The Lettsomian lectures delivered at the Medical Society of London, 1872, on the pathology and treatment of some diseases of the liver / by S.O. Habershon.

LETTSOMIAN LECTURES
ON
DISEASES
OF
THE LIVER

HABERSHON

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OF

THE MEDICAL SOCIETY OF LONDON

1872

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ON THE

PATHOLOGY AND TREATMENT

OF SOME

DISEASES OF THE LIVER

BY

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LONDON:
J. AND A. CHURCHILL, NEW BURLINGTON STREET.

1872.

PREFACE.

When I accepted the honour of delivering the Lettsomian Lectures at the Medical Society of London, I hoped that time would have permitted me to enter fully upon the subject which I had chosen; and although deeply conscious of the imperfect manner in which I have carried out my intention, I have preferred presenting the Lectures to the public in the manner in which they were delivered, rather than to enlarge upon the original matter. They are published at the request of some members of the Society; and whilst it has been quite foreign to my purpose to give a treatise on Diseases of the Liver, the Lectures will be found to contain practical suggestions, which will, I trust, be of service to those who are engaged in the active duties of the profession.

70, Brook Street, *May*, 1872.

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DISEASES OF THE LIVER.

LECTURE I.

THE LIVER AND ITS NERVES.

The tendency of modern medical practice is often to separate the diseases of one organ from those of another, and to *dis*sociate, as if organs had independent action, and could perform fully their functional requirements with very little connection with other parts; whereas there is the closest unity in the arrangement of the structures of the whole body, and especial means are provided to bring one portion of the organism into sympathy and intimate relationship with another. The two great means by which this living union is rendered effectual are the blood and the nervous system: the former, the medium by which fresh supplies of nourishment are afforded, or effete materials carried away from the ultimate structures; and the

latter, the agent which guides and controls and harmonises the mutual workings of the separate parts.

It is scarcely necessary to advert to the position which the liver occupies between the stomach and the absorbing intestinal mucous membrane, and the lungs and the heart. The liver receives the venous supply from the whole intestinal tract, and eliminates from the blood hydrocarbons in the secretion of bile; whilst at the same time, it reacts upon the constituents of the blood in a manner which modern physiological chemistry has not yet made known. The liver is, we believe, a vascular gland, as well as the source of bile; but, the liver itself is in a great measure under the control of nervous centres; and this nervous connection is worthy of our close attention.

It is not known how glandular structures are affected by the nerves, whether simply by regulating the quantity of blood which is sent to the gland, or by some more direct influence upon the secreting cells; but the action upon the vessels does not fully explain the phenomena we occasionally observe; for the nervous influence is capable of producing not merely a change in the quantity, but in the character, of the secretions. A sudden fright or intense emotional excitement has rendered the secretion from the breasts absolutely detrimental to the infant; the secretion from the kidneys undergoes immediate change, or may be checked, by profound nervous impression; under great emotional excitement or distress, the appetite is lost, and food does not digest if placed in the stomach; and, whilst it has

long been recognised that the mind has a causative relation in the production of acute yellow atrophy of the liver, a state in which the glandular function is well-nigh stopped, still, the lesser changes upon the liver are continually overlooked. In these days of intense mental anxiety—of constant strain upon the thought of men—of wrestling as if for life in the competition and struggle to obtain wealth—there is an influence, and that of a deleterious character, upon the functions of organic life, and the largest of the glands is often impaired in its integrity. Reference is not made to hepatic disturbance from excess, in which the secretion of bile is altered, the countenance becoming sallow, the tongue furred, and the excretions changed. In the hepatic disturbance to which I now refer, there is no sallowness, but a distressed and anxious countenance; the bile is excreted as in health, but the liver does not perform its function properly; the general nutrition of the body is interfered with; the patient is unequal to ordinary exertion; the ordinary duties of life become burdensome; the sleep is unrefreshing; the appetite is lessened; the pulse is compressible; there may be in some a gouty dyscrasia produced; in others there is a transient glycosuria; the liver is disturbed by an overstrained nervous system. This condition is not diabetes, neither does it present the symptoms of that disease: there may be no thirst, no excess of urine; nor is the condition persistent. It has often surprised me how frequently, in some of the forms of atonic dyspepsia, this evidence of

changed hepatic function is observed; and it is important, as directing us not only to the cause of the malady, but as suggesting the curative means—not so much the administration of drugs as the diminution of that which induces nervous exhaustion. To forget the cares of life, to unloose the daily burden, to seek the mountain-top and the wild moorland, far from the arena of strife and vexation, are the best remedies for many of these cares of hepatic indigestion. And, if these more effectual means cannot be used, at least the long hours of mental effort may be lessened, and time allowed for nervous energy to be restored. Sometimes a sudden nervous fright will produce severe jaundice, as in the case of a poor out-patient of mine at Guy's Hospital some years ago. A washerwoman, having left her room for a few minutes, returned to find all the clothes in flames. Her fright was followed in a few hours by jaundice; there was no pain, no febrile excitement; but, as the mind became composed, and after a few days' interval, the jaundice disappeared. If the distress be less sudden, but more prolonged in duration, there is also disturbed action of the liver. It would be a great mistake to "*treat the liver*" in these instances. "It is only the liver out of order," is a common expression, but a generally incorrect one. More frequently the hepatic disturbance is only the expression of a general state, and is relieved by general means. But, before entering further upon pathological considerations, it may be well to inquire what are those nervous connections whereby this close bond is

maintained and by which these symptoms are produced. The pneumogastric nerve, the vaso-motor nerve, and the ganglionic centres by which these nerves are brought into union, deserve our attention.

The pneumogastric is one of the most important nerves in the body; it is extensive in its connections, and its functional integrity is essential to life. It would be out of place to enter upon all the connections of the nerve; but it will suffice to say that after union with nearly all the nerves in the neck, and after giving off the laryngeal nerves, it enters into further union in the chest, and distributes branches to the lungs and to the heart. The nerve is brought into connection with the vaso-motor nerve in the chest, but still more intimately in the abdomen. The pneumogastric unites in the large semilunar ganglion of the vaso-motor which in a chain of enlargements surrounds the cœliac axis in front of the aorta, and branches from this ganglion are distributed upon the coronary artery to the stomach, upon the mesenteric vessels to the intestines, upon the hepatic artery to the liver, as well as to the pancreas and to the spleen, and descending branches unite with the renal and other plexuses. The pneumogastric nerve sends branches to the supra-renal capsules, and to the kidney; but there are other branches which have especial interest in connection with the liver. The right nerve entering the abdomen upon the œsophagus, and uniting with its opposite nerve, soon sends down a delicate branch which reaches the lateral ligament of the liver; another branch passes deeply to the plexus,

which is situated upon the vena cava, whilst others are connected with the semilunar ganglion and with branches to the liver and to the stomach; these latter pass to the pylorus, and also upon the walls of the stomach itself. The branches from the semilunar ganglion can be traced around the hepatic artery in Glisson's capsule; others pass to the vena portæ, and are traced into its walls. One of the branches from the pneumogastric appears to be quite continuous with the branch upon the vena portæ, and to join other filaments in Glisson's capsule. The branches upon the hepatic investments are of great interest, and any inflammatory disease of the surface of the liver induces pain, and the sympathy of the right side of the chest is shown by the lessened respiratory effort on that side. The ganglion of the vena cava is placed upon the cava, and, as shown from a dissection of mine, made with great care some years ago (see "Guy's Reports," 1857), the pneumogastric is by it brought into close union with the phrenic nerve, and with the vaso-motor. The phrenic nerve passes through the diaphragm, it forms a series of radiating branches in that important respiratory muscle, and then unites in this ganglion. Not only do we find in this union an explanation of the pains which are often experienced in the shoulder by patients suffering from disease of the liver, the phrenic nerve at its origin in the neck having close connection with the nerves to the shoulder, but other severe neuroses have an explanation in this important ganglion. It would be interesting if experiments could be made upon this ganglionic centre as easily

as upon ganglia in the neck; but, it is placed so deeply that the dissection required to expose its branches would be fatal to the life of the animal. There can, however, be no doubt that the function of these nerve centres is of great importance; and the pathological facts which are brought out in examinations after death, show us some of these functional connections.

Division of the pneumogastric nerve does not produce such marked effects upon the liver as upon the stomach and the lungs; but this subject requires further investigation. In a case of cancerous disease of the breast and of the vertebræ, under my care some years ago in Guy's Hospital, and in which paralysis and atrophy of half of the tongue was produced by a cancerous growth pressing upon the ninth nerve, there was also direct pressure from a similar growth upon the left eighth nerve, the pneumogastric; and there was great wasting of the left lobe of the liver, but no cirrhosis, and no fatty degeneration of the gland.* Claude Bernard, in his "Leçons de Physiologie," published in 1855, drew attention to most interesting facts connected with the pneumogastric and the functional activity of the liver. These experiments are well known, and have been fully illustrated and further developed in the observations of my colleague, Dr. Pavy. These investigations were the subject of the Lettsomian Lectures in the year 1860, and it is not necessary that I should do more than allude to them. Bernard showed that in diabetes there was an increase

* Recorded in "Guy's Hospital Reports," 1872.

in the functional activity of the liver; and he produced an artificial diabetes by puncturing and irritating the floor of the fourth ventricle, or by galvanising the pneumogastric in the neck. His explanation was, that the vaso-motor nerve upon the hepatic vessels was affected in these experiments; that the vessels became dilated by the paralysis or lessened power of these nerves; that the quantity of blood in the gland was thereby increased, and sugar was produced. Dr. Pavy has indicated still further that division of the superior cervical ganglion, and Cyon that incision of the last cervical or the first dorsal ganglion, have a like effect. It appears to be shown that this action upon the liver is one of lessened nerve-power, and the symptoms of disease confirm the statement.

We have already alluded to the fact of transient glycosuria being a not unfrequent symptom in atonic dyspepsia; and the same diminished power is shown, as we have several times observed, in the presence of considerable quantities of sugar in the urine for short periods in atonic gout. A year or two ago, a gentleman, about sixty-five years of age, consulted me for chronic gout. The urine was highly albuminous, but I also found that there was a very considerable quantity of sugar present. After a few days the sugar entirely disappeared; there was no excessive thirst; no large appetite; the quantity of urine was not excessive, nor was there the progressive wasting of diabetes. The gouty disease of the kidneys continued, although for a time relieved; again there was a transient return of

sugar; but several months afterwards bronchitis supervened—another indication, with him, of weakness of the nervous system, and especially of the pneumogastric and its associated vaso-motor branches. The bronchial affection led to a fatal termination. It may be stated that the urine was of high specific gravity; and, unless there had been an evident gouty dyscrasia, the presence of albumen might easily have been overlooked. Another case, which very recently I saw in consultation with several professional brethren, bears upon the same association of disease. A gentleman, in active practice till two or three weeks before his death, had been the subject of chronic gout, with a very sluggish condition of the colon, but with ordinary aperients the bowels had acted till one week before his death; then, severe pain in the region of the cæcum came on, with constipation and flatulent distention of the abdomen. The colon was enlarged, but pain soon ceased; and it seemed, as if the sigmoid flexure had bent upon itself and had thus led to obstruction. The liver was felt just below the ribs, and the surface was irregular, but no defined tubera could be made out; there were no enlarged glands; nothing could be felt in the rectum; and a tube could easily be passed by a surgical friend eighteen to twenty inches without pain, which seemed to nullify the idea of obstruction about the sigmoid flexure. The urine was of high specific gravity (1·032), scanty, highly albuminous, but free from sugar. It was found that for some time indication of disease of the kidneys had existed, as shown by the occasional

cerebral oppression and drowsiness, with cramps in the legs. We were led to discuss the question of cancerous disease, but this idea was laid aside; for, beyond detecting some irregularity of the liver, nothing was found—no jaundice, no previous vomiting, and no growth could be felt before the abdomen became tympanitic. Severe pain and exhaustion preceded death. It was found that there was old disease of the kidneys, one being quite atrophic; there was a constriction of the rectum about seven inches from the outlet; the bowel was distended, and there was partial peritonitis; and what was very remarkable, five-sixths of the enlarged liver consisted of scirrhous cancer. It would seem that the exhaustion, which in the one patient led to glycosuria from altered functional activity of the liver, in the other produced cancerous growth. Some years ago a young man was admitted into Guy's Hospital, under my care, with well-marked diabetes. He had previously suffered from a severe burn, but from that he soon recovered. The question was discussed whether there was any causative relation between the injury to the skin and the subsequent diabetes. Dr. Hill has recorded in Dr. Beale's "Archives of Medicine" some interesting instances of glycosuria following upon burns; and he refers to the nervous shock, and the imperfect elimination of carbon and hydrogen by the injured skin, as possible causes of the diabetic state. Whilst referring to the liver in connection with diabetes, we may advert to another indication of change in the functional activity of the gland in that disease. In

ordinary diabetes, bile is secreted as usual, and the excreta are well charged with it, whilst the hæmatinic relations of the liver are altogether disordered. But at the close of diabetes it is not unfrequently found that a state of complete acholia is induced; the sugar may have entirely ceased, the urine may have become of normal specific gravity, but the excreta are white, diarrhœa supervenes, and sometimes frothy and fermenting evacuations are discharged. The melancholia sometimes present with diabetes, also indicates the close connection of the nervous system with the diabetic state.

Mental depression a cause of Cancerous disease.—One word in reference to the state of the brain and nervous system in determining to cancerous disease of the liver. When, after severe mental strain or shock, especially of a depressing kind, general impairment of nutrition follows, then cancerous cachexia is soon induced. It is in the antecedent condition of cancer that treatment is most available; if we can remove the causes of distress, and procure rest and change of scene; or if indigestion exist, we can mitigate it by remedies, we may avert the full development of a cancerous cachexia; for, when once produced, a very slight excitement will determine its local manifestation, and the presence of gall-stone or direct disturbance of the gland may fix the mischief in the liver, just as a blow may determine the growth of cancer in the breast. When once a growth exists, the time for effective treatment is passed;

and when a dyspeptic patient between fifty-five and sixty-five years of age becomes wasted and exhausted under mental strain, there is always danger of cancerous disease, and especially in the liver.

Neuralgic pain in the region of the Liver.—We have already spoken of the ganglion of the vena cava, and of its union both with the pneumogastric and with the semilunar ganglion; and it is in this direction that we must look for the explanation of some attacks of severe pain which come on in the upper part of the abdomen during chronic disease of the heart. When from organic disease of the aortic or mitral valve, or from dilatation of the left ventricle or other cause, the right ventricle is distended, the inferior cava also becomes necessarily dilated, the liver is congested, the whole portal system engorged, the minute capillary vessels of the mucous membrane become congested, and its altered state leads to the secretion of thick mucus on the surface of the membrane. In this state, abdominal pain is produced, different in kind, and arising from at least three different causes.

First, it may be a sensation of fulness and throbbing, and of distress at the scrobiculus cordis, which is due to distention of the right side of the heart. This condition is relieved by mercurials with squill and digitalis; by purgatives and by diuretics; and, in fact, by any of those means which lessen the vascular strain on the right side of the heart.

Secondly, the pain may be situated across the epigastric region, and may be caused by gastric catarrh; the food is imperfectly digested, and becomes coated with a thick envelope of mucus; and flatulent distention is the result. The pain thus produced is often most distressing to the patient; the distention of the stomach impedes the action of the diaphragm and embarrasses to a greater degree the crippled heart. Hæmorrhagic erosion may also be induced, with coffee-ground vomit. This symptom—pain—is lessened by the remedies already indicated, and also by the use of mineral acids, by nux vomica, by carbolic acid, &c., the diet being meanwhile carefully regulated.

A third kind of pain is evidently of a neuralgic character; it is not angina pectoris, but it is abdominal; and I have noticed its locality as situated deeply behind the first part of the duodenum. It is severe, almost like that from gall-stone, but it is without jaundice or other symptoms of calculus; it is not connected with the stomach, for it is not affected by food, but paroxysmal, and recurring sometimes with great regularity. The remedies we have mentioned may be used to their full extent, mercury even to the verge of salivation, digitalis till it can no longer be borne, purgatives may be used freely, and the anasarca removed by puncturing the legs; but still this severe neurosis continues; it appears to be due to exhausted nerve-function, especially of those nerves of which we have already spoken. Narcotics and anodynes afford the only means we possess of palliating this distressing symptom.

There are some severe forms of neurosis in connection with the liver and stomach which are difficult of explanation, and which are often very incorrectly referred to gall-stone or to gout. It is perfectly true that spasmodic contraction and severe pain are induced at the pylorus by inflammatory congestion of the mucous membrane, following excesses and intemperance; so, also, by ulceration and cancerous disease of these parts; but the pain indicated is of a different kind, and *post-mortem* examination does not reveal these diseases.

Again, intense pain in the region of the gall-bladder and ducts is sometimes due to gall-stone not extending as far as the hepatic duct, and therefore not producing jaundice; or the calculus, as we have known, might be so angular that bile could pass beside it; but the cases to which we refer have presented no gall-stones.

In these instances, there is no indication of gout in the history or in the general symptoms, and there is no disease of the spine; we employ the term neuralgia as a mere designation. In a man of middle life, who had spent many years at sea as a captain in the merchant service, the periodical attacks of severe pain were so intense, with scanty mucous vomit, that I fully expected to find gall-stones or ulceration in the duodenum. He had remained for several weeks perfectly free from pain or distress, when another sudden attack prostrated his strength; these paroxysms recurred, and in one of greater severity he sank. There were no gall-stones; no ulceration of the stomach or intestine;

no abnormal adhesions; no contraction of the pylorus; no morbid appearance, except hour-glass contraction of the stomach, and we could scarcely regard that condition as the direct cause of death.

I might relate other instances which have come under my own notice, the symptoms of which were very obscure, and in which we were led to attribute the pain to some unknown disturbance of the gastro-hepatic system of nerves.

Some of these instances are relieved by nervine tonics, as by arsenic and by steel; and others by saline mineral waters, and by complete change of thought and scene.

Atrophy of the Liver.—The connection of the pneumogastric with the gastro-hepatic nerves is an interesting one in the pathological study of phthisis; and the atrophic deposition of oil-globules in the liver during phthisis is variously explained. A larger quantity of carbo-hydrogen may exist in the blood from undue absorption, and from the imperfect action of the respiratory organs; but a fatty liver is found in other exhausting diseases, in atrophy from intemperance, and from cancerous and other diseases; yet we cannot but think that the exhausted nervous energy tends to increase the disease, if so it may be termed. This nervous connection has to do with the indigestion which often precedes phthisis, and which is indicated by pallor, by failing appetite, and by diminished strength; the tongue is furred; and, as it

has been remarked by Mr. J. Hutchinson, there is often the dislike to fatty articles of diet. This is the most important time for treatment, before the physical signs of disease are manifested; and that treatment consists less in the administration of drugs than in improving the nutrition of the patient by fresh bracing air, and by cheerful healthy occupation. But, at the later stages of phthisis, we sometimes find that the pulmonary symptoms become quiet, the cough nearly ceases; there may be no pain, no diarrhœa, but a complete loss of appetite, "a gradual dying out;" and although bile is secreted, it is lessened in quantity, and sometimes it even ceases altogether; it is especially the vaso-motor nerves of the digestive apparatus which seem to have lost their energy and their power to work.

There is a condition of fatty atrophy, or degeneration of the liver, concerning which we are doubtful whether it is due in greater measure to the condition of the nervous or to that of the vascular system; whether the supply of nerves to the tissues, or the blood, is most at fault. I refer to poisoning by phosphorus; for it is most remarkable that, in a very short space of time, a few hours or days, not only is jaundice produced, but the liver-cells become loaded with oil-globules.

Again, whether the disturbance of the liver in agues and in fevers be due to the nervous system or to the altered character of the blood, there is no doubt that the secretion is changed, and jaundice is produced. Such forms of jaundice are referred to altered enervation of the gland. It is, however, in some of the

chronic forms of marsh-poisoning, and in jungle-remittents, when no jaundice may exist, that we find the nervous system suffers from extreme depression, and the mental energies seem to fail altogether. There is not the sudden exhaustion and febrile disturbance of the acute attack, but the nervous system lacks its power, and the patient becomes unequal to mental or physical effort. In no class of cases does the value of right treatment manifest itself in a greater degree. Arsenic and bark, with or without the iodides and bromides, soon effect great benefit, and relieve the symptoms of depression.

There are conditions of atrophy of the liver which are due to mechanical causes, such as pressure upon the gland, whether partial, as from compression of the ribs by belt or stays, or from more general pressure of fluid; or again from interference with the supply of blood, as when a large branch of the portal vein becomes obstructed, and the whole lobe wastes; or from the more diffused obstruction which we find in cirrhosis. These are, however, very diverse from the forms of atrophy which are due to the nervous system, and to which some allusion has been made.

The function of the liver is a double one; it has a relation to the blood on the one hand, and to the bile on the other; and in some of the conditions to which we have already referred, the function of the liver is altered in an important manner, but still the secretion of bile is maintained. There may be no jaundice, but we may have evidence either in the formation of sugar,

or in some other way, that the gland is functionally disturbed. It is in these instances, that the treatment must often be directed to the nervous system, by improving the general health, or by removal to a purer atmosphere; and, if medicines be used, those are most likely to be of service which act upon the nervous system, such as arsenic, nux vomica, nitro-muriatic acid, &c. In a second class of liver disturbance, the hæmatinic relation is affected as well as the secretion of bile, but in a transient manner. The urine contains an excess of colouring matter, of bile elements, or rather of uro-hæmatine.

We find an evidence of this altered nerve-function in the ordinary "bilious attack," and we may ask what is the true pathology of this state? It is sometimes spoken of as stomach-disturbance, and it is in the stomach that the mischief commences. The patient experiences a sense of faintness and exhaustion, it may be with pain at the stomach, vomiting, headache, furred tongue, and loaded urine. In a short time these symptons subside, and health is restored; but how is this condition produced? The irritation of the mucous membrane of the stomach from excess induces weakness or paralysis of the vaso-motor nerve of the liver; there is more blood contained in the gland, the secretion of bile is interfered with, the countenance becomes sallow, the urine altered and thick; at the same time there are often pallor and faintness, for the vaso-motor nerve of the heart is acted upon. Again, the tongue is furred, not, we believe, from direct extension of mischief from the stomach

to the tongue, but from the epithelial growth being interfered with by the state of the nervous supply and its intimate connection with other nerves of the same system. The faintness is due to a like cause, and will subside as the irritation lessens. It is unfortunate that this sense of exhaustion and faintness is relieved by stimulants which, for a short time, rouse the exhausted vaso-motor nerve; but the exhaustion as quickly returns, to be relieved by the same remedy. It is most difficult to persuade the patient that the exhaustion is really increased and perpetuated by the stimulant, and that if he will withhold his irritating draught the nerve-power will recover, the appetite return, and the functions will be restored. It may be that in the ordinary bilious attack something may be due to direct absorption by the branches of the vena portæ, and thus direct irritation of the liver may be produced; but this absorption is very slow, and we believe that the symptoms arise principally from the nerve-supply; just as in poisoning by arsenic we have the same exhausted vaso-motor nerve, the faintness, compressible pulse, and loss of power.

In another state, the action of the liver is more profoundly affected; its functional activity is arrested, bile is not secreted, and a most serious and generally fatal train of symptoms is produced. We refer to *acute yellow atrophy of the liver*. The whole nervous system is arrested in its action, and generally from some intense mental emotion. The patients are nearly always young. Thus, of cases which have presented

themselves at Guy's during the last few years, were:—

Ellen L., aged 23, who suffered mental distress a few months after marriage.

Elizabeth B., aged 30; no history of mental distress.

William B., aged 25; no history of mental distress.

Frances A., aged 23; a married woman, who had syphilis.

Isabella R., aged 21; a young woman of good family, who had left her home, and had been living as a prostitute.

John C., aged 18.

John S., aged 35; in whom the disease was partial, and in whom there was neither febrile excitement nor delirium.

It will be seen that the greater proportion of these cases is in young women; and in some, pregnancy seems to be connected with the causation of the disease, or rather some intense mental emotion consequent upon that state. The patient is seized with vomiting and headache, and in a short time jaundice follows with cerebral excitement. The temperature is not increased; the pulse is generally quickened; the tongue is furred; there are abdominal pain, nausea, and constipation; the dulness of the liver is diminished, or at any rate not increased; the urine is remarkably changed, and contains two abnormal products—leucine and tyrosine—with diminution of urea, and, according to Frerichs, of phosphate of lime also. The patient

sinks from exhaustion generally during the first week. Frerichs states that of thirty-one cases 13 died in the first week; 6 in the second week; 5 in the third week; and 4 in the fourth week. Cases of this disease have been recorded by Bright, by Graves, by Budd, Frerichs, Murchison, Harley, &c.; and the anatomical changes in the liver are as remarkable as the physical signs. The liver is lessened in size, the secretion of bile is checked, the gland assumes a deep yellow colour, and, when the affected parts are examined by the microscope, the *débris* of cells only are found; in one instance, I could not find a trace of hepatic cells in any portion of the liver. Nothing could more strikingly show the profound manner in which the gland is affected than this alteration of cell structure, but the presence in the urine of such remarkable products as leucine and tyrosine testify to the same fact. In glycosuria we have the formation of products closely allied to other normal constituents, glycocoll, &c.; in ordinary bilious disturbance, the presence of uro-hæmatine in excess shows also that the blood relation function is changed; but in acute yellow atrophy, we have, to use the expression of the late Professor Miller, the elements of putrefactive change; for these abnormal products that have been mentioned may be produced from albuminoid substance by fusing with caustic alkali, ammonia is thereby evolved, and an offensive fæcal odour is admitted. Leucine is an unctuous substance, but tyrosine is easily obtained in long fibrous crystals, sparingly soluble in water. Acute

yellow atrophy is nearly always fatal, and its whole history testifies to its close connection with the nervous system. We believe, that successful treatment must be in the same direction; the administration of mercury is probably as likely to be successful as when given in severe septicæmia.

There are, however, instances of the disease in a partial as well as in a more chronic form, in which there is red discoloration of the liver, and these cases sometimes recover; we have thought that the partial fatty degeneration may have been due to some such cause. The microscopical examination of the gland in acute yellow atrophy shows that the hepatic cells are degenerated, or replaced by granular matter—crystals of tyrosine may be observed; but in instances of red discoloration, fibroid tissue may be detected permeating the minute structure of the acini. In the diagnosis, there is some danger lest we confound with acute yellow atrophy the jaundice which comes on with typhus, or with enteric fever, with ague, or with the epidemic jaundice which occasionally occurs, as at Rotherham a few years ago, and which closely resembles a milder form of yellow fever. There is a severe form of jaundice which accrues after irritation of the duodenum and inflammatory disease of the bile-ducts; but in these leucine and tyrosine are absent from the urine, and the cerebral symptoms are, at any rate in the latter case, less severe. Local inflammatory diseases producing jaundice differ also in a similar manner,

but the diagnosis is sometimes attended with considerable difficulty. The narration of several instances which have come under my own care will best illustrate this remarkable and rare disease.

CASE I.—*Acute Yellow Atrophy.**

Isabella R——, aged 21, was admitted into Guy's Hospital, February 11th, 1867. She was of good family, but had left her home three months previously, and had since been living an abandoned life. Her temper was obstinate. On Friday week, February 1st, she was taken ill with vomiting, headache, and jaundice, which gradually increased in severity. On the 10th she became insensible, and was brought to the hospital at 6 p.m. of the 11th. On admission she was scarcely sensible, but was throwing herself about rather violently. She was fairly nourished, of dark complexion, and dark hair. The whole body was deeply jaundiced; the face was flushed, and the conjunctiva was injected; the tongue at the tip and the lips were of a dark red colour, but black sordes covered the dorsum of the tongue, the teeth, and part of the lips; the edges of the teeth were tinged with blood; the pupils were widely dilated. She resisted food, twisting and throwing her head from side to side, and jerking the shoulders, arms, and legs; occasionally she groaned; the urine was discharged involuntarily; the pulse was 128, and feeble; the respiration 30, and irregular; the

* Reported by Mr. Frederick Taylor.

temperature 97·2°. The liver dulness extended from 1½ inches below the nipple to the margin of the ribs; there were purpuric spots on the legs, and bruises on the knees. The urine was drawn off at 2 p.m.; it was of a bright orange colour; its sp. gr. 1·025, free from albumen, it became green with nitric acid, and it deposited on standing a quantity of renal epithelical casts, deeply stained yellow. By concentration of the urine, balls of leucine, and after a day or two needles and tufts of tyrosine, were deposited. On admission, a soap injection could not be administered, and croton oil was used to act on the bowels. During the night she had been screaming, and had muscular jactitation. She vomited twice, thick greenish mucus, streaked with black blood; she passed one or two thin and pale motions. At 9.30 a.m. of the 12th, the nurse thought she was dying, as breathing ceased for a time, and the patient became cold and pulseless; after a short time, however, she rallied, and the choreic movements returned. Only small quantities of fluid food were forced down. At 2 p.m. she had become quiet; the eyes were open; the pupils unequally dilated; the conjunctivæ were only slightly sensible to the touch, and the pupils to light; the arms appeared insensible to touch, but reflex movements could be produced by tickling the feet; she ground the teeth constantly; respiration 27, more regular; about 10 oz. of bright-coloured urine had been drawn off. At 4 p.m. she had been in the same position, but was partly roused by the sound of her name, and then burst out crying. At 6 p.m. the

respiration was 36, the pulse 150. Calomel gr. v. was given, and a soap injection administered. The bowels were moved about 9 p.m.; two or three clots, with bright-coloured motion, were passed, but she became more and more comatose, and died about half-past 10. Inspection was made by Dr. Moxon sixteen hours after death. The body was well developed, and deeply jaundiced. There were scars at the left Poupart's ligament. There were no nodes on the cranium. The arachnoid and pia mater were adherent, so as to tear the brain substance on removal. The brain was healthy, and the ventricles contained very little fluid. There was ecchymosis at the posterior part of both pleuræ. The lungs were congested with blood, and did not collapse freely. The pericardium was maculated on the posterior part, and still more so the fat surrounding it, some patches of blood being as large as horse-beans. The cavities on the right side contained fluid blood, with yellow, soft, gelatinous flocculi. The left ventricle presented extensive ecchymoses on the endocardium, especially of the septum. The muscle was very fatty. The stomach contained 9 oz. of soot-like fluid and water. The gall-duct was pervious. The bowels contained blackish clay-coloured stool. The consistency of the liver was gone, so that it formed a tremulous mass, and when cut the contents bulged over the edges. Externally the liver was clay-colour; the section was of *cadmium yellow*, with redder parts around the portal veins, and under the capsule. The substance was very flabby; the yellow portion was

softer than that which was of a deep red colour. The hepatic cells were in great measure destroyed. Both the ducts and veins were free from obstruction. The weight of the gland was 31 oz. The gall-bladder was shrunken, with pink-red walls; it contained a plug of deep pale-green mottled mucus. The spleen was 6 oz. in weight, and rather soft. The kidneys were 10 oz. in weight, plump, and the cortex swollen; the Malpighian tufts were highly fatty. The left ovary was shrivelled; the right ovary was enlarged, and contained a recent false corpus luteum. The ovaries were adherent to the Fallopian tubes, which were turned back. There was an ulcer on the inner surface of the vagina, near the urethral orifice; it had a soft base, and was shallow. The fibres of the pectoralis major were degenerated; the colour was bright, but many fibres had lost their striation, and much granular matter was present where the striation was yet perfect. The renal epithelium was fatty, so that the nuclei could not be seen; the stroma was healthy, but some yellow balls were present in the tubules here and there; these were epithelial cells, charged with bile pigment.

This interesting case of acute yellow atrophy of the liver presented many symptoms closely resembling acute poisoning by phosphorus in the delirium associated with jaundice, and in the fatty degeneration of muscular fibre and of glandular tissue; but the degenerative changes in the liver were of a different kind, and the extreme fatty degeneration observed after poisoning by phosphorus was wanting.

CASE II.—*Acute Yellow Atrophy.*

William B———, aged 25, was admitted into Guy's Hospital, on September 8th, 1858, under my care. He was a young man of dark complexion, a tailor by trade, of temperate and steady habits; he had resided at Walworth. For several years he had had occasional pain in the lower part of the abdomen, but no definite cause could be found for the present illness—no history of unusual exposure, over-anxiety, nor of intemperance. Three weeks before admission he felt great lassitude, sense of faintness, and was "ill all over." One week later jaundice came on, preceded by itching of the skin; and he had also noticed, prior to the discoloration of the skin, that the urine was of a very deep colour. *One* week before admission, on September 2nd, vomiting came on; it took place in the morning directly after awaking, and was preceded by a sense of "heaviness in the chest." On the 8th he was of a deep icteroid colour; the countenance was somewhat anxious, the mind oppressed and sluggish, but quite intelligent; the body was moderately nourished, the tongue clean, bowels confined, the pulse compressible, but normal in frequency; the appetite bad, and, except a feeling of slight discomfort across the chest, he had *not* suffered from any pain. The heart and lungs were healthy; the abdomen collapsed;

and there was no evidence of enlargement of the liver, spleen, or gall-bladder; and no tenderness in the hypochondriac region. The urine was abundant, and loaded with the colouring matters of bile. A full dose of colocynth and calomel were ordered, but did not produce any action of the bowels. On the 9th, compound jalap powder was given, and acted slightly; potash, with compound decoction of aloes and infusion of calumba, were prescribed. The symptoms were as on admission. On the 10th, more severe vomiting came on, of dark green, almost black fluid; there was no complaint of pain; the abdomen was collapsed, the pulse compressible, the mind intelligent. On the 11th the vomiting continued; all aperients and food were at once rejected from the stomach. On the 12th the patient became semi-comatose, but the same irritability of stomach continued; the urine was passed freely; an injection of castor oil was rejected at once from the bowels; water, or any fluid placed in the mouth, was only very partially swallowed. 13th.—Still in a comatose condition; during the whole of the night he had been moaning or raving; he refused food; the face and hands were clammy and perspiring; the pupils enlarged, but acted sluggishly under the influence of light; there were sordes on the teeth; the abdomen was collapsed, and free from tenderness; placing food in the mouth produced an attempt to retch; the pulse was moderately full and sharp, 116; respiration, 20. The left eye was partially closed, and there was less movement of the left than of the right

arm. Urine passed very freely; the bladder not distended.

He died on the 14th, at 1 a.m., after partial convulsion. *Inspection* was made thirteen hours after death. *Brain.*—The vessels were tolerably full of blood; the arachnoid in several places on the surface of the brain presented slight opacity. The brain substance was normal, and there was no excess of fluid in the ventricles. *Chest.*—Slight adhesions of the pleural surfaces were found at the apex of the left lung, and puckering of the lung beneath, with one or two lobules of iron-grey colour from old disease. The lower lobes of the lungs presented hypostatic congestion; on the surface of the pleura, towards the bases, were several patches of ecchymosis. *Heart.*—Pericardium healthy; heart small; blood dark, fluid, and scarcely any clot was present in the cavities; the valves were healthy. The surface of the left ventricle, near the aortic orifice, presented some partial red patches of ecchymosis beneath the endocardium. *Abdomen.*—Intestines not distended; no hernia, and no obstruction nor gall-stone; the peritoneum healthy. *Liver* small; weight, 2 lb. 2 oz.; its section was of a deep yellow colour, and it had a somewhat mottled appearance; the acini were distinct. There was considerable vascularity of Glisson's capsule, but no distention of the bile-ducts. Under microscopical examination of the liver structure very few hepatic cells could be observed, and those found did not present the usual well-marked cell-wall and distinct nucleus, but appeared filled with granules; there

was a great abundance of granular and fatty particles, and in the acini clusters of granules were observed arranged in lines as if in the position of the hepatic cells; some of the minute bile-ducts were also observed to be full of granules. The gall-bladder contained about ʒij. of dark-coloured thick bile; the bile-ducts were healthy, and no increase of vascularity existed at the orifice in the duodenum. The stomach contained about a pint of dark-green fluid; the mucous membrane presented numerous patches of arborescent injection, and some ecchymoses were found towards the cardiac and pyloric extremities, and at the lesser curvature. The examination of the mucous membrane showed considerable injection of the capillaries; some granular colouring matter of blood was observed on the surface of the membrane; the glandular structure was normal. There was some grey discoloration of the mucous membrane of the duodenum; the jejunum was healthy; the ileum presented slight enlargement of some solitary glands at its termination; Peyer's glands were not enlarged. In the ascending and transverse colon the solitary glands were generally distinct, and a layer of thick mucus adhered to the intestine. The spleen was slightly enlarged and soft; the pancreas and adjoining glands were healthy; so also were the supra-renal capsules and semi-lunar ganglia. The kidneys were large, but otherwise healthy. This case had been diagnosed as one of jaundice, arising from change in the structure of the liver, and the *post-mortem* examination confirmed that opinion.

We have tried to show that the nervous system has a most intimate relation with the morbid processes of the liver, even without the production of jaundice; and we are convinced that the treatment must in these cases consist in the removal of nervous disturbance and exhaustion. In a second class of diseases of the liver, the circulatory system is especially modified in the morbid processes; and in these, mercurial medicines, and others having like effect, are constantly of value. In a third lecture we hope to speak of some diseases of the ducts in which alkalies are often of signal service to the patient.

LECTURE II.

THE LIVER AND ITS VESSELS.

The connection of the liver with the nervous system occupied our attention at the last lecture, and we will now pass to the consideration of some of those pathological conditions which are connected with the vascular supply of the gland. The hepatic veins, the vena portæ, and the hepatic artery, constitute three blood-channels to or from the gland; they unite at the minute lobules, but the import of their pathological changes is very different, and the symptoms which indicate those changes are also diverse in their character and in their results. I would premise a few words in reference to the arrangement of these vessels.

The Hepatic Vein.—At the convex margin of the liver, close to the diaphragm, this large vessel enters the cava, having received the whole of the blood from the gland. It is a large venous reservoir, which divides into branches in the substance of the liver, forming the sub-lobular veins of Kiernan, and from these vessels minute branches pass into the lobules, the intra-lobular veins;

within the lobules a minute capillary plexus is formed, which extends through the acinus, and within it joins the corresponding branches from the vena portæ. The hepatic veins are destitute of valves; they have very little cellular tissue around them, so that they remain patulous after division, and there is nothing to prevent the blood from distending these hepatic venous canals (Kiernan), if there be any obstruction in the passage of the blood from the right ventricle of the heart. The close contact of the hepatic vein with the lobulus Spigelii is an arrangement of some pathological interest in connection with perihepatitis, and the production of anasarca of the lower extremities, for I have frequently found contraction at that part and consequent constriction of the vessel.

The *vena portæ* is a large venous trunk, which is composed of the united superior mesenteric and splenic veins; the minute venous capillaries from the whole of the intestinal tract, as well as from the spleen and the pancreas, are brought to this vessel, the vena portæ, before it again divides in the substance of the liver. The vena portæ has a distinct muscular coat, which is in many instances of hepatic obstruction greatly hypertrophied; in one instance lately I found it more than one-fiftieth of an inch in thickness; and this muscular wall is evidently an auxiliary force in the propulsion of blood. The vein is destitute of valves, and the whole of its branches are subjected to varying degrees of distention. The portal vein reaches the liver at the transverse fissure, in company with the bile-duct and with the hepatic artery; it receives filaments of

nerves from the pneumogastric, and from the semilunar ganglia, and these filaments are lost upon the coats of the veins; lymphatic vessels accompany these vascular structures, and the whole are surrounded by cellular tissue, which constitutes what is well known as Glisson's capsule, and which extends around the vessels as far as the acini of the liver. The vena portæ divides into two large branches, and some minute offshoots pass into the sheath of the canal, and form plexuses with branches from the hepatic artery in Glisson's capsule; the more important distribution, however, is to the acini or lobules of the liver; after numerous divisions a minute capillary arrangement is formed around the lobules, the inter-lobular plexuses, and passing within the lobule, that is to say, reaching the hepatic cells, another plexus is formed, the intra-lobular, which joins corresponding capillaries of the hepatic veins; the inter-lobular vessels freely communicate. Throughout the substance of the gland the vena portæ is accompanied by branches of the hepatic artery, and by minute bile-ducts; and when the vena portæ is obstructed, fresh channels of communication are opened, or, rather, small ones become enlarged, and the blood receives a new direction, as in the union of the internal hæmorrhoidal with the inferior hæmorrhoidal veins, and the left coronary with the œsophageal and diaphragmatic veins.

Frerichs (quoting from Sappey) draws especial attention to the minute branches of the portal veins which pass upon the falciform ligament to reach the under surface of the diaphragm, and the epigastric

branches of the abdominal wall, the branches of which reach the internal mammary and the superficial abdominal veins; and these collateral means of circulation are of great importance in obstruction of the larger portal vessels. The only remaining vascular supply to the liver is the *hepatic artery*, and this is perhaps the most important in many earlier stages of disease. It is a branch of the cœliac axis, and passing to the transverse fissure of the liver in connection with the vena portæ, it gives off minute branches in the sheath of Glisson's capsule to the ducts and other structures in the capsule, and ultimately it reaches the inter-lobular plexus of the vena portæ. In lardaceous disease the capillary arteries are thickened, and easily recognized under the microscope; and in this affection of the liver the minute branches of the artery may be traced as far as the lobule itself, but scarcely within the intra-lobular plexus. The hepatic artery is covered with numerous nerve filaments, and its pathological relations are most important.

The acinus of the liver receives branches from three different sources: the hepatic capillary veins occupy the centre, the portal capillaries are at the circumference, and the latter are joined by the capillaries of the hepatic artery. According to Virchow, these three portions have different pathological relations: the circumference of the lobule presents us with fatty changes—the portal part—that which is in closest connection with the absorbent mucous membrane of the intestine (and the blood of this vein has been shown to

be of a milky character after digestion); the central part first shows indication of increased pigmental deposit—the part that is nearer to the heart, and more indicative of hæmatinic change; and, thirdly, lardaceous disease is most marked at the centre of the lobule.

The pigmental deposit may certainly be seen in the centre of the lobule, and in partial fatty degeneration globules are more abundant at the circumference; but in many instances of lardaceous disease that I have examined, it was quite impossible to establish any such definite limit of disease, probably from the change having assumed a more general character. The capillary vessels surround the cells of the liver, which are contained in the meshes between them; they are extremely delicate in their character, and with difficulty defined. The injections of the liver are not satisfactory; but, by careful washing and gentle manipulation, the hepatic cells may be washed away, and the capillary vessels are left. As to the cells of the liver, they vary in size, and sometimes undergo atrophy, independently of the deposit of oleaginous particles or albuminoid substance in them. It is important to bear in mind that, as the function of the liver is a double one, having a relation to the blood as well as to the bile, so also is the circulation double in character; there is a constant current of blood towards the heart, whilst there is a constant secretion of bile and flow towards the bile-ducts.

The pathological changes in the *hepatic veins* are comparatively few, and are generally of a passive kind.

In the distention from heart-disease and chronic bronchitis, &c., these veins first present signs of congestion; the centre of the lobule is deepened in colour, the capillaries are enlarged, and the mottled appearance (called nutmeg-liver) is produced in some cases. I have seen fibroid cells in the acini as if from *ante-mortem* fibrillation of the blood. We rarely find contraction of the hepatic veins from inflammatory fibroid deposit, as with the portal vessels; but in some cases hepatic abscess, extending into the veins, leads to disease and thickening of the coats of the vessels.

In passive congestion of the hepatic veins, the gland gradually becomes enlarged, and after a time may be felt several inches below the ribs. It is found, on manipulation, to be harder than natural; the increase in size is uniform, the surface is smooth, and the thin edge may be recognised by sudden but gentle pressure. The secretion of bile is altered, and the countenance of the patient becomes sallow; the urine is deepened in colour, and is often scanty in quantity; there is a sense of painful tension produced by the stretching of the fibrous envelope; the bowels are irregular, and sometimes the excreta are paler than usual. All these symptoms are more marked if the congestion extend to the portal venous capillaries, and if there be distention of the vena portæ; then, there is evidence of congestion of the mucous membrane of the stomach, the digestion is impaired, catarrhal mucus is secreted in excess, food does not digest, but flatulent distention is produced, with increased dyspnœa and distress; the

intestinal mucous membrane is congested, and colic and irregular action of the bowels may be produced, whilst similar congestion of the hæmorrhoidal veins induces piles. If the congestion of the liver and of its vessels increase, serous effusion into the peritoneum follows, with the attendant symptoms of ascites.

This form of disease is distinguished from the fatty enlargement of the liver by the more congested appearance of the skin; it wants the smoothness that occurs in fatty degeneration; and it is also distinguished by the presence of obstructive disease of the glands and of the circulation. Another form of enlargement, which is free from vascular distention, is produced by lardaceous disease; it is, however, sometimes difficult to recognise simple enlargement of the liver from that which is due to growth on the upper surface towards the diaphragm, pushing down the gland. A few years ago a young woman was admitted into Guy's under my care with enlargement of the liver; no other disease could be found, and the general health was not much interfered with; the surface of the liver was smooth, the edge was easily defined; there was no disease in the lungs, nor of the heart; the malady progressed, and the patient died from exhaustion. On the *post-mortem* table, when the abdomen was opened, an enormous liver was observed, smooth, and apparently of normal structure; but when it was separated from the diaphragm, a very large hydatid cyst was found to have pushed down the gland, and had given the indications of simple enlargement of the liver;

the pressure on adjoining structures was the cause of death.

The passive enlargement and congestion of the liver to which we have referred is greatly relieved by those remedial measures which unload the capillary vessels of the intestinal tract and of the abdominal glands, free mercurial purgatives, with or without squill, saline purgatives, as the aperient salts of soda and magnesia, and by saline mineral waters, &c. But it is a great mistake to regard this condition of the liver as the primary disease; it is only a secondary one, though, unfortunately, often regarded as the most important malady.

Portal Vessels.—In the *portal vessels* the morbid processes are more numerous, and are often of a very distinctive character. The congestion to which we have already referred is secondary to that of the hepatic veins, and is dependent on obstructive disease affecting the pulmonary circulation. If the congestion reaches the interlobular plexus, the nutmeg mottling is more intense, and the gland sometimes assumes a coarse and granular appearance, as if it were undergoing fibroid degeneration; a form of cirrhosis in which the lobule is said to be atrophied first in its central portion. The congestion of the portal system is, however, sometimes of an *acute* character, and quite independent of pulmonary and cardiac disease; it is the interlobular venous plexus which then alone becomes congested; and it is this

change which we find in the hyperæmia after intemperance, after malaria, and other allied states.

Obstruction.—The vena portæ and its branches are subject to obstruction from causes affecting either the interior or the exterior of the vessels. As to the former, the vessel is obstructed by the coagulation of blood, thrombosis, or by the entrance into the vein of cancerous growth, or the perforation of an abscess or cyst; in the latter case, *external disease*, inflammation of the coats of the vein produces fibrinous effusion and contraction, even to the complete obstruction of the vein; œdema and fibrinous effusion into Glisson's capsule, acute inflammatory disease and suppuration, chronic inflammation of the peripheral portions of Glisson's capsule—as in ordinary cirrhosis—senile fibroid degeneration, each produce contraction of the vena portæ. The inflammatory disease set up by the passage of gall-stones, the pressure from abnormal growths, from hydatid cysts, from enlarged glands, from chronic peritonitis, may also affect the vena portæ in a partial or general manner.

To revert, however, to those obstructions that are of an *internal* character, we will mention, first, the coagulation of blood in the portal vein. This coagulation is more frequent than is usually supposed, and it is the cause of some of the symptoms which are observed in great exhaustion: the obstruction may be in the trunk of the vein or in its branches. In the coronary veins of the stomach, it is the cause of the effusion of blood

and the coffee-ground vomit which are sometimes observed towards the termination of disease, and in which no ulceration of the stomach can be found. In the mesenteric veins, this venous coagulation leads to appearances closely resembling internal strangulation.

Thomas C——, aged 43, was admitted into Guy's Hospital, December 7th, 1853, and died on the 31st. He was by trade a sailmaker, and for several years had been very intemperate in his habits; he was admitted suffering from œdema of the legs, with albuminous urine; diarrhœa and wasting supervened, and there was partial coma before death. On examination, the body was pale and spare. The lungs were found to be very œdematous, and some lobules of the lung were softened and breaking down. There was slight atheroma of the mitral and aortic valves. Abdomen: the intestines were distended; there was general peritonitis, which was most intense in the right iliac region; the peritoneum was injected where the intestines were in contact; eight inches from the ileo-cœcal valve the peritoneal surface of the intestine for several inches was of a dark grey colour, as if on the point of sloughing; there was no constriction, no strangulation, no hernia nor intussusception. The mucous membrane at the lower part of the ileum was in a sloughing condition, defined and intensely congested at the margin; this thin slough affected the whole of the mucous membrane, and was not confined to Peyer's glands. The

mesenteric veins were filled with clot. The left lobe of the liver was wasted, forming a fibrous mass, and white in colour; the remaining part of the gland was fatty. The kidneys were large and white. Thrombosis is also found in some cases in the glandular branches of the portal vein.

Cancerous Disease in connection with the Portal Vessels.—Another form of internal obstruction, however, is the extension of disease of a cancerous character into the canal of the vena portæ. Several instances of this kind have come under my own notice. In one, under the care of my late colleague, Dr. Addison, the portal vein became suddenly obstructed by the entrance of cancerous products, and the liver was injected with the abnormal growth. Severe hæmorrhage from the stomach and intestinal mucous membrane supervened, and in a few hours the patient died.

This form of portal injection and obstruction must be distinguished from another kind of cancerous disease, in which the heterogeneous product passes along the exterior of the portal vessels to its minutest branches, and may be seen distending Glisson's capsule throughout the liver. In an instance of disease, there was carcinomatous disease of the cervical and axillary glands, as well as similar disease of the spleen, liver, and mesenteric glands.

Communication of the Portal Vein with Abscess.—The vena portæ sometimes communicates with abscess in

the liver, with hydatid cysts, and thus leads to hæmorrhagic effusions. Our limits will not permit us to enter upon many interesting cases of that kind.

External Obstruction of the Vena Portæ.—The vena portæ may, however, be obstructed by disease external to it, or from inflammation of the coats of the vein itself. The result of this is sometimes seen in the entire wasting of considerable portions of the gland, as we have seen of the whole of the left lobe; and, if the obstruction have occurred during fœtal or early infantile life, the appearance is still more remarkable. The walls of the vein sometimes become thick and fibroid, and the vein completely obstructed, as in the following instance, which was under my care in Guy's Hospital during the year 1870. A large blood-cyst had been formed at the base of the liver.

Cordelia W——, aged 34, was admitted in November, under my care. She had been a spirit-drinker. Eight months before, she first presented symptoms of ascites, and in two months was tapped; she left the hospital, relieved, but returned in an almost dying state in five months, and was shortly afterwards tapped again. The fluid soon re-collected, and on November 2nd paracentesis abdominis was performed a third time, and thirty-seven pints were removed. On the 5th, the peritoneum was filling rapidly, but the patient sank from exhaustion. A dull, "heavy" pain had preceded the swelling of the abdomen, and five months afterwards was followed by anasarca of

the legs. The skin was dry and sallow; the body was wasted; there was no jaundice; the urine was healthy and free, and menstruation regular. The *post-mortem* examination was made by Dr. Moxon. The pleura presented acute recent inflammation at the lower part of the right lung. The lungs were collapsed, and partially carnified. The bronchi were healthy; the heart small and healthy. The abdominal cavity contained turbid serum. The peritoneum showed subacute peritonitis, long shreds of lymph passing between the coils of the intestine. The intestines were gathered together in front of the spine; the omentum was thickened, and was drawn up; the stomach, colon, and liver were adherent; and the gall-bladder was adherent to the duodenum. The liver was fatty and softened; many lobules were wasted; some were small, others were large and pale from fatty degeneration. At the back and under surface of the liver was a large apoplectic cyst, distending the hinder and middle part of the organ, so as to deflect the cava. The cyst was placed beneath the hepatic capsule; it was of the size of an orange, and contained laminated clots. The neck of the cyst was like a flattened tube towards the fissure of the liver, and it extended to the region of the head of the pancreas: at that part an old dense portion was found to be surrounded by thick tissue, and was connected with the portal vein. The portal vein itself was occluded throughout the liver, and the fusiform aneurism of the vein had given way, forming a blood-cyst. The walls of the aneurism were of stony

hardness from calcareous patches. The stomach was covered with thick mucus. The spleen was very large, and contained embolic patches. The kidneys were pale; the genitalia were normal.

In this remarkable case there was no true cirrhosis, but the liver was fatty and degenerated.

Fibrous bands sometimes extend throughout the liver; or, if local obstruction have taken place, considerable depression and pits are observed upon the surface, indicating fibroid contraction and atrophy.

Inflammatory Obstruction.—Cirrhosis.—A more frequent cause of portal obstruction is inflammatory change in Glisson's capsule, the chronic form of which is called *cirrhosis*. We have already adverted to the contraction of the liver which follows venous congestion; this kind, however, is due to *inflammation* of Glisson's capsule and the tissues connected with it, and must be distinguished from a *third* form of cirrhosis—namely, *senile fibroid degeneration*. Before speaking of cirrhosis, it may be well to refer to the *hepatic artery* and to some pathological considerations connected with it, for the hepatic artery is essentially connected with the early stages of inflammatory cirrhosis, although the portal vein is secondarily affected, and causes many of the prominent symptoms of the disease. The hepatic artery is probably concerned in all acute inflammatory diseases of the liver; it receives a large supply of nerves, and the pressure of blood is greatly affected by the division of the nerves in the neck,

according to the observations of Cyon. The capillary branches of the hepatic artery are largely distributed in the capsule throughout the liver; it is probable that direct absorption takes place by means of the branches of the portal veins in the stomach and intestine, and that the glandular structure of the liver is thereby irritated by acrid ingesta. Still, very many of the symptoms of ordinary hepatic disturbance are due to the vaso-motor nerves upon the vessels; if the nerves become paralysed, there is undue congestion; and we believe that we are warranted in this opinion from the phenomena observed in other parts when the sympathetic is divided. Congestion of the hepatic capillaries is followed by the effusion of serum, by œdematous swelling, by the effusion of fibrin, and by alteration in the secreting power of the hepatic cells. These are the stages of cirrhosis; the congestion of the vessels and effusion of serum causes swelling and enlargement of the whole gland; and it is probable, that in inflammatory cirrhosis increase in size *always* takes place at an early stage. This inflammatory product extends as far as Glisson's capsule to the lobules themselves, and in many instances the fibroid capsule of the liver also takes part in the morbid process, and perihepatitis is the result. The tissue forming Glisson's capsule does not in man so completely separate the lobules one from another as in some of the lower animals; but we find it permeating between groups of acini, and probably in a lesser degree between every lobule. The inflammatory product thus diffused throughout the

gland becomes more fully organised; it contracts and becomes firmer, and most important secondary changes ensue. As to the changes in the lobules themselves, the cells waste, at first towards the periphery; fibroid tissue may be seen even between the cells, or rather between small groups of them; clusters of acini are separated and give the gland a granular appearance; and, as larger groups stand out on the surface from the contraction of intervening fibroid tissue, the more distinct irregularities are produced, and the "hob-nail liver" is the result. Similar effusion and contraction takes place in the larger portal canals, and the obstruction of the portal veins becomes extreme; the liver is wasted, its colour is changed, and it is paler; its edge is rounded, its surface roughened, and the gland has a rounded appearance. The wasting in the gland is not uniform, sometimes it is more marked in the left lobe, sometimes at the margin of the right lobe; but the wasted appearance is greatly altered if fatty degeneration be associated with the fibroid disease, and if the tissues are stained from jaundice. In many cases of cirrhosis the capsule of the liver, continuous as it is with Glisson's capsule, becomes inflamed, fibrin is effused, the capsule is thickened and opaque, and frequently a thick covering is spread out upon the serous surface; this fibrin may be peeled off; it forms adhesions with adjoining tissues; it becomes vascular in character, and sometimes presents a hard and nodular appearance. The local obstruction of the portal circulation in cirrhosis produces enlargement of the spleen, which is

often covered with a thick fibrinous investment. The branches of the vena portæ are greatly distended, sometimes to actual rupturing of capillary vessels, and hæmorrhage may take place from the stomach, or from the hæmorrhoidal veins of the rectum. As the obstruction increases, serous effusion into the peritoneal cavity and ascites supervene; and it must always be borne in mind that the capillary vessels of the peritoneum and mucous membrane are in a state of intense congestion. This congestion is important, for it interferes with the absorption of medicines, and diuretics, &c., are powerless; and, again, if paracentesis be performed, there is great danger of peritonitis. Another result of this long-continued venous obstruction is hypertrophy of the coats of the vena portæ, to which I have previously referred.

It is a great mistake to regard cirrhosis as a merely *local* disease; it must be considered in its general relations, as well as in reference to those local changes which arise from the contraction of the liver-structure. It is essentially a wasting disease; changes take place in other structures; there is atrophy of the cerebro-spinal system, the lungs often become affected, and we observe fibroid disease of the lung and true phthisical disease, for it is erroneous to suppose that excess prevents phthisis. Again, the kidneys are often involved, and renal disease constitutes a most serious complication in cirrhosis of the liver. A patient with sallow countenance, bloated, but pale, with enlargement of the liver, with loss of appetite and impaired digestion, nervous exhaustion, and depression, may have

cirrhosis at an early stage, and the patient may be relieved if he will manfully stay his evil course; but, if with these symptoms we find the urine albuminous, and there be attacks of momentary loss of consciousness or vertigo, the condition is infinitely more serious. In senile cirrhosis, a contracted state of the kidney is frequently observed; reference is however now made to the acute inflammatory congestion from great excess. It is quite true that the wasting of cirrhosis is greatly increased by the imperfect absorption of nourishment, and by defective digestion; but this will not explain the whole of the symptoms.

A patient affected with cirrhosis often presents a wasted appearance: the skin is dry and harsh; the capillary vessels on the cheek are enlarged; the eyes are sunken; the nervous power and mental courage are lessened; the gait is less vigorous; the digestion is impaired; the appetite is dainty; the tongue is injected at the tip, irregularly furred, and, at later stages, becomes red and irritable, or aphthous; there is flatulent distention of the abdomen, sometimes with heartburn and acid eructations. Vomiting and irritability of the stomach are often present at one or other stage; the bowels are irregular, confined or loose, and often with symptoms of catarrhal irritation of the colon; hæmorrhoids and consequent loss of blood are not unfrequent. The urine is scanty, high coloured, having a deposit of lithates, or of uric acid, or of brighter coloured purpurates; and with nitric acid the urine assumes a very deep tint. On the surface of the skin spots of purpura

are often observed; and if there be any ascites and anasarca, the veins on the surface of the abdomen are enlarged, the superficial epigastric joining the mammary. The countenance is often sallow, but jaundice is not a constant symptom of cirrhosis; pressure on the bile-ducts or catarrhal inflammation of these ducts may, however, induce it. The blood in cirrhosis becomes changed in character; there is diminished power of coagulation, and if epistaxis occur, it is with difficulty checked; and in former medical treatment, when leeches and the cupping-glass were more frequently used, the persistent oozing of blood sometimes became a most serious question. Ascites follows as a later symptom, and afterwards anasarca of the lower extremities; but the legs in cirrhosis are often found to be small and withered, without any dropsical swelling. If there be inflammatory disease of the *surface* of the liver, pain in the side and pain in the shoulder are often present. Cirrhosis occurs at a very early period in life, when the wretched parent has allowed her child to be poisoned by alcohol; one instance occurred at Guy's even at 7, others at 8 and 10 years of age; but the disease may continue to an indefinite period. Some persons of intemperate habits at an advanced age have cirrhosis; but in these cases it is impossible to decide when the disease commenced. So also as to the prognosis: at an early stage, if the patient will submit to treatment, the disease may certainly be checked; and, even when contraction has taken place, our means of alleviation may be effective; but when the disease has advanced

to a chronic stage, and when exhaustion is indicated by attacks of bronchitis and of pneumonia, the prognosis is very unfavourable. It is also a very unfavourable sign in cirrhosis, when the appetite having completely failed, the bowels become irritable, and the tongue has a morbidly clean and red appearance. The association of renal disease, as we often find in senile cirrhosis, is a very serious complication; for it not only shows that another most important excretory organ is affected, but that degeneration arises from general senile change; in these cases the patient is very likely to become comatose. The diagnosis is, however, at any early stage obscure, and when the disease is *un*attended with inflammatory symptoms on the surface of the gland, the onset of the malady is very insidious; it is often by a process of exclusion, that we are led to suspect cirrhosis. Wasting with ascites, without pulmonary or cardiac disease, when no cancerous disease can be detected, when the liver is diminished in size, and there is no albumen in the urine, indicates cirrhosis; and, if with these symptoms we find enlargement of the abdominal veins and disordered congestion, we may strongly suspect chronic inflammatory disease of the liver; but pressure on the vena portæ from enlarged glands, &c., may cause ascites; it is sometimes very difficult to distinguish the ascites produced by cancerous tubera upon the peritoneum from cirrhosis, and so, also, when it is the result of chronic disease about the uterus and ovaries. A case of the latter kind occurred under my care in the clinical ward at Guy's three years ago.

An old woman was admitted in a prostrate condition with ascites. She had pain in the right side and in the region of the sigmoid flexure, but there was no indication of thoracic disease; the pulse was regular; there was no cough, no bruit, and no abnormal physical signs; the mind was clear; the urine was healthy; there was no uterine discharge, and no complaint of "bearing down," &c. The distention of the abdomen, evidently from fluid, with pain in the right side and in the region of the sigmoid flexure, were the only signs of disease beside the general weakness. Cirrhosis was regarded as the probable cause of the ascites, especially as we had evidence of some perihepatitis in a friction-sound audible over the region of the liver. The patient was allowed to sit up, and soon afterwards became faint, not, however, having left her bedside; increased exhaustion supervened, and she died on the second day. There was some thickening of the peritoneal covering of the liver, and so far the diagnosis was correct, but the disease was uterine; there was cancerous disease of the body of the uterus, with but little enlargement; the os uteri was blocked up so that there was no vaginal discharge; local inflammatory disease and suppuration had supervened in the walls of the uterus, and the walls gave way, causing fatal peritonitis. The ascites was atrophic in character. In that form of ascites which is apt to be mistaken for cirrhosis, but which arises from carcinomatous tubera upon the peritoneum, the disease is gradual; it occurs after the middle period of life, inflammatory disease of the surface of the viscera is set

up, and it is only by close attention to the general symptoms that a correct diagnosis can be made.

In the treatment of cirrhosis, the co-operation of the patient is essential for success; for if after partial improvement, there is a return to injudicious habits and to excess, the disease soon makes rapid progress. At an early stage, the cautious use of mercurial medicines lessens the engorgement of the portal system, and promotes the absorption of fibrin; but it is most important to bear in mind that, in proportion as general degenerative changes take place, mercury is injurious, and when the powers of digestion are thoroughly impaired, mercury increases the weakness of digestion. The long-continued use of iodide of potassium is often of service, but generally it is discontinued as soon as partial relief is afforded, instead of persevering in the remedy for several months. The hydrochlorate of ammonia has been recommended, and so, also, the bromide of potassium. If, however, there be great exhaustion with ascites, these remedies are ineffectual, and in no disease is there greater disappointment in the action of diuretics; they are valueless, and are given, the one after the other, without effect. The reason is patent—the medicine is not absorbed; the disease produces distention of the vena portæ, and the remedies do not enter the blood nor reach the kidney. In this state, I have often found more benefit from quinine with mineral acids, and from those means which are likely to improve the general health of the patient, than from measures more directly calculated to pro-

mote the absorption of fibrin effused in the glandular texture.

An important question arises in cirrhosis as to the propriety of withdrawing the fluid by tapping; and I believe that the operation is often deferred till it is too late. It is quite true, that at an early stage we are anxious to employ other measures less alarming to the patient; but, in several instances in which it has been performed early, patients have soon recovered without the recollection of the fluid, whereas in the later stages paracentesis is always attended with danger, for the peritoneal vessels are intensely congested, and peritonitis is easily induced. Many patients with chronic cirrhosis die a few days after tapping. Peritonitis does not, in these cases, produce pain, but rather typhoid exhaustion. The continued use of saline aperient waters is often attended with the greatest benefit in this form of chronic disease of the liver.

In cirrhosis, the disease is diffused; but sometimes a hard fibroid mass is situated in one or other part of the liver, or on its surface, local in character and closely resembling syphiloma. In these cases there has been a local source of irritation or injury at the part. In reference to tapping at an early stage of cirrhosis, I may advert to an instance which was lately under the care of my colleague, Dr. Rees, and myself.

Mary C——, aged 29, was admitted into the clinical ward on October 27th, 1871. She had been a servant at eating-houses for ten years, and had been in the habit of taking very freely of beer, and sometimes of

spirits. Two months before admission, her appetite failed; there was nausea and occasional vomiting. Two weeks later, the abdomen and then the legs began to swell; the bowels were constipated; aperient medicines produced vomiting, and she brought up half a pint of dark blood. She had suffered from hæmorrhoids. The patient was well nourished. There was considerable ascites and œdema of the parietes, as well as of the lower extremities. There was no enlargement of the veins; there was tenderness over the region of the liver, and the dulness was increased. She had not menstruated for two months. There was a blue line along the margin of the gums; the urine was scanty and high-coloured; the specific gravity 1·021; it was free from albumen. The bowels were constipated. Purgatives were used freely; but, as the quantity of fluid increased, on November 9th seventeen pints of fluid were drawn off, with great relief to the patient. Some fluid re-collected; but, under the use of the perchloride of mercury, and afterwards of iodide of potassium, it disappeared. The whole of the œdema ceased. Steel was afterwards given, and she left the hospital, nearly well, at the beginning of the present year.

It may be said that mercurials and iodide of potassium alone would have cured this affection—and we certainly could not state that the disease would not have been so cured—but the paracentesis at an early stage certainly promoted recovery; it saved much time, and spared the patient a long continuance of medical

treatment. Whilst adverting to this instance of disease, I may mention that, whilst cirrhosis is especially an inflammatory disease of Glisson's capsule, there is a condition in which the glandular tissue of the liver is especially involved; the liver becomes considerably enlarged—often permanently so; its tissue is indurated; and this form of disease is, at its commencement, with great difficulty distinguished from early cirrhosis. In this stage there is greater sallowness than in cirrhosis, and even jaundice: it has been called inflammatory induration.

The inflammatory disease in Glisson's capsule, of which we have spoken, is fibroid in character; but we sometimes find that acute suppuration follows the course of this fibrous tissue or investment, and extends from the transverse fissure almost throughout the liver. The symptoms of this state are obscure; they are typhoid in character; and almost every case that I have seen has been connected with abscess or with extension of disease from the lesser omentum, or with disease of the bile-ducts. This condition may be connected with an abnormal state of the lymphatic vessels and glands, for numerous lymphatics pass freely within Glisson's capsule. Perihepatitis is also productive, in some instances, of a local collection of pus on the upper surface of the liver.

Cirrhosis may be a partial as well as a general disease; and, we sometimes find that fatty degeneration is present, or that some portions of a cirrhotic liver are involved in lardaceous degeneration. Cirrhosis may be

also associated with acute yellow atrophy, or with inflammatory jaundice.

An old man, aged 67, was admitted into Guy's Hospital on February 1st, 1854, and died on March 5th. He was an emaciated spirit-drinker, with ascites and with jaundice. His strength had only failed for three months, the date of the ascites and jaundice. The skin was hot and dry; the liver could not be felt; the legs were œdematous; there was a cachectic lichenous rash on the body; the urine contained colouring matter of bile; and there were several spots of purpura on the hands. On inspection, there were atheromatous condition of the vessels of the brain, and subarachnoid effusion; there was degeneration of the coronary arteries and of the muscular fibre of the heart. The peritoneum contained two gallons of clear serum, with flakes of lymph. The liver weighed 4 lbs.; its surface was roughened from contraction; its section was irregular, congested, and lardaceous. The kidneys were granular; their arteries rigid; their weight 7½ oz. On examining the acini of the liver, fibroid tissue could be seen between the cells of the liver in the lobules. This condition was one of general degeneration, and the cirrhosis was a part of that general atrophy.

We cannot enter fully into the subject of inflammation of the glandular tissue of the liver itself; but only remark that the cellular structure undergoes remarkable change of a partial or general character, and abscess is sometimes the result. I am convinced that abscess may be either from simple in-

flammation, in which the symptoms may be obscure and the progress slow, although sometimes intensely acute and rapid, connected, possibly, with intermittents, or with acute disease of the abdomen, as dysentery; and secondly, suppurative disease may be associated with a changed state of the blood, as in pyæmia, in which the symptoms are especially typhoid, and always fatal, and the abscesses peripheral. The two following cases illustrate the obscurity in diagnosis in these forms of disease: in the one, the abscess was probably of eight months' duration, pleurisy was produced, and the patient had severe pain in the shoulder; in the second case, it was very doubtful whether the abscess consisted in the softening down of a syphilomatous mass, or was of a simple inflammatory character.

HEPATIC ABSCESS—LOCAL PLEURISY—SEROUS EFFUSION ON BOTH SIDES—SEVERE PAIN IN THE SHOULDER—NO JAUNDICE.

William W——, aged 22, was admitted into Guy's Hospital, under my care, on November 2nd. For six years he had been engaged on vessels trading on the West Coast of Africa, and latterly he had acted as steward. On these voyages his health had been good, and he had never suffered from any intermittent fevers, from dysentery, nor from jaundice. He was a man of steady and temperate habits; he had married, but had no family. Whilst in England, eight months

before admission into Guy's, when sitting quietly at tea, severe pain came on in the right shoulder; this was shortly followed by more intense pain in the right side. This severe and almost agonising pain in the side continued for four months, and it never entirely left him.

He was a small man, with a haggard, wasted, and anæmic appearance; and he applied at Guy's amongst the out-patients, saying that his malady was abscess in the liver. On examination, the liver could be felt below the margin of the ribs; but there were indications of pleuritic mischief on the right side. (This was shown on inspection to have arisen from the abscess in the liver causing local pleurisy on the opposed side of the diaphragm.) He refused to come into the hospital, and continued to attend as an out-patient. The pain in the right side persisted, and he always had a distressed appearance. On November 2nd his wife applied, stating that the pain had become more distressing, and that he was very ill. He was at once admitted. The pain was severe, and the right side was tender. He was very pale; the skin hot; slight cough troubled him. The chest was poorly developed; the left apex was flattened; the respiration was coarse; and the voice was more resonant than on the right side. There was dulness at the base of both lungs posteriorly, and in several parts coarse breathing and crepitation could be heard. The dulness on the right side was more evident in front than behind, and it extended from the nipple to an inch below the

margin of the ribs. There was an absence of healthy respiratory murmur, and some crackling could be heard, but not a well-marked râle. The tongue was clean; the bowels quiet. Dover's powder, gr. v., was given three times a day. Quinine was subsequently added, and given in the form of pill.

On November 14th the pain in the right side became more severe, and he was very ill. The general symptoms were, however, the same. Julep of acetate of ammonia, with solution of acetate of morphia, was given, and a blister was applied on the side.

On the 16th he was still worse, and he was unable to move from the left side, upon which he rested. There was no projection of the intercostal spaces, but great tenderness on pressure. No friction sound could be heard, and the general signs were those of local suppuration at the part. The pain was agonising. The tongue was rather dry, slightly furred; the pulse compressible. Mind perfectly sensible. He complained of thirst and of profuse perspiration. There were no rigors observed. The compound soap pill was ordered. He sank on the same day.

Inspection.—The body was very pale. The head was not examined. Chest: On the left side there was about a pint of serum, with some patches of recent lymph on the lower lobe. The lobe was partially compressed and congested, so also the posterior part of the upper lobe; there were no tubercles. There was some serous effusion into the right pleura, but the diaphragmatic surfaces of the pleura on the right side were

firmly adherent. The right lung was in the same state as the left. The heart was healthy. Abdomen: The liver was seen to extend about one inch below the ribs; its surface was granular. The general peritoneum was healthy; the intestines were contracted. The upper surface of the liver was firmly adherent to the diaphragm, and on partially separating it yellow projecting patches were observed from suppuration in the substance of the liver beneath. One or two of these abscesses broke, being very near to the peritoneum. On section of the right lobe of the liver from its convex surface, six or eight abscesses, one to one-and-a-half inches in diameter, were observed; they were filled with yellow healthy pus, and were bounded by dense walls; external to the abscesses the liver tissue was pale and softened, and had evidently become involved in acute diseased action. There was no disease of the gall-bladder, nor any at the transverse section of the liver. The softened part of the liver presented under the microscope hepatic cells mixed with fibre cells—elongated nucleated fibre, and inflammatory cells. The spleen was healthy, so also the intestines.

ABSCESS IN THE LIVER—DYSENTERY—SYPHILIS.

John P——, aged 34, was admitted into Guy's Hospital, October 9th, 1871. He was a groom, and had been a soldier in India for eleven years; he returned eighteen

months ago, and had since suffered from diarrhœa and the discharge of blood; he had had intermittent fever in India, but no jaundice, and there was a history of syphilis. A month before admission, he experienced pain in the right hypochondrium, and there was tenderness on pressure. There were no rigors, but profuse perspirations. There was occasional nausea, but no vomiting. The patient was sallow and spare; he slept badly; the appetite was poor, tongue coated, the pulse slow, the heart and lungs were healthy. In the right lobe of the liver, an oblong swelling extended nearly to the umbilicus, and was tender on percussion. On the 17th October, there was throbbing pain on the right hypochondrium, and on the 23rd it was thought that fluctuation could be felt. On the 3rd November, Mr. Durham made an exploratory puncture; reddish fluid exuded, but fibroid tissue rather than pus was found on microscopical examination. During November, the swelling increased in size; and since the patient had had syphilis, and there was some doubt whether the swelling consisted of a syphiloma, iodide of potassium was given freely. The tenderness and pain increased, and there was constitutional disturbance. On the 27th November, Mr. Durham drew off 6 ozs. of thick sanguineous pus by means of a trochar; on the 30th, the abscess was opened more freely, and 8 ozs. of pus discharged. There was afterwards constant oozing of thick red pus into the poultice. Quinine was given, the discharge gradually lessened, and the opening almost healed, leaving a hard zone about an inch and a

half on each side of the irregular cicatrix. A small quantity of discharge remained when he left the hospital, on January 16th. The character of the pus more closely resembled the degeneration of fibroid growth, than the ordinary pus of a hepatic abscess.

I have sought to give such practical illustrations as may aid in the diagnosis, and promote the scientific treatment of those maladies which are especially connected with the vascular supply of the gland. The full elucidation of these diseases would be impossible in the limits of one lecture.

LECTURE III.

THE BILE AND THE BILE-DUCTS.

The liver and the bile are frequently regarded by unprofessional minds as inimical to the healthy working of man's organism. Like friends unjustly maligned, who are made to bear their own faults as well as their neighbours', scarcely anything too bad can be said of them by some persons, whilst they are really constant benefactors; and there is truth in the remark, that even in medical diagnosis the liver is often "the refuge for the destitute."

It is generally considered by physiologists, that whilst some of the constituents of the bile are secreted by the liver, others are merely strained off from the blood; and this is the probable reason, as well shown by Dr. Harley, that in some morbid states, certain elements of bile may be present in the urine, whilst others are absent. The bile is a thick, greenish-yellow fluid, varying greatly both in colour and consistency; it has a specific gravity greater than water—1·026 to 1·030; a bitter taste, an alkaline reaction, and, from the presence of some organic products that readily

undergo change, it soon putrefies. According to the analysis of Berzelius, its constituents are :—

Water	90·44
Biliary and fatty acids . .	8·00
Mucus	0·30
Watery extract, chlorides, phosphates, and lactates . .	0·85
Soda	0·41
	100·00

The relative proportion of these constituents varies exceedingly. Sometimes, indeed, we find the gall-bladder and hepatic ducts filled with a clear, almost colourless watery fluid; the essential elements of bile are wanting, and it is evident that the power of the liver has received a check in its functional activity. Dr. Moxon informs me that he has several times found colourless biliary secretion in the *post-mortem* examinations after fever. A few days ago, a man admitted into Guy's under my name (although he died before I had an opportunity of seeing him) had this colourless bile. He was a brewer's man, who had pain in the joints of a rheumatic character, and had also *delirium tremens*. His death was comparatively sudden. The liver was large, healthy in appearance, but presenting congestion of the hepatic veins; the heart was comparatively healthy; the kidneys hypertrophied, 17 oz. in weight; the whole contents of the bile-ducts were like mucus and water, and the intestines were free from the colouring matter of bile.

The *Biliary Acids* are in the proportion of about 8 per cent., and are important elements of bile; glycocholic and taurocholic acids, as they have been termed, are secreted by the liver; they are of a resinoid character, and are in combination with soda. After they have passed into the duodenum they promote the emulsifying of the fatty elements of food, and become reabsorbed. With care, these acids can be detected in the urine in cases of jaundice arising from obstruction. It is probable that the presence of these acids promotes the solubility of another constituent of bile—namely, cholesterine—and that the deposition of cholesterine in biliary calculi is due to an abnormal relative proportion of these ingredients. Bile also contains a small quantity of fatty acids, stearic acid, oleic acid, as well as lactic acid, combined with ammonia and potash. Cholesterine is not formed in the liver, although present in its secretion; it is a normal constituent of the blood, and is often seen in considerable quantities in pus, and in serous effusions; it is found in brain tissue, and has also been detected in the vegetable kingdom. Colouring matter is a constant element in bile; the colour of bile is not uniform; it may be green, or of a reddish-brown colour, and we find the green colour described, —the biliverdine of Berzelius; the brown has been called bilifuscin; the red, bilirubin; the yellow cholepyrrhine. These colouring agents are derived from changes in the blood, and they are in great measure discharged from the alimentary canal. Sugar is not a natural constituent of bile, but a substance may be

obtained from all healthy livers which has received the name of glycogen, and which has an intimate relation with the sugar-producing function of the liver. In a former lecture, whilst speaking of acute yellow atrophy of the liver, I adverted to leucine and tyrosine, as being present in the urine in that disease; but these are not elements of healthy bile. There has been much discussion as to the arrangement of the minute capillary bile ducts; they may be traced to the periphery of the lobules, but there the difficulty of following commences. Kölleker supports the view that the ducts communicate with the hepatic cells; Dr. Handfield Jones, that they end in blind extremities; Dr. Beale has made careful injections of these ducts, and describes their direct continuity with a "cell containing network" within the lobules, and so far supporting the original supposition of an interlobular biliary plexus of Mr. Kiernan. Hering (Stricker's "Histology," New Syd. Tr.) describes intra-lobular biliary canals or passages, which do "not possess a membrana propria lined by hepatic cells, but are immediately bounded by these cells themselves." The minute ducts unite in larger branches, which pass in the course of the portal veins, and therefore in Glisson's capsule to the transverse fissure of the liver; and there the two ducts, from the right and left lobes, unite in the common hepatic duct; in its passage towards the duodenum the duct is joined by the cystic at an acute angle, and following this, in a retrograde direction towards the free margin of the liver, the bile flows into its reservoir, the gall-bladder.

The minute ducts have a tesselated epithelium, whilst in the larger ducts it is columnar. The bile-ducts have also minute crypts, or tubes, passing from their sides almost in a regularly set double line, and some communicate the one with the other at the transverse fissure. It is doubtful whether they are minute biliary receptacles, or mucous follicles; the larger offshoots from the bile-ducts in the peritoneal folds form anastomoses, and have been designated the vasa aberrantia. The gall-bladder is capable of holding an ounce to an ounce and a half of fluid; it has a cellular and a mucous coat, and although no defined muscular coat can be distinguished, the gall-bladder may be seen to contract in newly-killed animals, and in some larger animals plain muscular fibres are recognised. The mucous coat in the gall-bladder has a cellular appearance, and in the orifice of the duct there are several folds of the mucous and cellular coats.

Spasmodic Occlusion of the Bile-ducts.—Although no definite muscular coat can be traced in the bile-ducts, still they possess contractile bands, which are susceptible of irregular action. They receive nervous supply from the same source as the pylorus and the first portion of the duodenum, and in cases of gall-stone they are thrown into violent contraction; in catarrhal states of the mucous membrane the irritability is increased, but spasmodic contraction takes place independently of these causes. The gastro-duodenal mucous and muscular coats being in a state

of irritation, and the liver hyperæmic, very slight additional disturbance suffices to produce both pyloric spasm and contraction of the bile-ducts. The symptoms very closely resemble those produced by the passage of a gall-stone: there is sudden severe pain at the part; vomiting may be present; and in a few hours the skin becomes moderately jaundiced; but the pain and the jaundice quickly pass off, often without the evacuations showing an absence of bile, and without much deepening of the colour of the urine. It is evident that the obstruction has been of a transient kind; but the pain, though much less intense than in gall-stone, is of a severe character; there is some local tenderness; and there is indication of gastro-duodenal disturbance, in the nausea or vomiting, furred tongue, and flatulence; but there is no febrile excitement, nor quickening of the pulse, beyond that induced by the pain.

This condition is often mistaken for the passage of a gall-stone, but the symptoms are less severe and more transient; and we have no proof whatever that the symptoms are due, in the instances to which we refer, to the discharge of even minute granular calculi. In some cases a gall-stone will pass from the gall-bladder into the cystic duct for a short distance, and then fall back into the gall-bladder; the pain is intense, but no jaundice is produced, for neither the hepatic duct nor the common bile-duct is obstructed. In an instance of this kind that I saw some years ago in consultation, the commencement of the cystic duct

would easily accommodate the little finger for half an inch, but the gall-stone was in the gall-bladder; the pain, at first intense, suddenly ceased, and there was no jaundice. The patient died from uræmic poisoning and convulsion, with miscarriage. Spasmodic occlusion of the bile-duct is more easily produced by irritation of the duodenal extremity of the common bile-duct than at its glandular commencement; thus violent vomiting, as in sea-sickness, will induce obstruction and jaundice. It is well, however, to remember that after the passage of a gall-stone, a state of great irritability of the duct continues for some time; and that very slight fresh disturbance, without the discharge of a second calculus, suffices to induce spasmodic contraction and pain.

In catarrhal obstruction of the bile-ducts, the symptoms are more gradual, the jaundice more marked and enduring; there is immunity from pain; and in many cases, there is febrile excitement.

There is another condition, the symptoms of which closely resemble those of spasmodic contraction of the bile-ducts; namely, the traction produced by old adhesion between the gall-bladder and the duodenum, or with the colon or the stomach. Local peritonitis often takes place in the neighbourhood of the gall-bladder from gall-stone or other exciting cause; and we then find that flatulent distention of the stomach or transverse colon produces severe pain. A remarkable instance of that kind came under my care in 1869, in a gentleman aged 60. Eight years previously

he had had symptoms of gall-stone; there was great pain in the region of the gall-bladder, but no jaundice. The symptoms slowly subsided. In September, 1866, there was bilious derangement; but in May, 1867, during the night after a dinner-party, violent vomiting came on, with purging, and the next day he became semi-comatose. There was no albumen in the urine; but symptoms of great prostration came on, and after a month there was pain at the lower margin of the liver, with enlargement of the gland and tenderness. Rigors followed; and it was supposed that there was abscess of the liver. In June, there was evidence of pointing, and fluctuation could be felt. The abscess was punctured, and a great number of biliary calculi were discharged, with green fœtid pus; many of the calculi were small, and had smooth facets. The health improved; but in October a sinus two inches in length remained, and there was a thin "white of egg" discharge; the sinus afterwards closed. In April, 1868, there was a "bilious attack," and in June, symptoms of dyspepsia were more manifest. On June 18th, there was vomiting of coffee-ground grumous fluid and of blood, but there were no black motions; pyrosis and uneasiness after food were also present. These symptoms partially subsided, but vomiting persisted, and in November became severe, with nausea and pain in the back. In February, he was brought to London in an extremely prostrate condition. The vomited matter consisted of mucus, and the vomiting recurred frequently. The tongue was

clean, the bowels regular; but free action of the bowels relieved the vomiting; the chest was healthy; pulse 56. The abdomen was supple, except in the region of the gall-bladder, where was a cicatrix, with thickening beneath. Morphia was given in small doses, and the stomach was allowed to rest as much as possible; for, whenever either the stomach or the transverse colon became distended, pain was induced at the seat of the disease, and vomiting returned. It was evident that gall-stone had been the cause of the severe pain at the onset of the complaint. Local inflammation followed; peritoneal adhesions were formed; suppuration ensued, and an abscess was the result. This abscess opened externally, and gall-stones were discharged; but whether the suppuration took place within the gall-bladder, or externally to it after ulceration had taken place, was doubtful. In either case, the gall-bladder was probably destroyed. The sinus slowly healed, and a cicatrix remained, with firm adhesions to the surrounding viscera. It was very distinctly recognised that, whenever traction upon those adhesions was produced by flatulent distention of the stomach or by fulness of the transverse colon, severe darting pain ensued. Some ulceration of the mucous membrane of the stomach, or of the first portion of the duodenum, caused the hæmorrhage into the stomach and the coffee-ground vomit. With gentle action on the bowels and rest, all the symptoms subsided, health was restored, and has since been maintained.

In the treatment of spasmodic irritability of the bile-ducts, it is most important to remember that the disease will soon subside if the parts be allowed to rest. It is a great mistake to administer stimulants; the structures should rather be soothed by demulcents and by alkalies. Mercurial medicines only add to the irritation; and, if they relieve for a short time, the pain soon returns. With rest and patience, the irritation will gradually abate. The saline mineral waters are often of great service, as those of Carlsbad, Ems, Marienbad, &c.

Another morbid condition of the bile-ducts consists in a *catarrhal state of the mucous membrane*. The membrane becomes congested; its secretion is altered; the free passage of the canal is interfered with by inspissated mucus and by bile, and jaundice is the result. A congested and catarrhal state of the upper portion of the duodenum frequently accompanies this catarrh of the bile-ducts, and may precede it; and, again, it may be associated with chronic organic change in the liver itself, as with cirrhosis.

In the *post-mortem* examination of persons who have died of other disease, whilst this condition of bile-ducts existed, we have found very manifest hyperæmia of the mucous membrane and congestion of the vaginal plexus of capillaries upon the ducts. The symptoms are those of irritability of the stomach (although this is not always present), furred tongue, nausea, and often flatulence; there are febrile excitement, headache, and sometimes transient delirium; the bowels are disturbed;

after a short time (twenty-four to forty-eight hours), the surface of the skin becomes jaundiced, the urine deep in colour, and the alvine evacuations pale. In a few days these symptoms gradually subside. Elevation of temperature and febrile disturbance are sometimes absent; but the symptoms are more severe when the mischief is associated with disturbance of the stomach and duodenum. In those instances hyperæmia of the gastric mucous membrane precedes the other symptoms, and the disease spreads by continuity of structure to the orifice of the bile-ducts. Exposure to cold will itself produce this state of catarrh; especially if the exposure be accompanied with indiscretions of diet, or with excess of wine or ardent spirits.

I would advert to a condition of biliary catarrh sometimes observed in chronic disease, in which, with sallowness of countenance and sense of prostration, patients are seized with severe *rigor*, followed by an abundant discharge of bile; there is partial impediment to the free discharge; the secretion itself is altered; and the rigor closely resembles that which is observed in some diseases at the base of the urinary bladder and about the prostate gland.

Catarrh of the bile-ducts is distinguished from spasmodic contraction and from gall-stone by the absence of pain; but there is greater difficulty in distinguishing the early stage of acute yellow atrophy from severe instances of simple catarrh. The symptoms in the former, however, are more severe; the nervous system is affected in a more marked degree; the liver

is diminished in size in acute yellow atrophy, the temperature is not raised, and the urine contains tyrosine and leucine. Acute poisoning by phosphorus must be borne in mind as a cause of acute jaundice, resembling at its onset biliary catarrh.

Jaundice due to obstruction from catarrh generally subsides in a favourable manner, but not always with equal rapidity; and it is apt to be again produced by slight exciting causes. Catarrh of the bile-ducts is only of serious importance when it is conjoined with other diseases of an organic kind. And, when there is pressure from enlarged glands, or from malignant disease slowly exerted, the diagnosis is at first exceedingly obscure; in each case the jaundice may come on gradually, without pain and without febrile excitement; and it is only as the persistent character of the disease is shown, that we may be able to recognise the true nature of the complaint; for no growth may be perceptible throughout, as in some instances of disease of the pancreas.

The treatment of this form of disease should not be too active. If there be furred tongue, with nausea and constipation, a mercurial purgative will often be of service, but mercury is generally unnecessary. Potash and soda salines are beneficial; and soda with rhubarb, although an old and not very palatable remedy, is a good one. The saline mineral waters of a laxative kind, promote recovery; but the disease will subside without medicine, if fresh causes of excitement are avoided; and we must place this complaint amongst

those, the tendency of which is naturally to pass away.

The inflammatory condition of the bile-ducts is sometimes more acute; and the effusion may be of a fibrinous character, or it may be purulent. This unusual state has been observed in pyæmia; and abscess is occasionally formed in connection with the ducts. Again, ulceration may be produced by persistent irritation; it is rare to find this destruction of tissue in the bile-ducts, though it has frequently been found in the gall-bladder. An angular calculus in the ducts, whilst it fails to block up the canal, may cause ulceration; as we have known where several calculi were present in the ducts. From the gall-bladder, the ulceration may pass through into the peritoneum, or into the duodenum, or into the stomach or the colon, or it may reach the parietes, as in the case already mentioned. The symptoms of this extension of disease are generally a fixed pain at the part, with sympathetic disturbance of the adjoining viscera; but the indications may be so slight, that the discharge of the calculus from the bowel, or its impaction in the small intestine, may be the first evidence we have of the passage of the gall-stone from the bladder; and in an instance of a patient who died in Guy's Hospital from the administration of chloroform, it was found that an ulcerative opening existed between the gall-bladder and the duodenum, although the patient had given no history of disease at the part.

Entozoa, as the ascaris lumbricoides, have been

known to enter the gall-duct from the duodenum; and hydatids are in some cases discharged by this same channel.

A far more important pathological condition, however, is *inflammatory thickening of the duct*, with or without external inflammation and abscess. The passage of a gall-stone will sometimes induce fibroid thickening and persistent jaundice; or local inflammatory action and abscess may result. It is sometimes found that, after bile has begun again to flow freely, there is a continuance of pain and febrile disturbance; there may be prostration, a red and dry tongue, diarrhœa, and mental depression; and there is evidence of further disease, although the gall-bladder has emptied, and the liver, previously distended, has lessened in size. This state is one of great anxiety, and of doubtful prognosis; for we cannot be certain that local suppuration will not supervene; and in not a few cases, fatal peritonitis, from the discharge of the pus into the peritoneal cavity, has taken place. This form of suppurative disease is different in its pathology from suppuration in the course of the vena portæ, to which reference was made at the last lecture, and which is associated with pyæmia, and is due to the extension of disease along the folds of the lesser omentum.

As in the state of catarrh, so also in this form of inflammation of the deeper coats of the bile-duct, we would strongly deprecate an over-active plan of treatment. If the patient become exhausted by depressing

remedies, there is a greater probability of degenerative changes; and in those cases where local peritonitis and adhesion with the colon induce temporary intestinal obstruction, it is most important to allow the bowels to remain quiet. The symptoms are those of hepatic mischief, and of gall-stone with local inflammation; and superadded to these may be intestinal obstruction, from the cause just mentioned. Purgatives would seem to be indicated, but by breaking down partial fibrinous adhesion we may inadvertently cause extravasation and general peritonitis.

The next condition of the bile-ducts to which we would refer is *gall-stone* and distention of the ducts; but it is quite impossible fully to describe their pathological conditions and varieties of disease in this lecture. The hepatic secretion is found in various degrees of density; and its constituent parts, either from their undue proportionate quantity and consequent deposition, or from local centres of concretion, may constitute more or less solid masses. Dr. Thudichum, in his elaborate work on *Gall-stone*, has shown that biliary calculi have nuclei of casts from the smaller ducts, and very rarely of foreign bodies; the calculi consist especially of cholesterine, of inspissated colouring matter, with more or less of bile-acids, or with fatty acids; and, lastly, phosphate and carbonate of lime may be added to other ingredients. Sometimes the thickness of the bile itself is sufficient to cause obstruction, or minute granular calculi may be detected. The size of the calculi varies as much as their number;

sometimes one or two, as large as hen's eggs, fill up the whole of the gall-bladder, and are moulded to its form; in other cases, very large numbers are fitted together, so as to constitute an uniform mass. Many hundreds have been counted; and Dr. Thudichum quotes instances where they were thousands in number. They may induce intense suffering as they are discharged, or may only be detected by *post-mortem* examination. In an instance where I counted more than a hundred and twenty calculi, the gall-bladder could be felt during life; but there had been no pain for many years, nor other symptoms of gall-stone. The calculus may pass the gall-duct without symptom, and some remarkable cases are recorded where large ones were thus unconsciously extruded; but the symptoms are generally of great severity. Sudden pain in the region of the gall-bladder comes on as soon as the calculus begins to stretch the gall-duct; rigor may be experienced; the pain radiates across the abdomen, and through to the right scapula; vomiting of a severe kind comes on; the pulse is generally compressible; the patient often writhes about in the agony of pain, and becomes cold and collapsed, or breaks out into perspiration; the respiration may be unaffected, the bowels are often confined, and the secretion of urine checked. If the gall-stone pass from the cystic to the common bile-duct, or if it be in the hepatic duct itself, jaundice follows from the re-absorption of the elements of bile into the blood; and this discoloration generally commences on the second day; the urine

then becomes deep in colour, the motions clayey, and the vomited matters are necessarily free from bile. The intense pain is generally moderated in several hours, but it may last for days, and, in less degree, for weeks or even months. As it came on suddenly, so also as the calculus passes into the duodenum, it may as suddenly subside. In some cases, the intensity of the agony is more than the patient can bear, and is the cause of death. In two instances that have come under my own notice, the calculus was found protruding into the duodenum. The calculus produces distention of the bile-ducts and of the gall-bladder, with wasting of the gland-tissue and the secreting power. If the obstruction be permanent, it may cause ulceration of the duct or gall-bladder, and the calculus may then be discharged into the peritoneum (causing fatal peritonitis), into the duodenum, the colon, the stomach, or through the parietes, as in the case I have recorded.

The bile-ducts sometimes become enormously distended, the common duct forming a canal (as in a drawing from the museum of Guy's), three inches in circumference, like a coil of small intestine; the capillary ducts are observed upon the surface of the gland like cysts, and throughout the liver the biliary canals assume very large proportions; the whole gland in these cases acquires a deepish green tint; the gall-bladder can be felt as a globular pear-shaped projection at the edge of the liver; to the touch it gives a peculiar elasticity, and yields under gentle pressure in a manner which enables us generally

to distinguish simple distention from cancerous growth. This diagnostic indication is of great value; but in deep-coloured jaundice it is sometimes very difficult to distinguish the hardened and distended gall-bladder from tumour, especially since, as we shall presently show, the two diseases are often combined—namely, cancerous disease and gall-stone. The gall-bladder sometimes acquires a very large size. A remarkable case is one recorded by Dr. Babington, in the "Guy's Hospital Reports" of 1842. A young plumber, aged 27, thirteen months before admission, had a swelling of the lower extremities, and nine months previously felt a small tumour in the abdomen, which gradually increased in size, till it became as large as an uterus at term. The tumour occupied the right lumbar, the hypochondriac, and umbilical regions; severe pain came on in the abdomen a few hours before death. On inspection, the peritoneal cavity contained pus; the cyst was flaccid and nearly surrounded by liver-structure; near the kidney a portion of the cyst walls had given way; the cyst, an enormously distended gall-bladder, contained two large washhand-basinfuls of reddish, opaque, ropy secretion; no gall-stones were found.

Gall-stones have been detected in childhood; one is recorded at twelve years of age; but they are more frequent in adult and in advanced life.

Sedentary habits, constipation, and mental anxiety, probably conduce to the production of gall-stones. They have often been found in *phthisical disease of the lungs*, but it is not ascertained whether there is any

relation between the fatty condition of the liver and the deposition of the biliary constituents in the form of gall-stone. Another interesting association of disease is the presence of *cancerous disease of the liver or of the gall-bladder with gall-stone*, as in the following cases; in one of which, although no gall-stone existed after death, the symptoms had been well marked during life.

Whatever may be the antecedents of cancer, and in whatever way nutrition may be modified as to occasion the deposition of cancerous product, there is no doubt that when such a state of the system has been induced, preternatural hyperæmia in any part may determine the presence of cancer in that locality. Blows upon the breast have in this way become the exciting cause of cancerous disease, and so of other injuries. The same fact is observed in internal structures, and it is exemplified in some diseases of the liver and of the ovary. It is found that cancerous disease of the liver co-exists with gall-stone, and the presence of calculi and their discharge through the bile-ducts may be the determining cause of cancerous deposition in the neighbourhood.

Sarah M—— was a poor widow woman from Whitstable; she had been employed as a nurse, and till eight months before admission she had enjoyed good health. She had had several children. During July, 1868, severe pain in the right side came on in paroxysms, followed by jaundice. Six weeks later the abdomen began to swell, and then the legs. The motions were pale, and the urine was very deep in

colour. The jaundice continued for six months, and she had frequent pain on the right side. On admission she was emaciated; the countenance was sallow; the abdomen was very much distended, measuring 40 inches in circumference; the skin was tense, the superficial veins were large; the abdomen was resonant in front, but elsewhere it was dull, fluctuation being very distinct; the legs and feet were œdematous. Chest: there was slight dulness at the apex of the right lung, with bronchial breathing and bronchophony; there was dulness at both bases, with some crepitation. The heart healthy. Urine was thick, and did not clear entirely on boiling, nor on the addition of nitric acid; no tumour could be felt on the abdomen. On the first of April, she suffered so much from distention, that paracentesis abdominis was performed, and twenty-six pints of fluid were drawn off. The liver could then be felt; she experienced much relief for a few days; but diarrhœa and pain soon came on, with irritation of the stomach. The fluid slowly collected, and on the 25th nearly the same quantity was again drawn off. The relief was less than before, and on May 20th she was again tapped, twenty-eight pints being drawn off. After a few hours of partial relief, she quietly sank on the 23rd. Diarrhœa, with attacks of severe griping pain, hastened the fatal termination.

Inspection.—The brain was healthy. *Chest.*—Upon either pleura were several small patches of cancer penetrating inwards into the lung tissue, but they were more extensive upon the pleura than towards the lung.

One nodule of cancerous growth was in the substance of the lung at a little depth. It was deep red with white points throughout it, very firm, and with definitely limited edges. There was no disease of the lung tissue, but there was a partially airless state of the most dependent part. *Heart.*—Healthy. *Abdomen.*—The peritoneum was œdematous, and had a sodden appearance; it contained a large quantity of turbid fluid, and it was covered with partially adherent shreds of plastic lymph. There were also some nodules of cancer on it; and these were especially numerous in the recto-vaginal pouch. *Stomach.*—Contents were acid, and consisted of semi-digested food; here was marked *post-mortem* solution; near the pylorus were numerous small ulcers penetrating the mucous membrane. *Liver.*—Weighed 56 ozs. The left lobe was large, the right was small and puckered; the surface was deeply indented. There were many cancerous tubera in the liver, and the anterior two-thirds of the right lobe were especially affected. The principal mass was very hard, grey, pellucid, and "scirrhous." The liver to the right of the gall-bladder was very adherent to the colon by old thick bands; the gall-bladder was loosely connected to the colon. The liver tissue was highly fatty. The gall-bladder contained half an ounce of yellow bile. *Pancreas.*—The surrounding tissue was tough from chronic inflammation; some of the glands contained cancerous deposit. *Spleen.*—Sixteen ounces in weight; was harder than natural. The Malpighian corpuscles were very visible.

The kidneys were healthy, 9 ozs. in weight. Other viscera were normal. Although no gall-stone was found, we had no doubt of their previous existence.

William H——, aged 58, was admitted April 16th, and died May 9th, 1856. He had been employed for many years as a farrier, and was a man of steady and industrious habits. In December, 1855, he experienced pain in his abdomen, and became jaundiced; paroxysms of pain supervened, simulating gall-stone. The appetite was moderate; the colour became more and more deep, but his only distressing symptom beyond pain was diarrhœa, with a constant desire to evacuate the bowels. The stools were white and frothy. During three months he emaciated considerably. On admission the jaundice was exceedingly deep, the abdomen enlarged, tender, much distended with fluid, so that no tumour could be detected. He gradually sank. Inspection was made twenty-six hours after death. The face was almost black from the depth of the colour of the jaundice; the body wasted, and the abdomen much distended. The lungs were healthy. The heart healthy, except some fibroid degeneration. The abdomen contained several pints of bile-coloured serum; the serous membrane was minutely studded over with tubercles, small, white, and firm; in some parts, especially towards the diaphragm, united so as to form a partial layer. At the position of the gall-bladder was a dense white mass, about the size of an ordinary gall-bladder, distended, white, hard, and on section having the appearance of scirrhus;

in the centre was a small cavity filled with numerous gall-stones, about the size of peas, with smooth white facets. This scirrhous growth had obliterated the orifice of the cystic duct, and the opening of the common duct into the duodenum. The colon, duodenum, gall-bladder, and liver were drawn into close contact by the contraction, and by scirrhous infiltration. The walls of the gall-bladder were nearly half an inch in thickness, and the growth extended partially into the substance of the liver. The growth also pressed considerably upon the vena portæ near the liver, and the whole of the bile-ducts were enormously enlarged. Close to the duodenum the duct was destroyed; the pancreatic duct was also very much distended, and the head of the pancreas slightly involved. Some of the mesenteric glands were infiltrated, and the mesentery much shortened. The liver itself was of a deep greenish colour and atrophied. On carefully examining the growth it was found to be very dense, fibrous, and showed, besides elongated fibre cells and granule cells, numerous cells with large nuclei: similar elements were found in the minute growths on the peritoneum; they were evidently cancerous, but slow in growth, and more closely resembling fibrous tissue. It appeared probable that the gall-stones set up irritation or inflammatory action, which was succeeded by cancerous development. On examining the structure of the liver, no hepatic cells were discovered, but decomposition had considerably advanced. The spleen was healthy; so

also the alimentary canal; the kidneys were slightly degenerated. On tracing the large branches extending from the right semi-lunar ganglion into the liver, they were found to be involved in the scirrhous growth, and were destroyed. The mass extended quite to the superior mesenteric artery. All the voluntary muscles were affected with trichina spiralis, as well as the diaphragm and the œsophagus.

A third association of disease which we have several times found in gall-stone is worthy of consideration—namely, that *pleuritic effusion* is often present on the right side. This occurrence might lead a subsequent observer to suppose that there had been error in diagnosis, and that the disease had been one of diaphragmatic pleurisy; but, as we find the liver closely sympathising in acute pneumonia, so also here. There is impeded action of the diaphragm, the pneumogastric and phrenic nerves are both concerned, and equally so the vaso-motor; but, however the explanation may be made, we have repeatedly witnessed this association of symptoms, the effusion taking place a few days at least after the onset of the intense pain and the jaundice. I might adduce several instances of this kind that have come under my own observation.

Again, during the paroxysm of gall-stone there is *sympathy in the action of the kidney* of such a kind that the activity of the gland is sometimes checked, and uræmic poisoning may be produced; in one instance which I saw in consultation, and to which I have already adverted, the symptoms of gall-stone subsided,

but the patient died from uræmic poisoning with miscarriage, and it was supposed that a mistake had been made, and that renal instead of biliary calculus had been the cause of the earlier symptoms. Again, biliary and renal calculus sometimes coexists in the same patient; in one of the instances in which the biliary calculus was found to be just passing into the duodenum, there was also an encysted calculus in the kidney.

The *treatment* of gall-stone should be divided into that which is calculated to relieve the paroxysm; that which lessens the jaundice; and thirdly, that which is designed to prevent the recurrence of the attack. As to the first, the intensity of the pain calls for immediate attention, and, by means of the hypodermic injection of morphia and the inhalation of chloroform, we are enabled to afford considerable relief; these means are much more effective and better than the internal use of opium, which is with difficulty absorbed, and has sometimes been given in such large doses as to endanger the life of the patient. Externally, hot fomentations may be applied, or, what is more effectual, the mixed chloroform liniment, belladonna liniment, and aconite liniment—half an ounce of the two first, and a drachm of the latter. If the bowels are confined, they should be acted upon by a free mercurial purgative and warm saline draught, or by an enema.

In hastening the removal of the jaundice, an unstimulating diet should be given and gentle action on the bowels maintained; the saline mineral waters are often of great assistance, but must be administered with caution. Alkalies may be used with

advantage, not only in facilitating the discharge of inspissated bile, but in lessening duodenal irritation. It is of great importance, also, where other calculi are retained, and also where much irritation has been left after the passage of a calculus, that there should be no fresh source of irritation to the pyloric region of the stomach and the first portion of the duodenum. Bismuth with alkalies is of some value in diminishing this gastric sensibility; but whilst anæsthetics and anodynes afford immediate relief and alkalies promote recovery, a great amount of patience is required by the medical attendant, as well as by the patient, lest the disease be aggravated by over-active treatment.

Cancerous Disease. — The liver is more frequently affected with *secondary cancerous disease* than with *primary* deposit in the gland, and so, also, is the gall-bladder and its ducts; the infiltration of glands at the fissure of the liver or in the lesser omentum, as well as carcinomatous disease of the stomach and pancreas, may exert direct pressure upon the bile-ducts, and thus produce jaundice; but the gall-bladder is, in some instances, directly affected with one or other form of cancer, the slower form of scirrhus, or the more rapid one of medullary growth. Besides these, however, colloid disease affects both the gall-bladder and the ducts, and in some cases we have villous cancer; the first distention of the gall-bladder is with difficulty distinguished from hydatid disease in some instances of this kind, till, by the more profound constitutional disturbance, or by the evidence derived

from puncturing the enlargement, the true character of the disease is recognised.

A little boy, aged 4, who had been ill for twelve months, was brought to Guy's last September. He was weak and emaciated, and it was stated that a year previously he had a fall of thirty feet, and had fractured his thigh; the abdomen soon afterwards began to swell, vomiting came on, and there was progressive emaciation. On admission, the abdomen was large, and a rounded projection was evident at the liver about the position of the gall-bladder. It was doubtful whether the swelling consisted of a suppurating hydatid cyst or of malignant disease. A puncture was made, and five ounces of dark green pus were drawn off, mixed with blood, and containing large cells, as seen by microscopical examination. The child soon sank. The liver was healthy, but a large cyst of the size of the child's head was found on the lower surface of the gland; its walls were half an inch in thickness, and it consisted of an enormous distention of the cystic and hepatic ducts and gall-bladder, and from the inner surface large villous processes projected; the contents were pus with colouring matter of bile. The duodenum was fixed to this mass, and there were four ulcerative openings into the sac, communicating with the bowel. The other viscera were healthy.

Cancerous disease of the liver is very insidious in its character, and if there be no interference with the bile-ducts there may be no jaundice, but pallor of the skin; cachexia, emaciation, and severe dyspepsia are often the most prominent symptoms.

Patients affected with cancerous disease of the liver are generally beyond the middle period of life, and the powers of nutrition have become impaired by general or local causes. The full consideration of the diagnosis and treatment of these organic diseases would lead us beyond our limited space.

There are also many questions connected with the pathology of jaundice, the consideration of which is foreign to our present purpose. In our first lecture we briefly adverted to some of those forms which are connected with the altered nerve-supply of the gland and the general condition of the nervous system; in our second, in which the vascular supply was more especially noticed, we had also conditions of jaundice symptomatic of disease. Those, however, which have now come before us are essentially connected with obstruction; the bile is prevented from flowing onwards after its secretion, and the repletion of the ducts leads to the re-absorption of the bile into the blood, thus staining all the tissues, and producing jaundice of varying intensity, according to the duration of the disease, and the completeness of the obstruction.

I have sought to bring before the Society some practical elucidations of disease, rather than to enter upon abstruse and recondite subjects. I trust that the remarks I have made will afford subject matter for useful thought, and that some fragments of instruction may be gathered from them.

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