

becomes pathological when excesses in eating and drinking are habitually committed. The admission of irritating substances to the blood, as alcohol, highly stimulating condiments, the salts of lead, phosphorus, etc., increases the tendency to congestion. In malarious regions, congestion of the liver is produced and maintained by the absorption of malaria, especially when in sufficient quantity to cause febrile attacks. Without the objective evidence of malarial infection afforded by fever, the spleen may greatly enlarge (ague-cake), and the liver be kept abnormally full of blood.

Obstruction and regurgitation of the mitral orifice and of the right cavities induce abnormal fullness of the venous system and ischæmia of the arteries. After the lungs, the liver is the first organ to suffer the passive congestion thus caused. The same result is produced when an obstructive disease of the lungs maintains congestion on the venous, and ischæmia on the arterial side of the systemic circulation.

A state of the nervous system may affect the circulation in the liver to a great extent: injury of the semi-lunar ganglion causes immense congestion (Frerichs). Section of splanchnic nerves and the action of curare and some other poisons have the same effect. A fit of anger has brought on an attack of jaundice. Indeed, the facts prove that the nervous system, probably through the vaso-motor nerves, exercises an immediate influence over the circulation of the liver, the mechanism consisting in an increased or diminished blood-supply, by paresis or spasm—by the action of the dilator or constricting fibers of this system. Also, the liver possesses considerable elasticity, and enlarges and contracts with the increase and the diminution of the vascular pressure (Brunton).*

Congestion may also occur in consequence of sudden arrest of an habitual discharge, and has followed a successful operation for hæmorrhoids.†

Pathological Anatomy.—When the congestion is the result of mechanical obstruction at the heart or lungs, the changes which are entitled “the nutmeg-liver” are seen on section of the organ. At the center of each lobule the dilated radicle of the hepatic vein, enlarged and congested, may be discerned, while the neighboring parts of the lobule are pale, and the radicles of the portal are by comparison less full of blood, and really contain less because of the increased pressure from dilatation of the central vein. On section, a greater quantity of venous blood flows out than is normal, and the whole organ is darker and larger. The hepatic cells are either normal or present in places some cloudiness from albuminous infiltration, commencing fatty degeneration, and some brown-pigment deposition (Förster). The compression exercised upon the hepatic ducts interferes with the discharge

* “Lettsomian Lectures” for 1885.

† Murchison, “Diseases of the Liver,” 1877, p. 134.

of bile; and staining of the lobules about the central vein is a result, causing that appearance known as “hepatic icterus.” The consistence of the liver is augmented by the congestion if it continue for a lengthened period. The bile is not changed in its composition (Frerichs). A catarrhal state of the ducts is set up as a consequence of the congestion, and in due course hyperæmia of the portal radicles of the gastro-intestinal canal takes place, and a catarrh of the mucous membrane results.

Long-continued hyperæmia of the liver establishes a slow atrophic degeneration of the organ, consisting in wasting and disappearance of those cells lying in contact with the dilated central vein, their places being supplied by connective tissue having a granular appearance. The disappearance of these cells and the contraction of the newly formed connective tissue cause a diminution in the size of the liver, and an increase of its density, so that this state is often confounded with cirrhosis; but the substance of the organ has not the density, nor are there present the prominences which give the nodular aspect to the latter.

Symptoms.—Acute congestion of the liver usually begins with a general *malaise*; aching in the limbs and back; some slight rise of temperature toward evening; headache; a coated, yellowish tongue; loss of appetite, even repugnance to eating; nausea. More or less uneasiness, usually a feeling of weight and of tension, and tenderness, are experienced over the hypochondrium; lying on the left side causes a very unpleasant sensation of weight and dragging; buttoning of the clothing can not be borne; and the easiest position is recumbent, with the decubitus toward the right lateral plane, so that the congested organ can be well supported against the ribs. On the other hand, many patients seek a different position and can not bear any pressure against the hypochondrium. On percussion, the area of hepatic dullness is enlarged in all directions. In the normal state the upper border of the liver is parallel with the lower border of the sixth rib on the mammillary line—in ordinary quiet breathing; on full expiration the liver rises on a line parallel to the fifth rib, and on full inspiration it falls to the seventh. The lower border of the liver in health corresponds to the inferior margin of the ribs, or extends a finger's breadth below. If the liver is enlarged by hyperæmia, the hepatic dullness will extend across the epigastrium to the left hypochondrium. It is highly important to note that the area of dullness does not represent the actual size of the organ, for the thin margins do not return a dull sound on percussion. Especially will misconception occur on this point when the ascending colon is distended with gas. Again, the area of hepatic dullness may be greatly enlarged downward by alterations in the form and shape of the liver, when congenital, produced by tight lacing, etc., or displaced downward by effusion in the thorax, tu-

mors, etc. Although percussion affords the most certain physical evidence of enlargement of the liver, inspection may afford some assistance in making a diagnosis, as by the eye an enlargement of the hepatic space may be discerned. By palpation, the liver may be felt projecting below the ribs, and its smoothness or nodulation, its density and resistance, may be readily determined. By mensuration, the diameter of the two sides may be compared, when it will be found, if the congestion is considerable, and the atrophic change has not occurred, that the right is enlarged. A very characteristic symptom in these cases is a light grade of jaundice. If there be no recognizable tinting of the skin, the sclerotic will be distinctly yellow, and the complexion will have the so-called "muddy" aspect. The integument in the cardiac liver is somewhat earthy, faintly yellow, or fawn-color, as in various cachexiæ. In the acute congestion due to temperature changes, to malarial infection, to excesses in eating and drinking, etc., there is usually some gastro-duodenal catarrh, and catarrh of the bile-ducts, and consequently an obstacle to the outflow of bile, with more or less intense icterus. The urine in every case contains some pigment, and varies in tint from pale sherry to a port-wine color, and casts an abundant deposit of urates with much pigment matter. In the more severe cases there is considerable gastric disturbance, and vomiting of bile, and large, so-called bilious discharges take place by the bowels. The stools, after the ordinary fecal evacuations, consist of a greenish-yellow or brownish matter, semi-fluid or thinner greenish or yellowish liquid having the appearance and consistence of stored-up bile. Sometimes a large quantity of such material is discharged, giving great relief, the pain, soreness, and heaviness in the side and the headache and feverishness disappearing. Such acute cases are due to climatic, malarial, or dietetic causes. In the cases of congestion due to cardiac diseases or pulmonary obstruction, the symptoms of hepatic congestion come on slowly; there occur a gradual tension and weight in the right hypochondrium, a slow increase in the size of the liver, an enlargement of the area of hepatic dullness, and, usually, a very slight appearance of icterus, combined with more or less cyanosis, producing a violet-yellow or greenish coloration. Often, in protracted examples of this form of congestion, there exists extensive gastro-intestinal catarrh, with disturbed digestion, nausea, vomiting, diarrhœa, etc. In those cases of congestion of the liver due to psychological impressions, jaundice is the main symptom; there exists really a congestion in biliary production, with more or less hyperæmia, but there is no marked enlargement, tenderness, or heaviness in the hepatic area, and the patients experience the sensations belonging to an intense icterus, consisting of itching of the surface, depressed spirits, slow action of the heart, muddy urine, and a general yellowness or jaundice.

Course, Duration, and Termination.—The subsequent behavior of

cases of hepatic congestion offers wider differences than exist in the clinical history. The cases of congestion due to obstructive diseases of the heart or lungs develop slowly and continue indefinitely, and their course and duration are those of the cardiac or pulmonary disease. In these cases important alterations occur in the liver ultimately; it undergoes atrophy, obstruction to the portal circulation is added to the stasis in the general venous system, and ascites slowly forms. In the acute cases due to climatic and hygienic causes, the course is short, but the symptoms are violent. The whole duration of such an attack will not be more than a week or ten days, and the termination is in health. The same causes which produce the attack will operate in the future, and other attacks will succeed, and ultimately, in some cases, chronic disease of the liver will be established; but, if the causes cease, the effects will also. In the nervous cases, the jaundice reaches its maximum in a few hours, and then begins to decline, and usually lasts four or five days, terminating in recovery.

Diagnosis.—The acute form of congestion may be confounded with jaundice from catarrh of the bile-ducts, the symptoms being much the same; but the duration of the cases differs, and the latter is preceded by symptoms of gastro-duodenal catarrh, while in the former these symptoms succeed to the disturbance in the hepatic functions. The congestion due to obstructive pulmonary or cardiac disease is diagnosed by its clinical history and the association of the two groups of lesions. The contraction of the liver, which succeeds to enlargement in the cases of nutmeg-liver, may be confounded with cirrhosis; but, as these states have been confounded by pathologists, the differentiation is not important from the clinical standpoint.

Treatment.—The treatment of the cases due to pulmonary or cardiac obstruction is a question of the management of the lesions, cardiac or pulmonary, as the case may be. Not unfrequently, before the heart and lungs are incommoded in mitral disease, the hepatic functions are so disturbed as to demand attention. The timely prescription of digitalis of barium, or of nitroglycerin, may afford relief, not given by the remedies for disorder of the liver. As the condition is one of abnormal fullness of the venous system of the liver, relief is afforded in those of full habit by leeches around the anus. Unfortunately the need for digitalis, to diminish the leak at the mitral and for leeches to unload the distended veins, continues. Free watery evacuations, produced by salines, are highly useful; but in the progress of this disease the congestion of the mucous membrane excites a catarrh and diarrhœa, so that the limit of utility by saline purgatives is soon reached. In the acute congestion due to climatic or malarial causes, no remedy is so efficient as a full dose of quinine (grs. xv— \mathcal{D} j) with morphine (gr. $\frac{1}{4}$ — $\frac{1}{2}$). Small doses frequently repeated may, if preferred, be employed, but

the large dose is more efficient. A mild saline laxative, to keep the bowels soluble (the Saratoga waters may be used), is necessary, and elimination by the kidneys should be maintained by the use of lemonade and diluents. Fomentations, turpentine-stupes, etc., applied to the hepatic region are serviceable. When the attacks are due to errors of diet, spirituous liquors, and similar abuses, there must be a change in the habits of the individual. Abstinence, the use of a laxative, and quiet, will effect a cure, provided the excesses have been recent, and alterations of structure have not occurred in the liver.

INTERSTITIAL HEPATITIS—SCLEROSIS OF THE LIVER—CIRRHOSIS.

Definition.—By the term *interstitial hepatitis* is meant an inflammation of the intervening connective tissue. An induration of the organ is the result of this process, and hence it is entitled *sclerosis*, just as this term is used for corresponding states of other organs—as sclerosis of the kidney, sclerosis of the lungs, etc. Cirrhosis is the French term derived from the Greek word *kirros* (yellow), so named on account of the color of the liver; but it is a very inappropriate designation, and should cease to be used.

Forms.—The ordinary form of cirrhosis, and that to which this term is applied, is the contracting, designated the *granular* liver, because of the appearance on section. The nodulated character produced by the new-formed connective tissue in contracting, has given to this affection the familiar English name, *hob-nailed* liver.

There are some other forms characterized by hyperplasia of the connective tissue, and atrophy of the proper gland elements, in which no contraction ensues, the organ remaining permanently enlarged. To these forms is applied the term *hypertrophic cirrhosis*. One of these is supposed to arise spontaneously; another succeeds to inflammation of the ducts, and obstruction caused by hepatic calculi. A third form of the hypertrophic is the *fatty*, the connective tissue undergoing fatty degeneration without contracting.

Causes.—This is a disease of adult life, and rarely occurs before the period of puberty, chiefly because the conditions are wanting at this time. Griffith reports a case in a child of ten; Cayley, in another child of six; and Murchison, in a boy of ten. Nothing definite as regards the cause was known in the first two, notwithstanding a searching investigation; in the other, the abuse of spirits, medicinally and otherwise, was ascertained.* Murchison has never met with an exam-

* "Transactions of the Pathological Society," vol. xxvii, 1876, pp. 186, 194, 199.

ple of hob-nailed liver in which excess in the use of spirits had not been made out. There can be no doubt that the male sex is more frequently attacked than the female, not because there exists any inaptitude in the latter, but because of the difference in habits. The great factor is the free use of alcoholic liquors. The amount which constitutes excess differs in different individuals; in some subjects a small amount of alcohol, daily, suffices to set up the interstitial inflammation, when another person would not be affected by it in any way. It is highly probable that hereditary syphilis is a cause, but there are obvious difficulties in the way of a correct determination of this point. The form of atrophy which succeeds to the chronic stasis of the liver in obstructive cardiac disease is often confounded with sclerosis proper, but the change begins by an atrophy of the hepatic cells next the intra-lobular vein in the former; whereas, in the latter, the atrophy begins in the peripheral cells.

Sclerosis has been observed to follow impaction by gall-stones and the paludal cachexia.

Pathological Anatomy.—In the first stage, the organ is somewhat increased in size and hyperæmic; its parenchyma is somewhat denser, by reason of the presence of a viscid, reddish-gray material, which consists of fine connective-tissue elements, containing spindle-shaped cells (Förster).* The development of this material imparts to the parenchyma a granular aspect. The color of the organ is at this period a brownish-red, whence the name cirrhosis, or it may be greenish by staining of the bile-pigment; or the deposition of fat may give it a pallid appearance. Thus far, there is an actual addition of material to the organ, and it is somewhat increased in size. The next step consists in the contraction of the new connective tissue and induration. The substance of the liver is distinctly harder, and, on section, the knife is resisted as if passing through fibrous tissue. The surface of the organ is unequal, nodulated, and traversed by distinct, thickened bands of connective tissue (whence the English term "hob-nailed"). The line of section presents a granular appearance, due to the contracting of the intervening connective-tissue elements, and the consequent forced elevation of the softer material of the lobules. The peritoneum is opaque, thickened by organized exudation, the results of local peritonitis, and adhesions are formed to the diaphragm, between the liver and gall-bladder, etc. The appearance of the hepatic tissue is due to a hyperplasia of the connective tissue (Glisson's capsule) surrounding and compressing the groups of cells. The cells themselves, where the growth of connective tissue is sufficient to compress them, undergo a change partly fatty, partly pigmented, and in some places amyloid.

* *Op. cit.*, p. 264.

The abnormal pigmentation is due to compression of the terminal ducts and stasis of the bile. The vessels of the liver are variously damaged. In those parts where the greatest destruction of cells has occurred, the radicles of the portal vein are obstructed, and the radicles of the sub-hepatic are also closed by compression and lose their connection with the capillaries of the portal. The hepatic artery becomes dilated, and supplies the newly formed vessels of the recently developed connective tissue.* The important alterations occurring in the liver lead to secondary disorders of a serious kind. The interruption to the circulation by closure and obliteration of many of the hepatic capillaries—portal and hepatic—necessarily causes stasis in the whole range of the portal system, including the chylipoetic viscera. The formation of bile is impaired, diminished, and at many points entirely suppressed. The glycogenic and urea-forming functions are disordered to the same extent; consequently the depuration of the blood and the function of digestion, in so far as the presence of bile is necessary to the latter, are hindered or prevented.

HYPERTROPHIC CIRRHOSIS.—In that form of cirrhosis which is entitled *hypertrophic*, the liver continues enlarged, and may weigh from five to eight pounds. It also retains its shape, remains smooth usually, but may be marked by small prominences, due to the compression of islets of parenchyma by the increasing connective tissue. While, in ordinary cirrhosis, the new-formed connective tissue incloses groups of lobules, and is hence designated *annular or multilobular cirrhosis*,† in the hypertrophic form, single lobules are inclosed; hence the term *monolobular*. The initial change in ordinary cirrhosis begins in the connective tissue about the interlobular vein; in hypertrophic cirrhosis, about the interlobular duct. In the latter, processes of connective tissue, enlarging, project into the lobule, separating the rows of hepatic cells composing it, and these undergo atrophy. Broad bands of connective tissue newly formed extend through the organ between the parenchyma islets.

As with these changes in the connective tissue, inflammation of the interlobular ducts ensues, with this form of cirrhosis there is more or less jaundice, and hence it has been entitled "biliary cirrhosis." The spleen also enlarges considerably by simple hypertrophy. The other changes in related organs are the same as those of ordinary cirrhosis.

* Cornil, "Note sur l'état anatomique des canaux biliaires et des vaisseaux sanguins dans la cirrhose du foie," "Bull. de l'Acad. de Méd.," "Gaz. Méd. de Paris," 1873.

† Charcot and Gombault, "Archiv. de Physiol. Normal et Pathol.," 1876, p. 453 *et seq.* Also, Charcot, "Leçons sur les Maladies du Foie," etc.

Symptoms.—The initial symptoms are those of congestion—some heaviness, and dragging in the right side, and increase in volume, the liver projecting a finger's breadth below the ribs. There will be present, usually, some pain and tenderness on pressure, and now and then acute pain with a febrile movement indicative of local peritonitis. A slight icterode hue of the skin may also appear, and rarely jaundice. Again, in other cases, before symptoms referable to the liver manifest themselves, gastro-intestinal disorders—gastro-intestinal catarrh—occur. The appetite is poor, and food occasions distress; there is acidity, and acid matters are regurgitated; often in the morning there are much nausea and great straining, some acid, glairy mucus and bilious matter coming up after much effort. The bowels are sometimes relaxed, sometimes constipated, and now and then blackish, tar-like, semi-solid discharges occur. As intestinal hyperæmia is always present, and sero-mucus constantly poured out, diarrhœa soon comes to be the usual condition. A troublesome meteorism is a constant symptom, and this is due to decomposition of certain foods and a paretic state of the bowels. There are also cases, but rarely, in which the development of sclerosis takes place silently, and the first symptom to awaken attention is ascites. As respects size, the liver usually enlarges at first, but contraction soon comes on, and a considerable reduction takes place, the area of hepatic dullness being correspondingly reduced, except in that form of the disease known as hypertrophic cirrhosis, in which the dullness on percussion increases in all the diameters, or at least does not diminish. As the splenic forms a part of the portal system of veins, a constant stasis is maintained in the circulation of the spleen, and hence this organ remains swollen; but there are variations in its size, due to the formation of a collateral circulation, and occasionally to the development of a sclerosis in the organ. A constant stasis is also maintained in the intestinal mucous membrane, with the results already mentioned. An attempt at compensation for the obstruction in the venous system of the abdomen is made by enlargement of certain communicating veins, which in health are but slightly auxiliary to the regular route of communication. On the surface of the abdomen, from the xiphoid appendix to the pubis, veins appear, which were previously invisible; they are the communicating veinules between the epigastric and internal mammary, forming an irregular, feather-shaped figure; interlacing vessels also develop along the rectus muscle, laterally; communication is established between the parietal veins and the accessory vena porta of Sappey, and those branches of this accessory portal, communicating with the epigastric and internal mammary veins, form a cushion, bluish in color, of distended vessels around the umbilicus (*caput Medusæ*): communication also takes place between the inferior mesenteric

and the hypogastric veins, through the hæmorrhoidal, and between the anastomoses of the portal with the œsophageal and diaphragmatic veins.

Hæmorrhages result from the stasis—hæmatemesis or vomiting of blood, and intestinal hæmorrhage; the vessels yield under the increased pressure; or thromboses form in the stomach-veins, solution of the affected mucous membrane occurs, and an ulcer is the result. The author has seen two cases of cirrhosis in which frequently recurring hæmatemesis caused death, the hæmorrhage coming from small ulcers in the vicinity of the pylorus. The black, tar-like stools which are passed now and then in contracted liver consist of blood altered by the intestinal juices. The same obstruction of the portal circulation leads to the formation of hæmorrhoids, which often bleed freely and thus afford relief. Besides the interference with the digestive function due to the gastro-intestinal catarrh, the solution and absorption of certain kinds of food are prevented by the absence of the bile. These are especially the fatty and saccharine matters, and bile has the peculiar property of aiding the absorption of fats. Further, it plays the part of an antiseptic agent, and prevents the decomposition of food in the small intestine: when bile is absent the fæces are not only wanting in the proper color, but they have a peculiarly fetid odor—the odor of decomposition—and the gas passed has the same foul smell. A gradual emaciation is the necessary result of this morbid condition of the intestinal digestion. The integument of the face, neck, and fore-arms acquires a peculiar, earthy, icteroid hue, but a real jaundice is not common in cases of sclerosis. Sometimes with the first congestion, which initiates the morbid process, jaundice is a symptom, but it soon disappears and the earthy, fawn color, so characteristic in these cases, gradually develops. In those cases of sclerosis succeeding to impaction by gall-stones, jaundice has been a prominent symptom. When the cells have atrophied, and the canaliculi are obliterated, reabsorption of bile is no longer possible. The very considerable interference with the process of digestion produced by sclerosis and the retention in the blood of those effete materials which it is the function of the liver to remove induce an unhealthy condition of that fluid, and hence venous stigmata appear on the face and nose, and bleeding occurs from the nose, lungs, peritoneum (peritonitis hæmorrhagica), and elsewhere.* The urine is small in quantity, high colored, brownish, deficient in urea, but loaded with urates which are deposited in great abundance along with much coloring matter. Œdema of the feet and ankles succeeds to ascites, and the genitalia become much swollen. But the clinical history and treatment of ascites have been sufficiently discussed.

* "Thèse de Paris," 1874, Azmi Ahmed, "Des hémorrhagies dans la cirrhose."

Course, Duration, and Termination.—The course of interstitial hepatitis is essentially chronic. The first stage, or period of congestion and enlargement, often escapes notice, and only the stage of contraction, with its accompanying derangements, comes under observation. The duration is not fixed, and the termination is governed by the extent of the contraction and the consequent interference with function, but especially by the existence or appearance of such complications as mitral disease, emphysema of the lungs, and chronic interstitial nephritis. Fibroid change, such as occurs in sclerosis of the liver, may manifest itself simultaneously in other organs, as fibroid lung, fibroid heart, fibroid kidney. Obviously, the course and duration of the hepatic disease will be much influenced by the coexistence of this form of degeneration in other organs. Toward the end of some cases, brain symptoms arise which were at one time supposed to have the same relation to retention of effete products removed by the liver in the normal condition as the cerebral symptoms in albuminuria had to the failure of kidney excretion. By Flint this toxic material is supposed to be cholesterine, and hence the term cholesteræmia which he applies to these cerebral symptoms. This condition of the brain takes the form of stupor, and low-muttering delirium, passing into deep coma. In a few cases sopor and gradually deepening stupor come on early. These mental symptoms are, however, mixed up with the perturbation due to alcoholic excess, so that it is impossible to assign to each factor its proper influence in the development of this state. A large proportion of cases end before these mental symptoms are reached, cut off by intercurrent maladies, such as pleuritis, pericarditis, pneumonia, etc., or die exhausted by hæmorrhage. Some cases proceed to a typical ending by gradual failure, worn out by the difficult breathing from excessive accumulation of fluid, the constant upright position, the ulcerated legs, the bleeding hæmorrhoids, repeated tapping, stupor, delirium, and gradually deepening coma.

Diagnosis.—When all the usual symptoms of sclerosis are present, and the subject of them has been given to alcoholic intoxication, there can be no difficulty in coming to a diagnosis by exclusion. Furthermore, sclerosis is greatly more frequent than any of the diseases with which it may be confounded. The difficulties of differentiation occur with pylephlebitis, fatty liver, hydatid cysts, cancer or tuberculosis of the peritoneum. In pylephlebitis or inflammation with thrombosis of the portal vein, there may be present the same symptoms as in sclerosis, but they arise suddenly, and are not preceded by the symptoms of congestion and a history of alcoholic abuse. Fatty liver is one of the complications of phthisis, and also occurs in the obese, or in those having the tendency to obesity and who eat and drink freely and lead sedentary lives. Although the symptoms referable to the liver are similar to those which are present in sclerosis, there are important points of