of erysipelas. It may sometimes be induced by cold and damp.

The peritoneum, like other serous membranes, becomes vascular and of a bright-red colour under the influence of the inflammatory process; a large number of small scarlet patches at first appearing, which gradually coalesce and spread. It loses its glossy appearance and becomes dull and velvety from proliferation of the tissue-
ACUTE PERITONITIS.

Elements, and lymph is exuded which at first smears over the coils of intestine and slightly agglutinates them to each other. The morbid action may end in resolution, merely leaving the peritoneum opaque and thickened; or if it proceed beyond a certain stage there will be effusion of serum—perhaps to such an extent as to produce inflammatory dropsy; or coagulable lymph may be poured out causing adhesion between the apposed surfaces of the membrane. In extreme cases the effused fluid is turbid and purulent and in large quantity, and there are flakes of lymph floating in pus or serum; sometimes ulceration has taken place and the large or small intestines have been perforated. The inflammation may be local, not affecting the entire serous lining of the abdomen, and those parts of the peritoneum covering the stomach, omentum, mesentery, and bladder appear less liable to become inflamed than the portions over the convex surfaces of the liver and spleen, the iliac fossae, and the small intestines.

The earliest symptom in many instances is pain; which is at first confined to parts of the surface, but soon extends over the whole abdomen, is much increased on pressure, and is attended with high fever. It is frequently preceded by chilliness and rigors, with a feeling of weakness: in other cases it comes on abruptly, with acute distress in some part of the abdomen—not uncommonly in the hypogastric or one of the iliac regions. The pain is generally exquisite in severity, it causes much depression, and it is aggravated by any movement which calls the abdominal muscles into action,—such as passing a stool, voiding urine, or even taking a full inspiration. An examination can scarcely be borne; pressure, even the weight of light bed-clothes, being insupportable. The patient consequently lies quiet on his back, with his knees bent and the legs drawn up. The abdomen is tense, hot, and frequently tympanitic, and the abdominal respiratory movements are suppressed, either on account of the pain attending them or from paralysis of the diaphragm; the bowels are constipated, and there is often most distressing nausea and vomiting. The skin is burning and very dry at first; but soon the extremities become cold and damp. The pulse is frequent, small, and weak, the respirations are hurried, there may be hiccup, and the tongue is thickly furred. The intestine rapidly becomes distended with flatus from paralysis of the muscular coat, and the resulting tympanites gives rise to painful dyspnoea, chiefly owing to the diaphragm being pushed up by the greatly swollen stomach and bowels. Moreover, the countenance is always expressive of suffering, and of great anxiety. After a time the belly ceases to be tympanitic, although it remains somewhat enlarged from the effusion of serum. When a fatal termination is approaching, the symptoms of collapse increase hour by hour. The abdomen often becomes much distended, the pulse gets very feeble and quick—150 or upwards, the countenance assumes a ghastly expression, attacks of retching and
hiccup follow at short intervals, a cold clammy sweat covers the body, and death occurs within eight or ten days from the beginning of the disease.

The fearful malady to which women recovering from childbearing are liable, termed Puérperal Fever, is very generally accompanied by peritonitis; or perhaps it may be more precise to say that in the most common form of this disease the force of the poison seems to be expended upon the peritonum. The disease usually comes on about the third day after labour, but sometimes not until the fifth; beginning with one or more rigors followed by fever. The inflammation commences in the uterine portion of the peritonum, and spreads rapidly over the whole of its surface. In its local symptoms it does not differ from common acute peritonitis, while to the ordinary constitutional results of the latter will be added those of pyemia. The inflammatory fever seems to result from contamination or poisoning of the blood, either by putrefaction of part of the placenta left in the uterus, or by the absorption of some of the products of inflammation; or it can arise from indirect exposure to the poison of crysipelas, or to effluvia given off by the dead body; or it may be due to direct contagion, as is seen in lying-in hospitals. There is, unfortunately, no doubt that this disease may be carried by a third person from one parturient woman to another (see vol. i. p. 191); and consequently a practitioner when he has attended a patient with puerperal fever, is bound, I believe, to discontinue for a time his attendance upon cases of labour. Changing his clothes, washing his hands with a solution of chlorine or of permanganate of potash or of cyanide of potassium, wearing oil-silk gloves, will not (it is to be feared) prevent him from carrying the poison of this malignant disease about him; and I should therefore recommend that he absent himself from the lying-in room for at least three weeks from the last day of his exposure to the fever. In proof of the justice of these remarks it may be mentioned, as noticed by Dr. Armstrong, that in an epidemic of this disease which occurred in Sunderland in 1813, forty-three women suffered: of these, no less than forty were attended in their labours by one surgeon and his assistant.

In the treatment of acute (as well as of puerperal) peritonitis, the patient's diet must at first be restricted to milk, gruel, arrowroot, and beef tea; allowing plenty of diluents, such as iced water, tea, barley water, &c. The greatest quiet ought to be maintained in the sick-room, the air of which should be warm but pure. As I have no faith in the power of antiphlogistic remedies for checking the inflammation, I never resort to them. But we have one remedy which is invaluable, and that is opium. This drug should be given, in grain doses, every three or four hours until the pain is thoroughly relieved; and I believe that by it alone we may often
save the patient’s life. When perforation of the stomach or intestine has occurred a prompt and free administration of opium offers the only chance of recovery. Sedative fomentations, properly and sedulously applied, also afford great relief; or covering the abdomen with a mixture of four parts of extract of poppies to one of extract of belladonna and then fomenting, will prove very serviceable. As I have adopted this plan of treatment in all my cases for several years, and am fully convinced of its value, I trust that it will be fairly tried without inflicting general bleeding and antimony and mercury on the sufferer. Blisters are most pernicious, though often employed. Even leeches are quite unnecessary; provided the fomentation flannels be applied loaded with steam, and that they are changed every fifteen or twenty minutes. Linseed or hemlock poultices, made sufficiently moist and thick to retain their heat for three or four hours, may be advantageously substituted for the fomentations as soon as the patient can bear their weight without inconvenience. In all instances purgatives by the mouth do harm; but if there be evidence to show that the large intestine is oppressed with fecal matter, the latter should be removed by one or two enemata. Where great distress is caused by the flatulent distension, puncture of the intestine with a fine capillary trocar affords temporary relief and no evil result need be feared. Directly great exhaustion sets in stimulants must be given; no agent of this class being better than brandy. Essence of beef, cream, milk, raw eggs, full doses of quinine, and ammonia with chloric ether are also often invaluable in staying that prostration which, unless properly treated, soon ends in fatal collapse.

2. CHRONIC PERITONITIS AND TUBERCULAR PERITONITIS.

Chronic peritonitis is sometimes the sequel of an acute attack, though more frequently an independent affection. The inflammation may be partial or general.

M. Louis is of opinion that this disease, when not following acute inflammation, is always complicated with tubercles. On this point, however, Dr. Hodgkin says,*—“My own inspections would lead me also to the conclusion that chronic peritonitis is very frequently conjoined with tubercles; yet this concurrence has not been so uniformly supported by cases observed in this country, as it has been by Louis’ cases. That form of peritonitis which is accompanied by copious effusion, and which might easily be regarded as ascites, occurs without any appearance of tubercles. The same may be said of other cases in which the concrete product of inflammation had been more considerable.”

INFLAMMATION OF THE PERITONEUM. [PART XL.

Young children, especially such as manifest the strumous diathesis, are very often affected with tubercular peritonitis. This disease is by no means confined to them, however, for it is not unfrequently met with in adults between 18 and 25 years of age; particularly in those who, being hereditarily predisposed to phthisis, have led dissipated lives, or have been exposed to great hardships with insufficient food. Upon examining the peritoneum after death its substance will perhaps be found merely studded with miliary tubercles; or there may be a more abundant tubercular deposit, which with lymph glues the coils of intestines together, while it covers the liver and spleen with thick cheesy membranes. Sometimes one or more of the masses of tubercle in their softening give rise to ulceration and perforation of the intestinal coats; a faecal abscess alone resulting, inasmuch as effusion of the contents of the bowel is prevented by the adhesions which have previously formed. In the same way, different portions of intestine may communicate with each other by fistulous openings, without even faecal abscess resulting. I have also seen the faecal abscess lead to perforation of the abdominal parietes—an artificial anus. As a general rule, the mesenteric glands are enlarged and indurated; while, if the morbid action has been of some duration, they will be found softened in their centres.

The symptoms of chronic peritonitis are somewhat obscure, the abdominal pain being usually slight. There are often attacks of colic; while at other times there may be fever, with unhealthy fetid secretions and diarrhoea. Generally, treatment gives relief for a time; but at the end of a few weeks the abdomen again gets tender and becomes tense, there is more obstinate diarrhoea with nausea, all desire for food vanishes, the patient wastes rapidly, and the appearance becomes very anaemic. After a time, effusion of fluid takes place, the abdomen enlarges, and fluctuation is felt. When with tubercular peritonitis there is combined disorganization of the mesenteric glands, pulmonary phthisis, &c., the complicated disease rapidly progresses towards a fatal termination.

The treatment of chronic peritonitis will consist in paying attention to the functions of the digestive organs, so as to insure correct assimilation; in allowing a mild but nutritious diet, with plenty of milk or cream, raw eggs, and the solution of raw meat (F. 2); and in employing flying blisters or stimulating liniments to the abdomen. Pepsine (F. 420) is oft-times serviceable. The application of the iodine liniment mixed with a little of the aconite or belladonna liniment, or of the iodine ointment diluted with an equal weight of cod liver oil, can be strongly recommended. I think I have seen benefit likewise from the internal use of iodine—particularly the iodide of iron, from bark with sedatives, from the phosphates of iron and lime, &c. (F. 405), and especially from cod liver oil. These cases are, it need scarcely be added, very unpromising.
II. ASCITES.

Ascites [from ἀσκήτης = a wine-skin or leather bottle,—because of the swollen condition of the belly], or dropsy of the peritoneum, consists of a tense swollen condition of the abdomen, owing to the presence of an excessive quantity of watery fluid in the cavity of the serous membrane by which it is lined.

Causes.—The dropsy may arise from chronic peritonitis; from cirrhosis, cancer, or amyloid or scrofulous disease of the liver, from obliteration of the portal vein causing obstruction to the free passage of the blood through the system of the vena porta; from acute or chronic Bright's disease of the kidney; from disease of the heart, or of the aorta; from disease and enlargement of the spleen; from malignant affections of the omentum; and from a few other more simple disorders. Cirrhosis of the liver and renal disease are, however, the most common causes.

Pathology.—Ascites may form a part of general dropsy, or it may exist alone. In the former case it may arise from obstruction to the return of blood to the heart by the vena cava, as in disease of the heart or lungs, &c., or from disturbance of the relation between the blood and tissues, as in acute or chronic renal disease. This subject has already been treated of in the remarks on dropsy. Ascites when primary and not merely a part of general dropsy, is generally the result of obstruction in the portal vein, and most commonly the obstruction is due to cirrhosis of the liver, which obliterates its minute intra-hepatic ramifications. Any condition of the liver or adjoining parts, however, which compresses the vena porta or its branches, or disease of the vessel itself, may have the same effect. A chronic congestion of the entire portal system results, and this gives rise to serous effusion into the peritoneal cavity. An occasional cause of ascites is chronic peritonitis or tubercular or malignant disease of the peritoneum. The fluid of ascites is usually clear, of a pale yellow colour like urine, of an alkaline reaction, and loaded with albumen.

Symptoms.—The appearance of the patient is often thoroughly characteristic. The upper part of the body may be much wasted, the features pinched, and the countenance very anxious, while the abdomen is greatly enlarged. On examining the latter it is not only found distended, but the integuments have a shining appearance; while the superficial veins are generally dilated. Fluctuation is more or less appreciable, according to the quantity of fluid and the thickness of the abdominal walls. During the advanced stages there may be considerable dyspnea, owing to the pashing upwards of the spleen, stomach, and liver. Auscultation of the chest shows that the respiratory murmur cannot be heard as low as in health; that there is tubular breathing in the interscapular regions, especially towards the left side; and that the apex of the
heart is elevated, and rather pressed to the left. Frequently there is anasarca—infiltration of limpid serum into the areolar tissue, with the ascites; in most cases the former being confined to the lower extremities, though the face and arms may also be affected, particularly in examples of renal dropsy. The tissues affected with anasarca "pit," on applying pressure. The urine is usually scanty, and often loaded with lithates; while in ascites from cirrhosis it generally contains bile, and in that from renal disease there is an abundance of albumen. The general health gradually deteriorates; while the patient gets weak and emaciated, loses all appetite, is restless at night, and suffers much from mental depression.

Diagnosis.—In typical cases the diagnosis is easy enough; but every now and then the physician meets with an instance where a very thorough investigation is needed to prevent any error. And at the onset I must urge, that in cases of difficulty, whether in the male or female, it is a good plan to empty the bladder with a catheter. By doing so, the examination will often be facilitated; while all chance of mistaking a greatly distended urinary bladder for an abdominal or an ovarian dropsy must be removed.

On examining a case of ascites in which the fluid effused is tolerably abundant, a general fulness of the abdomen can be distinctly noticed. If the patient be standing upright, the fulness will seem to be most prominent below the level of the umbilicus; but by making the subject lie down, the abdomen is seen to become more flat, while both the flanks bulge outwards. When placed on one side, the lowermost part exhibits the greatest prominence. Supposing the quantity of liquid to be excessive, there may be found a general abdominal enlargement, uninfluenced by the posture assumed; while the abdomen will also appear to engroach considerably on the thorax, and the xiphoid appendix with the cartilages of the lower ribs will be much everted. By practising palpation some very characteristic signs are usually discovered. The great evenness of the enlargement, together with the sense of resistance and weight which is experienced on pressing the hand towards the spine, will first excite attention. Then there is also an evident sense of fluctuation communicated to the fingers; the waves being finer, and following more or less quickly upon the impulse in proportion as the distension is great, and the fluid serous or of a watery consistence. Edema of the abdominal wall, or the presence of much fat, obscures this last sign. Adipose tissue in excess, whether in the omentum or present as a large fatty tumour, has given rise to great abdominal enlargement which has been mistaken for ascites. The sense of fluctuation has been so closely simulated, that patients have even been tapped in these cases of fatty deposit.

On having recourse to percussion in ascites, there will be found,
in most cases, well-marked resonance over the higher parts of the belly, owing to the floating of the intestines; thus, as a rule, prominently distinguishing ascites from ovarian dropsy. I say, in most cases, for the distension is sometimes so great that the breadth of the mesentery is not sufficient to allow the intestines to reach the surface of the fluid, or the coils of intestines may be bound down by adhesions formed of coagulable lymph; and then in either instance, dulness must, of course, result. Again, there is occasionally (though very rarely) resonance on percussion in ovarian dropsy. This may happen after tapping, from the cyst filling with air; or it may occur from a communication forming between the cyst and the intestine, and so allowing of the escape of flatus from the latter into the former. I have noticed, however, that ordinarily where there is any real difficulty in the diagnosis of ascites and ovarian dropsy, the mere fact of difficulty may be taken as presumptive evidence in favour of the case being one of ascites. Ovarian dropsy very rarely simulates ascites; and never, save where there is a large unicellular cyst with thin walls. In both diseases there will be dyspnœa, which will be urgent in proportion to the distension. The quantity of the ascitic effusion is sometimes remarkably large. Several years since I was obliged, owing to the severe orthopnœa which existed, to tap a patient in the Hospital for Women suffering from ascites; when 460 ounces of a clear, urinous-looking fluid, loaded with albumen, were removed, the whole of which had been secreted in rather less than one month.

* Prognosis.—This is always unfavourable in ascites from organic disease. When the effusion is merely due to the action of cold causing congestion of the kidneys, or to functional derangement of the heart, or to an anaemic state of the blood, the danger is comparatively slight. The supervention of dropsy upon structural disease of the heart, or liver, or kidneys, is always a premonition that matters are advancing towards an unfavourable conclusion. This is not likely to be postponed by the addition, to the primary symptoms, of all those mechanical troubles which must be produced by the presence of perhaps several gallons of fluid within the abdomen. The deaths registered in England as due to pure and simple ascites, average about 750 annually.

**Treatment.—** Supposing that the cause of the dropsy is remediable, our object must be to remove it. The cases where this can be done, are, however, quite exceptional. We have therefore to try and procure absorption of the fluid; and with this intent recourse is had to drastic purgatives, to diuretics, and perhaps to mercurials. With regard to purgatives, few agents generally act better than the compound jalap powder, in doses varying from sixty to one hundred and twenty grains. Elaterium (F. 157) is often useful; so is calomel with jalap (F. 159), podophyllin (F. 160), gamboge with aloes and blue pill (F. 174), and croton oil (F. 168).
The best diuretics, perhaps, are the acetate of potash, digitalis, squills, and the juice of broom tops (F. 219); or the solution of potash, nitrous ether, and digitalis (F. 220); or spirit of juniper, nitrous ether, and winter green; or digitalis and squills, with blue pill or taraxacum (F. 219, 224); or nitric acid and taraxacum, where a tonic action is also needed. The chloride of ammonium, either singly or with taraxacum (F. 60), has been found useful in Germany. Copaiba, in fifteen minims doses every six hours, or what is better the resin of copaiba, which is the diuretic agent, has proved serviceable in some cases where other remedies have failed. I have seen benefit also from the iodide of potassium, combined with the ammonio-citrate of iron (F. 32,) where there has been evidence of any strumous or syphilitic taint in the system. The leaves of digitalis made into a sort of poultice, or a poultice made with an infusion of the leaves, applied over the abdomen has occasionally induced profuse diuresis when all other measures had failed. As a rule, in ascites dependent upon renal disease, diuretics do harm; while calomel, blue pill, &c., prove especially pernicious. We had better therefore, in such instances, trust to the simplest purgatives, to nitric acid in some bitter infusion, together with frequent hot-air or vapour baths. I have at times found belladonna act favourably in these cases.

When the distension gives rise to much distress, we shall often have to resort to paracentesis. In performing this operation, the individual to be tapped ought to lie upon the left side, along the edge of the bed; and the trocar and cannula should be introduced midway between the umbilicus and pubes. The horizontal position is preferable to any other; since it is the most comfortable to the patient, no pressure is required upon the abdomen, and especially because syncope is much less likely to follow the evacuation of the fluid. After the operation I pad and tightly bandage the abdomen, and generally continue the use of compression for two or three weeks, or even longer where it seems to be beneficial; while at the same time iodide of potassium is frequently given, and occasionally alternative doses of mercury. In spite of all treatment the fluid is usually, though by no means always, resorbed; and in such cases the disease ultimately proves fatal. The advantages of tapping, however, are not only that there is a chance of cure by it, and that the patient's comfort is much increased by the withdrawal of the fluid, but that the liver and kidneys and other abdominal viscera being freed from abnormal pressure are enabled to act more naturally.
III. ABSCESS OF THE ABDOMINAL PARIETES.

Severe contusions of the abdominal walls may be produced by kicks, blows, a fall upon some prominent object, or a squeeze between the buffers of two railway carriages, &c. The consequences are very often serious. A blow sometimes causes death immediately, owing to syncope from the shock to the solar plexus of the sympathetic. In other instances there will perhaps be laceration of some internal structure, with haemorrhage; the injured individual, often but not necessarily always, dying at the end of a few hours, from the combined effects of shock and loss of blood. Occasionally, the contusion causes rupture of an internal organ, with extravasation of its contents. There need not be any bruise or other external symptom of injury, and yet the tissues of the gall bladder, liver, spleen, stomach, intestinal canal, urinary bladder, or pregnant uterus may be torn. The patient either dies soon afterwards from collapse, or from haemorrhage; or surviving these dangers, from peritonitis after a longer interval. On the other hand, instances have occurred of laceration of the liver or kidney, where the patients having got over the first effects of the succeeding inflammation have yet fallen victims, at the end of a week or so, to blood poisoning from the absorption of the extravasated fluids. And, lastly, a contusion merely perhaps sets up inflammatory action in a limited portion of the abdominal wall, this action going on to suppuration.

Independently of external violence, an abscess in the abdominal parietes may be due to the extension of disease from other parts. Thus, it sometimes results from inflammation and suppuration of the vermiform appendix of the cecum, the pus working its way to the surface somewhere about the right inguinal region. So again, suppurative inflammatory action is apt to occur in the connective tissue of the pelvis, or in either ovary, especially in delicate and strumous women; the abscess afterwards pointing in one of the groins, in the hypogastric region, or in the vagina, bowel, &c. Inflammation and suppuration of the adipose and areolar tissues around one of the kidneys (perinephritic abscess) may occur from a blow or fall upon the back, or from some derangement of the general health. In favourable cases the abscess points in one form; but occasionally the pus burrows amongst the muscles of the dorsal region, and may ultimately be discharged into the urce, or into the cavity of the peritoneum. Then, finally, a circumscribed abscess may form in the peritoneum, as the result of partial or general peritonitis; the pus, confined by adhesions, either approaching the surface at some part of the abdominal wall, or bursting into the sac of the peritoneum, or into the bowel, &c.

The diagnosis of abscess in the abdominal wall is not always so
easy as might be imagined; except, of course, in those cases where
the tumour is prominent and has softened, allowing fluctuation to
be readily detected. Spasmodic contractions of portions of the
abdominal muscles are very apt to occur under the influence of
emotion, palpitation, &c., the tense parts communicating to the
hand of the examiner a feeling very much like that of a tumour.
The rectus muscle on either side, traversed as it is by from three
to four tendinous intersections (the lineae transverse), often con-
tracts in one or two divisions and gives an erroneous sensation to
the hand applied over it. Steady pressure, together with the
withdrawal of the patient's attention from the proceeding, will
often relax the muscular fibres and prevent any erroneous con-
clusion being drawn. An abscess in the epigastric region can be
sometimes seen and felt to pulsate, owing to the force derived
from the aorta. But this generally occurs in thin subjects; the
pulsation ceasing if the tumour be lifted up; or if it be gently
moved to one side away from the influence of the deep vessels.
Disease of the liver, hydatid tumours, and a distended gall bladder,
have given rise to the impression that an abscess was present in
the right hypochondriac region; while enlargement of the spleen
has acted in the same manner on the left side. And, lastly, a
bladder distended with urine has been mistaken for an abscess,
until further inquiry has led to the use of the catheter.

The treatment of abscess in the abdominal wall is not very
difficult; for, directly the practitioner is certain that pus is
present, a free incision should be made into the most prominent
part of the tumour to permit of the ready escape of the matter.
If there be merely a hard circumscribed swelling, however, attempts
can reasonably be made to check the inflammatory process and to
ensure resolution, by rest, fomentations, and the administration of
the carbonate of ammonia with bark (F. 371). In cases where
suppuration has become established, and the abscess has not been
opened, fecal fistula has sometimes resulted; the pus making its
way externally, and at the same time burrowing backwards, until
the ulceration has extended into a portion of adherent bowel.

IV. PHANTOM, OR MUSCULAR TUMOURS.

The fact has just been noticed, in the preceding section, that
spasmodic contractions of portions of the abdominal muscles are
apt to give rise to a feeling as if a well-defined tumour were under
the hand of the examiner. But in alluding to this circumstance,
attention was more particularly directed to those instances where
only the muscles of the anterior wall of the abdomen take on this
curious action under the influence of manipulation. The cases
now to be treated of are much more remarkable; for in them it