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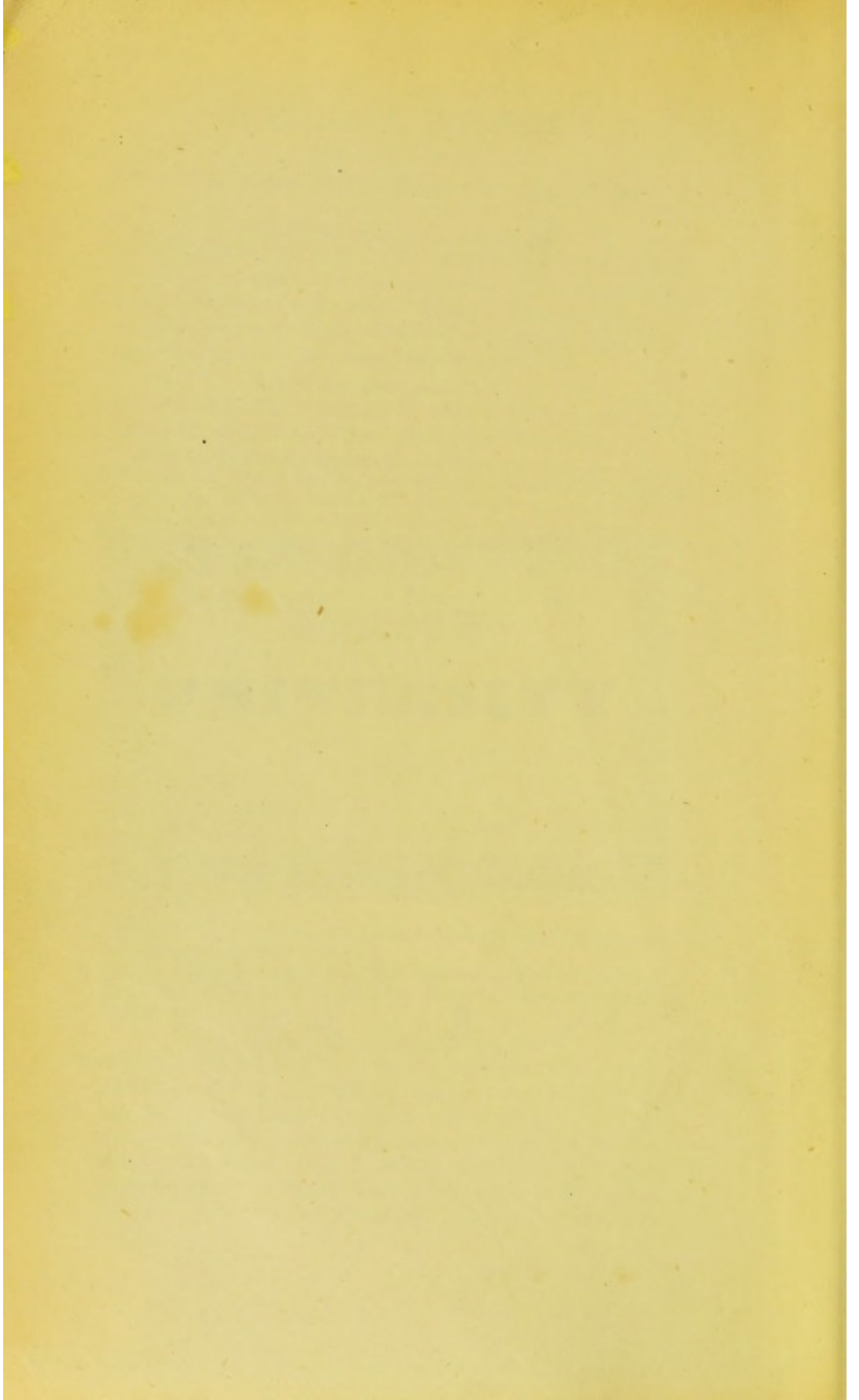
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DISEASES
OF THE
LIVER AND BILIARY PASSAGES.

DISPENSE

THE AND BINARY PARAGRAPHS

A
PRACTICAL TREATISE
ON THE
DISEASES OF THE LIVER
AND
BILIARY PASSAGES.

BY
WILLIAM THOMSON, M. D.
FELLOW OF THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS, AND
ONE OF THE PHYSICIANS TO THE ROYAL INFIRMARY
OF EDINBURGH.

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PRAGMATICAL TREATISE

DISEASES OF THE LIVER

BILIOUS PASSAGES

WILLIAM THOMSON M.D.

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In availing himself of the published labours of others, the author has, in the course of the Treatise, made such acknowledgments as supersede the necessity of any particular references in this place. But he thinks it right to mention that the opinions relative to the employment of Mercury in affections of the Biliary Organs, which he has endeavoured to illustrate and support, have long been entertained by his Father, and guided his practice in this class of affections; and that they were inculcated by him in the course of Lectures on the Practice of Physic which he delivered for several sessions in the Edinburgh School of Medicine.

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CHAPTER I.

OF THE CHANGES IN FUNCTION AND STRUCTURE TO WHICH THE BILIARY ORGANS ARE SUBJECT.

SECTION I.

FUNCTIONAL DERANGEMENTS OF THE BILIARY ORGANS.

1. As the peculiar functions of the Liver and its appendages, the Gall-bladder and the Gall-ducts, consist in the secretion and excretion of the Bile, the functional derangements of these organs must necessarily be referrible to an increased, a diminished, or a vitiated secretion of that fluid; or to its impeded, altered, or deranged excretion. These various disturbances of the functions of the biliary organs may, there is reason to believe, occur independently of any perceptible alterations in their structure, constituting what may perhaps with most propriety be denominated their *dynamical* derangements; or they may occur as consequences of, or at least in combination with, obvious *structural* alterations.

2. But whilst the bile may undergo various morbid changes in its quantity and in its qualities, without any apparent disease of its secreting organ, on the other hand, this fluid may present, to all appearance at least, its natural characters, and be found in its usual quantity, in cases in which there exists extensive structural alteration of the liver. "I have several times," says Dr Malcolmson, "seen a free, and even copious and healthy secretion of bile, when great part of the viscus was destroyed by suppuration, the remaining portion of the gland appearing then to take on an increased action."

MORBID BILIARY SECRETION.

3. So far as our knowledge of the process of glandular secretion, as a natural operation of the animal economy, at present extends, it seems reasonable to infer that the morbid exercise of this function, or, in other words, the production of a secreted fluid, differing, in respect of quantity or of quality, from the healthy standard, must depend on pathological conditions, either, 1st, of the blood, out of which the secretion is formed; or, 2d, of the secretory apparatus of the gland, by which those processes are effected on which the formation of the particular fluid depends; or, 3d, of the nervous system, as exercising, both organically and mentally, an influence over glandular secretion; or, 4th and lastly, of other organs, more or less remote, which exert an influence over the particular secretory apparatus, either directly or through the medium, as is said, of sympathetic connexions.

4. Whatever view we may take of the nature of the process of secretion in general, or of that of bile in particular, we can easily conceive that the *blood*, varying, as we know it to do, in its constitution, under a variety of circumstances with which we are very imperfectly acquainted, may at one time contain more, and at another time less, than a due share of the chemical principles which enter into the composition of bile. We can suppose, likewise, that, without any change in the constitution of the blood, the quantity of that fluid, capable of furnishing bile, which reaches the liver, and the length of time during which it remains there, may vary; and that variations of the circulation, in these respects, may exert a considerable influence on the amount of the biliary secretion.

5. As to any changes in the condition of the *secretory apparatus* of the liver, which can be supposed capable of modifying the amount or character of the biliary secretion, the only notions of such changes which we are able to form, rest on the idea of secretion being, more or less, a process of filtration.

Under certain circumstances, we find that the blood passes through the secretory apparatus, little if at all changed; and this so far favours the idea that there may be various modifications of the state of that apparatus, in which the amount of filtration, to which the blood is subjected in passing through it, will vary; and that, from these modifications, consequently, may result variations in the physical and chemical qualities of the bile.

6. Without insisting on the general physiological doctrine of the dependency of glandular secretion upon the *nervous system*, whatever the nature of this dependency may be supposed to be, we may remark that there is a variety of pathological phenomena which lead to the recognition of an organic influence exerted by the brain over the biliary function in particular;* but neither in respect of this influence, nor of that exerted by the same system as the organ of the mind, over this function, is it always very clear whether it is the secretion or the excretion of bile that is primarily affected by it.

7. Physiology seems to shew, that, of the organs not immediately concerned in the secretion or excretion of the bile, the *duodenum* is the one, the varying conditions of which have the most considerable influence on the biliary function. The flow of bile from the gall-ducts into the duodenum in the state of health, is not constant, but occasional only, depending on the presence of certain kinds of foreign matters in that portion of the intestinal canal. The flow consists immediately in *excretion*; but it seems probable, from analogy with the mammary secretion, that when excretion is interrupted by any cause, secretion will be more or less arrested; and, on the other hand, that when excretion goes on with more than usual activity, a corresponding impulse will be given to secretion. Hence we can suppose, that, under various morbid conditions of the duodenum, producing increased or dimi-

* Andral admits (*Clinique Medicale*, iv. 494.) "que sous l'influence de certaines modifications du système nerveux, le foie peut être altéré dans son mode de secretion."

nished facility or rapidity of excretion, the biliary secretion may be affected at least in respect of quantity.*

8. Before noticing more particularly the several morbid modifications of which the biliary secretion is susceptible, we may remark, that a belief in the very frequent occurrence of such modifications, and in their exerting a very powerful influence in producing deranged conditions of the function of digestion, has led to the general recognition, on the part of medical men and of the public, of a class of maladies termed Biliious, without much pains having been taken to define the precise signification in which that term ought to be understood. Some physicians seem to comprehend under it those derangements of the digestive organs only in which the bile is, or is conceived to be, in excess; others those in which it is deficient, or of morbid quality; and some again extend it to all derangements of the digestive organs in which the biliary secretion is morbid, whether in respect of quantity or of composition. Nor, perhaps, in the application of the term Biliious to derangements of digestion, has much pains been taken to ascertain the actual existence of deranged biliary secretion in the particular cases so designated, or their real dependence upon it. For biliious disorder and deranged digestion seem, not unfrequently, to have been used as synonymous and co-extensive terms, as if a due excretion of healthy bile were the only condition on which the exercise of digestion depends; which condition being disturbed, digestion must be deranged; and the reality of the disturbance of which may unequivocally be inferred from the derangement of digestion. We need seek for no more striking proof of the very general prevalence of this pathological theory of indigestion, viz. that "the essence of

* Since writing the above, we find in Lorry's *Treatise de Melancholia*, a division of the causes which produce what he calls *vitelline* bile (which he considers as the first degeneration of that fluid), corresponding very closely with that which we have here proposed. "Causæ illæ ad quatuor capita reduci possunt. 1°, Sanguinis vitia. 2°, Hepatis atque organorum, bilis tum secretioni, tum asservationi inservientium. 3°, Contentorum in stomacho et intestinis. 4°, Demum causarum qualiumcunque in reliquis corporis partibus habitantium concursus." P. 240.

the disorder resides in the liver," as has been said by one of its supporters, than the almost universal adoption, in the treatment of that class of maladies, of a remedy, the beneficial action of which is supposed to depend mainly on its being capable of bringing the liver to a healthy state of secretion. But when we consider how very complicated a phenomenon digestion is, it becomes apparent that there must be many other causes of its derangement besides disturbance of the biliary secretion; and that, consequently, some more positive proof is necessary of such disturbance, than the mere occurrence of indigestion. "It must be acknowledged," said the late Mr Twining, in his *Clinical Illustrations of the more important diseases of Bengal* (I. 207), "that the presence of functional disorders of the liver is often assumed to exist, on very vague and trivial grounds; and modes of treatment are adopted, in consequence of some imagined affection of the liver, which are not only unnecessary, but, it is to be feared, sometimes absolutely injurious. The uncertainty of the results of treatment pursued on such grounds, is much to be lamented. I trust we shall not meet many practitioners in the present day who are satisfied, without any distinct evidence on the subject, to ascribe every obscure chronic disease to some functional disorder of the liver, and who suppose they are acting on reasonable principles, while they injure the patient's constitution by persistence in the use of mercury."

DIMINISHED BILIARY SECRETION.

9. That the secreting operation of the liver, like that of other glandular organs, as the kidney, the testicle, &c., may, under certain circumstances, independently of structural alteration, go on with less than its usual activity, and that the bile may consequently be deficient in quantity, is on many accounts very probable, though it may reasonably be doubted whether this be so frequent an occurrence as is usually supposed. We are far from possessing the same facility in judging of the manner in which the *liver* exercises its secretory function,

that we possess in respect of the *kidney*. The only positive means, indeed, by which we can ascertain, during life, the occurrence of a deficient secretion of bile,—implying, where no structural disease is present, the existence of what is called by some pathologists *torpor of the liver*,—is our finding that the alvine evacuations are, in a greater or less degree, destitute of the colour which they receive from this fluid—are more or less pale, or of a dull white or ash colour, without this state of the stools being accompanied with the occurrence of any phenomenon which could warrant us in inferring the existence of obstructed biliary excretion.

10. The frequent observation of a simultaneous return of the stools to their natural colour, and of the function of digestion to its healthy exercise, has been alleged as an unquestionable corroborative proof of the dependence of disordered digestion, in many instances, on the deficient secretion of bile. Although, however, a connection between the two processes appears to be thus established, it does not seem to be very clearly shewn whether the deficiency of bile should be considered as in all instances the cause, or whether in some at least, it may not be the effect of the disordered digestion; nor whether the remedies found beneficial in such cases, restore the function of digestion to a healthy condition by re-establishing the secretion of bile, or re-establish the secretion of bile by restoring a proper condition of the stomach and of the intestinal canal.

11. There is a class of cases of great interest, in which some pathologists are disposed to believe that there occurs not only a diminution, but a suspension or suppression, of the biliary secretion. In the cases in question, jaundice occurs, although, on *post mortem* examination, it appears that there does not exist any perceptible disease of the liver, nor any obstruction to the flow of bile from the extremities of the biliferous tubes into the duodenum, the bile-ducts being not only not turgid, but absolutely empty of bile. Hence it is argued, that the jaundice cannot be in these, as it is in most instances, the effect of a re-absorption of secreted bile, itself dependent on the non-excretion of that fluid, but must be owing to the non-separa-

tion, from the blood, of the elements of which the biliary secretion is composed.

12. These cases, accordingly, are adduced among the proofs of the revived physiological doctrine, that the products of secretion are not *formed* in their appropriate organs, but merely *evolved* or *separated*, in these organs, from the blood in which they exist ready formed, or, at least, in an advanced state of preparation. By the advocates of this explanation, an analogy is conceived to exist between the affection in question, and that of suppressed secretion of urine. In both classes of cases, the mode of death by supervening coma, seems to indicate the action of a poison on the nervous system. In cases of suppressed urinary secretion, or Ischuria Renalis, urea is detected in the blood, as it is also in animals whose kidneys have been extirpated. In cases of Jaundice, there can exist no doubt as to the presence in the blood, of the peculiar biliary principles.

13. To account for the speedily fatal termination of cases of jaundice in which there does not exist obstruction to biliary excretion, as compared with the slow course, and, in many instances, favourable result of those which depend on such obstruction, Dr Alison has very ingeniously suggested that the economy sustains more injury from the biliary principles not being separated from the blood at all, than from their re-absorption, subsequently to their separation; and in this fact, again, he finds an additional point of analogy between this form of jaundice and renal ischuria, which is a much more severe affection than that produced by the re-absorption of the urine into the system, after its having been secreted. (Edin. Med. Surg. Journ. vol. xlv.)

14. When either deficient or suppressed biliary secretion occurs as a dynamical affection, on which of the several pathological conditions formerly noticed (3.) can it be supposed to depend? This is a question to which we are probably still far from being able to give a satisfactory reply.

15. Have we reason, in any instance, to suppose that deficient biliary secretion depends upon the constitution of the *blood*,—upon its being deficient in the biliary principles? In

this event, we should expect that the bile, in being absent from its usual, would not be found in any unusual, situations. White stools, without jaundice, might, therefore, be supposed indicative of such a deficiency of the biliary principles in the blood; but this combination of symptoms is said to have occurred in cases not of suppression, but simply of retention of bile (56), so that it cannot be absolutely relied on.

16. Can we suppose the non-secretion of bile to depend on any altered condition of the minute vessels of the hepatic *secretory apparatus*, such as the state of spasm, which was supposed, in the doctrine of Hoffmann and Cullen, to account for the cessation of a number of the secretions in the state of fever, &c. ? May not the distention of the biliary ducts by bile, mucus, or other fluid, impede the secreting action of the liver?*

17. What is the *modus operandi* of injuries of the *brain* in producing jaundice? Is it by affecting the secretion or the excretion of the bile? and, if by affecting the secretion, Is it by diminishing or increasing this? In the same way, in the influence exerted by the *mind* over the biliary secretion, have we any grounds for believing that any of the passions, or any degrees of particular passions, cause a diminution or suppression of the biliary secretion? These are points respecting which many dogmatic assertions stand recorded, but with very little pains having been taken to establish these assertions on rational evidence.

18. Are there any morbid conditions of the *duodenum* which cause a diminution or suppression of the biliary secretion?

* "Si extremitates secretoriæ, vel nonnullæ vel omnes, venæ portarum," says Walther, "vel sanguine tenace, viscido, partibus terreis mixto, infarctæ, vel per spasmus convulsivum contractæ sunt, tunc non adeo multum vel fere nihil bilis secernitur, et in vesicam felleam ducitur; reliquæ particulæ biliferæ sanguini venæ portarum innatantes, per ramos anastomoticos cum vena cava sanguini universo admiscentur; arteriæ inde sanguinem accipientes biliosum, secernunt liquida biliosa," &c. *Annotationes Academicæ; Bero- lini, 1786, De Hepate, p. 108.* Walther attributes to similar obstruction of the hepatic extremities of the vena portarum, the production of infarction of the liver, and the cessation of the biliary secretion which accompanies it. P. 109.

Dr Saunders was disposed to believe that a diminished secretion of bile is frequently the consequence of an original mischief in the stomach and duodenum, causing the sympathetic action on the liver to be less than that on which healthy secretion may depend. (Treatise on the Liver, p. 191.) According to some pathologists, when there exists irritation of the stomach and duodenum, or gastro-duodenitis, the liver partakes of this, sympathetically, and, as a consequence, the biliary secretion is arrested. But is *irritation* of the alimentary canal never alleged to play a very opposite part, relative to the biliary secretion, to that of causing its *diminution*?

19. According to Mr Annesley, the great cause of torpor of the liver is, diminished or exhausted energy of the secreting function of the organ, which may gradually superinduce, and become complicated with, accumulation of bile in the biliary ducts and gall-bladder, and with congestion in the bloodvessels of that organ: And he represents the vital energy of the hepatic apparatus as being exhausted in consequence of dissipation, drunkenness, and other causes. (On the Diseases of India, I. 366.) But the employment of such phrases as vital energy of hepatic apparatus, and diminished or exhausted energy of its secreting function, obviously throw no light on the nature of the changes which actually occur, either in the healthy or morbid exercise of biliary secretion.

20. A deficiency of the biliary secretion is the functional derangement which we should expect most usually to accompany structural alterations of the liver, seeing that in many of these alterations, portions of that organ are more or less completely destroyed, or altogether removed. But, as already hinted, experience seems to shew that, in many cases at least, the biliary secretion is carried on to its usual, or perhaps to an increased amount, when, to all appearance, there exists very extensive disorganization of its organ. It is alleged, however, that when the gall-ducts, in consequence of disease in themselves or in the adjacent parts, become impervious, so that the bile can no longer be discharged into the intestinal canal, the secretion may cease, as being no longer subservient to any purpose. Such a cessation we may suppose to depend

either on the stimulus necessary to secretion being no longer conveyed from the duodenum to the secretory apparatus of the liver (7. 18), or on the pressure of the retained bile upon that apparatus (16).

EXCESSIVE BILIARY SECRETION.

21. That the secretion of bile is liable, under particular circumstances, to become excessive in quantity, and that various affections of the alimentary canal, such as bilious diarrhœa and cholera, *originate* in this excessive secretion, is another opinion which has very generally prevailed. Of the occurrence of an excess, as of a deficiency of the biliary secretion, our principal means of judging, during life, must be derived from the appearances, and particularly from the colour, of the alvine evacuations; and there seems to be reason for doubting whether this mode of judgment be not exposed to some sources of fallacy, to which sufficient consideration has not at all times been paid, such as, that a small quantity of bile may be diluted with fluids in the intestinal canal, so as to produce the appearance of copious bilious evacuations; or that other matters may, from their resemblance to the bile in some of its morbid conditions, be mistaken for that fluid, when, in reality, they are of a very different nature, as when they consist of blood more or less altered. "It is probable," observes Dr Abercrombie, "that the bile may be increased in quantity, but it must at the same time be admitted, that our prevailing notions on the subject are rather hypothetical than founded on facts." "I am not aware of any test by which we can judge with precision of its redundancy (in the alvine evacuations); and I must confess my suspicion that the term bilious stools is often applied, in a very vague manner, to evacuations which merely consist of thin feculent matter mixed with mucus from the intestinal membrane."

22. But whilst in judging of the occurrence of increased biliary secretion, from the appearance of the alvine evacuations, it is proper to keep these sources of fallacy in view, it cannot be denied that post-mortem examination frequently affords demonstrative proof of such a state of the secretion having existed.

M. Andral remarks that, in a considerable number of dissections, he has been "particularly struck with the prodigious quantity of bile which filled the intestinal canal in persons who had experienced during life a copious diarrhoea. The liver, in this case, does not present any appreciable lesion, but is only gorged with bile. As to the intestinal canal, it is sometimes severely affected, its mucous membrane being inflamed, disorganized, and ulcerated; but sometimes, on the contrary, it presents no other appreciable lesion than a slight injection of the vessels running in the mucous membrane or beneath it; so that, if, in the first case, we might say with M. Broussais, that the bilious flux has been consecutive to the intestinal irritation, this connection is no longer so clear in the second case."

23. In admitting the occasional occurrence of an excessive biliary secretion, it does not follow that we must, as a matter of course, regard such excess as the proximate cause of the various nosological diseases in which it takes place; for increased, as well as diminished, secretion of bile, instead of being the first deviation from the state of health, may be only a consequence of some morbid state previously induced; and it is necessary to be cautious in judging which, among the various symptoms that present themselves in such diseases, actually depend on the excess of bile.

24. As to the pathological conditions on which excessive biliary secretion may depend (3.), it seems very probable, in the first place, that it frequently originates in an altered state of the *blood*; seeing that the remote causes, under the operation of which it manifests itself, are such as may be supposed to affect the qualities of this fluid. Thus, it is very generally alleged, that an increased biliary secretion occurs as a common consequence of an elevated atmospheric temperature, whether this shall be dependent on the season of the year, or on the region of the globe.* Considerable ingenuity has been displayed in accounting for this alleged fact, and more particularly for the

* Some doubts have been expressed by very respectable authorities, as the late Dr John Hunter and Mr Marshall, respecting the correctness of this opinion; but it must be admitted to be the prevailing belief among the practitioners of the East and West Indies, and of other hot climates.

occurrence of an increased secretion of bile in natives of a temperate, coming to be exposed to the influence of a hot climate; such an increased secretion, indeed, being conceived by some physicians to be the immediate cause of all the derangements in health that are experienced by persons on first making this transition.

25. According to one hypothesis, the increased secretion of bile in hot climates depends on a sympathy, or synchronous action, subsisting between the extreme vessels on the surface of the body, and those of the vena portarum in the liver. Dr Johnson, by whom this explanation was suggested, has adduced a number of illustrations of the connection which he believes to exist between the perspiratory and biliary secretions. These seem to him to shew, that where there is an increase or a diminution of the one of these secretions, there is a corresponding change in the other; and he affirms that, on a first arrival between the tropics, the perspiration and biliary secretion are both increased, but that, as the person becomes habituated to the climate, they both decrease, *pari passu*.

26. According to another hypothesis—that maintained by Mr Annesley,—the increased secretion of bile alleged to occur in persons passing from a temperate to a warm climate, depends on a vicarious connection between the liver and the lungs, in virtue of which one or other of these organs is able, to a certain extent, to perform the function of the other. It has been found that the quantity of carbonic acid gas formed in the process of respiration, in a given time, is much diminished by a high temperature and by other circumstances, which, as it is said, lower the powers of life. Hence, the excess of carbon must be carried off by some other channel; and, as bile is chiefly formed of carbon and hydrogen, an increased secretion of this fluid will guard the system against that superabundance of the former of these substances which must otherwise arise. Such, accordingly, is supposed to be the final cause of the increased secretion of bile alleged to occur in hot climates; and it is conceived that a similar explanation may be given of the operation of some of the other causes from which an excessive secretion of bile arises, such as sleep, the depressing passions

of the mind, fatigue, the use of vinous and spirituous liquors, &c. viz. that their primary effect is to diminish the quantity of carbonic acid gas formed in respiration.

27. The theory last mentioned obviously implies, that the excessive secretion of bile occurring as a consequence of high atmospheric temperature has its origin in the condition of the blood, as containing a larger proportion than usual of the constituent elements of that substance, the presence of which elements may be supposed to stimulate or urge the liver to excessive action. Whether there be any other circumstances, besides those already enumerated, in which such a state of the blood is engendered, and particularly how far this may happen under the influence of particular kinds of diet, and more especially the plentiful use of an animal diet, seems to be a matter well worthy of investigation. Whenever jaundice occurs, without there being a deficiency of bile in the stools, it seems reasonable to infer that there must exist, in that particular instance, a redundancy of the biliary principles in the blood.

28. But, independently of altered conditions of the blood itself, increased biliary secretion may very probably proceed from altered states of the hepatic circulation. Thus, the biliary secretion is said to be excessive in sanguineous congestion, and in the commencement of inflammation, of the liver.

29. It does not seem easy to conceive any altered condition of the hepatic *secretory apparatus* itself which should give rise to an increased secretion of bile.

30. Have we reason to believe that any particular states of the *nervous system*, or that any of the mental emotions, give rise to an increased secretion of bile? That a fit of passion is liable to be succeeded by a fit of jaundice, is well known; but of the precise mode of connection between these two phenomena, and particularly whether an increase of the biliary secretion is one of the intermediate series of phenomena, we suspect that very little is understood.

31. As to the relation of increased biliary secretion with the condition of the *intestinal tube*, excess of bile has usually been supposed rather to give rise to, than to depend on, de-

ranged action of the alimentary canal, as in the production of bilious diarrhoea and of cholera.

VITIATED BILIARY SECRETION.

32. That the bile is liable, like its kindred secretion the urine, to undergo various modifications in respect of its constitution, is shewn by the diversities which it exhibits in its physical characters, particularly as it is found in the gall-bladder and ducts in post-mortem examinations, and has been further confirmed by the results of chemical analysis, so far as chemistry has yet been applied to the investigation of the pathological conditions of this fluid. It is, obvious, indeed, that the variations in the physical qualities of the bile, should be regarded by pathologists only as encouragements to prosecute their inquiries into the variations liable to occur in its chemical composition; that what has been done, in this respect, for the renal, should be done likewise for the hepatic, secretion. But before we can hope to obtain correct notions of the pathological alterations to which the bile is liable, we must possess an accurate knowledge of its healthy composition. There is far, however, from being a correspondence in the views of chemists on this subject; so that, for instance, while by one chemist (Thenard) the substance named picromel is not recognised as an element of human bile in its healthy state, by another (Chevallier) it is esteemed as such, and its absence is regarded as a consequence of disease.

33. The opinion which was entertained by the older physiologists relative to the chemical constitution of the bile, is very distinctly set forth by Dr Coe, in his *Treatise on Biliary Concretions*, published in 1757. "That the bile is of a saponaceous nature, appears," says he, "by a plain experiment known to the vulgar, that is, the use of the gall of oxen in washing linen, scouring wool, &c., where, like soap, being mixed with water, it helps to wash out grease and other stains, which the water alone could have little or no effect upon. And soap, we know, is made of oil or fat, and a strong lixivium of fixed alkali

salts, incorporated together by boiling into a due consistence." The results of some experiments on the constitution of bile that were performed by M. Cadet, and of which an account was published in the Memoirs of the Academy of Sciences for 1767, led that chemist to the conclusion, "that the bile is a true soap, composed of an animal fat, and of the alkaline base of sea-salt; that it contains also a salt of the nature of sugar of milk, and a calcareous earth which is slightly ferruginous." He thought it probable that "the last two principles, together with the nature of the oily principle, are the causes of the bitterness and colour which the bile possesses, and which are not found in ordinary soap." (4th edition, p. 483.)

34. The more the bile was made the subject of chemical investigation, the more the number of its supposed peculiar constituents increased, each successive analyst adding one or several to the list of these given by his predecessors. Thus in the bile of the *ox*, which has been used in almost all the investigations, Gmelin's analysis gave no fewer than eleven peculiar substances. With regard to *human* bile, M. Thenard recognised two peculiar matters as entering into its composition, viz. resinous matter and yellow matter, but he did not admit picromel. Berzelius regarded these three matters as merely modifications of one substance, to which he gave the name of the biliary principle, that being the sole peculiar substance which he recognised as entering into the composition of this fluid. Tiedemann and Gmelin, again, have contended for the separate existence in human bile, of five distinct and peculiar substances, viz. colouring matter, choline, resin, picromel, and oleic acid.

35. M. Demarcay, who has recently been engaged in analyzing bile in the laboratory of Professor Liebig, holds out a prospect of a simpler view of its constitution being again established. The professed objects of his memoir (*Annales de Chimie et de Physique*), are to support the opinion of the early chemists, respecting the saponaceous character of bile; to shew that products of decomposition have often been considered as integrant parts of the bile; and that nine-tenths of this fluid, at least, consist of a true soap, with a basis of soda, that is easily decomposed and recomposed, and which holds in solution variable

but always small quantities of a few other substances. "The physical characters of bile, its homogeneous constitution, its viscid consistence, its extreme solubility in water, its energy in retaining water or taking possession of it, and likewise the remarkable property it possesses of dissolving fats in large quantity, assimilate it so much to soaps," observes M. Demarcay, "that the early observers were right in classing it among them." The substance which, in combination with soda, constitutes the great proportion of the bile, is, according to M. Demarcay, a peculiar acid to which he gives the name of Choleic. "In the preceding experiments," says he, "we see constantly reappear a substance (viz. choleic acid), possessed of the same physical and chemical characters, and which always yields, by its decomposition, the same few and easily distinguished products. I have naturally been led to endeavour to reconstitute the bile, by recombining with soda the substance which I had separated from it. I have succeeded in obtaining a well-defined salt, possessing all the characters of bile and exhibiting the same reactions, and which has left, on calcination, exactly the same quantity of soda. Treated by acids, alkalies, and the salts of lead, this recombination is affected like bile; the analogy between these two substances is such, therefore, that it is impossible to avoid regarding them as one and the same compound." "On an attentive perusal," he adds, "of the works that have been published on the composition of the bile, we see at every instant this particular acid (the choleic) reappear, either isolated and almost pure, as in the biliary resin of Berzelius; or more or less decomposed, as in that of Thenard and Gmelin. The decomposition of the bile is so simple and clear, that it is impossible, after having seen it, not to recognise in the biliary resin and taurine of Gmelin, products of decomposition." Of picromel, M. Demarcay says, that "it is nothing but bile, which, from causes easily assigned, has not undergone precipitation by the reagents employed," viz. the salts of lead. There are three products of the decomposition of choleic acid, which M. Demarcay has particularly investigated; *1st*, an unazotised solid substance, which he calls choloidic acid; *2d*, an azotised substance, consisting of white and transparent prismatic crystals,

named by Gmelin, taurine ; and, 3*d*, a crystallizable acid, soluble in ether, which he believes to be identical with what Gmelin described under the name of choleic acid.

36. Whichever of the statements above referred to, as to the chemical composition of the bile, may ultimately prove to be correct, it is obvious that this fluid may be considered as consisting of two classes of constituents ; 1*st*, those which are met with only in itself, and on which its peculiar qualities mainly depend ; and, 2*d*, those which enter into the composition of animal fluids, secreted by other organs besides the liver. The view which has been taken of the diversified opinions of chemists, shew how little we are able to say what substances should be comprehended under the *first* of these classes. Under the *second* there fall to be included, water with various salts of soda, and some other saline ingredients, and a small proportion of mucus or albumen.

37. With respect to the variations which the bile, as found after death in the gall-bladder and gall-ducts, exhibits in its physical qualities, these, so far as yet observed, relate chiefly to its consistence and its colour. In point of *consistence*, the bile found in the gall-bladder varies in every degree from that of water or serum to that of an inspissated juice or of pitch. In point of *colour*, it exhibits the various shades of yellow, green, brown, and black.

38. These variations in the consistence and in the colour of the bile, may be supposed to depend (*a*) on simple variations in the proportion of its natural elements ; or (*b*) on the absence of one or more of these ; or (*c*) on the presence of elements which it does not usually contain, such as, according to the experiments of Chevreul on morbid bile, cholesterine, margaric acid, oleic acid, &c.

39. Increase of the bile's consistence probably depends, in most cases, on an increase in the quantity which it may contain, of mucus or albumen, separately or conjointly, and perhaps in various states of combination or modification.

40. Variations in the colour of the bile must depend on the proportion of colouring principle contained in a given amount of fluid, or on combinations which this colouring principle may

have formed with elements not usually present. The various tints which the bile exhibits, from very light yellow through the deeper shades of this colour, into brown and black, probably depend chiefly on the degree of dilution of the colouring matter; whilst various experiments that have been made on the effect of the addition of acids to the bile (afterwards to be more particularly noticed), render it probable that when this fluid exhibits a green colour, it is to the addition of an acid that this is attributable.

41. The two deviations of the bile from its ordinary physical appearances which have attracted most attention are, *first*, that in which it presents a very dark or black hue; and, *second*, that in which it is of a very pale colour, almost white.

42. *Black* bile, as found in the gall-bladder, varies very much in its consistence, bearing sometimes a resemblance to common writing ink, sometimes to printers' ink, and sometimes being so viscid as to receive the appellation of pitchy. Whether blackness of the bile always depends on the same cause, is a point respecting which, we suspect, little is as yet known. In a case in which Dr Powell examined bile of a remarkably deep and almost black colour, but which was of its ordinary fluidity, he found it to contain a quantity of the peculiar crystallisable matter of which biliary concretions are formed, that is, of what is now called cholesterine. In a specimen of bile unusually thick and tenacious, and of a nearly black colour, examined by Dr Bostock (Dr Bright's Reports, i. 113), he found it to contain a large quantity of what was either a combination of albumen and mucus, or a substance intermediate between them; and this was intimately united with the proper biliary matter, which was of a peculiarly dark colour. "Black bile," says Mr Marshall, "becomes yellow by dilution with water; hence the blackness of bile appears to arise from a concentration of the ordinary colour of the secretion. The mere darkness of the tinge of bile, therefore," remarks this sagacious observer, "does not seem to be an indubitable proof that it is of an offensive quality."

43. The consistence of *pale* bile seems also to vary considerably, though perhaps it never reaches the same degree of visci-

dity as the black. It is described sometimes as resembling serum, sometimes as rather more tenacious than serum, sometimes as a watery or albuminous fluid, and sometimes as ropy, and, in its physical qualities, exactly resembling the white of egg. Sometimes it is of a bright light orange colour ; sometimes it is tinged with a slight yellowish colour ; sometimes it is almost pellucid, and sometimes it is perfectly transparent and colourless. Drs Graves and Stokes mention (Dubl. Hosp. Reports, v. 108), that in two specimens of bile of this kind examined by them, they found that, notwithstanding its resemblance in physical qualities to the white of egg, it contained no albumen, as was proved by the application of heat, and that it was not soluble in hot or cold water ; in fact, that it was pure mucus. But in a specimen examined by Dr Bostock (*loc. cit.*), by applying heat, and the appropriate chemical reagents, it appeared that the greatest part of the animal matter contained in it was albumen, probably united to a little mucus, with which was mixed a small quantity of the substance which gave the fluid its peculiar colour. Bile of these characters must not be confounded with a secretion from the internal surface of the gall-bladder, which may, under certain circumstances, accumulate in its cavity.

44. Another morbid appearance, occasionally presented by the bile, is, that, in place of its being a homogeneous fluid, particles of solid matter, of greater or less consistence, and of larger or smaller dimensions, are found floating in it, or deposited from it. The occurrence of such appearances is interesting, as connecting the morbid conditions of the bile with the formation of biliary concretions. Dr Bostock mentions a specimen of bile,—rather lighter coloured and more tenacious than ordinary, as if containing an unusually large quantity of mucus, but without any indication of albumen,—through which were diffused a number of black particles that very slowly subsided. It was not easy to separate these particles from the fluid, on account of its viscidty and their minuteness ; but he was led to conclude that they consisted of small portions of the resin of bile, in an extremely indurated state.

45. As connected with variations in the physical and chemical constitution of the bile, we may here notice the com-

position and mode of formation of those concretions usually termed gall-stones, which, as is well known, are very frequently met with in the different portions of the biliary passages. In respect of their *chemical composition*, the proper biliary concretions or gall-stones have been referred to four heads, according as they are composed, *1st*, of the yellow matter of the bile; or, *2d*, of the resinous matter; or, *3d*, of picromel; or, *4th*, of cholesterine. Their most usual constituents, according to Chevreul, confirmed by the late Dr Turner who had given much attention to the subject, are the yellow colouring matter of the bile and cholesterine, the latter predominating, and being sometimes in a state of purity. Sometimes, according to these chemists, gall-stones contain a portion of inspissated bile; and, in some rare instances, the cholesterine is wholly wanting. According to Cruveilhier, some biliary calculi are entirely formed of cholesterine; others of mucus and inspissated yellow matter or resinous matter; and many of them contain, at the same time, cholesterine, yellow matter, and resinous matter. Most cholesterine gall-stones have concretions of inspissated bile for their nuclei.

46. With regard to the *formation* of these concretions, there seem to be two principal modes in which this is effected. *First*, In those cases in which the biliary concretions consist merely of inspissated bile and mucus, their formation may be dependent either on original spissitude of the secretion, or on such a detention of healthy bile, in some part of the gall-passages, as favours the absorption of its watery constituents. But, *second*, In those cases in which cholesterine is the principal constituent of biliary concretions, we must suppose the bile in which they have formed, to have differed from its natural constitution, either in containing this principle in excess, or, as has recently been suggested by Muratori, in being deficient in the element (*viz.* soda), on which the solution of cholesterine in the bile depends. (See Brit. and For. Med. Rev. vi. 248.) Dr Bright mentions as a fact which has been confirmed to him by several observations, that the bile is very apt to undergo that change which leads to the deposit of concretions of adipocire in the gall-bladder, in patients labouring under scirrhus,

as females with scirrhus mamma, for instance, whether the disease has or has not attacked internal organs.

47. But, besides proper gall-stones, or concretions formed at the expense of the bile, it is alleged that there are occasionally found in the gall-bladder, concretions of phosphate of lime. M. Andral, who states that he has twice met with concretions of this kind, remarks, that, in both instances, there existed obliteration of the cystic-duct, which must, for a length of time previously to death, have prevented the bile from reaching the gall-bladder; and it was in the midst of the mucus contained in that cavity, that the concretion of calcareous phosphate had formed. (*Anat. Pathol.* ii. 615.)

48. Independently of the evidence of the liability of the biliary secretion to become morbid, which is derived from its physical characters and chemical analysis, a similar inference has been deduced from noxious effects said to have been produced by the inoculation of living animals, with bile taken from animals dying under certain forms of disease; whereas, under ordinary circumstances, no injurious consequences arise from such inoculation. That, in particular cases, bile transferred from one animal body into another operates as a poison, though mentioned by M. Andral (*loc. cit.*), as a matter of common observation, seems to rest chiefly, if not entirely, on a statement made by Cicognini, a surgeon of Forli, to Morgagni, (*Epist.* lix. § 18), viz. that he had found in the stomach and intestines of the son of a painter, who had died in most violent convulsions, emaciated and extenuated by a tertian fever, a green bile, which gave a violet tinge to the scalpel, and which was so poisonous that two pigeons, which were pricked with the instrument, died shortly afterwards in convulsions; and a cock which swallowed a piece of bread mixed with the bile, also died in a similar manner. This statement (which is quoted by M. Roche, as proceeding immediately from Morgagni himself, and is attributed by M. Littré to Mascagni) cannot certainly, without corroborative evidence, be admitted as establishing the occasionally poisonous qualities of bile.* We are not aware of

* The experiments performed by Deidier during the Marseilles Plague of 1720, in which it was found that this disease could be produced, by intro-

any experiments having been made to ascertain whether any of the ordinary or preternatural constituents of the bile singly, and consequently in its highest degree of concentration, acts as a poison on the animal economy.

49. If we know little of the pathological conditions upon which variations in the *quantity* of the biliary secretion may depend, less, if possible, do we know of the conditions which give rise to changes in its *qualities*. It seems probable that these may depend, in some cases, on a peculiar constitution of the blood, and in others, on peculiarities in the circulation. Dr Saunders alleges, that, "when a secretion is hurried by the excess of action, it seldom happens that the fluid secreted possesses its natural and healthy properties; hence arises," says he, "the variation in the appearance of bile, which, in some acute cases, as in Cholera Morbus, I have seen of a colour as black as soot, so as to resemble more the red particles of the blood, in a broken or diseased state, than the bile. Such a fluid may be considered as something between blood and bile, and carried off so quickly that the process of making bile is only just begun, though the change in the condition of the blood, with a view to that process, has taken place. This," Dr Saunders adds, "could not have depended on any diseased structure, for it is removed by opiates, and other means, which may restrain immoderate action."

ducing into healthy animals bile taken from subjects that had died of it, were relied on by that physician as a proof that the disease was not contagious, but originally bred in the body by the corruption of the bile; and they have frequently been referred to as illustrative of a vitiated state of that fluid. But, admitting the accuracy of the experiments, "it does not hence follow," as Dr Mead has justly remarked, "that the bile is the seat of the disease, or that other humours of the body are not corrupted as well as this. I make no question but the whole mass of blood is, in this case, in a state of putrefaction, and consequently that all the liquors derived from it partake of the taint. Accordingly it appeared afterwards from some experiments made by Dr Couzier, that not only the blood, but even the urine from an infected person, infused into the crural vein of a dog, communicated the plague. I will venture to affirm, that if, instead of bile, blood, or urine, the matter of the ulcers had been put into a wound made in the dog, it would have had at least an equally pernicious effect, as may well be concluded from the inoculation of the smallpox."—*Of the Plague.*

IMPEDED EXCRETION OF BILE.

50. The bile, subsequently to its secretion, may be prevented from making its way into the intestinal canal, by a variety of mechanical impediments of a *structural* kind, either originating in the gall-ducts, or produced in them by the pressure of neighbouring organs. These structural impediments will fall afterwards to be more particularly noticed. But cases occur likewise, in which, without any apparent structural change sufficient to account for the detention of the bile, the gall-bladder and the tubuli biliferi become distended with that fluid, while the appearance of the alvine evacuations proves that none flows into the intestinal canal.

51. To enable us to give a rational explanation of this phenomenon, it would be necessary to possess an accurate knowledge of the nature of the mechanism by which the bile, after its secretion, is conveyed from the liver through the biliary ducts, with or without the intervention of the gall-bladder, into the duodenum. Unfortunately, however, it is still a matter of dispute among anatomists and physiologists, whether these ducts and the gall-bladder be simply elastic, or whether they be endued with a muscular structure and irritable power. Assuming, as we are disposed to do, notwithstanding the opposite doctrine taught by some eminent physiologists and pathologists, that the biliary passages are susceptible of contraction from the application of a stimulus, we may consider the detention of bile in them as liable to depend either, 1st, on a want of the stimulus necessary to call the gall-ducts into action; or, 2d, on a paralytic condition of their muscular coats; or, 3d, on a spasm occurring in some particular portion of their track.

52. From the flow of the bile into the duodenum not being constant, but occurring only when certain foreign matters are present in the duodenum, it is conceived by those who believe in the irritability of the biliary ducts, that the simple presence of that fluid in the ducts is not sufficient to call into operation the power by which its propulsion is effected; and that for this, there is farther required a stimulus acting at the intes-

tinal extremity of the choledoch duct. When, from any cause, the ordinary stimulus does not operate, at that point, an accumulation of bile will take place in the biliary passages, *provided the secretion continues*. Accordingly, Mr Ferral, in relating a case of stricture of the pylorus without cancer, particularly calls attention to the fact that the gall-bladder was found greatly enlarged and distended with bile. "This," he remarks, "appears to be connected with absence of chyme in the duodenum, and the want of the accustomed stimulus to the biliary ducts;" and he refers to Morgagni as relating an experiment performed by Valsalva on a dog which he starved to death, and in which, likewise, the gall-bladder was found unusually large and distended with bile. (Lond. Med. Gaz. 5th June 1840.)

53. A *paralytic* condition of the gall-ducts or gall-bladder might be supposed to be occasioned by their over-distention, arising either from excessive secretion, or from temporary obstruction at a particular part of the biliary passages.

54. Independently of anatomical or physiological considerations, the pathological facts which seem to give countenance to the belief, that obstruction to the flow of bile through the ducts depends occasionally on *spasm*, are, that such obstruction is frequently of a temporary nature, suddenly commencing and suddenly ceasing, and that these phenomena occur, as is alleged, in persons of a nervous or hysterical habit of body. By some pathologists, however, as by M. Andral (Clin. Med. iv. 494), the admission of a state of spasmodic contraction of the gall-ducts is regarded as a pure supposition; and some imagine that when retention of bile depends upon spasm, it is the duodenum, and not the gall-ducts, that is the seat of the spasm.

55. By others, again, it has been supposed, that the cause of the bile's retention, when there exists no structural impediment to its flow, is to be sought for in its preternatural viscosity; but it seems as probable, or more probable, that preternatural viscosity of this fluid should be the consequence, as that it should be the cause, of its detention in the biliary passages.

56. Whatever may be the immediate cause of the detention of the bile in the gall-bladder, ducts, and tubuli,—and particularly whether this be dynamical or structural,—a very common

consequence of such detention is the re-absorption of this fluid into the system, producing a yellow discoloration of the serum of the blood, and a corresponding tinge in most of the fluid secretions, and of the solid tissues,—the state, in short, recognised under the name of jaundice. But cases are alleged to have occurred in which a great accumulation of bile has occurred in the gall-bladder, proving its regular secretion, while the evacuations have been destitute of colour, and yet no jaundice has manifested itself, that is to say, neither excretion nor re-absorption have occurred. By some it has been imagined, that the non-absorption of the bile, in such a case, must depend on its spissitude. Dr Powell, again, alleges, that accumulation of bile, combined with non-absorption, occurs “in that disease of the gall-bladder in which its powers of contraction are wholly lost, and which may be considered as a paralysis of it, such as sometimes happens to the urinary bladder, between which and the gall-bladder,” he observes, “there are many strong analogies. The accumulation, in these instances,” he adds, “has not unfrequently arisen to such an extent as to form a tumour externally, with an evident fluctuation, which has induced the surgeon to puncture it under an idea that the collection was matter.”

57. In connection with morbid derangements of the biliary excretion, it may be remarked, that, after this fluid has been discharged by the choledoch duct into the duodenum, it may, in consequence of an inverted action of that portion of the intestinal canal, be thrown, in greater or less quantity, into the stomach.

SECTION II.

DERANGEMENTS IN THE CIRCULATION THROUGH THE BILIARY ORGANS.

58. In the liver, as in other textures and organs of the body, there occasionally occurs a preternatural accumulation of blood, confined to one or other portion, or extending to the whole, of

the circulating system that is distributed through its substance ; an accumulation not accompanied with any of the other conditions of inflammatory action. This constitutes, of course, the state of vascular turgescence generally designated by pathologists under the name of Congestion.

59. Hepatic congestion seems, in a considerable proportion of the cases in which it occurs, to depend upon mechanical obstruction to the passage of the blood, through one or through both of the venous systems, the hepatic and the portal, with which that organ is provided, into the right side of the heart ; whether the obstruction be situated at the extremities of the portal ramifications, or in the trunks of the hepatic veins themselves ; in the vena cava ascendens ; in the heart, as when there exists disease of its valves, dilatation of its cavities, &c. ; or even when it is seated primarily in the lungs,—as in asphyxia of the child taking place during birth,—and acts back from the lungs through the heart, &c., upon the hepatic circulation. As the effect of obstruction of the portal circulation must extend to all those organs which discharge their blood into the vena portarum, viz. the stomach, intestines, pancreas, &c., so these organs are frequently found to participate with the liver in the congestive state.

60. But, besides *Mechanical* congestion of the liver, this state seems to occur when no organic impediment to the flow of the blood can be detected ; sometimes being accompanied with increased force of action in the vascular system, constituting what is usually called *Active* congestion, or determination of blood,—a state the relation of which to simple inflammation it is not easy to determine, but which seems readily to pass into it. Sometimes the congestion is unaccompanied with any increase, or is even attended with a diminution of vascular action, as in scurvy, constituting the state denominated *Passive* congestion.

61. Of whichever of these three kinds, congestion of the liver may be, its physical effect upon that organ must be identical, viz. to distend its parenchymatous structure and enlarge its bulk, particularly causing it to extend downwards beyond the cartilaginous border of the ribs, or to project upwards towards the right cavity of the chest. There must, in all of these three

forms of congestion, also, be a general correspondence in the appearances which the liver exhibits on post-mortem examination, the blood flowing freely from the divided surface when an incision is made into it.

62. It has been remarked that, in some cases of congestion, the whole substance of the liver is uniformly red; but that, in other instances, it is mottled red and yellow, or white, and that the relative position of the portions exhibiting the two colours is not uniform. Those who, with Ferrein, entertain the belief that the liver consists of two distinct substances, attribute the appearance of mottling, in congestion, to one of these substances undergoing this change, whilst the other remains free. But Mr Kiernan, and those who, with him, regard the liver as uniform in its structure, and not as composed of two distinct substances, explain the appearance in question by supposing that the hepatic, or the portal venous system, may each respectively be in a state of congestion, and that, according as it is seated in the one or in the other, will be the relative position of the two colours.

63. The state of congestion of the liver seems sometimes to appear and disappear very rapidly, particularly, according to M. Andral, in those cases in which it accompanies diseases of the heart, subsiding to a considerable degree, during their temporary alleviations from the detraction of blood. In whichever of its three forms hepatic congestion occurs, it may undergo resolution spontaneously, or under medical treatment; but it may also lay the foundation of distinct inflammatory attacks, and probably, also, of various forms of non-inflammatory alterations of structure.

64. One of the effects which is liable to result from hepatic congestion occurring in a considerable degree, is an extravasation of blood. It would appear that the blood, in some cases, passes through the secreting vessels of the liver into the tubuli biliferi, replacing or mingling with the bile, and is discharged by the larger gall-ducts into the alimentary canal. "The liver," says Dr Saunders, "is subject to hæmorrhagy, rendering the bile of a very black colour, and producing dark coagula. On adding water to such bile, the black powder

of red globules falls down to the bottom." "This does not indicate any abrasion or rupture of vessels: the organ may be, as yet, sound and entire. It is rather a defect in the action of the secretory organ, and may arise from pressure, infarction, or effusion. It is a state of congestion, not of inflammation."

65. In other instances, the extravasation takes place into one or more portions of the parenchymatous substance of the liver, producing what pathologists, in imitation of Laennec, are pleased to denominate hepatic apoplexy; but what may, with more propriety, be designated parenchymatous hæmorrhage of the liver. In some cases, the extravasation occurs immediately beneath the peritoneal coat of the liver; and in other cases, the blood escapes by the rupture of the substance and coat of the liver, or even, it has been supposed, by mere transudation, into the cavity of the peritoneum. These different forms or degrees of hepatic hæmorrhage may also occur independently of previous congestion, from the rupture or ulceration of the coats of some of the larger vessels of the liver.

66. There is a peculiar morbid appearance of the liver that has been met with occasionally in cases of the pernicious intermittent fevers of India and Italy, as well as of some other diseases, which seems to be more nearly allied with congestion than with any other form of morbid alteration to which it can be referred. The appearance referred to, consists in the liver seeming as if it were composed of black blood slightly coagulated, and of cellular filaments which alone offer any resistance to the finger. When this slight resistance is overcome, the liver has merely the consistence of jelly beginning to melt; for the blood appears effused into its texture, which, indeed, no longer exists as texture, but simply as pulp. An analogous morbid appearance is of much more common occurrence in the spleen.

67. In cases in which there exists a general deficiency of blood in the vascular system, the pale colour of the liver betokens its participation in the anemic state. Does hepatic anemia ever occur as a local malady? And if so, with what conditions of the circulation is it attended, and what influence has it upon the biliary secretion?

SECTION III.

STRUCTURAL ALTERATIONS OF THE BILIARY ORGANS,
INCLUDING INFLAMMATION.

HEPATITIS.

68. The parenchymatous substance of the liver and its serous covering are both susceptible of the state of inflammation. This affection may, in its commencement, be limited to the one or to the other of these structures; but even when it has so commenced, both of them usually become involved, in the progress of the disease. At least, where the serous membrane is first affected, the parenchyma, to a greater or less depth, can scarcely escape participating; and when the parenchyma suffers first, the inflammation must, in a large proportion of cases, by gradual diffusion, reach the serous surface.

69. It has been imagined that hepatitis assumes an acute character (meaning by this term that its symptoms are well marked, and its progress rapid), when the inflammation is seated in the serous covering; and a chronic character when the inflammation is seated in the parenchymatous substance. As regards temperate climates, this seems to be actually the case in a large proportion of instances; but in tropical climates this rule does not hold good, for, in them, acute inflammation of the parenchymatous substance of the liver is by no means uncommon.

PERITONEAL HEPATITIS.

70. The most important structural effect of inflammation of the serous covering of the liver, is the effusion of coagulable lymph upon its outer surface, whereby more or less of it is invested with a coating of greater or less thickness and density. We have seen a coating of this kind, of very considerable

thickness, or what used to be considered as great thickening of the serous membrane, in a case in which, in consequence of tight lacing, the ribs had produced indentations of some depth on the surface of the liver. In consequence of adhesive inflammation of the hepatic peritoneum, adhesions are sometimes produced, more or less intimate, between the liver and the various organs and parts in its vicinity. We shall afterwards see how important a part these adhesions frequently perform in preventing the effusion, into the cavity of the abdomen, of various preternatural collections of fluids which occasionally form in the liver, and which tend, by progressive absorption, to reach its surface.

71. It happens, not unfrequently, that abscesses form between the surface of the liver and some neighbouring organ or texture, with which it has contracted adhesions, as the stomach, the intestinal canal, the diaphragm, or the abdominal parietes. The first structural effect of this, as regards the liver, is the thickening of its membranous investments at the seat of the abscess, in consequence of the deposition of coagulable lymph. In a case of this kind which fell under our observation, and in which the abscess made its way through the diaphragm into the cavity of the thorax, a cup-like depression on the convex surface of the liver was bounded by a dense hard substance from the third to the half of an inch in thickness. But if ulcerative absorption should ensue, the hepatic base of the abscess may be destroyed, and more or less of the substance of the liver itself be removed, in which case it may be difficult, in post-mortem examinations, to distinguish between such an abscess and one which had originally formed in the substance of the liver.

PARENCHYMATOUS HEPATITIS.

72. When inflammation of the parenchymatous substance of the liver occurs, uncomplicated with any other disease, it seldom proves fatal until it has existed for a considerable length of time, and has passed through several of what are usually called

the terminations of that state. It is only, therefore, in cases in which hepatitis supervenes on fever or dysentery during their advanced stages, and in which either the severity of the primary disease, or the additional shock of the new malady, causes a fatal termination, that pathologists have an opportunity of witnessing the effects which inflammation produces on the liver, in their incipient stage. In such cases, the usual appearances indicating inflammatory action may be observed, either over the whole of the surface, or throughout the whole internal structure, of the liver, or confined to a single lobe, or portion of a lobe. "The surface of the organ," as Mr Annesley has observed (i. 433), "in the inflamed part, is generally more vascular than usual, of a bright red or reddish-brown colour. Sometimes it is covered with a gelatinous coating of lymph; at other times, by one much more consistent, which glues the inflamed surface to the contiguous parts. When this coating is removed, the surface of the organ underneath is of a deeper colour, more vascular than natural, and a little thickened. The substance of the liver immediately subjacent is also more vascular, and gives out more blood, when cut into, than in the healthy state. The internal structure of the organ, during the early stages of its inflammatory state, is always more vascular, of a reddish or brownish-red colour, and considerably more friable and softer than usual. Occasionally, however, it is firmer and denser; but this is chiefly observed in the more chronic cases of disease. In some instances, the surface of the inflamed organ is variously shaded: sometimes it is marked with red, brown, brick-coloured, greenish-brown, and even with almost black spots and streaks, while the internal structure is inflamed, congested with blood, much tumefied, and softer than natural. Upon making a section of the viscus with a very sharp scalpel, and wiping with a sponge the cut surfaces, these present a lighter coloured reticulum, or mesh, studded with red or brick-red granulæ, and the divided ends of bloodvessels and biliary ducts. Upon being torn asunder, which is generally done with more facility in the acutely inflamed state, although sometimes with more difficulty in the chronic

conditions of disease, the torn surfaces exude a greater quantity of fluid blood, but still retain their minutely granulated structure, and present both a brighter and a deeper colour than in their healthy state."

73. When inflammation of the substance of the liver does not undergo resolution in its incipient stage, there may ensue effusion, into its parenchymatous structure, of one or other of the secretory products of inflammation, viz. serum, coagulable lymph, or pus.

74. The effusion of serum singly into the substance of the liver, and the consequent production of a state of that organ properly designated *œdema*, has been observed in many cases, on post-mortem examination, but not in combination with marks of an active degree of inflammatory action. So long as inflammatory effusion is confined to serum, there are strong chances in favour of the inflammation undergoing resolution, and the patient recovering; and, in that case, the serous effusion will be absorbed, and no trace be left of its having ever existed. It is, consequently, more frequently in connection with the other forms of inflammatory effusion, that the pathological anatomist has occasion to see inflammatory *œdema* of the liver.

75. The effusion of *coagulable lymph* into the substance of the liver, with more or less of serous, but without the accompaniment of purulent effusion, seems to occur not unfrequently, in cases of slight, but long continued inflammatory action; or in cases originally of a severe character, but which have been partially subdued by active treatment. This effusion is, of course, attended with a greater or less degree of induration and of enlargement of the whole organ, or of a portion of it, and particularly of the right lobe. (Annesley, i. 474 and 517.)

HEPATIC ABSCESS.

76. The effusion of *pus* into the substance of the liver, and the consequent formation of one or of several abscesses in that organ, is the most serious, and, unfortunately, by no means an

uncommon result of inflammatory action, whether of an acute or of a chronic character. From observations that have been made in cases in which death has occurred at an early period of hepatitis, in consequence of its complicating, or being complicated, with fever or dysentery, or of some other cause, such as wounds and accidents, there seems reason to believe that in many cases at least, suppuration of the liver commences with a softening of one or more small portions of its substance, and an infiltration at those parts of sero-purulent fluid into its parenchymatous structure. In the texture surrounding these softened portions, to a greater or less depth, there are found evident marks of increased vascularity. By the gradual absorption, probably, of the softened portions of the liver, and increasing purulent secretion, the extent of the abscess is gradually enlarged.

77. The inner surface of hepatic abscesses may be lined with an adventitious (pyogenic) membrane, of greater or less thickness, or may be destitute of this, in whole or in part. Their contents may present all the varieties of appearances met with in abscesses situated in other parts of the body.

78. The number of separate abscesses which form in the liver in particular cases, and the size which they individually attain, are subject to great variety. Sometimes there are numerous small abscesses, as of the size of a filbert, dispersed through its substance. Sometimes there is a single abscess nearly of as large dimensions as the liver itself, yielding as much as ten or eleven pounds of pus and upwards. From some trials made in Ceylon by Mr Marshall, it appears probable that, during the formation of pus, the liver is increased in amount of substance, exclusively of the purulent matter secreted in the organ, and, no doubt, in consequence of the simultaneous deposition of coagulable lymph.

79. The rapidity with which suppuration takes place, and abscesses form and increase in the liver, seems to be subject to every possible variation. But, in particular instances, considerable difficulty arises in determining the duration of the period that elapses between the commencement of the inflammatory attack and the supervention of suppuration, in conse-

quence of the obscurity of the attendant symptoms,—an obscurity not unfrequent even in cases in which there are the strongest grounds for believing that, as respects rapidity of progress at least, the disease is entitled to be regarded as acute.

80. Is suppuration, and the consequent formation of abscesses, more liable to occur in one portion of the liver than in another? It seems singular that M. Louis should have thought necessary farther investigation to determine whether abscesses ever really form in the parenchymatous structure of the liver, or whether the supposed abscesses of that organ have not their seat uniformly on its surface, between it and the membranes which cover it (Rech. Anat. Patholog. p. 351); for though, as we have seen (71), cases of the latter kind do occasionally occur, there seem no grounds for believing that, even in temperate climates, they are more frequent than abscesses of the parenchymatous substance of the liver. Of fourteen cases of suppuration of the liver occurring in the 88th regiment, in Bombay, Sir James Macgrigor mentions, that in six it was seated in the right lobe; in one, in the left; in two, in the right lobe and lobulus Spigelii; in two, in the right and left lobes; and in three cases all the three lobes were in a state of suppuration. (Annals of Medicine, 1801, p. 363.) Of twenty-six cases of hepatic abscess in European subjects, observed by Mr Geddes in the Madras Presidency, in fifteen the abscess occupied the upper part of the right lobe towards its posterior surface; in three, the lower margin of the right lobe; in two, the left lobe; in one, there was one abscess in the centre of the right, and another in the left lobe; and in five, there was a number of small abscesses disseminated through both lobes. (Trans. Med. and Phys. Soc. of Calcutta, vi.)

81. Does an abscess that has formed in the substance of the liver ever undergo resolution by the absorption of its contents? And if so, what becomes of the purulent matter thus absorbed? Does it remain in the circulating mass of fluid; is it re-deposited in some different part of the body; or is it thrown off from some emunctory, such as the mucous lining of the bronchi, or of the intestinal canal, or from the kidneys, &c.? or, may

it be disposed of in several, or in all of these ways, in different cases, or in the same case? These are questions to which each pathologist will be disposed to reply, according to the opinions he may entertain on the general doctrine of *purulent metastasis*.

82. Many cases unquestionably have been observed in which suspected abscess of the liver has disappeared; and in some of these the bronchial, the alvine, or the urinary excretions have, singly or collectively, been found, simultaneously with the disappearance of the abscess, to contain a larger or smaller proportion of a purulent-like matter. Of late years, this subject has engaged a large share of attention on the part of several experienced practitioners in India, more especially of the late Dr Conwell (*Treatise on the Liver*, 1835), and of Dr Mouat of H. M. 13th Light Dragoons (*Madras Quarterly Journ.* No. v. p. 18), whose observations, if they are really to be explained on the principles they advocate, would shew that, in hepatic abscess, purulent metastasis, particularly to the urinary organs, is of much more frequent occurrence than had previously been suspected.

83. Dr Conwell seems to have thought that the disappearance of pus from hepatic abscesses, is not effected by a simple process of absorption; but that the "vessels which traverse the area of an hepatic abscess become eroded, and that as the tumid state of that organ subsides, the hepatic veins, relieved from pressure, dilate their openings, leading from the surface of suppuration to the vena cava, and become pervious." (P. 489.) In some of his dissections, veins filled with pus were traced into the cysts of abscesses in the liver. Mr Malcolmson, in reference to the possibility of the pus of a hepatic abscess passing into the venous trunks, and thus being evacuated by the urine, makes the following observations:—"I have observed the large veins hanging loose into the cavity of abscesses, their coats unchanged, and their orifices only obstructed by soft and very slightly attached coagula of blood, which, in one instance, had given way, and hastened the death of the patient by hæmorrhage into the abscess. But, although I have diligently looked for it, I have never discovered pus in the

veins, and have found the puriform deposits in the urine, considered as pus derived from the liver abscess, present in cases where no abscess existed; and, in other instances, have ascertained the supposed pus to be secretions of a very different kind. Yet, making every allowance for the many sources of error to which the observations in question are subject, the inquiry is one deserving of the utmost attention; and if the present state of science admits of it, a great benefit would be conferred on practitioners in warm climates, by a clear statement, from competent authority, of the observations necessary to establish the fact, and the fallacies to which such observations are liable." (Med. Chir. Trans. xxi. 105.)

84. In the progress of a hepatic abscess to the surface of the liver, adhesion sometimes takes place to the neighbouring organs or parts, and sometimes not. What the circumstances are which determine the formation or non-formation of such adhesions, that is, which determine the production of inflammation, and the effusion of coagulable lymph, on the peritoneal surfaces, it is not easy to determine. Dr Daun, in some valuable observations appended to an "Abstract of cases of hepatitis occurring in the 89th regiment at Quilon,* during the months of September and October 1819," which we have had the advantage of perusing, represents it as a characteristic feature of the Quilon hepatitis, that the membranous surface of the liver is very seldom affected with inflammation, and that consequently adhesion of this surface to the neighbouring organs very seldom happens at that station. From an excellent report from the same station by the late Dr Nicoll, then surgeon of the 80th regiment, it appears that that gentleman had been led to believe that simple acute hepatitis is much more frequently attended with adhesions of the liver to the diaphragm, than hepatitis complicated with intermittent or remittent fevers, or with dysentery or diarrhoea.

85. If a hepatic abscess reaches the surface of the liver without adhesions having formed between the prominent portion of

* Quilon is situated in the Presidency of Madras, on the coast of Travancore, between Cape Comorin and Cochin, Lat. $8^{\circ}.50$ N; Long. $76^{\circ}.40$ E.

its external surface and the adjacent organs or parts, the progressive ulceration, or the accidental rupture, of its parietes, must be followed by the discharge of its contents into the cavity of the abdomen. Such an occurrence will, of course, be speedily succeeded by peritoneal inflammation, under which the patient will rapidly sink. This termination of a hepatic abscess may, it is obvious, occur, in whatever part of the liver the abscess is situated. As to its frequency, it may be mentioned, that of Mr Geddes's twenty-six cases of hepatic abscess, in one only had rupture occurred into the abdominal cavity, and that was one of the two in which the abscess was seated in the left lobe (80). Of sixteen cases of hepatitis, detailed in the report of Dr Daun, already referred to, in two an abscess had burst into the cavity of the abdomen. "This," Dr D. remarks, "is a rare occurrence, but it is one more likely to happen at Quilon than at most other stations."

86. In respect of cases in which, on inspection after death, an abscess of the liver is found to have burst into the cavity of the abdomen, but in which an opportunity has not existed of watching the symptoms during life, it is proper to keep in remembrance that rupture of a hepatic abscess may probably happen, in some instances, after death, from incautiously moving the body. Is it not probable that this had occurred in a case related by Vogel (*Loder's Journ. f. d. Chirurgie*, ii. 264), in which no sudden aggravation of symptoms had occurred previously to the patient's death?

87. It may be remarked, both in respect of abscesses originating in the substance of the liver, and of those to which we have already referred (71), as liable to form upon its surface, that any adhesions to neighbouring organs by which they may be bounded, may experience ulceration or rupture; and in this way their contents may be discharged into the cavity of the abdomen, just as if no adhesions had ever existed.

88. If an abscess, forming in the substance or on the surface of the liver, shall take the direction of the abdominal parietes, and effect adhesion with them, then it will point, and, unless opened artificially, may finally burst and discharge its contents, externally. The situation on the surface of the body

at which a hepatic abscess may point, is liable to considerable diversity; indeed, this may happen at any part with which the liver is naturally in contact, or with which its enlargement may bring it into contact. A considerable number of cases have been recorded in which hepatic abscesses discharged externally, either by spontaneous or by artificial apertures, have undergone a cure. Many circumstances, however, may interfere to prevent this fortunate termination. One of these, to which attention has lately been particularly directed, is the occurrence of gangrenous ulceration of the parietes of the abdomen. In reference to an opinion expressed by Mr Hawkins, that two cases in which this occurred in his practice, were not examples of abscess of the liver, but of encysted tumours of the peritoneal coat, Dr Malcolmson states his conviction, that the gangrenous ulceration depends on a cause quite unconnected with any thing peculiar to the internal disease, and that it becomes a serious obstacle to the recovery of many patients in whom ordinary abscesses of the liver are opened. (Edin. Med. Surg. Journ. lii, 353, also 382.)

89. When an abscess occupies the upper or convex portion of the liver, so as to be seated near to the suspensory ligament, if adhesive inflammation occurs on its outer surface, the diaphragm will come to form a part of the sac of the abscess, and the substance of that muscular septum may be gradually removed by progressive absorption. In the mean time, the corresponding pleural surface of the diaphragm may either take on adhesive inflammation in its turn, and become attached to the lung, or it may remain free. In the latter case, when the whole thickness of the diaphragm is perforated,* the contents of the hepatic abscess will be discharged into the right cavity of the chest, producing all the effects of empyema, that is to say, compressing the lung, in a greater or less degree, according to its quantity, upwards and backwards, towards its bronchial attachments. As in empyema depending on inflammation of the pleura, so in the discharge of a hepatic abscess into the thorax, the purulent

* Senac states (*Maladies du Coeur* ii. 307), that he has seen in some bodies the pus of hepatic abscesses glide beneath the pleura, without penetrating into the chest.

collection may point externally, and either undergo spontaneous rupture, or be opened artificially.

90. If, on the other hand, adhesion takes place between the diaphragmatic and the pulmonic pleura, the abscess will open into the parenchyma of the lungs, and be discharged, more or less completely, by expectoration. Of 64 cases of hepatitis which occurred in the 88th Regiment in Bombay, from June 1799 to June 1800, Sir J. M'Grigor mentions that, in two of the fatal cases, the right lobes of the liver and lungs communicated (*Ann. of Medic.* 1801, p. 365). Of Mr Geddes's 26 cases of hepatic abscess (80), in two, the abscess had traversed the diaphragm and lungs, and part of its contents had been brought up by expectoration. Both of these were cases in which the abscess was seated in the right lobe.

91. The size of the aperture in the diaphragm, by which a hepatic abscess is discharged into the cavity of the chest, or into the substance of the lungs, is very various, being sometimes as large as the cavity of the abscess, but sometimes very small. In a case mentioned by Curtis (p. 98), it was not larger than would allow a very small quill to pass. "The matter," says Dr Pemberton, "either bursts suddenly into the lungs, by which the patient is instantly destroyed, or it filters through innumerable small orifices into the air-cells, and is spit up gradually for many weeks. This fortunate occurrence may still give the patient some small chance of recovery, but it more commonly happens that, after having been worn down by continual coughing and hectic fever, he at last sinks under the disease." Mr Curtis conceives that there can be very few instances of suppuration of the liver healing up in this way. "We had," says he, "seven or eight of these cases at the hospital, but all of them proved fatal." And Mr Marshall, in observing that "recoveries sometimes occur after the contents of an abscess of the liver have passed through the lungs," adds; "this fortunate circumstance happens, I believe, but rarely, except in cases where the abscess is very small, and the consequent inflammation of the lungs not very extensive." (P. 149, 150).

92. A few instances have been observed in which an abscess of the liver has discharged itself into the cavity of the pericar-

dium. A case of this kind, related by Dr Smith, an American physician, is noticed by M. Andral in his work on Pathological Anatomy. A second case fell, as we are informed, under the observation of Mr Knott, assistant-surgeon to the Enniskillen Dragoons, while serving in India. A third case, in which the same occurrence took place, under Dr Graves' notice, will be alluded to presently.

93. It happens not unfrequently, in cases of hepatic abscess, that it forms adhesions with, and ultimately discharges its contents into, one or other portion of the alimentary canal. Sometimes it is with the stomach, sometimes with the duodenum, and sometimes with the transverse arch of the colon, that the communication is effected. From the anatomical relations of the parts, it is abscesses of the left lobe of the liver principally that open into the stomach. When a hepatic abscess communicates with the stomach, its contents may be evacuated partly by vomiting and partly by stool; when with the colon, entirely by stool. Of the 64 cases of hepatitis occurring in the 88th Regiment, under Sir J. M'Grigor's observation (90), in three abscesses of the liver found their way into the intestines. When this mode of discharge takes place, the patient not unfrequently recovers.

94. It has been alleged that the contents of a hepatic abscess occasionally find their way into the intestinal canal, not by a *direct* preternatural communication, but through the intervention of the gall-ducts, into which they enter by a preternatural opening in their parietes. Few instances of this mode of discharge, however, seem to have been ascertained by actual dissection. In a case of hydatid abscess that occurred to Valsalva, the biliary duct communicated with the abscess by a large orifice, and was dilated throughout the whole of the rest of its extent; shewing manifestly, as Morgagni remarks, "how it might have received vesicles from the abscess, and conveyed them into the duodenum."

95. Occasionally one and the same hepatic abscess opens by several apertures, either in the same or in different directions, and at various intervals of time. Thus, in a case mentioned by Bajon, a hepatic abscess seemed to discharge itself first into the

lungs, and afterwards into the intestinal canal; and Dr Graves has recorded a case of hepatic abscess, which, besides opening into the stomach by three perforations, also opened into the sac of the pericardium. (Dubl. Med. Journ. No. xiv. 349.)

96. Sometimes two or more abscesses find their way to the surface of the liver. These may take the same general direction. Thus Asper relates a case in which two operations were performed for the evacuation of separate abscesses, and the patient recovered. In other instances the abscesses take different directions. Petit mentions a case, for example, in which a hepatic abscess was opened artificially, and, five months afterwards, when it was healed up, the patient had an attack of illness accompanied with purulent alvine evacuations, of which he died on the fifteenth day, when there was found an abscess of the concave part of the liver, opening into the colon. And in a case related by Drs Graves and Stokes, the contents of an abscess in the right lobe of the liver escaped into the intestines; but, subsequently, an abscess in the left lobe burst into the sac of the peritoneum.

97. Besides being discharged into the cavities of the abdomen or thorax, or into the lungs or the several portions of the intestinal canal, hepatic abscesses have been found, in a smaller proportion of cases, to take other routes, and establish other communications, as, for instance, to open into the vena cava, or into the infundibulum or pelvis of the kidney.

CICATRICES IN THE LIVER.

98. When a hepatic abscess is discharged by nature or art, it frequently happens, particularly when the aperture is external, that the discharge gradually diminishes, and ultimately ceases; and, consequently, it may be inferred that the cavity is obliterated by cicatrisation. Have any cases of this kind been recorded in which a post-mortem examination has been made; and, if so, what have been the appearances found?

99. In cases in which the contents of a hepatic abscess undergo reabsorption (76), is its cavity obliterated by cicatrisation? Or can we believe, as Dr Nicoll seems to have done, that the

contents of very small hepatic abscesses may be discharged into the cavity of the abdomen, without giving rise to fatal consequences, and cicatrisation subsequently ensue? Various cases have been recorded, and several have now been delineated, in which portions of fibrous or cartilaginous substance, on the surface or in the interior of the liver, each with radii stretching to a greater or less distance from a central part, have been met with in post-mortem examinations, and this sometimes in individuals who had been suspected, during life, to be affected with hepatic abscess. But to the recognition of these appearances as genuine cicatrices, it has been objected that they have never been met with in the successive stages which a cicatrising abscess must pass through, previously to the completion of that process. (Louis Rech. Anat. Pathol. p. 408.)

ULCERATION OF THE LIVER.

100. Besides the process of progressive absorption which attends the enlargement of abscesses, and effects their approach to the surface, the liver has appeared to be in some cases the seat of ulcerative absorption or ulceration. This process may accompany or supervene on the progress of a hepatic abscess, as when it attacks the inner surface of an abscess that has discharged its contents into the lungs, or when it attacks the circumference of an abscess that has contracted adhesions with a neighbouring organ, in which last case the issue may be the same as if no adhesion had formed.

101. In other cases, ulceration of the substance of the liver seems to have succeeded to the establishment of adhesions between this and neighbouring organs, independently of the previous formation of abscess. Is the ulceration in this case propagated from the neighbouring organ, as the stomach, to the liver, or from the liver to the neighbouring organ? It seems probable that in cases of small simple ulcers forming in the stomach, and accompanied with adhesion to the liver, amongst other organs, ulceration of the liver may be only a secondary effect. Is not malignant ulceration of the stomach also liable to extend to the liver in cases of adhesion between these two organs?

GANGRENE OF THE LIVER.

102. Does the liver ever become the seat of gangrenous inflammation? It is highly probable that many of the cases which have been recorded as examples of this occurrence, were not actually such; but merely cases in which, from various causes, some operating during life, and others only after death, softening of a part or of the whole of the liver was accompanied with a greater or less degree of dark discoloration. But, in rejecting many, are we to reject all the cases of alleged gangrenous inflammation of the liver? Mr Annesley states that he has never seen a true case of this affection. (i. 434.) Do the cases related, or referred to, by Dr Chisholm (Edin. Med. Surg. Journ. vii. 257.), establish the actual occurrence of gangrene as an occasional termination of inflammation of the liver? (1.) In one of these, it is mentioned, there arose from the body a most disagreeable smell; and, on opening the abdomen, the fœtor became so intolerable that it was difficult to support it during the examination of the liver. Three-fourths of this viscus were composed of three abscesses full of pus, and the remaining fourth was so far sphacelated that it resembled rotten wood, and crumbled, on handling it, in the manner in which such wood does. (2.) In another case, the symptoms of hepatitis were more violent, says Dr C., than in any of the many thousands I have had occasion to treat, the patient dying on the evening of the fourth day. The concave surface of the liver was totally sphacelated, and on the convex was an abscess and adhesion. (3.) Mr Marshall mentions (148) that, on inspecting the bodies of two men who died of dysentery in Kandy, abscesses were found in the livers, containing ill-conditioned offensive sanies. In both these cases, the walls of the abscess were in a state of gangrene. At a little distance from the seat of the abscess, the substance of the liver shewed no traces of disease. "Except these two cases," observes Mr M., "I have not observed a tendency of the liver towards mortification." (4.) In a case of hepatitis terminating in sphacelus, related in the Edin. Med. and Surg. Journ. (viii. 56), by W. C., surgeon in the navy, it is stated that the liver was a mass of thick

grumous pus, with sphacelated portions. (5.) The only instance in which gangrene of the liver has been seen by M. Andral, was in a case of abscess of that organ, with gangrene of the parenchyma surrounding it, which occurred in a man 60 years of age. (Clin. Med. iv. 420.) (6.) In a case in which a person attempted to kill himself, first by cutting his throat with a knife, and afterwards by discharging a pistol at his forehead, and in which the wound of the throat mortified, and exfoliation from the frontal bone occurred, there was found after death a large gangrenous abscess of the upper part of the right lobe of the liver. (Dr Thomson's Collection of Pathological Delineations. See also Conwell, § 135.)

103. Dr Stokes has been led, by the consideration of what he conceives to be an undoubted case of actual gangrene of the liver, to suspect that this never occurs, as the result of inflammation properly so called, but that it may be the result of hepatic apoplexy, or hepatic parenchymatous hæmorrhage. (Dubl. Med. Journ. iii. 360.) Without offering any comments on this opinion, we shall simply suggest the question whether, as in the lungs, there occurs a state which is considered gangrenous, that does not seem to be a termination of pneumonia, so there is in the liver a gangrenous or gangrenoid affection which is not a consequence of hepatitis?

104. We have seen (75), that inflammation of the liver sometimes gives rise to an increase in its bulk, in consequence of its being accompanied with the effusion of coagulable lymph. But in cases of hepatitis which assume a very chronic character, it sometimes happens that the liver undergoes a diminution of its bulk. In some cases in which the liver has been found to be of unusually small dimensions, there has been the appearance of one or more cicatrices on its surface, leading some to suppose that the diminution of bulk had proceeded from the previous existence of abscess. But this, it is obvious, would, of itself, occasion only a partial deficiency, and not a general shrinking of the organ. In other instances of diminished bulk of the liver, no appearance of cicatrisation has presented itself. From the observations of Dr Saunders, it would appear, that though, in cases of this kind, there is an increased density and

diminished porousness of the parenchymatous substance, and consequently an increased specific gravity, there is, on the whole, a diminution in the weight of the organ, leading to the inference that it has undergone, not a mere compression, but a removal of a portion of its substance (p. 280-1).

ADIPOSE DEGENERATION OF THE LIVER.

105. A very remarkable, but not very uncommon, structural alteration of the liver, consists in the deposition of fatty matter throughout its substance. The surface of a liver that has undergone fatty degeneration exhibits, as Dr Addison remarks (Guy's Hosp. Rep. i. 476), a pretty uniform and highly characteristic appearance. It is of a cream or pale yellow colour, figured irregularly with brownish or deep orange spots. It is usually, though not always, more or less enlarged, and sometimes very considerably so. When cut into, its interior is found to present an appearance somewhat corresponding to that of the exterior, excepting that the brown and pale yellow tissues are much more uniformly distributed throughout the entire substance of the organ than they are upon its surface. It is sometimes softer, and more readily crushed between the fingers, than is the healthy liver. Sometimes, however, it is firmer than natural, and occasionally even of a scirrhus or almost horny hardness.

106. The presence of fatty matter in the liver is manifested by the unctuous feel it communicates to the fingers; by the greasing of the knife with which it is divided; by the stain it imparts to bibulous paper on which it is pressed, and the manner in which such paper burns; as well as by the exudation of oil, when a portion of its substance is exposed to dry heat, as in the flame of a candle, or is immersed, in thin slices, in boiling water. Whether the oily or fatty matter deposited in the substance of the liver, be, in all cases, of the same nature, we do not possess the means of determining. In a case in which it amounted to somewhat less than a twentieth part of the substance of the organ, Mr Bird found it (*ut supra*, p. 478) to consist of a soft brownish fat, very fusible, and possessing a peculiar and unpleasant odour; and in another case, in which it con-

stituted the greater part of the substance of the organ, Dr Bostock found it to be generally similar to tallow in its chemical properties. (Dr Bright's Reports, i. 114.) In this structural alteration, is the fatty matter superadded to the natural structure of the liver? or, does it replace a greater or less amount of that substance which has been removed by interstitial absorption? There seems reason to believe that, in proportion as fatty matter is deposited, the proper substance of the liver is removed. We do not know to what extent this substitution may go on in extreme cases; but, from the analysis by Dr Bostock just referred to, it would appear that the greatest part of the organ, at least, may come to be composed of fatty matter.

GRANULAR DEGENERATION OF THE LIVER, OR CIRRHOSIS.

107. One of the structural alterations most commonly met with in the liver, in temperate climates, is that which was described by Dr Baillie under the name of the Common Tubercle of the liver, and which is, at present, generally recognised under the designation of the granular state of that organ. "The tubercles which are formed in this disease," says Dr Baillie, "occupy generally the whole mass of the liver, are placed very near each other, and are of a rounded shape. They give an appearance, everywhere, of irregularity to its surface. When cut into, they are found to consist of a brownish or yellowish-white solid matter. They are sometimes of a very small size, not larger than the heads of large pins; but, most frequently, they are as large as small hazel-nuts, and many of them are sometimes larger. When the liver is thus tuberculated, it feels much harder to the touch than natural, and not uncommonly its lower edge is bent a little forward. Its size, however, is generally not larger than in the healthy state, and I think it is often smaller. If a section of the liver be made in this state, its vessels seem to have a smaller diameter than naturally. It very frequently happens that, in this state, the liver is of a yellow colour, arising from the bile accumulated in its substance." "This," Dr Baillie adds, "is the common appearance of what is generally called a *scirrhous* liver; but it bears only a remote

resemblance to scirrhus in other parts of the body. I should, therefore, be disposed to consider it as a peculiar disease affecting this viscus."

108. Very various opinions have been entertained by pathologists, since the publication of Dr Baillie's work on Morbid Anatomy, as to the nature of the tubercles, granules, or nodules which form the characteristic feature of this structural alteration. By some, they have been regarded as consisting of an entirely morbid formation, whilst, by others, they have been supposed to be produced by an irregular development of the natural substance of the liver, or of a particular portion of it. If the former of these opinions were correct, it might be expected that the same kind of morbid formation would occur in other organs besides the liver; while, if the production of the granules or nodules depends on an irregular development of the natural structure of the liver, it follows that they can be expected to present themselves only in this organ, or in such others as possess an analogous glandular structure.

109. We have seen that Dr Baillie was disposed to regard these nodules as a peculiar disease affecting the liver. M. Laennec also conceived them to be a morbid production, but one differing from any which had previously received a name; and, in reference to the yellow colour which the nodules frequently exhibit, he proposed to apply to this *accidental texture*, the name of Cirrhosis. "In proportion," says he, "as the cirrhoses develop themselves, the texture of the liver is absorbed, and often, at length, disappears entirely; and, in all cases, a liver which contains cirrhoses, loses in size in place of increasing proportionally. This species of production," he farther alleges, "developes itself also in other organs, and at length softens like all morbid productions."

110. Those pathologists who have coincided in regarding cirrhosis of the liver as the consequence of an irregular development of the natural anatomical elements of that organ, have differed in their more particular views of its nature, according as they have conceived with Ferrein, that the liver consists of two distinct substances, or with Kiernan, that it is composed of one substance only, "the structure of all the

lobules being similar, and each lobule being of the same structure throughout."

111. M. Boulland seems to have been the first writer who maintained that the round bodies which characterize granular liver, are not referrible to a texture of new formation, but depend on a dissociation or disgregation, according to his own phrases, of the two natural elements of that organ, viz. the glandular grains, acini or yellow element, and the vascular network, or brown element. Its first stage he conceived to consist in an increase of the extent of the vascular network, caused by habitual sanguineous congestion; and its most advanced degree, to consist in the obliteration of this network. "The tawny yellow masses constituting cirrhosis," says he, "are, in our opinion, nothing else than the secretory granules undergoing gradual disorganization, in consequence of the obliteration of the vascular network, and of the obstacle to the hepatic circulation thence arising." (Mem. Soc. Med. d'Emul. ix. 170.)

112. M. Andral adopted the same general view with Boulland as to the nature of this structural alteration, stating that, in dissecting with care, livers in which granulations existed, it appeared to him evident that these granulations were merely a result of hypertrophy of the white substance of the liver; and that to account for their development, there is no need of admitting the production of any new texture. While the white substance of the liver undergoes hypertrophy, the red substance may remain of its natural amount, or may increase or diminish in amount; and on this circumstance depend the variations in respect of its bulk and other physical qualities, which the liver, in the state of granulation, is liable to exhibit.

113. The only explanations of the production of the granular state of the liver, founded on a belief of that organ consisting of one substance only, with which we are acquainted, are, 1st, that proposed by Cruveilhier, who attributes cirrhosis to atrophy, or complete disappearance, of the greatest number of the hepatic granules, with a considerable development of those which remain, but without any process that can be regarded as disorganizing, such as Boulland had assumed to exist; and 2d, that of Dr Carswell, according to whom the morbid condition of the liver,

denominated cirrhosis, consists in atrophy of the lobular structure of the organ, produced by the presence of a contractile fibrous tissue, originating in inflammation, and formed in the capsule of Glisson ; and is not, as Laennec supposed, a disease depending on the formation of a new tissue. (Illustrations, &c. *Art.* Atrophy.)

114. If to these various explanations, we add that of Dr Hope, to whose elaborate descriptions and delineations of the varieties which granular liver is liable to exhibit, we have much pleasure in referring, (*Principles and Illustrations of Morbid Anatomy*, p. 104, and figs. 75 to 84), we shall, we believe, have presented to our readers a summary of nearly all that has been suggested, as to the mode in which granular degeneration of the liver is produced, the speculations on which subject we consider as of the more importance, that they seem calculated to throw considerable light on several obscure points both in healthy and in morbid anatomy. Dr Hope, then, concludes from his examinations, that granulations consist not in mere hypertrophy of the white (or yellow) substance, but in an interstitial deposition in that substance, connected with a lesion of secretion. "Whether," says he, "this deposition is an accidental tissue or not, I leave others to decide ; but to me it appears to result from an alteration in the form, rather than in the nature of the secretion ; since the granulations present a texture and discharge a function analogous to those of the natural white substance, a greater degree of density constituting the only very appreciable difference."

115. Are the morbid appearances, of the mode of production of which such various explanations have been given, actually dependent on a single and identical structural alteration ? This is a question which, notwithstanding the many examples of granular hepatic disease that have fallen under our observation, we must confess ourselves incompetent to resolve. Its determination appears to us to require a more minute species of investigation, by injection, dissection, and microscopic examination, in the successive stages and different aspects of granular degeneration, than, with all the labour bestowed on the subject, it seems yet to have received.

TUBERCLES OF THE LIVER.

116. The peculiar morbid deposit to which the name of *tubercle* is at the present day exclusively appropriated by pathological anatomists, and which is so familiarly known to them as occurring in the lungs, and there giving rise to genuine pulmonary consumption, is rarely met with in the liver of the human adult. M. Cruveilhier states, that, among the numerous cases of pulmonary and abdominal phthisis which he has had occasion to examine, he has never met with tubercles of the liver; and M. Louis, in his work on phthisis, mentions, p. 118-119, that in two cases only had he observed a greater or smaller quantity of tuberculous matter in the liver. It is stated by M. Cruveilhier, however, that in the livers of tuberculous children, it is not uncommon to find thousands of small granulations of the size of millet seeds, hard and semitransparent, which can be felt, as well as seen, in consequence of their density, but which usually escape inattentive examination; and in the liver of the lower animals, as the rabbit, the sheep, the monkey, &c., this species of morbid deposit is not uncommon.

CYSTIC DEGENERATION OF THE LIVER.

117. Under the term Hydatid, or some corresponding term, pathological anatomists have very frequently included two morbid changes of structure, which are, in reality, very distinct from one another; *first*, a collection of watery fluid, contained in a cyst, the inner surface of which exhibits the general characters of serous membrane, whilst its outer surface is either adherent to the substance of an organ in which it is more or less imbedded, or, if not so imbedded, is covered with a layer of condensed cellular substance, of greater or less thickness. The *second* morbid alteration which has been included under the name of hydatid, is a cyst of the same general characters as the preceding, but containing within itself one or more detached cysts, which various circumstances prove to be distinct animals, or what are now generally designated *entozoa*. As it is desirable carefully to discriminate between these two kinds

of morbid alterations, the former may be denominated Simple serous or watery Cysts, and the latter Hydatid Cysts; or from the genus of hydatid entozoa, which cysts of the latter description are found to contain, they may be called Acephalocyst cysts. Each of these two forms of cysts is occasionally met with in the liver.

118. Simple watery or serous cysts may be found on the edge or surface of this organ, or more or less completely imbedded in its substance. How they take their origin, whether by the expansion of a cell naturally existing, or by the production of a cell entirely new, is not understood. But having once commenced, they may attain very considerable dimensions. In respect of number, they are sometimes single, and sometimes several coexist. When a cyst of this kind is not wholly imbedded in the parenchyma of the liver, the distension of its parietes may, in the progress of its development, become such as to occasion its rupture, and the consequent discharge of its contents into the cavity of the abdomen. There seems reason to believe, that, in particular circumstances, serous cysts connected with the liver take on inflammation of their inner surface, which may terminate in suppuration, so as to convert their cavity into an abscess.

119. There seems to be no organ of the body which is so subject as the liver to the development in its substance of hydatid or acephalocyst cysts. The number of such cysts that form in this organ seems to range from one to four, the latter being the greatest number which Cruveilhier, who has paid much attention to this morbid alteration of the liver, has on any occasion met with. The number of hydatids contained within each such cyst, is very various. Cruveilhier states, that the multiple or fruitful acephalocyst occurs much more frequently than the solitary or barren one.

120. It sometimes happens that the inner surface of an hydatid cyst takes on suppurative inflammation, and, in this way, instead of containing simply hydatids with more or less of serous fluid, the cyst comes to be filled with a mixture of pus and dead hydatids.

121. In the gradual enlargement of an hydatid cyst of the

liver, suppurated or not suppurated, its contents are liable to all the same contingencies as those of an abscess of that organ. From external violence, or its spontaneous development, the cyst may be ruptured, and its contents discharged into the cavity of the peritoneum; or the cyst having, by the occurrence of adhesive inflammation, become united to the parietes of the abdomen, its contents may be discharged externally; or, in the event of the cyst adhering to the diaphragm, they may enter into the cavity of the chest or into the lungs, or into both; or, if the adhesion shall be to some portion of the alimentary canal, the contents may be vomited or voided by stool.

122. Without entering on the merits of the doctrine so elaborately enforced by Dr Baron, in his Inquiry illustrating the nature of Tuberculated Accretions, &c., and subsequent publications, viz. that the different forms of morbid growths to which animal structures are liable, comprehending all the various modifications of tubercles and tumours, are, in fact, degenerated or transformed hydatids, we may admit that hydatid cysts and their contents, as they occur in the liver, are liable to undergo various kinds of degeneration or transformation; so that, from this common source, there may result a considerable diversity of morbid appearances, in different livers, or even in different portions of the same liver. It is not unusual to meet with such conversions of hydatid cysts and their contents in the livers of the lower animals; and in that of the human subject, also, similar conversions have occasionally been met with. In the cases referred to, the nature of the primary affection in which the various forms of morbid growth under observation had originated, has been sufficiently established by the circumstances that, in some parts of the organ, hydatid cysts, retaining their original characters, have existed; and that, within some of those cysts which had undergone partial conversions, coats of hydatids, little if at all altered, have been found. The changes which occur in the cysts themselves, seem to be, chiefly, the deposition of more or less of cartilaginous, and subsequently, probably, of bony matter in their coats. The changes in their contents are probably more varied; the matter into which they are changed

resembling sometimes suet, and sometimes tubercular matter, and, in some cases, assuming a cretaceous character.

MALIGNANT DEGENERATIONS OF THE LIVER.

123. In a large proportion of the cases in which morbid growths referrible to any of those forms of new structures or accidental textures to which pathologists apply the term malignant (comprehending the various modifications of scirrhus, cancerous, encephaloid, hæmatoid, and melanose tumours), are met with in the liver, post-mortem examination shews that similar growths exist likewise in other organs or textures of the body; and there seem good grounds for believing that, in a considerable number of such cases, the development of these growths in the liver is posterior to their appearance in one or in several of the other parts. "Of all organs," says Dr Hodgkin, "the liver is perhaps the most liable to become the seat of secondary depositions of malignant tumours or tubercles. We find them in this situation when the primary formation has taken place in the eye, the breast, the stomach, the rectum, the mesentery, the kidney, the testicle, or, perhaps, in many other situations."

124. Of very many cases of malignant degeneration of the liver, which have fallen under our own observation, a considerable number has occurred in females, who had undergone at different periods before death, amputation of the mamma; a considerable number has been in individuals who laboured under malignant affection of the stomach; several in persons whose death was primarily attributable to cancerous obstruction of the intestinal canal; and several, also, in persons in whom extirpation of the eyeball had been practised, on account of malignant disease of that organ.

125. But whilst the development of malignant growths in the liver seems frequently to be *consecutive* to their development in other parts of the body, it is not invariably so, for it occasionally happens that the liver is the first and the only organ in which they occur. Thus, several cases of fungus hæmatodes have been related by Mr Langstaff (Med. Chir. Trans. viii. 288, 291; ix. 302), in which this affection occurred in the liver

exclusively, shewing, as he observes, that "this disease may attack an important organ, and produce death, without the specific disease diffusing itself to any other viscus."

126. Whether cancer of the liver occurs as a primary, or as a secondary or consecutive affection, it may be limited to only a single point, and, spreading from this, attack the contiguous parts in succession; or it may be developed in a number of different points of the organ at the same time. Consecutive cancer, limited to a single point, may arise from contiguity of texture. Thus, as Cruveilhier remarks, it is not uncommon for cancer of the small curvature of the stomach to attack the lower surface of the liver (which, having become intimately united to that curvature, replaces the parts of the stomach that have been destroyed), in such a way that the liver may be removed, by successive layers, from its concave to its convex surface. But, most commonly, cancer of the liver, whether primary or consecutive, develops itself in a great number of points, leaving the intermediate parts untouched. This constitutes what has been called by Cruveilhier, "cancer of the liver in disseminated masses;" and it is to this form of cancerous disease, that the remarks we have now to offer, principally apply.

127. When cancer of the liver occurs in disseminated masses, a large proportion of these masses (Cruveilhier says, sixteen out of twenty), are observable upon the surface of the organ, from which they project in a greater or less degree, so as to produce a corresponding number of prominences, of different sizes, that represent portions of a spheroid. As each of these tumours enlarges, its spheroidal prominence becomes hollowed out, towards the middle, by a cup-formed depression. These physical characters of cancerous tumours in the liver, are of practical importance, because they can frequently be recognised through the parietes of the abdomen, so as to lead to a knowledge of the nature of the disease. The *cupping* in the centre which they undergo, has been attributed to an increase in the density of the sub-peritoneal cellular tissue at the corresponding point. Dr Farre, in speaking of the class of cancerous tumours which he designates *tubera circumscripta*, has very

correctly stated that "they commonly remain distinct at the surface of the liver, but, internally, they ultimately coalesce, and form immense morbid masses which pervade its substance." We have sometimes noticed, in dividing a liver affected with this structural alteration, that a section in one direction exhibited the appearance of a number of distinct tumours; whilst a section made in a different direction, presented the appearance of the whole organ having been converted into the morbid growth in a uniform and continuous manner.

128. The number of points in which cancerous matter is deposited, and, consequently, in which cancerous masses form, is very different in different cases. It may vary from one or two to several thousands. The size to which they attain, likewise, is subject to great variety; but, in general, it may be said that their size is in the inverse proportion of their number. From the size of a millet-seed to that of the head of a child at birth, they may be found in every successive stage of enlargement, not in different cases only, but in the same identical liver. This variety in their size, in the same organ, may depend in part on their having originated at different periods; but in part probably also, on their growth having advanced with different degrees of rapidity.

129. It would be foreign to our purpose to enter here on an examination of the diversities which cancerous or malignant tumours, as found in different livers, or in different parts of the same liver, may exhibit, in respect of their intimate structure; or on a consideration of the questions how far these diversities depend on original differences of composition or structure, on their degrees of advancement, or on accidental complications, such as the supervention of inflammation, the extravasation of blood, the simultaneous deposition of two or more distinct forms of morbid secretion, &c. Nor does it fall within our plan to notice here the different opinions that have been propounded, as to the precise seat in which the morbid secretion is primarily deposited. These are points, the investigation of which may no doubt be prosecuted very advantageously on the liver, but which would fall more properly to be discussed in a work on general pathology than on practical medicine.

130. In some cases, malignant tumours, developed in the liver, exhibit, to the eye of the anatomist, very characteristic appearances, so that their precise nature can be immediately determined. Thus, several cases have now been recorded in which *melanotic* tumours have been found in the liver, among various other organs infested by them. In other cases, the diseased substance has so much the appearance of brain, as to establish its identity with the tumors termed *encephaloid*. In others it assumes, from its earliest appearance, or in the course of its development, the *hæmatoid* character, in which event fungi may protrude from it either externally on the surface of the organ, or into cavities which form in its substance. In other cases, again, the morbid structure exhibits those characters by which *scirrhus* texture, as occurring in other organs, is now usually discriminated. But after we have set aside those cases in which we are able, with considerable confidence, to fix the character of the morbid growth, it must be acknowledged that no inconsiderable number remains in which it exhibits characters not easily referrible to any recognised form of structural alteration.

131. In conformity with the division of cancerous structures into the hard and the soft, M. Cruveilhier recognises a hard and a soft variety of the disseminated cancerous masses of the liver, differing from one another, as he conceives, 1st, in the *web*, which is cellular and loose in the soft, but dense and fibrous in the hard variety; 2d, in their degree of *vascularity*, and 3d, in the quantity of *cancerous* juice with which they are penetrated, both of which are greater in the soft than in the hard; and, 4th, in their *progress* and *development*, which is, in general, slow in the hard tumours, and rapid in the soft ones. But he acknowledges, that, notwithstanding these differences, it is probable that the hard variety changes, in some cases, into the soft: at all events, these two varieties are frequently met with alongside of one another, and they may both be the seat of a disorganizing process which has for its result the formation of pus, the production of a tubercular or gelatiniform matter, and the conversion of the mass into pulp (*bouillie*) or gangrene. It must, of course, be an object of interest with the practical

physician, to ascertain whether these changes in the condition of the structural affection, give rise to, or are accompanied by, any changes in the symptoms, local or constitutional.

132. In disseminated cancer of the liver, the absolute and comparative amount of the morbid masses and the natural substance of the organ, seems to be very different in different cases. MM. Bayle and Cayol, in their very able article on Cancer (*Dict. des Sci. Medic.*), had alleged that a liver which has undergone cancerous degeneration, is *always* found enlarged, its size and weight being sometimes doubled or trebled by the effect of disease. In this case, they add, it usually fills the epigastric region, and extends into the left hypochondrium; its inferior border descends to near the right iliac crest, and its convex surface pushes the diaphragm back on the chest, as high as the fifth, or even the fourth rib. In a large proportion of cases this statement is correct. But M. Cruveilhier has shewn that it is not uniformly so, there being great variety, not only in the amount of the heterologous production, but also in that of the parenchymatous structure of the organ. This author represents the proper substance of the liver as being, in some cases, of its natural amount, any increase of size which the organ has undergone corresponding to the size of the tumours. In many cases, however, in which the liver has acquired an enormous size, so as to weigh from 15 to 20 lb., besides the bulk of the tumours, there appears, he says, an increase in the proper substance of the liver itself, to double or treble its ordinary amount. In other cases, again, the liver is atrophied either partially or generally. The partial atrophy may affect one lobe, or only a small portion of the liver. General atrophy may go to such a degree that the liver, though containing a number of tubercles, shall not exceed the natural size of the organ, or shall even be under that size. In some cases of this affection, M. Cruveilhier has found the proper substance of the liver reduced to the sixth, or perhaps even to the eighth, part of its natural amount.

133. The connexion between a cancerous mass and the surrounding hepatic substance, by vessels and cellular tissue, is very various in its degree of closeness. Mr Wardrop remarked in re-

spect of fungus hæmatodes in the liver, that the "limits of the tumour are always readily perceived, though it is never inclosed in any distinct capsule; for the sound liver contiguous to the diseased portion seems gradually to degenerate into the same structure as that of the tumour, and appears to be inseparably connected with it." MM. Bayle and Cayol, while they allow that in some cases there is evidently a continuity of substance between cancerous masses and the parenchyma of the liver, allege, that in most cases they appear to be merely contiguous to that tissue; or, at least, to be connected to it only by some vascular prolongations; it being possible to separate them without difficulty with the handle of the scalpel, while the cavity which contained them is left perfectly smooth. The texture of the liver around these masses, they conceive, therefore, is almost always perfectly healthy.

134. Cancerous tumours in the liver are sometimes so seated as to compress more or fewer of its several classes of vessels, sanguiferous or biliferous. M. Cruveilhier thinks that some cases of *partial* atrophy of the liver accompanying this morbid degeneration, may be attributed to the compression of the secondary arterial and venous branches; and that some cases in which the organ has undergone *general* atrophy, may have depended on compression of the large vascular trunks. It is probable that the compression which these masses exert on the venous system contributes, at least, to the production of the ascites and anasarca which attend this disease, particularly in its advanced stages; and it seems well ascertained, that the jaundice which so frequently occurs in this form of disease, is the consequence of the compression of the larger excretory gallducts. M. Cruveilhier affirms that he has never observed cancer of the liver accompanied with jaundice, without finding it to depend on a compression of this kind.

B. STRUCTURAL ALTERATIONS OF THE BILIARY PASSAGES.

135. We have now to consider the structural alterations to which the biliary passages, viz. the tubuli biliferi, the gall-ducts and gall-bladder, are subject.

GALL-STONES.

136. The most common of these is the presence of gall-stones, of which we had formerly (45, 46) occasion to mention the composition and mode of formation. At present, therefore, we have to view them simply as foreign bodies, varying in their size, number, and seat, and, according to these circumstances, occasioning more or less impediment to the flow of the bile.

137. Gall-stones may form in all parts of the biliary passages, —in the tubuli, in the hepatic ducts and its divisions, in the cystic duct, in the gall-bladder, and in the common duct. Most frequently, however, their first formation seems to take place either in the biliary tubuli or in the gall-bladder, though, being subsequently conveyed into one or other of the ducts, they may undergo enlargement there.

138. It has been imagined that gall-stones might be formed also, exteriorly to the biliary passages, in the substance of the liver itself; but this is an error which seems to have arisen, in part at least, from their being occasionally found in portions of the biliary tubuli, which, in consequence of adhesive inflammation of their inner parietes, have been formed into separate sacs, so as, when cut through, to present the appearance of cysts developed in the substance of the liver, around the calculi that are lodged in them.

139. In whatever portions of the biliary passages gall-stones are formed, they are liable to be moved onward, in the course of the natural flow of the bile, to the gall-bladder or to the duodenum. Occasionally, however, cystic calculi do not lie loose in the gall-bladder, being sometimes lodged in pouches or ulcerations of greater or less depth; and sometimes adhe-

rent, inorganically it must be presumed, to its inner surface. (Batt, Edin. Med. Surg. Jour. i. 109).

140. In respect of the number in which biliary concretions may form, and of the size which they may individually attain, there subsists, as is well known, the greatest variety. The gall-bladder may contain a single calculus, filling its whole cavity, and little if at all inferior to the natural dimensions of that cavity; or it may contain several thousands of very minute dimensions.

141. It is obvious that the physical influence of biliary concretions in impeding the exercise of the biliary functions, must depend, in a great measure, on the seat which they occupy. The cystic duct may be obstructed, and the gall-bladder filled with calculi, and yet the bile reach the duodenum through the hepatic and common ducts; whereas, if the hepatic duct be obstructed, the bile can reach neither gall-bladder nor duodenum; and if it be the common choledoch duct that is the seat of obstruction, though the bile may reach the gall-bladder, it cannot reach the duodenum, at least by its natural channel.

142. It is to be kept in mind, too, that the degree of obstruction produced by a calculus in the gall-ducts, is not uniformly proportional to its size. A small calculus lodged in the common orifice of the choledoch and pancreatic ducts, may be sufficient to occasion complete retention of bile; while one or more calculi of larger dimensions, if lodged in portions of the duct that admit more readily of dilatation, may allow of the bile passing between themselves and the parietes of the duct. It is in this way only that we can explain such an occurrence as a gall-stone, more than half an inch in diameter being found plugging the common duct, without jaundice having occurred, and without any preternatural accumulation of bile in the biliary passages. (Cruveilhier, 12th Livr. Pl. V.)

143. Biliary calculi of very large dimensions are occasionally voided by stool, during life, or found in the alimentary canal, on post-mortem examination. In regard to such calculi, the inquiry naturally presents itself, whether the gall-ducts are capable of such distention as to allow of solid bodies of so large dimensions passing through them; and if this be determined

in the negative, whether the calculi can have entered the alimentary canal of smaller dimensions than they have subsequently attained; or whether they must be supposed to have passed into the intestines, of the dimensions in which they are ultimately found, but by some preternatural route. It seems absurd to suppose that a biliary calculus, after entering the alimentary canal, can increase *quasi* a biliary calculus, though it is conceivable enough that it might form the nucleus of an *intestinal* concretion where there exists a disposition to such a formation. The bile with which it can come into contact in the intestines, is altered in its qualities, and transformed into an emulsion, and is no longer in circumstances favourable to the precipitation and crystallization of its insoluble matters, being subjected to the peristaltic motion which is constantly conveying it, with the remains of the food, to the lower extremity of the alimentary canal.

144. That, in some cases, the presence of large biliary concretions in the intestinal canal, is to be accounted for by their having passed into it, from the biliary passages, by a perforated aperture of communication, does not admit of question;* and

* 1. "Mr Cline having found," says Andree, p. 45, "the gall-bladder adhering to the duodenum, and a direct aperture from it into that intestine (which parts are among his anatomical preparations), it appears that in this course a stone of any dimensions, confined in the gall-bladder, might take its passage directly into the gut, and be discharged by stool." 2. M. Cruveilhier quotes a case in which, the duodenum and ascending colon being both adherent to the fundus of the gall-bladder, a perforation, allowed of the easy introduction of the finger, established a communication between the cavities of the duodenum and of the gall-bladder. A biliary calculus, of a triangular pyramidal form, six lines in height, was inserted by its base into that aperture, the surface of which was smooth and continuous. 3. In a case of biliary calculus passing from the gall-bladder into the small intestine by a fistulous communication, and inducing fatal symptoms of internal strangulation, of which a short notice is given by M. Reynaud, it was found that solid adhesions existed between the gall-bladder and the duodenum, and a large loss of substance, limited by these adhesions, occasioned a communication between the two cavities. The perforation did not appear of long standing. The upper part of the small intestine had undergone, throughout an extent of several feet, a considerable degree of dilatation; the lower part was diminished in diameter. At the upper part of the small intestine was an oblong tumour, very hard, of the size of a pigeon's egg,

that this is the probable explanation of many cases in which no suspicion of a gall-stone having passed from the biliary passages to the intestines, had been excited previously to the time of its being voided, seems probable. But it may be questioned whether we have data for fixing the greatest dimensions to which the gall-ducts are capable of dilating, or consequently for determining in particular cases, independently of post-mortem examination, whether a biliary calculus, passed by stool, had found its way into the intestinal canal by natural or by preternatural passages. Few dissections, we suspect, have been made of cases in which very large calculi have been voided, for the purpose of ascertaining by what route they had found their way into the bowels.

145. Besides making their way into the alimentary canal, and being discharged from thence by stool, or, as sometimes happens, by vomiting, biliary concretions may be discharged externally, by producing abscess and ulceration in the coats of the biliary passages, particularly of the gall-bladder, and in the parietes of the abdomen. A case has recently been recorded

forming an obstacle to the course of the fecal matters. This tumour was a biliary calculus. 4. In a case related by Mr Brayne of Banbury, in which a patient survived a year and a half after passing a gall-stone $1\frac{3}{4}$ th inch in its greatest, and $1\frac{1}{4}$ th inch in its shortest diameter, it was found on dissection, that the cystic and hepatic ducts were of the usual dimensions, but the gall-bladder was smaller and very much thickened, and had formed a strong adhesion, about the size of a shilling, to the duodenum, close to the pylorus. There was no uncommon appearance of vascularity; but a communicating aperture, large enough to admit a crow-quill, was discovered in the centre of the adhesion." Mr Brayne thinks there can be no doubt that the aperture in the adhesion was once large enough to give passage to the stone. (Med. Chir. Trans. xii. 255.) Had the patient's life been still farther prolonged, might not the communicating aperture have become altogether closed, if not entirely disappeared? Thus, 5. Walter mentions a case in which the fundus of the gall-bladder, having formerly ulcerated into the colon, on which it rests, was so firmly attached by cellular tissue, that the aperture produced by the ulceration was quite shut up, and the gall-bladder again appeared entire and uninjured. 6. Dr Carswell has represented a case of præternatural communication between the gall-bladder and duodenum, at the orifice of which there were found, on examination after death, two small gall-stones. Whether any had passed during life, and if so, of what size, is not recorded. (Atrophy, Pl. III. Fig. 3.)

in which a biliary calculus is said to have been discharged by the urethra.

ACYSTIC ENTOZOA.

146. In the gall-ducts and biliary tubuli of the liver of the sheep, and of many other animals, there is very frequently found a species of entozoon, popularly known under the name of the liver-fluke, and to which naturalists have assigned that of the *distoma hepaticum*. Several cases have been recorded in which this, and another species of the same genus, the *lanceolatum*, have been said to be found in the human subject: and some of these cases seem to rest on such authority as to be entitled to credit. Many, however, who have been very extensively engaged in entozoological inquiries, have failed to detect the distoma in man; so that, admitting the genuineness of some of the cases recorded, it must still be regarded as of exceedingly rare occurrence.

147. In post-mortem examinations, one or more intestinal worms are occasionally met with in the biliary ducts, or perforating the substance of the liver. It has generally been believed that, in these cases, the worms had passed from the alimentary canal into the place, or places, in which they are found, subsequently to the death of the patient. But in some cases in which no other morbid appearances have been detected, in any part of the body, to account for the production of death, or of the symptoms by which it was preceded, pathologists have been inclined to think that this migration must have been effected whilst the patient was alive. Two obstacles to the entrance of intestinal worms into the biliary-ducts, during life, have, however, been suggested; 1st, the bile, as being an element in which it is conceived that intestinal worms could not live; and 2d, the irritability of the ducts and of their intestinal orifice, which, it is conceived, would oppose a mechanical impediment to their entrance and progress. It may be questioned to what weight these objections are entitled, separately or conjointly; and probably the consideration which principally indis-

poses pathologists to admit, that intestinal worms can pass into the biliary ducts of a living person, is the fact of their so seldom being met with in that situation, in post-mortem examinations.

INFLAMMATION OF THE MUCOUS MEMBRANE OF THE BILIARY PASSAGES.

148. The mucous membrane lining the gall-bladder and the larger biliary ducts, is liable to be attacked with inflammation, of a more acute or of a more chronic character, which produces the same effects upon it as on mucous membrane in other parts of the body, viz. its vascular turgescence and general swelling from serous or other interstitial effusion; and, when the inflammation is chronic, its more permanent thickening and induration. The inflammation may be confined to a more or less circumscribed point of the gall-bladder or of the ducts, or it may spread over the whole of their inner surface.

149. It has been alleged that, in a large proportion of the cases in which inflammation occurs in the lining membrane of the gall bladder and ducts, it has extended into them from the duodenum. May it, in any case, be derived from the substance of the liver, or may it extend from the ducts into the substance of that organ? It certainly has been remarked, that, in acute inflammation of the gall-bladder (cholecystitis), the substance of the liver is almost always red; and that, in the chronic form of this disease, it is not uncommon to find hepatic abscesses or tubercles, and other degenerations, existing simultaneously.

150. It is obvious that inflammatory swelling of the mucous membrane of the *gall-bladder* cannot, by itself, produce any influence on the course of the bile; but that, in proportion to the degree of swelling which the lining membrane of the *gall-ducts* experiences, will be the impediment to the passage of the bile into the gall-bladder and duodenum; and that, where this inflammatory affection is limited to a particular portion of these ducts, as to the hepatic, or choledoch, or to the cystic,

the mechanical obstruction produced by it will affect the flow of the bile in precisely the same manner as a calculus occupying the same position. (141.)

151. There can be no doubt that the mucous membrane of the *biliary tubuli* may take on inflammation, as well as that of the larger ducts; and it seems probable that inflammation of the substance of the liver will be communicated to them more readily than to the latter. M. Cruveilhier mentions that he has repeatedly found, in examining the livers of new-born children, through which tubercles were scattered, that these tubercles contained a cavity filled with concrete bile; and he is, therefore, disposed to regard them as the consequence of inflammation of the biliary tubuli, which, being obliterated, from space to space, by adhesive inflammation, have been converted into biliary cysts. These cysts, which have also been observed in adults, may acquire a considerable size.

152. Inflammation of the mucous membrane of the gall-bladder very seldom terminates in a collection of purulent matter. In the few cases in which this occurs, it seems to be most frequently attributable to the presence of biliary calculi. These, by blocking up the gall-ducts, prevent the pus secreted by the mucous membrane from flowing into the duodenum; and thus the gall-bladder, distended with purulent matter, comes to form a tumour in the hypochondrium. In other cases in which supuration of the gall-bladder has occurred, it has appeared to depend on the existence of an abscess in the liver preventing resolution of the cystic inflammation. Distension of the gall-bladder with purulent matter may cause adhesion of its external surface to the abdominal parietes, and the contents may be eventually discharged externally.

153. Under the same circumstances, probably, in which supuration is liable to supervene to inflammation of the mucous lining of the gall-bladder, ulceration may occur in that membrane. Sometimes the ulceration amounts merely to superficial erosion; sometimes it penetrates through the other coats, and terminates in perforation. Sometimes it occupies only a very small spot; in other cases it is extended over a consider-

able extent of surface ; and sometimes there are numerous distinct ulcers in different parts of the sac.

154. If perforation of the gall-bladder shall occur without its having previously contracted adhesions with the adjacent parts, an effusion of bile will take place into the cavity of the abdomen, followed by peritonitis terminating speedily in death. But in many of the cases in which perforation of the gall-bladder occurs, it is preceded or accompanied by the formation of such adhesions. Sometimes the point of adhesion corresponds to the anterior parietes of the abdomen, and, in this case, the perforation of the gall-bladder gives rise to the formation of an abscess projecting into the right hypochondrium ; and when this opens spontaneously, or is opened by art, a biliary fistula is produced, by which gall-stones, as well as purulent matter, may be discharged externally. In other instances, the gall-bladder contracts adhesions with the transverse colon, with the duodenum, or even with the stomach ; and when its perforation occurs, the matters which it contains, solid and fluid, entering the corresponding portion of the alimentary canal, are discharged by stool or by vomiting.

155. The parietes of the *gall-ducts*, in like manner, may undergo softening and ulceration, and ultimately perforation, followed by an effusion of bile into the cavity of the peritoneum. The perforation of a gall-duct, as is observed by M. Andral, sometimes happens behind a point at which the duct is obliterated, either in consequence of disease of its coats, or of the lodgment of a gall-stone. " Sometimes," observes Dr Powell, p. 104, " the long continued impaction of a gall-stone in a duct is productive of inflammation and ulceration therein, and has all the lasting inconveniences which such affections produce ; and it has happened that the duct has burst during such impaction, and necessarily excited a train of symptoms, from its discharge into the cavity of the abdomen, which have soon proved fatal."

156. In the healing of ulcerations of the mucous membrane lining the gall bladder or ducts, a greater or less degree of contraction of their parietes is liable to occur, producing shrinking

of the bladder, and stricture or closure, or occlusion, as it has been lately termed, of the ducts. M. Louis mentions that, of eight cases in which the communication of the gall-bladder with the cystic duct was cut off by obliteration near its neck, in five there was more or less affection of the mucous membrane, and in these the gall-bladder was very diminutive, from twelve to eighteen lines in length, and contained only a small quantity of mucous or puriform fluid. In the other three cases in which the mucous membrane was not ulcerated, or very slightly so, the gall-bladder is said to have been of a more or less considerable size, and distended with a fluid resembling white of egg or albumen. And, of nine other cases of diseased gall-bladder, he found that in two, in which its size was diminished, there was in like manner more or less alteration of the mucous membrane. It would appear from M. Louis's results, that the number of cases in which obliteration at the neck of the gall-bladder is accompanied with, or independent of, the existence of calculi, is nearly equal. (l. c. p. 393.) The hepatic and choledoch ducts, as well as the cystic, may be the seat of occlusion dependent upon cicatrisation.

DEVELOPMENT OF TUMOURS (ENLARGEMENT OF GLANDS ?) IN
THE CAPSULE OF GLISSON.

157. Mr Twining had the merit of directing the attention of pathologists in a particular manner to an organic affection which seems to prove, not unfrequently, the primary cause of obstruction to the bile in its passage to the liver, viz. the development, in the capsule of Glisson, of tumours varying in size from that of a grain of barley to that of a bean. "Two small bodies," says this writer, "can always be found by careful dissection, which, from their structure, appearance, and uniformity of situation, I am inclined to believe are absorbent glands. One of them is situated near the termination of the gall-bladder in the cystic duct; the other at the upper part of the ductus communis choledochus. Enlargement of these bodies with inflammatory excitement about the capsule of Glisson, may cause closure of the biliary ducts. I have found the ducts obliterated exactly at the

point where these enlarged glands were causing pressure. If," continues Mr T., "my view of the influence of these parts in disease be correct, we shall have a satisfactory explanation of one mode in which transient obstructions to the flow of bile into the intestine are produced from temporary irritation of these glands, on the occasion of disorders in the vicinity; and we see a distinct reason for obliteration of the cystic or of the common duct, in the chronic disease of old drunkards, which is just the description of subjects in whom the closure of the ducts most frequently takes place."

INFLAMMATION OF THE SEROUS COAT OF THE GALL-BLADDER.

158. The peritoneal coat of the gall-bladder occasionally experiences inflammation, terminating in the effusion of organizable lymph upon its surface. Mr Twining states, that, in persons dying soon after their arrival in India, the gall-bladder is commonly found distended with bile, having produced, by its pressure, enlargement and deepening of the sulcus in which it is lodged. But, in persons who have been long in India, it is found decreased in size, and disproportionate to the large sulcus in which it is lodged; and, in many of these cases, it is covered by a false membrane which sometimes agglutinates it to adjacent parts. The formation of this false membrane Mr Twining attributes to inflammation being induced by frequent repletion and habitual over-excitement of the gall-bladder and neighbouring parts; and he accounts for the diminution of the gall-bladder by the shrinking which this new membrane experiences during its organization.

159. If, instead of being confined to the peritoneal surface of the gall-bladder, the effusion of coagulable lymph should extend to neighbouring surfaces, adhesions, more or less intimate, will be produced; and, if the surfaces be at some distance, the membranous bands, in shortening during and subsequently to their organization, will produce an approximation between them and the gall-bladder. In this way, membranous bands come sometimes to be formed between the gall-bladder and the duodenum, which may produce a considerable degree of constrict-

tion of that portion of the alimentary canal, and give rise to symptoms simulating those of organic disease of the pylorus. This approximation seems to be attended with a proportional shortening of the biliary ducts.

STRUCTURAL ALTERATIONS OF THE CELLULAR AND FIBROUS
COATS OF THE GALL-BLADDER.

160. It is probable, that many of the morbid alterations to which the coats of the gall-bladder are subject,—as, for example, the formation of cartilaginous or bony plates, or of earthy or stony concretions, originate in the sub-mucous or sub-peritoneal cellular coats. Appearances have sometimes been met with, which would lead to the belief that inflammation of this viscus had had its primary seat in the sub-mucous texture, and had either remained confined to that coat, extending over a smaller or larger portion of it, or spread to the membranes on each side. Serous effusions into the cellular inter-coats have been observed to such an extent as to add considerably to the thickness of the parietes; and abscesses have been found in the same situation. Louis mentions that of the seventeen cases of diseased gall-bladder which had fallen under his observation, in two, the sub-mucous membrane was hard, thick, and scirrhus; in another case, it was merely thickened.

161. Whatever be the nature of the coat of the gall-bladder, which is interposed between its sub-mucous and its sub-peritoneal cellular membrane, in the state of health, the existence of muscular fibres in that situation, in some cases of disease, does not admit of doubt. M. Louis mentions, that, in one of his cases in which the mucous membrane was destroyed throughout a great extent, there were found, beneath the sub-mucous cellular coat, fibres of a muscular appearance, resembling those of the fleshy coat of the stomach; and M. Andral notices the appearance of muscular fibres in the coats of the gall-bladder as one of the changes which it is liable to undergo in hypertrophy. “In this state,” says he, “the folds of the mucous membrane disappear; a condensed cellular tissue, resembling fibrous texture, is interposed

between the mucous and the serous coats ; and lastly, in this cellular tissue I think I have found, in such a case, true fleshy fibres. In like manner," he adds, "in many points of the economy, we find that one of the effects of hypertrophy is to make muscular fibres appear where, in the healthy state, they are not observed in man, but where they very probably exist in a rudimentary state."

162. When cancer exists in the liver itself, the gall-bladder occasionally participates in this morbid degeneration. Primary cancer of the gall-bladder and gall-ducts must be a comparatively rare occurrence ; but M. Durand Fardel states, that, within a short space of time, he has met with three instances in which the gall-bladder, and one in which the choledoch duct, were primarily affected in this manner, without the structure of the liver being in any way altered. In two of the cases, however, the corresponding portion of the colon participated in the disease. (Arch. Gener. 3d. ser. viii.)

ENLARGEMENT OF THE GALL-BLADDER, &c.

163. Enlargement of the gall-bladder may be produced by an accumulation, in its cavity, either of bile or of some fluid secreted from its own internal surface. It may consist of simple distension, or there may be an increase of its substance proportional to the increase of its size. An accumulation of bile in this cavity is found to depend, in some instances, on the existence of a mechanical obstruction to its passage into the alimentary canal ; but, in other instances, it arises independently of such obstruction. This accumulation has occasionally been found to amount to twelve pounds and upwards, the dimensions of the sac being, of course, proportionally increased, so as to occupy a very considerable portion of the cavity of the abdomen.

164. When, from impaction of a concretion or any other cause, the passage of the bile from the liver into the gall-bladder is prevented, this receptacle, as Dr Powell observes, is not, in general, found empty, but distended to about its usual size, or something more, by a thick colourless mucous fluid, which is

commonly coagulable into a firm mass by heat, by acids, and by alcohol; and which, except that the coagulum seems denser, very accurately resembles serum. This fluid is freer from any tint or admixture of bile, in proportion to the duration of the obstruction; and it appears to be the unmixed secretion of the internal surface of the gall-bladder. From a case observed by Dr Powell, it seems probable that the mucous secretion of the gall-bladder may experience deviations from its usual characters. This fluid, accumulating in large quantity in the gall-bladder, may, as Walther remarks, distend it to such a degree as to thin its coats, and render it as pellucid as the bladder of fishes. To this state of the gall-bladder, it has been proposed to apply the term *Cholecystonchus*.

165. A mechanical obstacle to the flow of bile into the intestinal canal, wherever situated, may occasion dilatation not only of the gall-ducts, but likewise of the biliary tubuli; more particularly if, from the obstacle being in the hepatic duct, the entrance of the bile into the gall-bladder is prevented. The distention of the tubuli may be to such a degree as to communicate a sensation of fluctuation to the fingers, applied to the surface of the liver.

166. We have recently alluded (152.) to the circumstances under which an accumulation of pus may occur in this cavity.

167. In a case related by Dr S. F. Simmons (*Med. Communic.*; London, 1784, i. 101), a tumour, occupying principally the left side of the abdomen of a woman, was found, on dissection, to be formed by an immense sac, containing sixteen pints of hydatids of various sizes, which, from its position and other circumstances, was conceived to be the gall-bladder. Walther also mentions his having once met with hydatids in the cavity of the gall-bladder; but he regarded this as a very rare morbid appearance, and, as far as he remembered, one that had never before been described. (*Annot. Academ.*)

168. Several instances have been recorded, in which the gall-bladder has been found greatly distended with air; but we are not aware of this form of pneumatosis having ever been recognised during life.

DIMINUTION OF THE GALL-BLADDER, &c.

169. We have already adverted to two circumstances under which the gall-bladder is liable to experience a diminution of its size; viz. first, When cicatrisation occurs subsequently to ulceration of its mucous coat (156.); and second, When a layer of coagulable lymph has been effused on its serous surface, and has become organised. (158.) But there seem to be other circumstances in which diminution of the gall-bladder may take place.

170. If the biliary secretion is very deficient, or if some obstacle prevents its reaching the gall-bladder, and the secretion from its internal surface is not sufficient to maintain its distension; or if, from the existence of a preternatural communication, the bile passes directly from this sac into the intestinal canal, then in a shorter or longer time, the gall-bladder will undergo diminution of its capacity. The state of its coats, in these cases, is very various, according, probably, as they shall be more or less affected with inflammation; being sometimes so soft and thin that they tear on being touched, and, at other times, much thickened, and harder than natural.

171. It seems to be under circumstances such as have been just alluded to, that the gall-bladder occasionally undergoes what is called a cellular transformation. Richter found, in the body of a woman who died in a most intense degree of jaundice, that the gall-bladder was wanting, and, in its place, there was merely a membranous substance, without a cavity, and of the circumference of a sixpenny piece. And M. Andral relates the case of a man who died some months after biliary calculi had been discharged externally by an abscess opening on the side, and in whom no trace of the gall-bladder could be found, there being nothing in its sulcus, except a mass of cellular tissue of considerable density. From the choledoch canal, there arose a duct, which, in situation and direction, perfectly resembled the cystic; but, after a course of a few lines, it could no longer be followed, in consequence of its terminating interiorly in a

cul-de-sac, and losing itself in the cellular tissue. (Anat. Pathol. i. 241.)

172. Independently of diseases originating in its own textures, the gall-bladder, in some instances, becomes involved in a supuration of the neighbouring parts, between which adhesions, and sometimes communications, are established, as the liver, stomach, duodenum, and colon; and, in such an event, both this membranous cavity and its ducts may be removed by interstitial absorption, so that, on examination after death, no trace of them shall be discoverable.

SECTION IV.

INJURIES OF THE BILIARY ORGANS.

LACERATION OR RUPTURE OF THE LIVER.

173. Laceration of the substance of the liver is by no means an uncommon effect of falls, and even of falls by which no external marks of injury are produced upon the parietes of the chest and belly. "On the morning of the 1st January 1824, three soldiers, in attempting to get out of Edinburgh Castle, mistook their way in the dark, and precipitated themselves over the perpendicular side of the rock. They were found dead the next morning, and the livers of the whole of them were found, on dissection, to be lacerated." (Dunlop's Notes to Beck's Medical Jurisprudence.)

174. Simultaneously with the rupture of the liver, occasioned by a fall, there may occur fracture of the ribs, or rupture of some of the other parenchymatous abdominal viscera, as of the spleen or pancreas. In other cases, the cranium and brain are the parts which suffer most in injuries producing rupture of the liver. M. Richerand, in support of the particular views which he entertained respecting the formation of abscesses of the liver after injuries of the head, has mentioned (Nosogra-

phie Chirurgicale, ii. 227, edit. 1808) some cases in which individuals whose skulls had been fractured in consequence of their falling from a height, and who died within twenty-four hours after the accident, were found to have their livers also lacerated. He caused about forty dead bodies to be precipitated from a height of about eighteen feet, and found that in these bodies the brain and the liver were always more or less injured, the latter presenting, in some instances, lacerations of considerable depth. No viscus, he says, without excepting even the brain, suffered more than the liver from the violent commotions produced by the fall.

175. The extent of the laceration is not always in proportion to the apparent severity of the injury. Dr Pearson has related and delineated (Trans. of the Coll. of Phys. of London, iii. 377) a case of very extensive laceration of the liver, which strongly illustrates this point. While a young man was ascending a ladder, the sixth step, on which he was standing, broke, and he fell with his right hypochondrium and epigastrium upon the edge of a pail which he had in his hand. Death happened ten hours after the accident. On post-mortem examination, the right lobe of the liver appeared divided, in an oblique direction, through its whole substance, from its extremity on the right side, to the border of the left lobe; the two portions being connected only by the vena cava and the trunks of the *venæ cavæ hepaticæ*. Morgagni, observes Dr P., relates four or five instances of a division of the liver by external or mechanical causes, without any great injury of the integuments; but they were either much smaller ruptures than that now described, so that the patients lived several days; or they were equally extensive and as promptly fatal, but from a far more powerful cause.

176. Rupture of the liver, and that of great extent, has often been produced by the wheels of a carriage passing over the body, sometimes fracturing the ribs, and at other times producing the rupture of the liver without this fracture. (1.) Dr J. Green of Lowell, Massachusetts, has related (American Journal of Medical Science, vi. 539) a case of rupture of the liver, occurring in a lad of 19 years of age, which was occasioned by

being thrown from a chaise in quick motion, by driving against a waggon. He fell with violence, and the wheel (of chaise or waggon?) was seen to pass over his abdomen. Death followed in fourteen hours. The abdomen was extremely tense, containing two quarts of dark fluid blood. A rent was found in the liver commencing at a point in the right circumference of its great lobe, more than eight inches in length, and of such depth as nearly to have separated the half of that lobe from the organ; shorter rents ran in radiating directions from the same point, shewing a great extent of injury. Considerable portions of the peritoneal covering of the organ were torn off, rolled up, and loose in the cavity of the abdomen. The parietes over the place of the injury were perfectly sound, with no apparent bruise or external mark of any kind. (2.) Within a month of this accident, a stage-coach ran over a man in the same street, and almost instantly killed him, the wheels passing over his body. Upon examination it was found that large fractures of the liver were the chief internal injury, although in this case several ribs were broken. (3.) In the *Midland Medical and Surgical Reporter*, ii. 76, there is related a case of rupture of the liver, occasioned by the passing of a wheel over the abdomen, the subject of which survived for 52 hours. The abdomen was found on post-mortem examination full of blood, about a pint and a half being absorbed by a sponge. At the posterior part of the right lobe of the liver was a large lacerated wound. The bowels were inflamed.

177. In whatever way rupture of the liver may have been produced, if it be very extensive, an effusion of blood will necessarily take place, occasioning, according to its quantity, and the length of time the patient lives, a greater or less degree of distension, which has usually its seat on the right side of the abdomen. When the injury done to the liver is less severe, we generally become acquainted with its existence before death, in the cases which have a fatal termination, either by the pain which the patient feels in one or both shoulders, or by the discoloration of the skin which usually accompanies any injury of the biliary organs.

WOUNDS OF THE LIVER.

178. With a view to elucidate the question, formerly much controverted among medico-legalists, how far wounds of the human liver, with or without loss of substance, are necessarily fatal, or may be recovered from, experiments have repeatedly been performed on the lower animals, in the way of dividing, to a greater or less depth, the substance of this organ, or of removing a portion of it with the knife or by ligature. Kaltschmidt has related some experiments of this kind performed upon dogs, which had a successful termination. (Haller's Coll. Disp. Chir. v.) "From experiments on rabbits lately tried by Dr Monroe," says Dr Hennen (Mil. Surg. p. 439), "it appears that considerable portions of the liver may be removed without injuring the health of the animal, the wounds cicatrizing as in other parts."

179. But, independently of such comparative experimental trials, it may now be considered as established, by the results of observations in individual cases, that wounds of the surface of the human liver, whether incised, punctured, or gunshot, are not necessarily fatal; though, from the inflammation to which they give rise, they are always attended with a considerable degree of danger. When these wounds penetrate deeply into the substance of the liver, they almost always prove fatal. "A deep wound of the liver," says Dr Hennen, "is as fatal as if the heart itself was engaged; the slighter injuries are recoverable, particularly if the membrane alone is injured." P. 434. In illustration of the extent to which the liver may be wounded, and the patient nevertheless recover, we may refer to a case of gunshot wound of the liver, mentioned by Saucerotte, in which, on dissecting the patient, who died a considerable time afterwards of a different disease, it was found that the ball had passed through the small lobe about three inches from its inferior border. (Melanges de Chirurgie, p. 377).

180. In the human subject, as in animals, a small portion of the substance of the liver may be removed without necessarily

inducing a fatal result. In Blanchard's *Anatomia Practica Rationalis*, Amsterdam, 1688, we find the case of a soldier who was wounded by a sword in the hepatic region; the wound was succeeded by a profuse hæmorrhage and deliquium; on the cessation of the hæmorrhage, a morsel of the substance of the liver was removed by the forceps, and after many threatening symptoms, the patient recovered. At the end of three years he died of fever; on dissection, a small portion of the lower part of the wounded lobe of the liver was observed to be wanting, where it had been removed by the cutting instrument; the other viscera were sound. In Schmucker's *Vermischte Schriften*, iii. 156, an interesting case is related of a soldier who, in order to evade punishment, inflicted three wounds on one side of his belly with a knife. Through one of these a portion of the liver protruded. The surgeon applied a ligature to this portion, and afterwards cut it off. It does not distinctly appear, from the relation of the case, why he should have done so; but this patient recovered after more than three ounces of his liver had been cut away in the manner of an experiment.

181. So far as we are aware, no surgical writer has given a comparison of so large a number of cases of wounds of the liver, falling under his own observation, as Dr Thomson, in his *Report of Observations made in the British Military Hospitals in Belgium, after the Battle of Waterloo*. "We saw," remarks Dr T., "twelve cases of wounds of the liver, in which considerable progress towards recovery had been made before our return from Belgium, about ten weeks after the battle. Most of these wounds had two orifices; in some instances, one of the orifices was in the parietes of the chest, and the other in those of the abdomen; in other instances, the orifices appeared to be both in the chest, or both in the abdomen. We saw but two cases in which a single opening existed. (1.) In one of these, there was a considerable discharge through the wound, of a serous fluid tinged with bile, and the patient said he had for some time spat bile on coughing. (2.) In the other, the ball had entered through the anterior extremity of the eighth rib on the right side, and was supposed to be lodged in the spleen, from the pain that was felt in that region; but of this there could

be no certainty. In this case, bile, nearly pure, was discharged from the wound for many days; but when we last saw this patient, about eight weeks after he had received the wound, the bilious discharge had ceased.

“ We had no opportunity to see, nor were we informed of, any cases in which the bile, either from the liver or gall-bladder, had, in wounds of these parts, been effused into the cavity of the abdomen. (3.) In one singular case of wound of the liver, of which the patient died on the thirtieth day, it was found, upon examination after death, that the ball, which had entered the chest at the lower and outer part of the right papilla, had passed through the lower part of the lungs, and the upper part of the right lobe of the liver, and that, entering the abdomen, it had come out of that cavity on the left side of the umbilicus. The injured lung had collapsed, and was covered with an exudation of coagulable lymph. Between the wound on the convex surface of the liver and the peritoneum passing from the inferior surface of the diaphragm to the parietes of the abdomen, a considerable quantity of bile was accumulated in a cavity which resembled an abscess. This bile was prevented from falling into the cavity of the abdomen by the newly formed adhesions with which it was every where surrounded.

“ Several other instances presented themselves in which the wound of the liver was combined with one of the lungs, and in which bile was discharged through the wound of the thorax. A case has been already mentioned (1.) in which the ball was lodged, and in which bile was expectorated on coughing. (4.) In another case, the ball entered below the scapula, on the right side, and was cut out of the anterior part of the right hypochondrium; a copious glutinous discharge, tinged with bile, made its escape at the posterior orifice. (5.) In another case, a ball had entered about an inch and a half below the last rib on the right side; a bilious discharge ensued, and afterwards empyema supervened. And (6.) in another case, the ball had entered at the lower part of the left side of the sternum, and was cut out at the middle and outer part of the right side. This patient spat blood for two or three days, and had a bilious discharge through the anterior wound, which gradually disap-

peared. In some instances, the bilious discharge from wounds of the liver was extremely glutinous; in other instances, it had the consistence sometimes of pus and sometimes of serum; and, in others again, it was mixed with considerable quantities of coagulated blood."

182. When wounds of the liver do not terminate immediately by death or by resolution, they may give rise to abscess of this viscus.

RUPTURE OF THE GALL BLADDER AND DUCTS.

183. Notwithstanding the strength of the gall-bladder, and the thickness of the parts which lie over it, rupture of this bag has been observed to occur, in a few rare cases, as a consequence of external injury. Leseure, in an Inaugural Dissertation, published at Paris in 1824, sur les Ruptures et les Perforations de la Vesicule Biliaire, has referred to five instances of this occurrence, in four of which death succeeded immediately to the blow that occasioned the rupture; whilst in the fifth case, the patient, a child of twelve years, survived the accident four days.

184. In a few cases in which, in consequence of rupture of the gall bladder or ducts, bile has escaped, to a considerable amount, into the cavity of the abdomen, death has not occurred for a considerable period after the accident, or the patient has even completely recovered from its effects. (1.) Dr Skeete has recorded (London Medical Journal, vi. 274, 1785) a case of considerable effusion of bile into the cavity of the abdomen, occurring, in consequence of a fall from a tree, in a boy 14 years of age, who survived the accident six weeks. In this case paracentesis was performed on the 24th day, and sixteen pints of yellow fluid were evacuated, containing apparently a very large proportion of bile. The operation was re-attempted on the 37th day, unsuccessfully. On post-mortem examination, bilious fluid to the amount of two or three gallons was found contained in the abdomen, particularly in one large cavity, formed, chiefly, by the right hypochondrium, which had been

greatly enlarged by the diaphragm yielding to the pressure of the fluid upwards. The peritoneum surrounding the fluid was everywhere covered with coagulable lymph, bearing some resemblance to a distinct and regular cyst. There were numerous adhesions of the intestines to one another, and to the peritoneum. In this case, in consequence of the adhesions of the liver to the stomach and neighbouring parts, the gall-bladder and biliary ducts were involved in such a state of confusion, that nothing satisfactory could be ascertained with regard to the exact place at which the injury had been received; so that it must remain a doubt, observes Dr S., whether the bile was effused into the cavity of the abdomen from a rupture of the gall-bladder or of the biliary ducts. (2.) Mr Fryer of Stamford has related (*Med. Chir. Trans.* iv. 330) a case of what he regarded as extravasation of bile into the abdomen from rupture of the liver or gall-bladder, in which recovery took place. The subject of this observation was a boy about thirteen years of age, who received a violent blow, from one of the shafts of a cart, on the region of the liver; this was succeeded by pain, and frequent vomiting of bilious matter, with great sinking, coldness of the extremities, and a weak, small, and fluttering pulse. Twenty-one days from the accident, in consequence of the abdomen being very considerably distended with fluid, and his appearance indicating rapid sinking, tapping was performed, by which operation thirteen pints of what appeared to be mere bile were evacuated. The tapping was repeated three times after this, at intervals of twelve, nine, and nineteen days; at the second operation, fifteen pints of the same bilious fluid were drawn off; at the third, thirteen pints of a similar fluid; and at the fourth, six pints only. No examination, however, was made of the nature and composition of the fluid. At the date of the report, ten years after the accident, the patient was a stout young man.

185. Instances of rupture of the biliary ducts are much rarer than those of rupture of the gall-bladder. M. Campaignac, however, has related (*Journ. Hebdom.* 1829, ii. 210) a case, in which a man, thirty-five years of age, who had received a vio-

lent blow from a carriage on the right hypochondrium, having died eighteen days after the accident, the left branch of the hepatic duct was found to exhibit, near the lobe of Spigelius, a longitudinal rupture, with unequal borders, capable of permitting the introduction of the end of the small finger. The abdomen contained about six pints of a deep green fluid. The folds of the intestine were united to one another by a half-organised false membrane, which lined also the anterior parietes of the abdomen; and other marks of inflammatory action were perceptible.

WOUNDS OF THE GALL-BLADDER AND DUCTS.

186. Wounds of the gall-bladder, in the human subject, have always been considered as fatal accidents. "I have never known," says Dr Hennen (p. 440), "a patient recover after a wound of the gall-bladder; and, indeed, it is difficult to imagine a case where such a wound could happen without an effusion of bile into the abdominal cavity, unless adhesion had previously taken place to the parietes." The only authentic case of wound of the gall-bladder not proving fatal that has been recorded, is one mentioned by Parroisse (*Opuscules de Chirurgie*, p. 254) as having occurred to M. Huttier; that, namely, of a man who received a gun-shot wound on the internal and lateral part of the right hypochondriac region, and who died, two years afterwards, of thoracic inflammation, when a bullet was found in the gall-bladder.

187. In cases of wounded gall-bladder, the period of time which elapses between the reception of the injury and the occurrence of death, varies in different cases. In a case, related by Waton, in which the gall-bladder was punctured by a bayonet (*Journ. de Medec. Militaire*, vii. 550), death occurred in about thirty-six hours. In a case of wound of the gall-bladder related by Sabatier (*Medec. Oper.*, 1796, i. 43), the patient lived three days. And in a case of sword-wound of the gall-bladder related by Dr Stewart in the *Philosophical Transactions*, the patient lived about seven days. (No. 414, p. 341.)

188. With respect to the causes of death in injuries of the biliary passages, it may be remarked, that when, in cases of rupture of these organs, death occurs immediately or speedily, it may be supposed to be the effect of the shock upon the nervous system, produced by the external violence which occasioned the rupture. But when death occurs, in such injuries, after the effects of this shock must be supposed to have passed over, or when it occurs in wounds of these parts not accompanied by any considerable violence, and not involving any other serious injury, it must be regarded as depending upon the effusion of bile into the sac of the peritoneum.

189. From the results of experiments in which there has been introduced into the abdomen of a living animal, and frequently in such a way as to supersede the necessity of opening the peritoneum, a quantity of bile taken from another healthy animal, it appears that, though this fluid is rapidly absorbed, and though it does not necessarily produce fatal effects, yet it gives rise to severe inflammation of the peritoneum, attended with very violent symptoms, and most generally terminating in death.

190. These experiments, however, seem to warrant the conclusion that, in cases of rupture, and particularly of wound of the gall-bladder, it is probably not so much the original escape of bile occurring at the time of the injury, which brings about the fatal termination, as its continual filtration into the peritoneal sac, whereby the quantity is augmented, and the irritation is increased and permanently maintained. This conclusion necessarily suggests the inquiry how far surgery can afford any aid in arresting the escape of bile in injuries of this description. (Campaignac, u. c.)

191. With a view to the elucidation of this question, it may be remarked, that numerous experiments have been made on the biliary passages in the lower animals, which tend to shew, that considerable injury may be inflicted upon their parietes, without death necessarily arising, provided the continued escape of bile into the sac of the peritoneum be prevented. M. Herlin, a navy surgeon, relates (*Journ. de Med.* xxvii. 463) some

experiments which he made with regard to extirpation of the gall-bladder in cats and dogs. The animals not only lived after being subjected to this operation, but seemed healthy. M. Herlin made an incision in the abdomen of a cat, and, having laid hold of the gall-bladder, tied it at its neck. He then opened it, and allowed the bile which it contained to escape into the abdomen. The wound of the abdomen was then stitched up. The animal experienced no particular uneasy symptoms except vomiting, which lasted only for a short time, and in less than fifteen days it was perfectly cured. It recovered its appetite, ate of every thing as usual, and was, in all other respects, in its ordinary state. The body was opened before, and examined by, M. Petit. He found the neck of the gall-bladder tied, and its sac, the wound of which had cicatrised with the parts in the neighbourhood, partly filled with a clear mucous fluid. M. l'Anglas repeated this experiment on two dogs, and extirpated the sac of the gall-bladder, after having tied its neck. These two animals recovered.

192. More recently, M. Campaignac has performed on two dogs the experiment of applying a ligature to the neck of the gall-bladder; and, in both of these, the wound underwent cicatrification. The one was killed on the 26th day, and the other about six weeks, after the operation. M. Campaignac also applied a ligature so as to inclose a portion of the parietes of the gall-bladder, and then cut it off. On killing the animal six weeks afterwards, there was found in the place of the ligature a firm and regular cicatrix.

193. Of late years, physiologists, in their attempts to ascertain the influence which the bile exercises over the process of chylication, have performed the experiment of tying even the choledoch duct, in several species of animals, young and adult. Some of these animals have survived the operation sufficiently long to prove that its performance is not necessarily fatal in itself. Such was the case with the young cats experimented on by Sir Benjamin Brodie. (Brande's Journal, xiv.) Of the adult animals operated on by Magendie, however, the greater number died of the consequences of opening the abdomen, and

of the operation necessary for tying the duct. (*Elem. de Physiol.* 2d edit. ii. 117, note.) Of three young cats operated on by Mr Mayo, one was killed a few hours after the operation; a second died within 50 hours, and the third was killed three days after the operation. An adult dog in which the duct had been tied, was found dead on the second morning of the experiment. Of two young dogs on which the same experiment was performed, one died, the other was killed about 48 hours after the operation. (*Lond. Med. Phys. Journ.* Oct. 1826.) Tiedemann and Gmelin found several dogs whose choledoch duct had been tied, to survive the operation. (*On Digestion.* Fr. transl. ii. 49.)

194. Not only may animals survive the immediate effects of ligature of the choledoch duct, but nature may, in those which survive, restore, by a reparatory process, the function of the parts. In the experiments performed by Sir Benjamin Brodie with a view to ascertain the effects resulting from ligature of the choledoch duct, he found in several instances that, on destroying the animal on which this operation had been practised, at the end of seven or eight days, and exposing the cavity of the abdomen, and then making an opening into the duodenum, he could, by compressing the gall-bladder, cause the bile to flow out of the orifice of the choledoch duct in a full stream, in spite of the ligature. On further dissection, he found that a mass of albumen (coagulable lymph), which had been effused, adhered to the choledoch duct, above and below the ligature, and to the neighbouring parts, and enclosed a cavity in which the ligature was contained. The pressure of the ligature had caused the duct to ulcerate, without adhesion of the surfaces that had been brought into contact, taking place; and the ligature, having been separated from it by ulceration, lay loose in the cavity formed by the albumen which had been effused around it. The bile could be made to flow into this cavity from the upper orifice, and out of it by the lower orifice of the choledoch duct; and thus the continuity of the canal intended for the passage of the bile was restored. It is still more remarkable, observes Sir Benjamin, that the same thing hap-

pened even when two ligatures had been applied on the choledoch duct at some distance from each other. The physiologist, continues this scientific surgeon, will not fail to observe the difference between the effects produced by a ligature applied to an excretory tube, and a ligature applied to an artery or vein. MM. Tiedemann and Gmelin observed the same phenomenon in the experiments which they made on ligature or division of the choledoch duct in dogs. They found it re-established by the 13th, 20th, and 26th days after the operation.

CHAPTER II.

OF THE CAUSES OF MORBID ALTERATIONS IN THE FUNCTIONS AND STRUCTURE OF THE BILIARY ORGANS.

195. According to systematic arrangement, the remote causes of the diseases of the biliary organs should be divided into the predisposing and the exciting; but in respect of these, as of other classes of diseases, it is abundantly proved, that this distinction is rather nominal than real. The same agent which, operating in a weaker degree, or for a shorter period of time, produces merely predisposition to liver disease, should it operate in greater intensity, or for a longer period, may induce actual disease. Or two or more agents, any one of which separately would produce mere predisposition, may, when operating conjointly, act as exciting causes. It would be of greater importance, in considering the causes of the diseases of the liver, to be able to distinguish between those that act primarily on that organ in inducing disease, and those which act upon it only secondarily, through the medium of some other organ in which they primarily excite disease, as, for example, through the medium of the stomach, or other portions of the alimentary canal. But this seems to be a matter of very great difficulty. A late French writer on the diseases of the liver, has, indeed, in a very summary manner, relieved those who may be disposed to repose their faith on his judgment, from all difficulty on this head. According to M. Bonnet, when hepatic irritation is *primary*, it must owe its production to one or other of the following causes: viz. a blow or fall on the right

hypochondriac region, a wound penetrating the abdomen, or a violent succussion in the vertical line of the body, such as that which results from a fall on the feet, hips, or knees. With the exception of cases depending on these causes, and on mechanical congestion, hepatic irritation is, according to M. Bonnet, always *consecutive*, resulting constantly either from a gastroenteritis or an inflammation of the peritoneum; for all the other causes to which the production of hepatic diseases have been ascribed, act primarily, according to him, in producing one or other of these two states. It is impossible not to admire the boldness with which this author applies his universal explanations of *irritation* and *propagation of irritation*, to remove all the obscurities in the history of liver-complaints in which others had felt themselves involved; and, more particularly, the self-complacency with which he guards himself against the mistake into which physicians, not *au courant* of the doctrines of the new school, might have fallen, of supposing that he had only reproduced M. Broussais' ideas on the ætiology of hepatitis; assuring his readers, that, while "the one is susceptible of several solid objections, the other adapts itself to all explanations, and is ever in accordance with the facts"!! Though by no means flattering ourselves with the expectation of being able to draw so definite a boundary between the morbid powers which act primarily, and those which act secondarily, on the liver, we shall not leave the distinction altogether out of sight.

SECTION I.

EXTERNAL MORBIFIC POWERS.

INFLUENCE OF CLIMATE.

196. The influence of those physical conditions of the different portions of the earth's surface, which are collectively de-

signated *Climate*, in causing variations in the frequency and fatality of diseases of the biliary organs, has long been well known. But much more precise information than was previously possessed, respecting the extent of these variations, has recently been furnished by the publication of the very valuable Statistical Reports of the Sickness, Mortality, and Invaliding among the British Troops in the different quarters of the globe;—a series of documents that do the highest honour to the Army Medical Department, from the records of which they have been chiefly prepared, and that supply to medical men extensive and accurate data for their reasonings on a number of subjects, respecting which they have hitherto been obliged to form their judgments from very limited and vague observations.

197. The particular element of climate to which most influence has usually been attributed in regulating the prevalence and severity of hepatic diseases, is Atmospheric Heat; and accordingly, as a general rule, it may be admitted, that the frequency and fatality of these diseases in different countries, is in proportion to their annual range of temperature. We shall find reason to believe, however, that there are other conditions besides temperature, belonging to particular climates or regions, by which the prevalence and severity of liver complaints are at least partially determined.

198. The average amount of sickness and of mortality, produced by any given disease, is calculated, in the Statistical Reports, on the annual ratio of admissions into hospital, and of deaths, per 1000 of mean strength. Conformably with this calculation, it appears, that, among the British troops *on home service*, the sickness on account of diseases of the biliary organs is 8, and the mortality .3. This may serve as a standard of comparison with the same contingencies in other countries.

199. The very great frequency of the occurrence of diseases of the liver in the East Indies, is a fact familiar to everyone. The statistical report on the British troops serving in that region, has not yet been published; but, from information with which we have been favoured, it appears, that, on an average of five years, the annual ratio of admissions of British soldiers in Her Majesty's service, on the Indian continent, on account of the

diseases in question, is in Bombay 62, in Bengal 63, and in Madras 106 ; and that the ratio of deaths, from the same cause, in these three presidencies respectively, is 3.5, 4.6, and 6. In Ceylon, on an average of 16 years, the ratio of admissions is 53, and that of mortality, 4.3. From materials, embracing 12 years, supplied by Mr Annesley to the London Statistical Society, the ratio of admissions and deaths from liver diseases, in the Madras Presidency, among British troops, both in the Queen's and in the H. E. I. Company's service, appears as 116 and 5.62.

200. From a comparison of the different divisions of the Bengal and Madras armies, Mr Annesley was led to believe that the difference in the frequency of the diseases of the biliary organs, and particularly of acute inflammation of the liver, among the British troops composing these divisions, is dependent, in a great degree, upon the nature of the soil and climate, and the mean annual temperature ; hepatitis being most frequent on the Coromandel coast and in the southern provinces of India, where the annual range of temperature is highest. Mr Annesley further conceives, that, in the same climate, those who are exposed to the direct rays of the sun, especially if this be followed by exposure to the night-dews and malaria, are most subject to hepatic affections. Dr Mouat, however, in reference to the variations in the frequency and mortality of hepatic diseases found to occur at different stations in the Madras Presidency itself, observes : " Temperature will not explain this anomaly ; for Bangalore, a cool station, bears nearly the highest ratio except Hyderabad, which has a still lower temperature during the cold weather."

201. Next to the Presidency of Madras, the stations occupied by British troops, in which liver complaints prevail amongst them most largely and most fatally, appear from the Statistical Reports to be those in Western Africa, the Mauritius, and St Helena, the ratio of deaths from this cause, annually, being in the first of these colonial commands, 6, and in each of the other two 4. It deserves to be noticed, however, that, whilst the Mauritius and St Helena correspond in the ratio of mortality, they differ very widely in the rate of frequency, which is in the former, as in Western Africa, 82, and at St Helena only 29 ; im-

plying, so far as the extent of observation warrants an inference, that diseases of the biliary organs are, in the last mentioned island, of extreme severity.

202. That in these stations, also, there are other circumstances besides their mere atmospheric temperature, which assist in determining the frequency and fatality of liver complaints among the British troops, seems highly probable. For though, as is remarked in the Statistical Report, this class of affections occurs more frequently, and of a graver character, at St Helena than in the West Indies, the temperature is lower and more uniform in the former, and other diseases are more rare. And, in like manner, though the agency of high temperature is in operation in Jamaica, to at least an equal extent as in the Mauritius, the climate of the latter exhibits much the same degree of influence in inducing hepatic diseases as that of Western Africa or St Helena. It is also deserving of notice, that in the Mauritius, during years remarkable for a very high temperature, this class of affections has not been more frequent than usual.

203. Mr Boyle, in his Medico-historical account of the western coast of Africa, p. 360, expresses a strong persuasion that a high range of temperature cannot be the exclusive, or even the most common cause of hepatitis, since, upon different parts of the coasts of all hot countries, and without any cognizable or important varieties of thermometrical range, the prevalence of the disease will vary in the most unaccountable manner. This, he observes, is found to be peculiarly the case in the British settlements on the western coast of Africa, as in those upon the leeward or southern portion of this coast (from Cape Sierra Leone to Cape Lopez), hepatitis is rather a common complaint; whereas, in those upon the windward or northern portion, on the contrary (from Cape Sierra Leone to the Gambia), it is so uncommon, that the author, while serving at Sierra Leone, never saw one genuine case in the acute form, and unaccompanied by other disease. He has, indeed, seen it succeed to an attack of irregular fever, and become formidable in its course. He has also seen and treated a great many cases of chronic hepatitis whilst at Sierra Leone, but, with few exceptions, they were

imported from the leeward coast, and occurred generally in the persons of foreigners brought into the colony in detained slave vessels.

204. It appears from the Army Statistical Report on the West Indies, that in the Windward and Leeward Islands, though diseases of the liver are by no means so common among the British troops as in the tropical regions of the eastern hemisphere, they are nearly thrice as prevalent as among troops in the United Kingdom, and occasion about five times as high a ratio of mortality, the ratio of admissions being 22, and that of deaths 1.8. They vary materially, both in prevalence and severity, at different stations in these islands, occasioning at Grenada, for instance, three times as much mortality as at most of the other islands, and that without any assignable cause. In Jamaica, considering the high degree of temperature in that island, diseases of the liver are by no means very prevalent or fatal,—only half as much so as in the Windward and Leeward command; the ratio of admissions, on account of these diseases, being 10, and that of deaths 1. Many parts of the island enjoy a remarkable immunity from them.

205. In British America, the prevalence and fatality of this class of diseases appear to be rather under the ratio of Great Britain. In Gibraltar, the Ionian Islands, and Malta, the ratio rises successively above that of Great Britain, as respects both frequency and fatality, being at the last 21 and 1.1, which corresponds very closely with the ratio of the Cape of Good Hope. The ratio of Bermudas, 14 and .5, corresponds nearly with that of Gibraltar.

206. With these results relative to the prevalence and fatality of hepatic diseases among British troops serving in different regions of the globe, it is interesting and important to compare the liabilities, in these respects, of the various other races employed in colonial military service, whether natives of the country in which they serve, or of countries less remote from it than Great Britain, in respect of temperature. In general, it may be stated, that both the sickness and mortality among the native or coloured troops, from this class of diseases, is slight in all the British Colonial stations, with the exception of the

Mauritius. In the Madras Presidency, the ratio of admissions and deaths from diseases of the liver, among the native soldiers, is only 9 and .11, instead of 116 and 5.62, as we have seen it to be among the Europeans. They cut off more than a ninth of the Europeans, and less than one per cent. of the natives. It is singular, however, that the natives seem to be less able to resist these diseases, when attacked by them, than the Europeans, since of those attacked, 12 per cent., or 1 in 8, died among the former, and only five per cent., or 1 in 20, among the latter. The mortality in the West Indies, also, from diseases of the liver, is much less among the black than among the white troops. Among the white troops, the ratio of deaths annually from diseases of the liver, ranges from 1, as in British Guiana, St Lucia and Jamaica, to 4.5, as in Grenada, the average being about 1.8. Among the black troops, the same ratio ranges from .3, as in British Guiana, and .4, as in Jamaica, to 1.6, as in Dominica, and 1.7, as in Antigua and Montserrat, the average being .9. Respecting the Mauritius, it is remarked in the Army Statistical Report, that, though the black pioneers employed there are accustomed from infancy to a high temperature and constant exposure, they suffer more from hepatic disease than the white troops, natives of a northern climate, the mortality being relatively as 5.7 to 4. The admissions are certainly not so numerous among the former, but, as generally happens among colonial corps, many of the milder cases undergo native treatment without the patient coming into hospital. As the negro does not suffer to any extent from diseases of the liver, either on his native coast or in the West Indies, notwithstanding the high temperature, his liability to them in the Mauritius, so far as this can be considered as established by the present extent of observation, must be supposed to arise from some peculiar tendency in the climate to induce them, for which no satisfactory theory has as yet been advanced.

207. Alpinus, in his work *De Medicina Ægyptiacorum*, makes no particular mention of liver diseases as prevailing in Egypt. Baron Larrey's account of his campaigns, however, abundantly proves how frequent a disease hepatitis is, at all events among Europeans, in that country, and how liable to run

on to suppuration. (ii. 35.) From Sir James M'Grigor's state of the deaths and diseases of the Indian army in Egypt, from the time of embarkation to the return to India, in 1801-2, it appears that, of 309 deaths among Europeans, 64, or more than 1 in 5, proceeded from liver complaints, and that, of 391 deaths among natives of India, only 12, or about 1 in 32, arose from the same class of diseases. (Medical Sketches, Table II.)

208. Though cases of diseased liver are much more numerous in hot than in temperate regions, they seem to be less varied in their nature. Sir George Ballingall has remarked with regard to India, that "the diseased appearances of the liver are generally confined to suppuration or induration, the legitimate results of inflammation; while the different species of tubera, described by Dr Farre, are by no means a common occurrence in that climate, and the existence of hydatids in the liver is very rare." (See, to the same effect, Dr Conwell's Treatise on the Liver, § 135.) The same observation we have heard made by several practitioners of long and extensive experience in India.

209. Dr Powell, in observing that it is probable that climate, and its attendant circumstances, have a considerable influence on the production of biliary concretions, states, that, so far as he has been able to ascertain, this must be a very rare disease in hot countries; "the bile there," he adds, "has a tendency to run into a different state of alteration." We are informed by Mr Annesley, that he has seldom observed biliary calculi lodged in the *hepatic ducts*, in India. It is very probable, he observes, that when they form in this situation, they become a source of irritation, and, acting as a foreign substance, produce inflammatory action, which soon terminates in abscess,—a suggestion confirmed by the experience of Dr Daun, as will afterwards be more particularly noticed. But Mr Annesley alleges, that biliary calculi frequently form, in warm climates, in the *gall-bladder*, and often produce inflammatory action in this receptacle, or in the cystic or common duct, not unfrequently attended with spasm, which often extends to adjoining organs. Finally, Mr Twining, in his enumeration of the morbid appearances of the biliary organs observed by him in dissections in Bengal, mentions "concretions, in colour and

consistence like yellow soap, extending along the biliary canals, through a considerable space." The left lobe, he alleges, has been observed more frequently affected in this way than the right: it is, however, he adds, a rare disease in Bengal. He also mentions biliary concretions in the gall-bladder, but says nothing of their frequency.

EPIDEMIC PREVALENCE.

210. Depending, in a considerable degree at least, for their production, on circumstances of season, some of the diseases of the liver occasionally assume an epidemic character. The late Dr Colin Chisholm published, in the Medical Commentaries for 1786, "The History of a singular affection of the Liver, which prevailed epidemically in some parts of the West Indies," in that and the previous year; at which time he was surgeon at St George's, Grenada, the West India island in which, as we have seen (204), diseases of the liver are, at the present day, most prevalent. In his Manual of the Climate and Diseases of Tropical Countries (p. 65), Dr Chisholm reverts to this disease under the name of Anomalous Hepatitis, and seems to believe that its propagation depended, in some degree, on infection. Dr Chisholm states also, in his Manual, that this very anomalous and dangerous disease occurred several times subsequently, during his residence in the West Indies, sometimes epidemically and sometimes sporadically; and that it is not unfrequent in the larger islands, in situations and seasons similar to those in which it occurred in Grenada.

211. A considerable number of instances have been recorded of the epidemical occurrence of Jaundice. Thus, Dr Cleg-horn, in his Observations on the Epidemical Diseases of Minorca, mentions a slight jaundice, without fever, which soon yielded to purgatives and saponaceous medicines, as having been "a common distemper" in that island in July and August 1745. Dr William Batt has described a jaundice which was epidemic in Genoa and its vicinity in 1792-3. He saw, in all, forty-three cases, the first in the end of September 1792, and the last towards the end of August 1793, but the

greatest number previously to the vernal equinox of the latter year. The disease, although sometimes troublesome, was rarely dangerous. In the city of Genoa, only two died, and one of these not of the disease but of the remedy; for, having taken some ipecacuan as an emetic, it produced, by the efforts of vomiting, a fatal hæmorrhagy. (Edin. Med. Surg. Journ., i. 107.) On what internal morbid condition can epidemic jaundice be supposed to depend?

INFLUENCE OF DIET AND EXERCISE.

212. The quantity and qualities of the food that is used by different individuals, are by no means unimportant as regards the action and condition of their liver. An over proportion of animal food seems to favour an excessive secretion of bile, partly, perhaps, by causing, in consequence of its stimulant qualities, an increased determination of blood to the chylopoietic and assistant chylopoietic viscera; and partly, also, probably, by modifying the qualities of the blood. And whatever may be the direct effects of variety and high seasoning of dishes, upon the liver, or their agency through the mucous membrane of the alimentary canal, there can be no doubt that, as temptations to excess in the use of animal food, they exert a very prejudicial influence upon this organ. In the experiments performed by M. Magendie on the feeding of animals upon substances that do not contain azote, both the bile and urine appeared to M. Chevreul, who examined them, to possess almost all the characters of these secretions as met with in herbivorous animals. The bile, it is particularly remarked, contained a considerable portion of picromel, the peculiar character, as M. Chevreul conceived, of the bile of the ox and of herbivorous animals in general. (Mem. lu à l'Acad. d. Sciences, 19 Aout, 1816.)

213. It seems not out of place to allude here to the well known enlargement which, under a particular mode of feeding, the liver of the goose undergoes, in a very short space of time, and which furnishes gourmands with one of their most relished dishes. Those who are engaged in providing this article of luxury, make choice, we are told, of a healthy goose, and inclose it in a kind of cubical cage, where it is, as it

were, closely packed up, without room to move. It is placed in a dark situation, and crammed (*gavé*) three times a-day with a paste made of flour of maize, a little salt, and sometimes a little oil: it is supplied with water containing charcoal and red river sand. The cold season is the most favourable for the success of this operation, for which a month is sufficient; if continued longer, the goose would lose the fat which it has acquired. It is known by the whiteness of the beak, and the difficulty of breathing, that the animal has arrived at the desired point of stuffing (*sagination*), and that it must be killed to prevent its dying of suffocation. The weight of the liver increases to two or three pounds, and it is esteemed by gastronomic scavans in proportion to its weight and size. (Dict. d. Sci. Med. *Art. Oie.*)

214. What the respective influence of the food and of the confinement may be in this barbarous operation, we cannot pretend to tell; but that persons leading a life of bodily inactivity, particularly men engaged in literary pursuits, and women occupied in sedentary employments, are peculiarly liable to hepatic diseases, seems to be very generally admitted by those who have paid attention to the history of this class of affections. By some, the flexure of the body forwards, to which such persons so very generally yield, has been supposed to be one of the circumstances which operate injuriously on the biliary organs. But the more generally received explanation turns on the belief that the excretion of the bile depends little on any inherent action of the gall-ducts, and to a very great extent on the agitation which the hepatic system suffers during bodily exercise; and that, consequently, the want of such exercise must lay a foundation for morbid derangements of the biliary organs. It is supposed probable, too, that the venous circulation of the liver is promoted by the muscular motions produced in bodily exercise, and that, these failing, this circulation will be proportionally languid. As illustrating the influence of bodily inactivity on the production of *biliary calculi*, it is mentioned by Dr Powell, that "they are comparatively much more frequent in women than in men, and, of either sex, especially in those who have passed the middle and active pe-

riod of life. Haller noticed the frequency of their occurrence in criminals whose death had been preceded by long confinement; and Bianchi, in persons who had been subject to frequent attacks of gout. They are often found in the gall-bladders of oxen which have been stalled during the winter months, and I have reason to believe that they occur in a larger than common proportion of maniacs who have been confined.' (P. 133, 134.) The statement of Gurlt, that, of 800 horses, in none were gall-stones found, seems to strengthen this view of the dependence of the formation of these concretions on bodily inactivity. (See Müller's Archiv, 1834, p. 194.)

EXTERNAL INJURY.

215. External injury inflicted upon the region of the liver, independently of its producing the immediate mechanical effects of contusion, rupture, and wound, may give rise to different forms of diseased action in that organ. Its most frequent consequence, unquestionably, is inflammation; and traumatic hepatitis may pass through all the same stages as hepatitis depending on internal causes. Dr Nicoll, in the report formerly quoted, mentions that he has known many decided instances of acute hepatitis being induced by outward violence, and particularly refers to three fatal cases of this kind, in each of which the greater part of the right lobe of the liver was found converted into pus. But a blow on the region of the liver is sometimes followed, at a longer or shorter interval, by the development of a simple serous or of an hydatid cyst, or, perhaps, of some other form of non-inflammatory structural alteration, conformably with the diversity of effect well known to be produced by external injury on the mamma or testicle.

ALCOHOLIC LIQUORS.

216. The influence of alcoholic liquors in inducing diseases of the liver, has been much insisted on, both as respects tropical and temperate climates, with this difference, that, in the former, it is inflammation of a more or less acute character which is found to be produced by excess in these agents, while in temperate climates, diseases of the liver arising from

this cause, when they prove fatal, generally exhibit the granular character. The belief that wine and spirituous liquors operate specifically in the production of liver-complaints, was opposed by Dr Thomas Mills of Dublin, who affirms that persons who indulge freely in the use of such liquors, are not the most subject to these ailments,—that they occur in those who are temperate, and are found even in children and infants. In the statistical report on the sickness, &c. among the troops in British America, it is mentioned that the prevalence of diseases of the liver in Nova Scotia and New Brunswick, is little higher than among the Dragoon Guards and Dragoons serving in the United Kingdom, and the mortality is only half as high,—a fact, it is observed, “which tends to throw very considerable doubt on the supposed influence of spirituous liquors, in inducing affections of the liver, at least in a cold climate; for, owing to the low price of these in Nova Scotia and New Brunswick, there are few stations where intemperance is carried to a greater extent; yet not only do the troops suffer less from diseases of the liver than at home, but the proportion of deaths is only two-thirds as high as among persons insured in the Equitable office, who, from their rank in life, as well as the caution exercised in their selection, are by no means likely to be addicted to that vice.” It may be observed, too, that Sir George Ballingall, while he conceives that in India, affections of the liver are obviously, in a great majority of instances, the joint effects of climate and intemperance, acknowledges that in others we find them the result of climate alone. When originating solely in this latter cause, he adds, their symptoms are often very obscurely marked.

MERCURY.

217. It is a well-established fact, that *mercury* administered as a remedy in different forms of disease, occasionally proves the cause of hepatic affection, which presents itself sometimes under the distinct characters of hepatitis, and sometimes under the more obscure garb of jaundice. The first notice of the influence of mercury in inducing disease of the liver, with which we have met, is contained in a letter by Dr Sherwen,

dated from the River Ganges in September 1770, which is published in the 6th and 7th volumes of the *Annals of Medicine*. Dr S.'s experience of this operation of mercury was confined to a single case. Dr Dick, who practised long in Calcutta, in a letter to Dr Saunders, of which extracts are published in that author's work upon the liver (p. 257), alludes to his having very often observed chronic liver-attacks succeed to long courses of mercury, undergone for the cure of venereal complaints. The late Dr Cheyne makes the following observations on this subject. (*Dublin Hospital Reports*, i. 278.) "It does not appear to be generally known, that mercurials actually produce the jaundice; yet this is a fact of which, in the course of the last two years, I have seen three striking examples." "In large establishments for the cure of venereal complaints, jaundice not unfrequently appears during courses of mercury; and if the mercurial is not laid aside, and purgatives given, and the antiphlogistic regimen adopted, a new and alarming series of symptoms is apt to arise; the brain becomes affected; the patient becomes at first frantic, and then he falls into a state of coma. Three cases of this kind have been related to me by competent observers." The following statement by Dr Nicoll, relating to the same point, is well deserving of the attention of practitioners. "I have occasionally seen hepatitis come on a few days, but oftener weeks, after a mercurial course for a venereal complaint. Although the venereal disease has not been very common in the 80th regiment for some years past, yet a great proportion of those who have had it, and have undergone courses of mercury for its cure, have suffered from hepatitis; and many of our fatal cases were of that number. I have known three striking instances of hepatitis occurring in young men, who had been from two to three weeks under the influence of mercury (*Pil. Hydrarg.*), for chancres. In the first, the disease terminated fatally; and, in the other two, by bleeding, purging, and increasing the quantity of mercury, they both recovered. Amongst our chronic cases of ophthalmia which occurred at Quilon in 1815, eight men were seized with hepatitis, after having been from four to nine months in hospital. These men all reco-

vered under the usual treatment. On the first appearance of the ophthalmia, they had been all purged and bled freely; and when the disease became of a chronic nature, were put under an alterative course of mercury." "That the inordinate use of mercury," says Dr Chapman of Philadelphia (*Amer. Journ. of Med. Sci.* i. 476), "may in various ways derange the primæ viæ and liver, so as to produce the icterose affections, seems to me highly probable. Many years ago, I saw an inveterate case of jaundice developed during a protracted salivation for syphilis, and within the last few months I was consulted in a second case of it under the same circumstances. In neither of these instances, was there reason to suspect any previous disorder of the chylopoietic viscera." After referring to Dr Cheyne's experience on this matter, Dr Chapman proceeds; "It is somewhat remarkable, that this fact should not have been earlier applied by me; since, for several years, I have taught in my lectures that the extravagant employment of mercury by many of our practitioners, in autumnal fever and other diseases, must be assigned as one of the causes for the general prevalence of chronic hepatic affections in some portions of our country." "In further support of this hypothesis, I have learned from the venerable Dr Somerville, of the south of Virginia, who has practised medicine in that section of the country for nearly half a century, that, till the enormous introduction of mercury in the treatment of autumnal diseases, hepatitis was hardly known, but that since then it most widely prevails. Not a few confirmatory statements have I received from my correspondents in other parts of the United States, so that the fact seems pretty well established." (See also Dr Conwell, § 108.)

218. In what way may we suppose the two morbid agents last mentioned, alcohol and mercury, to act in inducing liver-disease? Do they, through the circulation, reach the organ itself? Do they affect it through the nervous system? or do they primarily produce disease in some other organ, which extends, or is transferred, to the biliary organs?

219. In considering these questions, there are two facts which it is proper to keep in mind, viz. 1st, The occasional occurrence

of abscesses in the liver, in cases of injury of the head,—a fact which has long been noticed, and which was at one time supposed to indicate the existence of a peculiar sympathy, or of some physical mode of communication, between the head and the liver. To this doctrine we shall have occasion afterwards to advert. But, in the second place, besides secondary abscesses, or purulent deposits, the liver is, as we have seen (123), very liable also to become the seat of secondary malignant growths, in whatever part of the body the primary disease may have developed itself.

220. These facts would seem to imply that foreign matters, circulating along with the blood, are peculiarly liable to be detained in this depuratory viscus; and they suggest the inquiry whether any thing analogous can be supposed to happen in respect of alcohol and mercury, when these substances exert a noxious influence upon the liver. MM. Autenrieth and Zeller state, as the results of some experiments which they made on the effects of mercurial frictions upon animals, that mercury was found in the bile of animals which had been killed by the use of this metal, and in a quantity proportionally much greater than even in the blood of these same animals. They noticed, also, an alteration in the colour of the bile in dogs thus treated, inasmuch as it was green in place of being yellow, as it usually is. This change in the physical properties of the bile they are disposed to attribute rather to the presence of the metal in it, than to an alteration of the secretion. (Reil's Arch. viii. 252.) In some ingenious experiments performed by M. Cruveilhier, it was found, that when mercury was introduced into the *abdominal* venous circulation, it was for the most part arrested and deposited in the liver, giving rise in that organ to inflammatory action; and that, on the other hand, when introduced into the *general* venous circulation, it was usually arrested in the lungs. These results, however, M. Cruveilhier acknowledges not to have been uniform; the mercury in these experiments, like the pus absorbed from abscesses, being sometimes deposited in other organs or parts of the body than the liver and lungs; in consequence, as he conceives, of the

foreign substance having escaped in part, or in whole, through its first barrier, and finally been stopped in some other situation. Dr Percy, in his recent "Experimental Inquiry concerning the presence of alcohol in the ventricles of the brain, after poisoning by that liquid," states as his third conclusion, that "alcohol may be detected in the blood, the urine, the bile, and the liver. It may be separated with great facility from the bile and liver; and this circumstance," he conceives, "may probably serve to explain the frequency of hepatic disease in habitual drunkards." M. Andral, it may be remarked, had previously suggested that the alcoholic particles introduced into the alimentary canal, being carried directly to the liver by the mesaraic veins, may act as a direct irritant upon that organ.

221. Whatever may be thought of the validity of M. Cruveilhier's views of the liver and lungs as *barriers* to the circulation, or of the applicability of these views to the explanation of the production of liver-disease by substances introduced into the alimentary canal, it seems probable that, in many cases, alcoholic liquors exert their first morbid effect on the mucous membrane of that canal; and that the morbid affection of this membrane, to whatever it may amount, extends, by continuity of texture, to the mucous membrane of the gall-ducts, and from thence to the parenchyma of the liver. "In the dissection of those who have been intemperate dram-drinkers," says Dr Saunders, "the diseased structure may be traced from the stomach along the course of the ductus communis, and I have frequently seen these ducts so contracted and thickened (in such persons), that they could not transmit bile;" and Mr Twining, in mentioning obliteration of the biliary ducts as being only observed when the liver had undergone certain forms of enlargement, adds, "the patients for the most part are drunkards."

MENTAL EMOTIONS.

222. The influence of mental emotions in inducing, sometimes by a sudden, and sometimes by a slow operation, derange-

ments of the biliary organs, is illustrated in the not unfrequent induction of jaundice by a fit of passion, and in the sallowness and other symptoms indicative of biliary disturbance that frequently attend hypochondriasis. Mr Annesley observes, "that though the depressing passions of the mind, generally remarked in hepatic inflammations, are, in such cases, merely symptoms of the disease, they are also amongst the most frequent causes of all kinds of biliary disorders, and are not the less to be looked upon as causes, for being also generally present as effects of those diseases," (p. 440 :) and Dr Wilson Philip alleges, that whilst the passions, particularly the depressing, often instantly derange the functions of the liver, they seldom fail, if long continued, to affect its structure. (On Acute and Chronic Diseases, p. 180.)

223. We have already (6, 17, 30,) alluded to the unsatisfactory character of the explanations that have been given of the immediate mechanism by which the symptoms indicative of bilious derangement, arising from particular states of mind, are produced ; and, in particular, have pointed out the doubts which, we conceive, may reasonably be entertained, as to whether it is the secretion or excretion of the bile that is disturbed.*

* Dr Beaumont, in his account of his experiments on St Martin, mentions, that, on one occasion when St Martin had experienced a fit of violent anger, he found the contents of the stomach considerably tinged with yellow bile, a circumstance which he had but once before observed in his experiments upon him. "This circumstance of bile flowing into the stomach during a fit of anger is," says one of Dr Beaumont's reviewers, "if correct and well ascertained, a very curious one ;" and he alleges that the application by the ancients of the term choleric to a bilious man, was always (up to the time of this experiment, we presume) "ranked among those fancies which originated in some play of the imagination." We had supposed the reflux of bile into the stomach, during a fit of passion, to be a matter of common experience ; and, indeed, we cannot but regard the reviewer's being unaware of the fact, as a proof how little he himself is troubled with those unpleasant sensations which, in the exercise of his vocation, we fear, he must not unfrequently excite in others.

SECTION II.

RECIPROCAL INFLUENCE OF DISEASES OF THE BILIARY
ORGANS IN PRODUCING ONE ANOTHER.

224. The reciprocal influence of the different diseases of the biliary organs, dynamical and structural, in producing, and in maintaining one another, is highly deserving of attention, seeing that, in consequence of this tendency, the symptoms of these affections are usually found variously complicated with one another, in individual cases. Thus, any morbid condition, whether seated in the substance of the liver, or in the gall-ducts, which tends to impede the flow of the bile from a particular portion of the biliary passages, will, amongst various other effects, favour the formation of gall-stones; and, in its turn, the existence of gall-stones in any part of the biliary passage has a great tendency to produce inflammation, not only of these passages themselves, but likewise of the substance of the liver. And when inflammation of these parts has been produced by any cause, the existence of gall-stones in the biliary passages may have a powerful influence in preventing its termination in resolution. Accordingly, Dr Daun, in his report on hepatitis as occurring at Quilon, expresses his suspicion that its deep-seated character was attributable to concretions obstructing the passage of bile in the ducts. Other illustrations of this reciprocal influence have been noticed in the course of the first chapter.

SECTION III.

INFLUENCE OF DISEASES OF OTHER ORGANS IN PRODUCING
THOSE OF THE LIVER AND BILIARY PASSAGES.

225. There are certain diseases occurring in other systems or organs of the body, to which affections of the biliary organs, dynamical or structural, are very liable to succeed, and which, consequently, may be regarded as standing to these affections in the relation of exciting causes.

226. (*a*) That the liver is liable to undergo morbid changes during the progress of *fevers*, seems to be established by the experience of most countries, and, particularly, of those in which fever usually assumes a remittent or intermittent type. M. Louis has found that, in nearly a half of the cases of the typhoid fever of Paris, which prove fatal, the liver is in a state of softening, the most severe and the most evident, says he, of almost all its lesions; and, in some cases, so great is the degree of softening that the organ is very easily torn, the fingers being plunged into it without, as it were, experiencing any resistance. As we may suppose the same change to have occurred in cases which recovered, it is a matter for investigation whether, on the return of health, a liver in this state regains its ordinary condition, and, if so, what length of time is required for this.

227. Dr Davis, in his account of the morbid appearances found in the bodies of those who died subsequently to their return to England from the Walcheren expedition of 1809, states, that "the liver was generally loaded with blood, and the portal system obstructed. In some instances, the liver was of a gelatinous consistence. Portions of it, taken between the fingers, could be squeezed to a substance similar in appearance to grumous blood." P. 185. We have already referred (66) to similar observations made in Italy and in India, respecting the state of the liver in fevers of an intermittent or remittent type. But the affection of the liver accompanying these fevers in

hot climates is often of a decidedly inflammatory character. "Acute hepatitis," says Dr Nicoll, "is frequently found complicated with intermittent and remittent fevers, as well as with dysentery and diarrhœa; but whether the hepatic affection is a cause or a consequence of these diseases, is a point which has not been satisfactorily determined. We are ignorant of the connection which subsists between them; we are only acquainted with the fact that hepatitis sometimes precedes, but more generally follows, attacks of tropical fevers, dysentery, and diarrhœa."

228. (b.) That diseases of the biliary organs, dynamical perhaps in their commencement, and becoming structural in their progress, may take their origin from affections of the *alimentary canal*, and particularly of the stomach and duodenum with which they are most immediately connected, seems, from both anatomical and physiological considerations, to be very probable. According to M. Broussais, whenever the mucous membrane of the stomach and duodenum is inflamed, whether primarily or as a consequence of encephalic inflammation, the liver becomes engorged; and this engorgement, which leads to excessive biliary secretion, sometimes gives rise to inflammation. It is, he alleges, this extension of inflammation, whether of an acute or of a chronic character, from the intestinal canal to the liver, which, in consequence of inattention to the primary symptoms, is generally regarded and treated by medical men as primary hepatitis. (Hist. des Phlegm. Chron. 3d edit. iii. 266-275.) M. Andral is disposed to concur in the opinion of M. Broussais, that, in most cases of inflammation of the liver, there has been previously duodenitis. The observation of symptoms seems to him to favour this conclusion; and, in some cases, the examination of the dead bodies of jaundiced persons has brought to light no other alteration but a high degree of inflammation of the duodenum, which appeared to have extended itself to the biliary ducts.

229. M. Louis, on the contrary, whilst not denying that inflammation of the mucous membrane of the duodenum may co-exist at the same time with inflammation of the liver, infers,

from the cases of hepatic abscess which have fallen under his examination, that such a coexistence is far from being constant. In four cases of this kind, in which the mucous membrane was carefully examined, it was found perfectly healthy, with the exception of a slight degree of softening, unattended with redness, which was noticed in one of the cases. (Rech. Anat. Path. p. 404.)

230. Without denying that inflammation frequently follows the course alleged by M. Broussais, it may reasonably be questioned whether his doctrine is not pushed to an excessive length in the pathological propositions, that "hepatitis is consecutive to gastro-enteritis, *when* it does not depend on external violence;" and that "chronic gastro-enteritis is *the cause* of hepatic engorgements, and of yellow and fatty livers, even among the phthisical." (Comment. des Propositions de Pathologie, Prop. 149.)

231. We have already referred (221) to the general belief, that the primary morbid action of spirituous liquors is on the alimentary canal, and that marks of disease, more or less apparent, can be traced, extending from this canal to the substance of the liver, when disease of this organ occurs in persons addicted to intoxication. It was suggested by M. Ribes, and the opinion seems to be adopted by M. Andral, that inflammation commencing in the intestinal canal may propagate itself to the liver, not merely along the mucous membrane, but also along the veins, the inflammation spreading from the small mesaraic branches to the trunk of the vena portarum, and thence extending itself to the parenchyma of the liver.

232. It seems not impossible that inflammation of the duodenum, without extending farther into the biliary system than the intestinal orifice of the choledoch duct, may produce such a stoppage of the biliary excretion as to give rise to jaundice in the first place, and eventually to organic disease of the liver. But Dr Stokes conceives, that the dependence of jaundice on gastro-duodenitis, which he regards as the morbid condition that most commonly induces it, is to be explained on different principles. "In this case," says he, "an inflammatory affection of

the stomach and duodenum acts *sympathetically* on the liver; and we have jaundice occurring independent of hepatic inflammation, or mechanical obstruction to the flow of bile. It is said," he further remarks, "that the inflammation extends from the duodenum along the common biliary ducts to the liver. I am not possessed of facts to confirm this assertion; but I have little doubt that, in the majority of cases, the jaundice is more the result of a mere lesion of innervation of the liver, than proceeding from any spread of inflammation along the duct into its substance." (Lond. Med. Surg. Journ. 1834.)

233. Sir Henry Marsh has adduced (Dubl. Hosp. Rep. iii. 270.) several cases, to prove that a long continued obstruction of the large intestines, from an accumulation of hardened fæces or scybala, becomes occasionally the immediate cause of jaundice; but the only approach we can find to an attempt, upon his part, to explain the relation subsisting between these two phenomena,—the intestinal obstruction and the jaundice,—is his observation, that the cause which prevents the free descent of the bile, and produces jaundice, resides sometimes in the large intestines. Whether he supposes the stoppage of the bile, and its reabsorption into the circulating system, to take place within the alimentary canal, or previously to its excretion from the biliary passages, does not appear. Nor is any judgment on this point offered by Dr Stokes, in recognising the jaundice which depends on the accumulation of scybalous matter in the bowels as one of the forms arising from mechanical obstructions. Dr Coe, however, had previously mentioned, as causes on which jaundice may depend, "the duodenum being loaded with such contents as stop the orifice of the duct, or the colon being stuffed with hard fæces, pressing upon the duodenum and ducts." (P. 267.) In the same manner, jaundice may be produced by enlargements of some of the other viscera adjacent to the liver, as of the pancreas.

234. We have already alluded to dysentery, as one of the diseases with which hepatitis is very liable to be complicated, particularly in tropical climates. Much doubt has existed among pathologists as to the relations of these two diseases to one

another,—as to which is the primary, and which the secondary affection, or whether they be not parts of the same disease. Dr Nicoll, in avowing his inability to determine this point, mentions, that “it was by no means an uncommon occurrence, at Quilon, for hepatitis to succeed to the termination of dysentery. I have sometimes noticed its attack almost immediately on the ceasing of the dysenteric symptoms; while, at other times, weeks, nay months, elapsed, before hepatic symptoms supervened.”

235. (c) We formerly had occasion (59) to notice the influence of diseases of the *heart*, and particularly of such as impede the emptying of the inferior vena cava into the right auricle, in producing sanguineous congestion of the liver; a subject which is specially considered by Corvisart, in his Essay on the diseases of that organ, in an article “on the means of distinguishing sanguineous engorgement of the liver, consecutive to diseases of the heart, from other hepatic affections.”

236. (d) It is easy to conceive that diseases of the *lungs*, occasioning an impediment to the circulation of the blood, may, in like manner as diseases of the heart, act back upon the liver, so as to produce mechanical congestion of this organ. Mr Paisley, formerly head surgeon in Madras (in a letter which, though addressed to an individual in reference to a particular case, seems to have been for many years very extensively circulated among the medical practitioners in India, and to have been in high estimation among them as a code of medical practice in the diseases of that climate), particularly notices the frequent connection of diseases of the liver and of the lungs. In pointing out the liability of the lungs to become secondarily affected in diseases of the liver, Mr Paisley affirms that, reciprocally, in all disorders of the lungs of any standing, the liver is always affected. The nature of the affection, however, he does not explain. Dr Powell, in referring to this remark of Mr Paisley's, states, that, in examining phthisical patients, or such as have, from any causes, had the lungs rendered less pervious to the circulating blood, he has very frequently found the liver enlarged in its size and looser in its texture,—in some, very

considerably so, and appearing little more than a connected mass of blood, readily giving way and breaking down on the application of slight pressure; and that in other cases, injections, pushed into the vena portæ, have seemed to distend the liver more readily and completely than where no disease of the lung subsisted. It is easy, also, to conceive that inflammation of the lungs may extend to the liver.—“In many instances,” says Mr Parker, in his *Treatise on the Stomach in its Morbid States*, “inflammation commencing in the lungs, or their investing membrane, is thence propagated to the liver. I have seen two instances of pneumonia terminating in abscess, which have commenced in the inferior lobe of the right lung, and have ultimately involved the liver in the disease. Andral has recorded another instance of this mode of extension from the lung to the liver. (Obs. 23.) Regnault has also noted several instances of pleurisy producing hepatitis.” (P. 141.)

237. Fatty degeneration of the liver is a very frequent attendant on pulmonary consumption; but of the nature of their connection, it seems impossible to suggest any explanation. M. Laennec remarks, that the fatty infiltration of the liver is met with in other chronic diseases besides phthisis, and that, likewise, he has found it alone, and without any serious concomitant organic disease. “M. Broussais,” he adds, “appears to think, that this state of the liver is a sympathetic effect of inflammation of the duodenum. I have seen few evident instances of inflammation of that intestine, and I believe that it is very rare in the eyes of all anatomists, who do not confound cadaveric congestion with inflammation. I have often found the duodenum very red when the liver was healthy, and the liver fatty when the duodenum was very pale.” M. Louis mentions, that, of 49 cases of fatty liver which he had met with in the course of three years, in 47 it occurred in phthisical persons, so that to a certain point, he observes, it may be considered as a consequence of that affection. He met with it in a third of the bodies of phthisical patients which he examined, and more frequently in women than in men in the proportion of four to one. He concurs with Laen-

nec in refusing to recognise diseases of the duodenum as one of the causes which favour the development of the fatty state of the liver, seeing that duodenal affections were rarely met with in his dissections, and quite as unfrequently among those with fatty, as among those with healthy livers. The late Dr John Home mentions, in his Statistical and Pathological Report of the Royal Infirmary of Edinburgh (Edin. Med. Surg. Journ. xlix. 1), that, of 65 cases of pulmonary phthisis in which the liver was examined, in 10 it was in a fatty, and in 5 others in a waxy state. All these cases of fatty and waxy liver, except one, occurred in women; so that, though the total proportion of phthisical cases in which the liver had undergone this kind of degeneration, was less than M. Louis had found it to be in his dissections, the relative proportion of the sexes established, still more decidedly, its greater frequency of occurrence among women than men. In 23 of Dr Home's 65 cases, the liver is said to have exhibited different forms of the early stages of cirrhosis, an affection which is not mentioned either by Louis or Andral as having been noticed in their cases of phthisis. "In many cases," says Dr Home, "this state of the liver was no doubt owing to obstructed circulation through, and diminished function of, the lungs; but I would ascribe its origin in most of the cases to the abuse of spirituous liquors, to which many of the individuals in whom it was found were addicted; hence we may account for its more frequent occurrence among men than among women."

238. (e.) The attention of pathologists was particularly called to the frequent coexistence of diseases of the liver and of the *brain*, by the late Dr Cheyne, who pointed out acute hydrocephalus, phrenitis, apoplexy, lethargy, tetanus, catalepsy, chorea, epilepsy, and, on the authority of the late Mr Todd of Dublin, idiotism and mental derangement, as the cerebral affections in which there is frequent coincidence of hepatic dynamical derangement or structural alteration. On the question of priority and succession in these two classes of diseases, Dr Cheyne remarks,—“That the brain should be suddenly affected in consequence of its connexion with the liver, is not more remarkable

than that the liver should be suddenly disordered from affections of the brain. Yet this last is an established observation. I am informed, by a gentleman who has occasion to dissect a great many bodies, that, in diseases of the brain, he never fails to find the liver diseased either as a cause or a consequence. The same gentleman assures me, that the liver generally discovers the marks of recent inflammation after fatal injuries of the head. Every surgeon knows that abscess of the liver is a common effect of injury of the brain."

239. Dr Pritchard has devoted a chapter of his Treatise on Diseases of the Nervous System to the consideration of epileptic and maniacal cases connected with disease in the liver and other abdominal viscera. In referring to Mr Todd's statement as quoted by Dr Cheyne, respecting the frequency of liver-disease in cases of idiotism and mental derangement, Dr Pritchard acknowledges, that, within the sphere of his own observation and inquiry, the instances have not been very numerous in which organic disease of the liver, or other large viscera, has been discovered in conjunction with maniacal disorders. But, of the conjunction of such disease with epilepsy, he states that he had seen a sufficient number of observations to conclude that there must be some sympathy or connexion, depending on circumstances unexplained by any principles in pathology, between that morbid state of the brain which gives rise to epilepsy, and a diseased state of the liver and other large viscera of the abdomen.*

240. (*f.*) The liability of the liver to become the seat of abscesses, subsequently to the reception of *injuries on remote parts* of the body, was first noticed in regard to injuries of the head. Paré mentions examples of this occurrence, and endeavours to account for it. Subsequently to his time a number of additional cases of abscess of the liver succeeding to injury of the head were recorded, and various explanations were proposed as to

* It may be mentioned here, that Mr Andree, in stating that the bile of animals has been found a successful medicine for epilepsy, accompanied with a bloated and pale countenance, adds, "which I think not improbably to have been cases of diseased liver."

the nature of the relation between the head and the liver on which this succession might be supposed to depend. Of these explanations some implied that the matter which forms the abscess was originally produced within the head, and conveyed or transferred in some way or other from the head to the liver; and others implied that it was originally produced in the liver itself. In the progress of time it came to be ascertained, *first*, that the liver is not the only organ of the body in which abscesses occur subsequently to injuries of the head; and, *second*, that injuries of the head are not the only forms of lesion in which abscesses of the liver and of other remote organs are liable to be produced. Hence it has become necessary, in attempting to explain the phenomenon in question, to seek for some principle of more general application, than a peculiar relation subsisting between any two organs or portions of the body, such as the liver and the head. The recent progress of pathological investigation seems to render it very probable that, in such cases, the veins serve as the medium of communication between the seat of the primary lesion and that of the consecutive abscess; and that inflammation of the lining membrane of these vessels in the part injured, the consequent formation of pus, and its introduction into the circulation, are some of the links which connect the two events. But pathologists are not agreed in opinion as to whether the pus thus formed in the seat of the primary lesion may not, in some instances at least, be simply deposited in the seat of the consecutive abscess; or whether it gives rise, in all cases, to a new inflammation in the part to which it is conveyed, in the course of which the consecutive abscess is formed.

CHAPTER III.

OF THE SYMPTOMS AND DIAGNOSIS OF DISEASES OF THE
BILIARY ORGANS—THEIR COMPLICATIONS AND TERMINATIONS.

241. The next point of view in which we have to consider the diseases of the biliary organs, respects the possibility of recognising them, as they occur in nature, by the combinations or successions of morbid phenomena, or symptoms, which attend them,—of establishing, in short, their diagnosis upon obvious and constant characters.

242. The principal sources of difficulty and fallacy to which the medical practitioner is exposed in diagnosis, may, as we have elsewhere endeavoured to shew (*Encyclopædia Britannica*, Art. *Physic*, Practice of), be referred to four separate heads, viz. *1st*, the occasional absence of any obvious or characteristic symptom, in cases in which there exists decided structural alteration of some of the textures, systems, or organs of the body; *2d*, the occasional identity, or at least close resemblance, of the groups or trains of symptoms arising from different pathological conditions; *3d*, the occasional diversity of the group or train of symptoms produced in different individuals, by a lesion apparently identical; and, *4th*, the simultaneous occurrence of morbid conditions in different parts of the same economy, sometimes corresponding and sometimes differing in their nature; sometimes coming on simultaneously and sometimes in succession; and embarrassing the practitioner in his diagnosis, either simply by the complications of morbid phenomena to which they give rise, or by one set of symptoms obscuring the other.

243. Of these sources of difficulty and fallacy in diagnosis,

—tending to lead the practitioner into one or other of two errors, that of supposing in particular cases the existence of morbid conditions which do not actually exist, or that of overlooking the presence of morbid conditions which do exist,—ample illustrations present themselves in investigating the symptoms of the diseases of the liver. There are few organs, in particular, in which so large an amount of disease, and that even of, what is usually termed, an acute character, may exist, as in this one, without being revealed by any symptoms which attract the attention of the patient or of those about him; and in which, consequently, the practitioner, when called on to act, labours so much under the disadvantage of not having had it in his power to pursue active measures at the commencement of the disease.

244. “The symptoms of diseases of the liver,” says an assiduous and discriminate observer, “are few in number, often too obscure, or too little marked to enable us, from a consideration of them, to affirm the existence of an affection of that organ. In other instances there is no doubt as to the existence of some affection, but it is very difficult, or even impossible, to determine its nature. For, on the one hand, similar symptoms are often produced by several affections of the liver which present the greatest differences in respect of their anatomical characters; and, on the other hand, we cannot affirm that in any of these affections we meet constantly with any one symptom.” “The object of this article is to furnish some data that may aid, *1st*, In recognising the existence of disease of the liver; and, *2d*, In determining its nature.” (Andral, Clin. Med. iv.)

245. In admitting the frequently obscure character of hepatic affections, we, at the same time, concur with Dr Malcolmson, in thinking that it cannot be too strongly impressed on the young practitioner, that the obscurity of many cases arises from the carelessness of the patient, or from an insufficiently minute examination on the part of his medical attendant, rather than from the absolute absence of symptoms by which the existence of internal disorganization may be detected.

246. In reference to the subject of diagnosis, M. Broussais

has remarked, with much truth, that it is in general advisable for the practitioner to confine his attention to the characteristic or leading phenomena of diseases; and that burdening the memory with all the symptoms that may accompany a predominant lesion, cannot fail greatly to embarrass him in his examination of individual cases. But in limiting, as much as possible, the number of symptoms on which we should rely in our attempts to arrive at a correct diagnosis between resembling diseases, it becomes the more necessary to examine these symptoms thoroughly, so as to acquire an accurate knowledge of the various modifications which they may, under different circumstances, exhibit. This must be our apology for the fulness of detail into which, in the present chapter, we shall occasionally enter.

247. Before commencing the consideration of the particular symptoms by which the practitioner is led to recognise the existence of morbid alterations in the dynamical and structural conditions of the biliary organs, and by which he endeavours to discriminate the several diseases of these organs from one another, it may not be amiss to submit to the reader the following enumeration, given by Mr Twining, of the diseases liable to be mistaken for affections of the liver; since it is obvious that the primary object which we must have in view in investigating these symptoms, is to ascertain what assistance they are calculated, individually or collectively, to afford us in the discrimination of hepatic diseases from those diseases that resemble, and even, occasionally, simulate them.

1st, Empyema, or hydrothorax of the right side of the chest.

2d, Disease of the right *lung*.

3d, Ulcers, and some chronic disorders of the *stomach*.

4th, Diseases of the *duodenum*, or of the *cæcum*, and a loaded state of those intestines, without actual disease.

5th, Scirrhus *pylorus*.

6th, Indurated *pancreas*.

7th, Induration of the transverse *colon* in severe dysentery, with a solitary large sloughing ulcer, and thickening of the coats at that part of the intestine.

8th, Adhesion of the *omentum majus* to the cæcum, or to the brim of the pelvis.

9th, Mr Twining mentions, that in two cases of young women, he has seen an affection of the *spine*, attended with pain at the right side, which had been mistaken for diseased liver, and treated with mercury, to the manifest disadvantage of the patients.

10th, Dr Malcolmson has remarked, that water within the *pericardium* may be mistaken for diseased and enlarged liver; and in his practical Essay on Beriberi, he has recorded three striking examples of the difficulty which occasionally exists, in India, in making the distinction.

SECTION I.

OF PAIN CONSIDERED AS A SYMPTOM OF DISEASES OF THE BILIARY ORGANS.

248. Pain, as a symptom of affections of the biliary organs requires to be considered, 1st, as having its seat in the hepatic region, understanding by that term, the space occupied by the liver, whether as of its natural dimensions, or as having undergone a more or less considerable degree of enlargement; and, 2d, as occurring *sympathetically* in some part of the body not occupied by the liver.

I. PAIN IN THE HEPATIC REGION.

249. Though the occurrence of pain in the hepatic region affords a *prima facie* presumption, it does not in itself constitute a conclusive proof, of the existence of disease in the biliary organs; for experience has shewn that diseases of the neighbouring parts, in the thorax as well as in the abdomen, may occasion pains simulating very accurately, in their seat as well as in other qualities, those which arise from diseases of the

liver and its appendages. Of this nature, according to Andral, are inflammation of the pleura, particularly its diaphragmatic portion; partial peritonitis in the vicinity of the liver; acute or chronic inflammation of the pylorus or of the commencement of the duodenum; nephritis; and tumours developed either between the kidney and liver, or below the gastro-hepatic epiploon. Mr Twining points out adhesions of the right portion of the omentum to the cœcum, or to the brim of the pelvis, as frequently causing a pain at the epigastrium, or at the right portion of the colon and edge of the right false ribs, which is liable to be mistaken for liver disease.

250. For purposes of diagnosis, it would be highly desirable to be able to divide the diseases of the biliary organs into those which are liable to be accompanied by pain in the hepatic region, and those which are not attended by this symptom.

251. Do pains in the hepatic region accompany any diseases of the biliary organs of a simply dynamical character? M. Andral particularly notices that extremely sharp pains are sometimes observed in the hepatic region, which are not accounted for, after death, by the existence of any lesion in the liver or its excretory canals; and which, for various reasons, he regards as *neuralgic* affections of the pneumogastric or great sympathetic nerves. (Clin. Med. iv.) Dr Cusack, in a paper entitled "Cases of certain Nervous Diseases, occurring principally in females" (Dubl. Med. Jour. vol. v.), gives an account of several cases of a hypochondriac neuralgic affection, which, when seated on the right side, is liable to be mistaken for inflammation or disease of the liver. (See also Cyclopædia of Medicine, article Liver, Inflammation of, by Dr W. Stokes.) If *spasmodic* affections of the gall-ducts actually occur, there can be little doubt that they will be accompanied with the production of pain, varying in its intensity according to the degree of spasmodic contraction, and the circumstances under which it occurs. When the biliary passages undergo, from any cause, a considerable degree of *distention*, within a short period of time, it can scarcely be doubted that this must be accompanied by painful sensations of a more or less severe description.

252. With respect to the structural diseases of the biliary organs, those most liable to be accompanied with a considerable degree of pain, seem to be gall-stones, inflammation, suppuration, and, according to Andral, the production of encephaloid matter in the inflamed texture of the liver; whilst those which most usually produce only a very obtuse pain, or none at all, comprehend a great number of the chronic affections of the liver, such as the development of hydatids; its fatty degeneration; its induration; its different kinds of general or partial hypertrophy (granulations, cirrhosis, &c.), and its general or partial atrophy.

253. But in respect of the diseases of the biliary organs, both dynamical and structural, which have been mentioned as being liable to be accompanied with pain, it is necessary to keep in mind, that this symptom, though a frequent, is not an invariable attendant upon them; and that, consequently, we are not entitled, from the absence of pain, to infer the non-existence of any of these diseases.

254. It would be very desirable also, to be able to avail ourselves, for purposes of diagnosis, of those diversities which pains occurring in the hepatic region, in consequence of various affections of the biliary organs, are liable to exhibit, particularly as respects their extent and more precise seat; the circumstances under which they are experienced; their intensity and general character, and their duration. A view of some of the principal diversities of hepatic pain in these respects, seems a proper introduction to any more particular attempt to connect particular forms of this symptom with particular forms of hepatic disease.

255. As regards *extent* and *seat*, pain, proceeding from diseases of the biliary organs, may be diffused very widely through the hepatic region, or it may be confined to a circumscribed point in it. Thus, in some persons, as M. Andral has observed, the whole of the lower part of the right side of the chest, and the hypochondrium of the same side, are the seat of a painful affection. In other instances, the pain is experienced in one or other of the following very various situations; 1st, towards the epigastric

region; *2d*, along the cartilaginous border of the false ribs of the right side; *3d*, in a more or less limited point of the right hypochondrium; *4th*, towards the lower and lateral part of the right side of the chest, and sometimes, in this case, in a very circumscribed space, as, for example, that occupied by the last false rib of the right side; *5th*, posteriorly on the same side, near the vertebral column; *6th*, in the left hypochondrium at the space usually occupied either by the great end of the stomach, or by the spleen; *7th*, and lastly, at different points of the abdomen, such as the umbilicus, the flanks, &c., if they be occupied by the enlarged liver.

256. As respects the *circumstances under which pain* in the hepatic region *is experienced*, the principal diversities which present themselves are the following:—*1st*, The patient may be sensible of pain only when pressure, more or less forcible, is made with the hand or with the fingers, on the hepatic region; or the pain may be relieved, or disappear, under such pressure. *2d*, The pain may be felt only when the body is placed in particular positions, or subjected to particular motions; and *3d*, The pain may be constant, independently of pressure, and under all conditions of the body in respect of posture, &c.

257. In respect of *intensity*, pains in the hepatic region, dependent on affections of the biliary organs, may present every degree, from the slightest to the most excruciating. It is scarcely necessary to observe, that these diversities in the intensity of this symptom may proceed partly from differences in the nature, and partly from differences in the degree, of the affection which it accompanies; and partly, also, from differences of individual constitution or temperament. In some cases of hepatic colic, death has occurred apparently as a consequence of the intensity of the pain. (Portal, p. 174.) “Very violent pains of the liver, from biliary calculi,” says M. Portal (p. 23), “sometimes cease as by enchantment, when the calculi have passed from the choledoch duct into the duodenum; such pains may, therefore, frequently be without danger, though intense. On the other hand, in persons suffering from severe scrofulous

affections, pains in the liver, though so dull as to be scarcely sensible, often announce suppuration of that organ, without any suspicion of its existence being entertained."

258. As to the *duration* of pain in the hepatic region, great diversity may also present itself; and, in particular, it may assume either a continued or an intermittent form. When the pain in the hepatic region is of an intermittent character, we are warranted in inferring either that the morbid condition on which it depends is one of an occasional nature, as spasm, neuralgia, or a shifting calculus; or that, if permanent disease exists, there is required for the production of pain, in addition to it, the co-existence of some other condition that is not constantly present, such as distention of the stomach, &c. Authors have related cases of what they have regarded as hepatitis attended with intermittent fever, of a quotidian, a tertian, a semi-tertian type, &c., in which the pain in the hypochondrium recurred, or became more intense, with each febrile paroxysm (Mongellaz sur les Irritations Intermittentes); but it seems probable that the affection in these instances was spasmodic or neuralgic, and not inflammatory.

259. In respect of *character*, it has been supposed that the occurrence of sharp lancinating pains in the liver, as in some other organs, may be regarded as indicative of the existence of cancerous affection; but Andral has shewn that pains of this character have occurred in persons labouring under hepatic affections not of a cancerous nature; and, conversely, that instances of persons affected with cancer of the liver experiencing very little or no pain, are nearly as numerous as those of persons so affected, who experience this symptom in a severe degree.

PAIN AS ATTENDANT ON BILIARY CONCRETIONS.

260. In employing the presence or absence of pain in the hepatic region, as a diagnostic character for determining the existence or non-existence of *biliary concretions*, it is necessary to keep in mind the three different situations in which these bodies may exist, viz. 1st, the gall-bladder; 2d, the gall-

ducts ; and, 3d, a passage formed by an ulcerated communication between the gall bladder or ducts and the intestinal canal.

261. It seems to be universally allowed that biliary calculi may form and remain in the *gall-bladder* without discovering themselves by pain, or, indeed, by any other symptom whatever ; so that they have been frequently found in this situation, in the bodies of persons in whom nothing had occurred during life, to suggest a suspicion of their existence. But it is alleged, that frequently, even while they remain in the gall-bladder, they occasion “ a dull heavy pain at times, which may be increased by any extraordinary motion, or by a distention of the stomach ; for which reason such patients usually feel themselves most uneasy after eating. In some instances the pain has been very great ; rarely, indeed, if ever, so violent as it is from stones passing the ducts, though more constant and durable, especially when, by the largeness or situation of the stone, it has pressed upon the neighbouring parts.” (Dr Coe, p. 184.) “ In some patients, the pain is like a fit of the choleric returning at times.” (P. 186.) It may be questioned, however, whether these and other concomitant symptoms that have been noticed in cases of concretions in the gall-bladder, must not have had some different origin than the simple presence of these bodies in that situation.

262. In the *gall-ducts*, as in the gall-bladder, a concretion may lie in a dormant state without producing pain. But when a calculus is in progress of propulsion through the ducts, it, in many instances, gives rise to most intense pain. The character of the pain which usually attends the passing of biliary concretions along the gall-ducts, has been frequently and perhaps variously described. According to Dr Coe, “ the patient is seized with a sudden, violent, somewhat deep-seated pain, either at the pit of the stomach, or more inclining to the right side, which is sometimes more constant, but for the most part has exacerbations and remissions, in the manner of labour-pains.” “ The pain is, for the most part, extremely acute ; as violent, perhaps, as any the human body is naturally subject to.” “ All the women I have seen in this disease, have compared the pains

of it to those of labour, but agreed unanimously that they are more violent than labour-pains." Dr Powell, in describing this pain as a "violent and acute pain at the pit of the stomach, more so, apparently, than that which attends upon acute inflammation," remarks; "this pain seems generally to be confined to that point of the epigastric region which very accurately corresponds to the situation of the opening of the common duct into the duodenum, and from thence it appears to dart through to the back. The pain is clearly referred to one spot, and that most probably not the actual one where the concretion is present, but in whatever part of the duct that may be, the sensation is at the termination of the canal in the duodenum." According to Dr Pemberton, "the pain proceeding from spasm or from gall-stones is most acute exactly at the pit of the stomach; but from this spot, as from a centre, there is a diffused pain over the whole of the epigastric region, and this pain often extends to the right side and to the back." Dr Bright, in remarking that the pain with which the passing of biliary calculi is generally accompanied, may be considered one, at least, of the most prominent symptoms which attend this disease, says; "That pain is of two kinds—a dull aching pain, which is constant; and an acute and agonizing pain, which comes and goes in paroxysms:" and Dr Pemberton observes, that "though the patient, during the passage of a gall-stone, is never free from some pain, yet it increases by paroxysms, into a state of acute suffering, and subsides again into one of comparative ease; and these paroxysms occur several times in an hour." But the last-mentioned author, in remarking that the pain seldom lasts, without intermission, above two or three days, adds, that he remembers its continuing in one person near a month, without any intervals of ease, except what were procured by opium.

263. What are the circumstances which can be supposed to determine the non-occurrence or occurrence of pain during the passage of a concretion along the gall-ducts, and its degree of intensity? The most obvious of these seems to be the pro-

portional size of the concretion and of the duct, both of which may vary greatly in this respect. Their relative dimensions may be such as to enable the concretion to pass easily, in which case, probably, no pain will arise; or they may be such that a very slight degree of distention will suffice to allow of the concretion's passage; or, lastly, they may be such as to require a great degree of distention before the passage of the concretion can be effected, in which case, we may presume, the intensity of the pain will be greatest.

264. But, besides the simple *distention* of the coats of the ducts occasioned by a concretion in its progress through them, if we admit that the gall-ducts are susceptible of spasmodic *contraction*, we can imagine this state to be excited by a concretion so situated; and in the occurrence of this spasmodic contraction, perhaps, may be the explanation of the intensity of the pain that is experienced in some cases in which the size of the calculi is by no means considerable. If, indeed, it be generally true, as has been alleged, that large calculi occasion less pain than small ones, during their progress through the gall-ducts, it does not seem obvious on what other principle this can be explained, except the less liability of a large than of a small body to produce spasm, in its passage through an irritable muscular canal; as surgeons frequently find to happen in the introduction of instruments into the urethra and œsophagus.

265. Whatever may be the influence of these, and other local circumstances, in determining the amount of pain resulting from the passage of gall-stones along the ducts, it seems very probable that this must, in a considerable degree, be influenced by individual constitution; so that in two cases of this kind, apparently identical in their circumstances, in the one there shall be intense pain, while in the other it shall be entirely wanting, or trivial in amount.

266. Some of the phenomena which accompany pain when it arises from spasm of the gall-ducts, or from the passage of biliary concretions along them, serve, perhaps, more effectually than any characters of its own, to distinguish it from pain dependent

upon inflammation. (1.) "The pain of gall-stones is commonly attended," as Dr Coe remarks, "with great sickness and vomiting, with faintness, shortness of breath, great restlessness, and anxiety." "The breath," says Powell, "becomes short and hurried; there is great general anxiety and restlessness, often amounting to delirium, and at last great depression and fainting; the stomach is affected by nausea, and there are frequent efforts to vomit." (2.) When an intense degree of pain occurs as a consequence of *inflammatory action*, we may expect it to be accompanied with a febrile excitement of the circulation; but nothing of this kind attends the pain arising from spasm, or from the passage of gall-stones. Dr Pemberton, accordingly, mentions the circumstance of the pulse not being 100 in a minute, as one of the characters by which the pain of gall-stones or spasm may be distinguished from that which attends inflammation. And the more exquisite the pain is, says he, provided the pulse is below 100 in a minute, with the more confidence may we rely on this diagnostic symptom; inasmuch as the only other condition from which such pain could arise is the inflammation of a membrane, in which case, the pulse would far exceed the number specified. (3.) The occurrence of perspiration, as a consequence of the pain occasioned by spasm or gall-stone, is another mark by which we may be assisted in determining its non-inflammatory character. "The severity of pain is so extreme," says Dr Bright, in speaking of the passage of gall-stones, "as to bring on a state of the greatest exhaustion, and reduce the pulse below the natural standard, both as to strength and frequency, or, still more often, to render it rapid and weak, while the hands and the whole surface are bedewed with a cold perspiration."

267. There seems reason to believe that, in some of those cases in which calculi have made their way from the gall bladder or ducts into the intestinal canal, by perforations in their respective coats, the whole of this process has been effected, without any considerable degree of pain having been produced.

PAIN AS ATTENDING INFLAMMATORY AFFECTIONS
OF THE LIVER.

268. In the study of pain as a symptom of *inflammation of the liver*, the pathologist has a twofold object ; 1st, to ascertain in what respects inflammatory hepatic pain differs from pain produced by other affections of the biliary organs ; and 2d, to discriminate those particular variations in inflammatory pain of the liver, which depend upon, and are indicative of, the various seats of the inflammation, as regards texture or region of the organ, as well as the degree of the inflammation and its state of advancement.

269. It is with neuralgic pains, or the pains produced by the passage of gall-stones through the ducts, that, in its more intense degree at least, inflammatory hepatic pain is most likely to be confounded.

270. But, in the *first* place, inflammatory pain is to be distinguished from the spasmodic and cholelithic, by the gradual mode of its development as contrasted with their suddenness of suppuration ; by its permanence, as compared with their paroxysmal character ; and by its gradual mode of cessation.

271. In the *second* place, the effect of posture or of pressure in increasing or diminishing hepatic pain, affords much assistance in discriminating its proximate cause. "In those who have biliary calculi," says M. Portal, p. 23, "the pain is sometimes of extreme severity, with vomitings, convulsions, &c. ; and yet when we touch or slightly compress the part, we by no means excite such an increase of pain as would be produced if the pain of the liver proceeded from any other cause, particularly if it was inflammatory." In the case of spasm or gall-stones, according to Pemberton, "the greatest relief from pain is experienced by bending the body forward upon the knees," and pressure on the part affords relief. The pain of inflammation is increased by pressure, in proportion as the inflammation is nearer to the surface ; and the posture and motions of the pa-

tient are regulated, as far as possible, with a view to avoid pressure upon the inflamed parts.

272. It is generally specified as a character of *hepatitis*, particularly in its acute form, that the *decubitus* of the patient, according to the technical expression, is on the right side; lying upon the left side being attended with pain, in consequence, it is presumed, of the weight of the organ stretching the over-sensitive nerves. When the liver has undergone a great degree of *enlargement* from any cause, if the patient attempt to lie on the left side, the nerves, though they may not be over-sensitive in themselves, will undergo a proportionally increased degree of stretching, and the weight of the liver will also compress other organs. Hence, in such cases, also, the *decubitus* will be on the right side.

273. Dr Malcolmson remarks (1.) that, when an *abscess* of the liver is of considerable size, or adherent, the position assumed by the patient is often very striking, the distension of the abdomen and pressure of the diaphragm causing him to seek relief by drawing up the thighs on the abdomen, and bending the body to the right side; or by sitting up in bed leaning to the same side. This circumstance, he observes, will help to distinguish the disease from water in the pericardium, and some other complaints, with which it has been, and may again be confounded. (2.) The same author mentions the patient's lying on his back, a little turned to the right side, as a position so characteristic of hepatic inflammation, that an observant practitioner may often detect the existence of *hepatitis* from this circumstance alone; and he ascribes the patient's preference of this posture, to the ribs being pushed against the diseased liver by the weight of the body, on his attempting to lie wholly upon the right side. (3.) When, however, it is the left lobe that is principally diseased, or when this lobe is enlarged, and pressed on the diseased right side of the organ, it is not uncommon, Dr Malcolmson remarks, for the patient to lie most easily on the left side. (*Edin. Med. Surg. Journ.*, lii. 377, 359.)

274. In the *third* place, the seat of the pains produced by spasm of the gall-ducts, or the passage of calculi along them, is

very uniformly the pit of the stomach, and diffused from thence, as from a centre, over the whole of the epigastric region. There is likewise, when this pain assumes a shooting character, great uniformity in the direction which it follows, viz., it darts through the back to the right side. The pain arising from hepatic inflammation may occur in a number of situations in which that dependent on spasm or gall-stone, never occurs.

275. Supposing the dependence of pain in the hepatic region upon an inflammatory affection of the liver, to be satisfactorily established, we have next to consider what assistance we may derive from its particular characters, in judging of the various circumstances of the inflammation, as respects its seat, its intensity, and its stage of advancement.

276. As respects the *seat of the inflammation*, (1.) the intensity of the pain may afford us some little assistance in judging whether it affects the surface or the substance of the liver; the pain of membranous hepatitis being usually of a more acute, and that of parenchymatous hepatitis of a duller character. The pain of membranous hepatitis, also, is more liable to aggravation, by every position, motion, or other cause, that subjects the parts to compression or distention. (2.) The seat of the pain may, in part, assist us in judging in what particular portion of the liver the inflammation is seated; but, in judging of this, probably more dependence is to be placed on the marks of functional disturbance furnished by the organs contiguous to the liver. Thus, when the upper or convex surface of the liver is the seat of inflammation, it may be expected that the *lungs* will exhibit marks of being involved in the affection to a greater or less extent; and when its lower or concave surface is inflamed, the *stomach* may, in like manner, be expected to participate.

277. No very accurate judgment respecting the *intensity of the inflammation* can be formed from the intensity of the pain; for this is subject to great variations, independently of the degree of the inflammation;—variations attributable partly, as we have seen, to diversities of the tissue affected, but partly also, to peculiarities of individual constitution which we are, per-

haps, unable altogether to appreciate. It is to such inappreciable causes that we must attribute the not unfrequent occurrence, both in hot and in temperate climates, of inflammatory affections of the liver, advancing pretty rapidly to suppuration, without producing such a degree of pain as to lead to a suspicion of their existence; of cases, in short, of latent hepatitis.

278. As to the *stage of advancement* which the inflammation may have attained, the supervention of suppuration is perhaps the period in the progress of inflammatory affections of the liver, which it is of most importance for the practitioner to be able to discriminate. But of this stage of hepatitis, as Mr Annesley remarks, "pain is a very uncertain symptom. At the period of tumefaction or enlargement of the organ which, in the more acute cases, precedes the formation of matter, the pain is sometimes considerable, and is afterwards converted into a throbbing or beating sensation, accompanied by shooting or darting pains in various directions. When, however, abscess is fully formed, a pricking pain is often only felt, and chiefly in the situation where the abscess is pointing. In the more chronic cases, the pain is often not much felt in the region of the liver, and this pricking sensation is the only uneasiness felt in that situation, and sometimes the only notice we receive of the existence of abscess, unless our attention has been particularly directed to the subject. In such cases, however, pain will generally be complained of on sudden motion, on quick respiration or action of the diaphragm, as in sneezing, coughing, &c." According to Dr Malcolmson, "pain on slight pressure, when fixed, or when it returns to the same spot, especially in the lumbar region or between the ribs, is a serious symptom; and, when accompanied by emaciation and evening fever, however slight or irregular, will be too often found to be caused by the formation of adhesions or abscess. When the tenderness arises from rheumatism, or from sympathetic affection of the muscles, from mere disorder of the functions of the liver, it is for the most part transitory, diffused and seldom fixed in the same spot; and when from the latter cause, is never severe."

II. SYMPATHETIC PAINS, OCCURRING IN HEPATIC AFFECTIONS.

279. We have, in the next place, to offer a few remarks on the pains occurring in different parts of the body, external or internal, as sympathetic effects of diseases of the biliary organs, and particularly of the liver, by which the suspicions of the medical practitioner, unless he be aware of this source of deception, may be entirely withdrawn from the actual seat of disease, to an organ or part that is not really affected.

280. The seat in which such a sympathetic pain most frequently occurs, or at least, in which its occurrence has been most frequently noticed, is the right shoulder, a fact of which no satisfactory explanation seems yet to have been proposed. Nor does it seem to be well determined in what affections of the biliary organs sympathetic pain in this situation is liable to occur. Its frequent occurrence in hepatitis has been long noticed, and has led even, in some instances, to the idea of its being a pathognomonic symptom of that disease. But a considerable number of years have now elapsed since Mr Curtis pointed out that, in India at least, pain in the right shoulder is far from being a uniform symptom of hepatitis, though he concluded that, when it does occur, it renders the nature of the disease very certain. The subsequent experience of Louis and Andral in temperate climates, and of Annesley in India, have confirmed the correctness of Curtis's statement respecting the frequent absence of this form of pain, in cases of hepatitis. M. Louis goes the length of expressing a doubt "whether this symptom really belongs to hepatitis;" but Mr Annesley's more extended observation fully confirms that of Curtis, for he, too, says, that, when present, it is certainly characteristic of the disease in the right lobe.

281. But though, in India, hepatitis may be the disease in which the occurrence of this symptom is most frequently noticed, it does not follow that it occurs exclusively in this affection. Dr Coe mentions "a considerable pain in the right shoulder, or arm, or both," as a symptom which sometimes at-

tends stones in the gall-bladder, whether they are of the larger or smaller kind; and he also mentions, among the signs of gall-stones passing through the ducts, that "sometimes a pain is felt in the shoulder and arm on the right side." Dr Powell observes, that, "in acute inflammation of the liver, as in some cases where it has been wounded, and, it is said, occasionally too from the passage of concretions, the pain is felt chiefly at the top of the shoulder, and sometimes this has been the only spot of which the patient has complained." To these authorities respecting this symptom, we shall add only that of M. Andral, who, in observing that it has long been remarked that *several affections* of the liver are accompanied by a fixed pain in the right shoulder, adds, "This pain has appeared to us to occur less frequently than has been alleged; yet, in more than one case, we have observed it in a very marked degree."

282. The fullest enumeration with which we are acquainted of the other seats, besides the shoulder, which pain, occurring as a sympathetic effect of disease of the biliary organs, may occupy, is that given by Mr Annesley in reference to inflammation of the substance of the liver. After mentioning that the pain accompanying this affection is sometimes referrible to the top of the right shoulder, frequently to the right shoulder-blade, and occasionally to both shoulder-blades, he proceeds: "It is, on some occasions, seated on the back, between the lower angles of the shoulder-blades; and, in some instances the only pain which has been complained of has been in the loins. We have observed it, in a few cases, in the right clavicle and its vicinity, and, in others, in the left shoulder and shoulder-blade only." "We have seen a few cases where pain followed the course of the muscles of the right side of the neck; it often extends from under the ensiform cartilage, in the direction of the mediastinum, to between the shoulder-blades." "Pain frequently also extends from the right side, under the shoulder-blade, to the spine, where it terminates."

283. Dr Malcolmson, in his *Essay on Abscess of the Liver*, mentions several additional seats of pains occurring as sympathetic consequences of hepatic affections. "Pain at the

nipple," says he, "is a common symptom in deep-seated liver-disease, even where the diaphragm and lung are unaffected. Pains at the extremity of the sternum, or shooting under the ribs and across the back, are also to be looked for; nor is their shifting nature, nor the ease with which they are removed for a time, any proof that the disease is not of a serious nature. The rarer symptom of pain in the right hip" (which occurred in a case that is related by Mr M.), "may have been caused by irritation of the nerves, by the abscess—afterwards found to exist—in the posterior part of the right lobe; and such anomalous pains are never to be overlooked. They are occasionally felt in the right knee or foot, in both the lower limbs, in the nucha or back of the head; and depend on the same cause as the more common symptoms of pain at the top of the shoulder and the side of the neck, or of numbness of the upper two-thirds of the arm, or down to the middle of the forearm, which, however, are often absent, or of very temporary duration." It may here be noticed, that Dr O'Brien states himself to have met with several instances of hepatic affections, in which so severe a pain was felt in the os ilii and hip on the right side, as to give the patient a lame step. (Dubl. Med. Trans. i. 363.)

284. We may refer here also to a case described by Andral, in which the liver was found, after death, filled with cancerous masses; and in which, during life, the patient had never complained of any pain in that region, but had experienced, from time to time, "a very painful sensation in the two sides of the chest, that soon extended to the arms and to the hand; the latter, in particular, was the seat of a very disagreeable creeping sensation; sometimes one or other arm was seized with very sharp, lancinating pains, passing like flashes." The same author, in reference to the pains occurring as sympathetic effects of diseases of the biliary organs, notices that, in some cases of affection of the liver, the only pain experienced by the patient has been seated in the head; and this has sometimes been sufficiently intense, constant, and long continued, to fix exclusively the patient's attention.

285. In the instances hitherto quoted, the pains occurring sympathetically in diseases of the biliary organs have been referred to external parts; but, in other instances, they seem to occupy a position in some of the internal viscera. Baillou, who believed melancholy to have its principal seat in the liver, had remarked, that frequently those labouring under this disease, in place of experiencing the pain in that region, refer it to the chest. "At other times," says M. Portal, in reference to this observation, "those who labour under alterations of the liver experience pains in the heart, and more frequently in the stomach. Others have referred them, in the left hypochondrium, to the spleen; others, to the umbilicus, to the small intestines, to the kidneys, and principally to the right. All these differences in the seat of the pains arise, no doubt, from the nerves of the region of the liver, which is the seat of affection, having correspondencies with particular nerves of the parts that have been named; whence it may happen that a lesion of the liver, producing little pain in that organ, gives rise to a much more severe pain in those named, especially in the stomach, the most sensible of all.* In this case, we might easily be deceived as to the seat of the cause of that pain, which, though actually in the liver, would not be referred to it by the patient." (P. 21.)

* The influence of inflammation of the liver in producing a considerable proportion of the pains falsely attributed to the stomach under the name of Cardialgia, &c. was particularly insisted upon by Ferrein in a Memoir published in the Transactions of the Royal Academy of Sciences for 1766 (4to, p. 121). The late Dr Conwell, in his Treatise on the Liver, alleges, that "when a nerve, composed of ganglionic and cerebro-spinal filaments, sustains injury from inflammation, &c. in the liver, the ganglionic filament does not announce it by pain, but the cerebro-spinal filament does, and *the pain is felt at the opposite and remote extremity of the cerebro-spinal nerve.* The symptoms of hepatic disease," he adds, "prove this. Accordingly, a chart, exhibiting the opposite and remote distribution of the cerebro-hepatic nerves and of the cerebro-spinal nerves corresponding to them, would indicate the situations of disease in the liver, from the seat of the symptomatic pains occasioned by it." Dr Conwell has proceeded with most praiseworthy industry to trace the course of all the nerves which he considers related to the liver; but unfortunately, upon this, as on various other occasions, the reader has to regret that this author's discrimination in the use of his materials is not equal to his assiduity in their collection. His suggestion, however, is one well deserving of being followed out.

SECTION II.

OF SWELLING, CONSIDERED AS A SYMPTOM OF DISEASES OF
THE BILIARY ORGANS.

286. Next, if not equal in importance, in the diagnosis of diseases of the biliary organs, to the symptom of Pain, is the ascertainment of the existence or non-existence of Swelling in the hepatic region, and, in the event of its existence, the determination of its characters.

287. The material causes having their seat in the biliary organs, upon which such swelling may depend, are, *1st*, An increased accumulation of blood in the vessels; *2d*, Distention of the gall-passages; and *3d*, The deposition of foreign matters, either of a fluid or solid character, in the parenchymatous structure of the liver. How much such a swelling may vary in amount, is obvious from the fact, that the weight of the liver may be increased, from its natural standard of between 2 and 5 lb., to not less than six times the latter weight, and even upwards.

288. From whatever cause the swelling may proceed, it may either be manifest upon *simple inspection*, or it may require careful, and even expert, *manipulation* for its discovery; to which means of investigation may be added those of *percussion* and *auscultation*.

289. Some of the Indian writers on diseases of the liver, recommend that the *inspection* of the hepatic region, with a view to determine the existence or non-existence of swelling of the biliary organs, should be made, not from one or other side of the patient's bed or couch, but from the foot, as enabling the eye to compare with more precision the relative conditions of the two hypochondria.

290. *Percussion* of the hepatic, as of the other regions of the body, may be performed either by striking the fingers directly upon the part to be examined, or—what is much better—by interposing one of the fingers of the other hand between the

part percussed and the fingers employed in percussing; or, lastly, by the interposition of the instrument termed the Plesimeter, consisting of a small plate of bone or ivory, of moderate thickness, with two flat surfaces, and with some roughness or irregularity upon its margin, to enable the fingers which hold it to press it down firmly upon the surface to which it is applied.

291. It may be proper here to recall some of the principal facts that have been ascertained relative to the percussion of the liver in the state of health. We shall suppose the individual under examination to be in the erect posture.

292. In the state of health, the right side of the chest emits the clear *pulmonary* sound throughout its whole extent, from the top of the lungs down to the sixth or seventh rib. From the sixth rib, or a little lower down, a diminution of the clearness of the pulmonary sound begins to be perceptible, indicating that we are approaching the liver, as it lies sunk in the hypochondrium. On gentle percussion, however, the dullness of the *hepatic* sound is at first little marked, in consequence of the thin lamina of lung that is here interposed between the liver and the costal parietes; but it is more evident in proportion as percussion is performed with an increased degree of force. Lower down in the hypochondrium, where there ceases to be any pulmonary substance interposed between the liver and the parietes, the dull hepatic sound manifests itself upon the gentlest percussion, and continues downwards to the margin of the false ribs, beyond which we come upon the clear sound of the intestines. As a thin layer of pulmonary substance, lapping over the upper part of the liver, masks, by its sonoriety, the dull hepatic sound; so, a thin layer of hepatic substance, projecting a little way over, or in front of, the stomach and intestines, masks the transition from the dull hepatic, to the clear intestinal, sound.

293. The distance between the points on the surface of the costal parietes, where the dull hepatic sound commences and those where it terminates, represents, of course, the vertical height of the liver and of the right hypochondrium. By repeat-

ing the percussion in a vertical direction, or from chest to abdomen, at different distances, and always in parallel lines, and by marking each point of change of sound on the upper and lower margins of the liver, we may obtain an exact idea of the limits of that organ *superiorly* and *inferiorly*.

294. Examined transversely, the costal parietes, seated between the sixth rib and the border of the false ribs, on the right side,—those, in short, which cover the right hypochondrium, will emit, on percussion, almost throughout their whole extent, the dull hepatic sound; but this dulness will differ in degree, according to the height at which the chest is struck, just as in vertical percussion. *Outwards*, the dull sound extends to the posterior surface of the body, marking the prolongation of the liver backwards. *Inwards*, it terminates within the mesial line; towards the upper part, the internal limit of the dull sound of the liver is about an inch, or an inch and a half, within that line, beyond which the pulmonary sound is distinguishable as far as the heart; towards the lower part, the dull hepatic sound extends a little beyond the inner margin of the cartilaginous border of the right false ribs, as comprised between the projecting angle towards the ninth rib, and the ensiform cartilage; and it approaches here a little closer to the mesial line than it does superiorly. By joining the extreme points that have been mentioned, we obtain the *internal* boundary of the liver.

According to the experiments of M. Piorry, the liver presents from $2\frac{1}{2}$ to 3 inches in vertical height, at the part nearest to the sternum; 4 inches, more exteriorly; and from 4 to 5 inches, in the lateral region. Its transverse diameter is from 10 to 12 inches.

295. When the liver undergoes enlargement, whether general or partial, the direction in which it extends, is by no means uniform. *1st*, Sometimes (still understanding the patient to be in an erect posture) the enlargement is upwards, towards the cavity of the chest, pushing before it the diaphragm and the lungs. *2d*, Sometimes it is downwards, towards the abdominal cavity, so as to protrude from below the costal parietes. *3d*, Sometimes it is forwards, so as to occasion more or less displacement

of these parietes. And, 4th, It may extend at the same time in more than one of these several directions.

296. It must always be kept in mind, in endeavouring to trace the boundaries of the liver, that this organ may undergo displacement, in precisely the same directions in which it may undergo extension from enlargement; and the means of distinguishing between these two states of the organ, viz. its enlargement and its displacement, require to be kept steadily in view.

ENLARGEMENT OR DISPLACEMENT OF THE LIVER UPWARDS.

297. The suspicion of the liver having undergone enlargement, or displacement, upwards, may be excited by a greater or less degree of oppression of breathing being experienced by the patient. It is obvious that, if the liver has actually undergone one or other of these changes, it will be found, upon percussion of the right costal parietes, that the dull hepatic sound has gained, to a proportional extent, upon the clear pulmonary sound. The amount of the change may be judged of pretty nearly, by the height to which the dull hepatic sound rises above the sixth rib. To determine whether the change consists in the enlargement or displacement of the liver, it is proper to ascertain the situation of its lower margin. If this be natural, or lower than natural, we conclude that the elevation of the upper margin is the effect of enlargement; but, if the lower margin be elevated above its natural position, we infer that the liver has undergone displacement, from some force pushing it upwards. It may even happen sometimes, in cases of enlargement of the left lobe, that a dull sound is emitted from the left hypochondrium, similar to what is more frequently produced in that region by tumefied spleen.

298. Dr Malcolmson has recently pointed out another physical sign of the encroachment of the liver upon the lungs, derivable from the use of the stethoscope, viz. a loud sound between a crepitous rattle and a bleating, audible to the patient and even to the bystander, and accompanied by a vibration of the parietes of the

thorax, communicated to the hand applied to the part. In a case which he details, Dr Malcolmson satisfied himself that the sound in question was caused by the thin edge of the lung being compressed against the costal pleura by the enlarged liver. Dr Malcolmson mentions, that when enlargement of the liver takes place, either from congestion or chronic inflammation of the right lobe, or abscess of its convex surface, the tendency to encroach on the cavity of the chest is so great that he has found the use of percussion and the stethoscope lead to the detection of enlargement of the viscus, more frequently even than examination below the margin of the ribs.

299. An obvious source of fallacy to which we are exposed, in judging of the position of the upper margin of the liver, is the occurrence of changes within the thoracic viscera themselves, that will cause the clear pulmonary sound to be replaced by a dull sound, bearing more or less resemblance to the hepatic. These changes may consist in effusion into the cavity of the pleura, in infiltration of the substance of the lungs, in pneumonia, &c. For the discrimination of the enlarged or displaced liver from changes such as these, it is to be kept in mind, 1st, That when there is a fluid free in the cavity of the pleura, change in the patient's position causes a variation in the seat of that fluid, and consequently of the dull sound which it emits; whereas change of position exerts scarcely any influence on the situation of the liver, or, consequently, of the hepatic sound; and, 2d, that the sound emitted, by portions of infiltrated lung, and even of lung that has been the seat of pneumonia, at least in its early stages, is not so dull as that emitted by the liver.

300. It is conceived, that, upon the same principle on which percussion enables us to detect that the liver has undergone such *enlargement* as to cause it to extend upwards or downwards beyond its natural boundaries, so it may enable us to recognise those cases in which that organ undergoes a *diminution* of its dimensions.

ENLARGEMENT OR DISPLACEMENT OF THE LIVER
FORWARDS.

301. The liver occasionally enlarges in such a way as to throw forward, or cause a bulge of, the costal parietes of the right hypochondrium, particularly their cartilaginous portion. The cases in which such a projection of the costal parietes forwards takes place, seem to be chiefly instances of the development of enormous encephaloid tumours in the substance of the liver, or of hydatid cysts in its substance or upon its inferior surface.

ENLARGEMENT OR DISPLACEMENT OF THE LIVER
DOWNWARDS.

302. The hepatic swellings, respecting which the practitioner is most frequently called on to exercise his powers of diagnosis, are those which are situated in the abdominal cavity, below the margins of the false ribs. Here, again, it is necessary to remember that the presence of the liver in a preternatural situation, may depend either upon its enlargement or upon its simple displacement. In cases in which the abdominal parietes are thin, and there is no preternatural accumulation within the cavity of the peritoneum, enlargement or displacement of the liver downwards may be obvious to simple inspection; but to trace the extent and direction of the change, there is need both of manual and digital examination through the integuments, or of palpation, as it is termed by French writers, and of percussion.

303. In proceeding to conduct a *manual examination* for the detection of enlargement or displacement of the liver beneath the costal margin, there are two preparatory precautions of much importance. The *first* is to place the patient in such a position, and to adopt such other measures, as are best calculated to produce the most relaxed condition of the muscles of the abdominal parietes that can possibly be effected. With this view, he should

be laid on his back, with his legs flexed upon his thighs, and his thighs flexed upon the abdomen. Care must be taken that the hands of the examiner shall communicate no sensation of coldness to the patient, and that they are applied in such a delicate and gradual manner, as not to excite uneasiness or apprehension. With all the precautions that can be used, if the examination gives rise to pain, the patient is very liable to contract the abdominal, and particularly the recti muscles, even against his own intentions, so as to render it impossible to ascertain the condition of the interior of the abdomen, and to deceive those who, not being on their guard against this source of fallacy, mistake the contracted muscles for tumour in the abdominal cavity. Mr Twining considers as a very common and important symptom of an incipient tendency to central abscess in one or other lobe of the liver, a great degree of tension of the corresponding rectus abdominis muscle, which resists pressure by a quick involuntary action, while the other is lax, and other parts of the patient's belly are comparatively soft and elastic. (i. 243.)

304. The *second* precaution is to use those means which are likely to bring a swelling or tumour in the hepatic region, supposing it to exist, into such a position in the abdominal cavity as, from the pliancy of the parietes, will be favourable for its detection and examination. It is on this principle, that writers on liver-diseases, recommend that the hand not engaged in the actual manipulation, should be employed in raising the right false ribs and side, so as to carry the liver forward. For the same reason, such a slope should be given to the upper part of the body, as will assist the liver in descending in the abdominal cavity by its own weight.

305. When the practitioner is satisfied that matters are favourable for his examination, he has first to investigate, by cautious pressure, whether any foreign mass occupies that space beneath the cartilages of the false ribs, which, in health, is occupied by folds of the intestinal canal; and if so, how far this foreign mass extends; and having procured as much information as he can on these points, he has next, by the cau-

tious insinuation of his fingers, to endeavour to trace out the margin or boundaries of the mass, in its various directions, with a view to satisfy himself whether it actually be formed by the liver, or by some neighbouring organ in the state of disease; as the stomach, the duodenum, the omentum, the pancreas, or even more remote organs, as the ovarium. The circumstance on which he must chiefly rely in his judgment on this point is, the possibility of tracing the passage of the mass upwards behind the cartilages of the ribs, in which case the presumption is strongly in favour of the liver being the seat of disease; or, on the other hand, the possibility of tracing the boundary or margins of the mass as it approaches towards the proper seat of the liver. Another ground of distinction, by which he may aided in his diagnosis, is, that hepatic enlargements are necessarily fixed in their positions, whilst most of the tumours that simulate them, admit of a greater or less degree of motion.

306. It is obvious, that, just in the same way as we endeavour to trace the continuity of any tumour, in the abdominal cavity, with the liver, by means of palpation, we may also endeavour to determine the question of its continuity, by means of percussion. If we find the hepatic sound to pass without interruption, and without considerable modification of its character, into the tumour, we shall be led to believe, that it does in fact proceed from the liver. Conformably with this view, it is stated by M. Piorry, that, in cases in which there exist, at the same time, an enlargement of the liver, with a tumour or encysted dropsy in the cavity of the abdomen, percussion will often enable us to ascertain whether these affections be connected with the liver, or whether they are separated from it. Sometimes the dull hepatic sound will be succeeded lower down in the abdomen, by a dull resonance of a different character, proceeding from the tumour, and terminating on a line corresponding with the border of the liver. This may occur if the morbid growth is in immediate contact with the liver, and differs from it in density. In other instances, a fold of intestine may be situated between the liver and the tumour, and the clear sound which it will emit, upon percussion, will sufficiently

establish that the accidental growth is independent of, or distinct from, the liver.

307. Even when we can distinctly trace the sharp edge of the liver protruding beneath the costal parietes, this protrusion, as already suggested, may be the effect not of an enlargement of this organ, but of its displacement by disease of other parts, as by an effusion into the right cavity of the chest pushing down the diaphragm.

308. According to Dr Stokes, when empyema occurs to a considerable extent upon the right side of the chest, the diaphragm, being displaced or protruded into the upper portion of the abdomen, where it may be found full and resisting, pushes the liver downwards, forwards, and across this cavity. When the liver is thus displaced, a tumour corresponding to it in size is found in the right hypochondrium, frequently accompanied by a distinct sulcus, immediately below the ribs, and above the upper boundary of the tumour. This sulcus results from the space left by the touching of the two convex bodies, namely, the protruded diaphragm and the upper portion of the liver. On the absorption or evacuation of the empyematous fluid, the liver ascends and the sulcus disappears. The disappearance of the sulcus, however, does not necessarily imply the ascent of the liver to its natural position, for that organ may yield to the pressure of the diaphragm, and become deeply concave on its upper surface. This, Dr Stokes states to have occurred in a case in which the liver was softened and engorged, so that the disappearance of the sulcus is favourable only when accompanied by the ascent of the hepatic tumour. (On the Chest, &c.)

309. It is necessary also, in attempting to form a judgment as to the source of any swelling or tumour that may be discovered in the hepatic region, to remember that, though in many cases the enlargement of the liver is general, all its parts being equally affected, yet, in particular cases, the several portions of this organ undergo enlargement, from different forms of disease, separately. The left lobe may remain of its natural structure and dimensions, whilst the right lobe is diseased and enlarged; or *vice versa*. Consequently, the circumstance of

a swelling or tumour being limited to the right or to the left hypochondrium, or to the epigastrium, is not sufficient to disprove its being seated in the liver.

310. When the existence of a swelling or tumour in the hepatic region, and its connection with the biliary organs, have been satisfactorily ascertained, we have next to inquire how far the character of the swelling, considered by itself, can guide us in judging as to the nature of the disease which has produced it? The first point to be ascertained is, whether the bulk of the tumour consists of fluid or of solid matter, and this, of course, is to be determined by its yielding or not yielding a feeling of fluctuation, when carefully examined.

DISCRIMINATION OF FLUCTUATING TUMOURS.

311. The diseases connected with the biliary organs which produce a *fluctuating* tumour, are hepatic abscess, serous or hydatid cyst, and distention of the gall-bladder, whether with bile, or with a fluid secreted from its own internal surface; or with both kinds of fluid combined in various proportions.

312. M. Petit, the son, many years ago, in some remarks published in the first vol. of the Memoirs of the Royal Academy of Surgery, pointed out the grounds of diagnosis between hepatic abscess and distention of the gall-bladder, so far as this is to be derived from the swelling. The following are the characters on which he insisted. *1st*, The tumour caused by hepatic abscess is not circumscribed, but appears merged in the neighbouring parts, and, as it were, lost in the integuments, which are usually œdematous; whilst that produced by swelling of the gall-bladder is exactly defined and distinct, being seldom accompanied with œdema. *2d*, The tumour formed by the distended gall-bladder is always situated beneath the false ribs, behind the rectus muscle; but that depending on abscess of the liver is very variable in its situation, and may occupy, indifferently, all parts of the epigastric region. *3d*, There are several respects in which the fluctuation that accompanies

the two kinds of swelling differs. (a) In distention of the gall-bladder, the fluctuation appears suddenly; in hepatic abscess, very slowly; in the latter case, it is suspected long before it is ascertained; in the former, most generally, it presents itself before its existence has been suspected. (b) From the earliest period that the fluctuation of the distended gall-bladder appears, its existence is unequivocal; whilst the fluctuation of abscess, particularly at its commencement, is a matter of much uncertainty. (c) The fluctuation of the abscess is, at first, apparent only in the centre of the tumour, and in proportion as the suppuration increases, it extends to the circumference; whilst the fluctuation of the distended gall-bladder is, from the first day, almost as manifest at the circumference as at the centre. 4th, and lastly, To whatever extent the suppuration may proceed in abscess of the liver, its circumference is always hard and swelled; the distended gall-bladder, on the contrary, after the subsidence of inflammation, is not in general surrounded with any degree of hardness or swelling.

313. When a tumour results from the projection of a serous or hydatid sac upon the surface of the liver, it usually elevates a portion of the abdominal parietes, so as to be perceptible on simple inspection. The great degree of resistance, and the great elasticity of the swelling, combined with those other circumstances that imply its connection with the liver, may lead to the detection of the nature of a tumour of this kind.

314. M. Piorry alleges, that, when a hydatid cyst is percussed, either directly or with the plessimeter, it emits a very peculiar sensation, which he designates hydatid *fremissement*, or quivering. He describes it as consisting in a vibration or oscillation, very analogous to those produced on the percussing finger by the *timbre* of a repeating watch, or by a chair containing elastic springs; and he holds that this phenomenon, when it is very manifest, is a positive sign of the presence of numerous hydatids in a common cyst.

DISCRIMINATION OF SOLID TUMOURS.

315. During life, the different diseases of the liver, capable of producing solid swelling, may, under favourable circumstances, be, in some measure, discriminated from one another, by the degree of smoothness, roughness, or more prominent inequality, which the surface of the swelling may present. In enlargement from congestion or inflammation, the surface will be smooth, without prominences or depressions. In tubercular enlargement, it is liable to present numerous inequalities, in consequence of unequal development of its several parts. In enlargement from cancerous masses, numerous prominences raising the parietes of the abdomen, may be felt; but when softening occurs in these masses, says M. Andral, each elevation is succeeded by a depression. We shall be assisted, likewise, in judging of the nature of the morbid condition of the liver upon which the swelling depends, by the permanence which it exhibits. When, for example, the swelling comes and goes in a sudden manner, we may infer that it depends upon congestion.

316. But in laying down these general rules relative to the possibility of ascertaining the particular nature of a disease seated in the biliary organs, from an examination of any tumour or swelling to which it may give rise, it must be borne in mind that the absence of swelling in the hepatic region, cannot be regarded as affording in itself a sufficient proof of the non-existence of any one of the diseases to which the liver is subject; for all the affections of that organ, as M. Andral has remarked, may pass through the successive periods of commencement and increase, without the organ enlarging to such a degree as to produce apparent swelling. And even when enlargement actually exists, we may be unable, in particular circumstances, to satisfy ourselves of the fact by inspection on manual examination. This is particularly the case when a considerable effusion of fluid has taken place into the cavity

of the peritoneum, or when the large intestine has undergone considerable distention by an accumulation either of fæces or of wind. The operation of paracentesis in the one case, and the evacuation of the bowels in the other, may bring to light enlargement of the liver, of the existence of which no positive proof could previously be obtained.

317. It is represented by the advocates of percussion (see Piorry, Diagnostic, ii. 216) as one of the superior advantages which this method of investigation possesses over simple palpation, that, in most cases, effusions of fluids into the abdomen do not prevent us from measuring exactly, by mediate percussion, the size and the situation of the liver. The sound emitted by the peritoneal fluid is less dull than that of the liver, and is most distinguishable from it over the parts which are least dependent, and where intestines swim in the midst of the effusion. If we wish to judge of the size of the liver in ascites, we must make the patient lie first on one side, and afterwards on the other; and study attentively, in these two different positions, the seat and the extent of the liver, and of the effusions, respectively.

SECTION III.

OF THE STATE OF THE SKIN, CONSIDERED AS A SYMPTOM OF
DISEASES OF THE BILIARY ORGANS.

YELLOWNESS OF THE SURFACE.

318. As one of the most frequent and prominent symptoms of diseases of the biliary organs, may be mentioned that of yellowness of the surface of the body, or jaundice—as it is usually termed, depending on a deposition of biliary matter from the circulating blood. Though, for obvious reasons, this yellowness

is most apparent in the skin, it is not confined to it alone, but pervades all the different tissues of the body.

319. It has been believed by some pathologists, that a general yellow suffusion of the skin may be produced by a cause or causes different from the deposition of bile,—as by some process of decomposition going on in the red globules of the blood, or by their finding their way into the smaller order of vessels, &c.; and, in particular, such explanations have been proposed of the yellowness accompanying certain forms of fever; of that which has been observed to ensue from the bite of the viper, and of some other venomous animals; of that occasioned by the eating of some species of mushrooms in Europe, and of certain poisonous fishes in the East and West Indies, &c.; and also of that which is very liable to occur in new-born children, constituting the *Icterus neonatorum* of systematic authors. But, without inquiring into the reasons which have led to the denial of all or any of these forms of yellowness on the surface of the body being attributable to bile, we shall proceed to consider the symptom of jaundice as allowed to depend on the presence of bile in the different fluids and textures of the body.

320. We have already seen (11, 56), that there are two principal circumstances under which jaundice seems to arise; *1st*, When bile is not secreted by the liver at all, or is secreted in deficient quantity; and, *2d*, When the bile, though secreted, is unable to effect its passage into the intestinal canal, and, accumulating in the gall-ducts, either finds its way backwards,—regurgitates, as is said,—through the secreting apparatus into the venous system, as some suppose, or is taken up again, as others imagine, by the process of absorption. It is conceived by some pathologists, that a third circumstance under which jaundice may arise, is the absorption of bile from the alimentary canal, after it has been discharged into it by the gall-ducts.

321. In some of the cases in which pathologists have been led to believe that the occurrence of jaundice depended on the non-secretion of the bile, rather than on its re-absorption, there has been obvious structural alteration; whilst, in others,

from the absence of any such alteration, it has been necessary to attribute the disordered function to simple dynamical derangement. It is equally true with respect to jaundice depending on non-excretion of the bile, that it may be caused by obstruction either of a dynamical or of a structural character. Under the *dynamical* causes of biliary obstruction, may be included spasm of the gall-ducts or duodenum, and an inspissated state of bile. The *structural* causes are more numerous, consisting, in some cases, of morbid conditions of the ducts themselves; in others, of the liver; and in others, again, of some neighbouring organ. The several diseases of the *ducts* themselves, which may obstruct the flow of bile into the duodenum, have been already considered (135, seq. q.), such as inflammation of their lining membrane, with various consequences resulting from this, as thickening, constriction, &c.; enlargement of glands in their coats; the presence of gall-stones, &c. The diseases of the *liver* itself which create jaundice by producing non-excretion, are principally those in which tumours of considerable dimensions form, that press upon the hepatic or the choledoch duct. And, lastly, among the diseases of *neighbouring organs* giving rise to the same effect of obstructed biliary excretion, may be mentioned tumours of the spleen, the pancreas, the stomach, the duodenum, or even, as has been alleged, a collection of scybalous matter in the intestines. A case of aneurism of the hepatic artery, described by Dr Stokes, which proved the cause of obstinate jaundice, may here also be referred to. (Dubl. Med. Journ. 1834, No. xv.) In employing yellowness of the skin as a diagnostic symptom, therefore, it is necessary to keep in mind, *1st*, That it may arise from morbid conditions of other organs than the liver; and, *2d*, That the conditions of the liver capable of producing it are exceedingly various.

322. We propose now to consider what assistance can be derived,—in attempting, in particular instances, to determine on what pathological condition jaundice depends,—from the peculiar characters of this symptom, particularly as respects its shade or hue, and its continuance, these being the two circumstances

which seem likely to throw some light, if not on the nature of the disease occasioning it, at least upon the intensity of the malady.

323. We are indebted to Dr Bright (Guy's Hosp. Rep. i. 604) for the most accurate observations which we possess as to the variations in shade or hue which the colour of the skin presents, according to the morbid condition upon which the jaundice depends.

324. When jaundice arises from sanguineous *congestion*, in which the viscera of the thorax participate, the countenance gradually assumes a dingy aspect, in which the purple suffusion of carbonised blood is mingled with the yellow tint of a slight jaundice; the conjunctiva is more decidedly tinged: and, if the disease continue long, the jaundice sometimes completely prevails over the purple tint.

325. The appearance of the skin termed black jaundice was connected by Dr Leake (On diseases of the Viscera, p. 274), with a putrid dissolution of the blood.—“What is called the black jaundice,” says he, “is not a distinct malady, but only an inveterate state of one and the same disease, attended with a bloated habit, and change of complexion to a livid hue, from the extravasation of dissolved putrid juices into the cellular membrane, which will be most apparent on the surface of the body, under the eyes, and on the temples, where the skin is thin and the circulation most languid.”

326. When the jaundice depends on *obstruction of bile in the ducts*, particularly the larger ones (as from gall-stones), the skin usually displays a very vivid colour, which comes on suddenly or more gradually, and continues longer or shorter, according to the nature of the obstructing cause. This vivid colour may cease altogether, or continue till death takes place at no very distant period; or it may pass gradually into a dingy green colour, giving the countenance a mulatto appearance, that may be designated as black jaundice. When the obstruction of the ducts depends upon organic lesion, the countenance generally becomes gradually suffused with bile; at length, the more decided jaundice takes place, and this goes on increasing in intensity for a time, after which the colour

loses its brilliancy, and assumes a dark dusky-green hue, and squalid appearance, which is one of the worst symptoms.

327. According to Mr Annesley, deep green, or even olive-coloured jaundice, which has been commonly called black jaundice, and is comparatively rarely met with, is only found attendant upon cases in which there occur great congestion of the liver, accumulations of black viscid bile in the liver and gall-bladder, and complete obstruction of the ducts. (i. 480.)

328. In jaundice from *chronic change in the structure of the liver*, the change from the natural colour is usually gradual and inconstant; and the yellow tinge of the conjunctiva often precedes, for some weeks, any more decided indication. In time, however, preceded by a bronzed appearance of the forehead, or the darkened areola of the eye, a jaundice bearing the lighter tints, from a sallow suffusion to a fainter or more decided lemon hue, still, however, liable to considerable fluctuation, establishes itself over the whole body.

329. In jaundice from *inflammatory action of the liver*, in a day or two after the early symptoms have appeared, the conjunctiva becomes tinged, and, in a few days more, there is universal bright brilliant suffusion of the skin. In the severer cases, a jaundice of the most intense colour is diffused over the whole surface. If the disease does not prove fatal at the early period, but goes on for some weeks, the skin assumes a light lemon coloured tint, bespeaking, says Dr Bright, a very general disorganisation of the liver.

330. In respect of this last form of jaundice, the inflammatory, it is proper to quote here the observation of Mr Annesley, who says; "A certain degree of jaundice is often remarked in the hepatitis of Europe, especially when it terminates in abscess; but jaundice is not a frequent concomitant of hepatitis in India, unless when the ducts or gall-bladder become involved in the disease, or when it supervenes to biliary calculi or obstruction of the ducts." Dr Malcolmson also observes, that "in many cases of suppuration in the substance of the liver, the skin is hardly or not at all tinged with bile. Saunders and other writers," he adds, "lay too much stress on this symp-

tom." "All inflammations of the liver," observes M. Portal (p. 138), "are not followed by jaundice. It is, no doubt, in those cases in which the inflammation is seated in parts of this viscus, remote from the excretory biliary-ducts, that jaundice does not occur."

331. It is obvious that of the various pathological conditions capable of producing jaundice, some are more or less transient, while others are permanent in their nature. To the former class belong the dynamical affections and the simple circulatory derangements, and to the latter, a large proportion, if not the whole, of the structural alterations. In proportion, therefore, to the continuance of an attack of jaundice, is the probability of its depending upon a structural morbid condition. In some instances, the morbid condition, producing jaundice, is such as to disappear and reappear repeatedly within short spaces of time, as in spasm of the ducts, or in gall-stone moving backwards or forwards in these canals; and, in such cases, the jaundice may assume what may be called an intermittent or remittent form. Some very singular cases have been recorded in which jaundice has assumed a periodical type, and in some of these the intervals between the paroxysms has been of considerable duration. Mongellaz has quoted from Strack a case of febrile jaundice of a tertian type, and refers to others by the same author; from Mittlehauser, he quotes a case of jaundice of a quintan type; from Schuster and Bianchi, cases of mensual jaundice occurring in women; and from Martinet, a case of mensual and sexmensual hepatitis and jaundice.

ITCHINESS.

332. There is frequently experienced in the jaundice, a very troublesome sense of general itching over the skin. Dr Heberden, who says that this itching is unaccompanied with any eruption, observes (Commentaries, p. 245), that it "is supposed to be owing to the irritation of the skin, from the acrimony of the bile mixed with the blood; but it is not easy to say why this or any other cause should make this complaint so exceed-

ingly distressful to some, whilst it is not at all felt by others. According to Dr Powell (p. 85), the itching of jaundice is attended by some elevation of points, which, in the recourse that is had to scratching for relief, are more readily broken than the surrounding plain, and form coagulated scabs, with a trifling surrounding inflammation. The pruriginous affection liable to occur in diseases of the liver, is, indeed, sometimes the source of great annoyance to the patient.

PALENESS OF THE SURFACE.

333. "Will the colour of the skin," asks Dr Pemberton, "afford us any assistance in conjecturing about the nature of a chronically diseased liver?" (P. 41, note.) Dr Addison has called attention (Guy's Hosp. Rep. i. 479) to a state of the integuments, earliest observable, as well as most conspicuous, in those of the face and of the backs of the hands, but liable to pervade the whole surface of the body, which, he thinks, is indicative, if not pathognomonic, of fatty degeneration of the liver. To the eye, the skin presents a bloodless, almost semi-transparent appearance, more resembling ivory or wax, according as there is a predominance of pallor or of sallowness. To the touch, the integuments feel loose, smooth, and even flabby; and in the greatest intensity of the affection, convey a sensation resembling that experienced on handling a piece of the softest satin. Is it to the same conditions of the liver and of the integuments that Dr Pemberton alludes, when he mentions that in two cases of enlarged liver, perfectly cream-coloured, both on its surface and through its substance, the face and the whole of the skin of the patients, during the illness, were of the same pale colour?

SECTION IV.

OF MORBID AFFECTIONS OF THE ALIMENTARY CANAL CONSIDERED AS SYMPTOMS OF DISEASES OF THE BILIARY ORGANS.

334. In the progress of the various diseases of the biliary organs, dynamical or structural, different morbid affections of the alimentary canal are liable to supervene. Some of these may be regarded as merely symptoms of the primary hepatic disease, of the existence of which indeed they sometimes afford the first, or, at least, the most certain indication; while others constitute in themselves, secondary diseases, possibly of a dangerous character, and requiring, to a certain extent, an independent mode of treatment. Thus, in various hepatic diseases, the *stomach* may be affected with occasional nausea and vomiting, in greater or less degrees; or its disorder may amount to the state of permanent dyspepsia. In like manner, the *intestinal canal* may be variously affected in the progress of these diseases; its secretions may assume a morbid character, giving rise to corresponding changes in the characters of the alvine evacuations; or its mucous membrane, in whole or in part, may become affected with inflammation; or its peristaltic action may cease, or be quickened, or become inverted. Hence cholera, diarrhœa, dysentery, cholic, and ileus, may be respectively considered as occasional terminations or complications of the diseases of the biliary organs.

335. Morbid conditions of the biliary organs may be supposed to affect the alimentary canal in several different ways; 1st, by some change in respect of the quantity or quality of the bile which they discharge into it; 2d, by an extension of disease, dynamical, as in the case of spasm, or structural, as in the case of inflammation, cancer, &c.; and, 3d, by mechanical compression.

336. Under a variety of circumstances the bile regurgitates from the duodenum into the *stomach*, producing sensations of nausea, and ultimately occasioning vomiting. In this manner,

the bile is rejected, either mixed with articles of food recently taken, or with the gastric secretions, or, in some instances, nearly pure. The anti-peristaltic action of the duodenum, producing the anormal course of the bile, in these instances, may be supposed to depend on the quantity of this fluid which is discharged into it, or on its quality; or to occur from causes independent of any morbid condition of the bile.

337. In certain forms of disease, as yellow fever, cancer of the stomach, &c., dark coloured matters are liable to be vomited, which were long supposed to be products of a morbid secretion of the liver, or of a morbid change in the bile. It is now, however, understood, that in a large proportion of instances, at least, the matter ejected in what is called black vomit, is blood that has transuded from the vessels of the stomach into the cavity of that viscus, and which either possessed the qualities which it exhibits, at the time of its transudation, or has subsequently acquired them from the action of some of the contents of the stomach upon it.

338. Biliary concretions are said to have occasionally made their way into the stomach, and have been rejected from it by vomiting.

339. Nausea and vomiting, independently of being produced by the regurgitation of bile, are liable to be induced in cases of enlargement of the liver, by the compression to which the stomach is thereby subjected.

340. The quantity and quality of the bile that is discharged into the *intestinal tube*, and the changes which it there experiences from the agency of other substances, necessarily modify, to a considerable degree, the appearances of the *alvine evacuations*. We shall, in the first place, notice the characters which these evacuations assume, when the bile is not secreted at all, or when, being secreted, it is prevented from reaching the duodenum.

341. "It is generally stated, and as generally believed," remarks Dr Powell (p. 85), "that costiveness is a necessary consequence of a want of bile in the intestines, and from this circumstance it has been asserted that the great use of the bile is to stimulate the intestines. If the position was founded

in fact, the inference would be just, but, I think, this will admit of doubt. In truth, with the greater number of patients I have seen, the contrary has been the case, they have been rather purged than otherwise; and most of the clay-coloured stools of this disease, at which I have looked, have been remarkably soft in their consistence." Dr Heberden, as Dr Powell candidly acknowledges, had previously made a similar remark. "It might naturally be expected," says that accurate observer, "that the want of irritation from the bile should make icteric patients costive; but in fact they are often disposed to have a purging. Certainly neither of these states is peculiar to their distemper; and the spontaneous diarrhœa, or the readiness with which a costiveness is removed, may help to distinguish it from the ileus." (Comment. p. 246.)

342. If the non-secretion, or the non-excretion of the bile be complete, it is obvious that the fæces must be destitute of that colour which they are wont to receive from the intermixture of this substance; and if it be incomplete, their shade of colour must vary according to the quantity of bile which enters the duodenum, and is incorporated with them. Is the appearance of the alvine evacuations calculated to afford us any assistance in judging, in a particular case of jaundice, as to the nature of the internal morbid condition upon which it depends? On this point, again, we may adduce the observations of Dr Bright, which seem much more precise than those of any other practical author with whose writings we are acquainted. (Guy's Hosp. Rep. i.)

343. In jaundice depending on *venous congestion*, the dejections are not obviously deficient in bile.

344. In jaundice from the *obstruction of concretions*, the stools become of a pale drab colour; and in that from the obstruction of *organic deposit*, they are of the lightest drab colour, approaching to white.

345. In jaundice from *chronic change of the liver*, the alvine evacuations seldom present that marked deficiency of bile which is observable in some other cases; on the contrary, they vary through the different shades of brown and yellow;

and are often remarkable rather for the unequal manner in which the bile is mingled, than for the absence of that secretion. The action of the bowels is generally irregular; and as the disease advances, evacuations of blood frequently take place.

346. In jaundice from *inflammatory affection of the liver*, the stools are, both in the more and in the less acute cases, of a light colour; but less decidedly so, and subject to greater variations, than when the obstruction is mechanical; and occasionally, after a few days, they give little evidence of deficiency of bile.

347. That there should exist bilious yellowness of the skin in a particular case, and yet the patient's dejections exhibit their usual colour, implies, in the *first* place, that the internal affection is not of such a nature, or to such a degree, as to prevent the whole or a part of the secreted bile from passing into the duodenum. This, from Dr Bright's statement, would appear to be the case in venous congestions; and to a greater or less degree, in the inflammatory and chronic affections of the liver. And even when there is a stone in the hepatic or choledoch duct, if it does not so exactly fill the canal but that some bile passes by, either from the natural impelling powers, or from being squeezed through by the violent vomitings which are liable to occur, the stools, as Dr Coe remarks (p. 154), may be tinged yellow. But, in the *second* place, does not the simultaneous existence of jaundice, and of a natural colour of the stools, seem to imply, as already hinted, the existence, in the blood, of an excess of the biliary principles, whether that the liver is incapable of removing the whole by the secretory process, or that, the quantity secreted being excessive, the excess is reabsorbed into the sanguiferous system?

348. We may, in the second place, notice those modifications in the appearances of the alvine evacuations which have been conceived to depend on an excess of the biliary secretion.

349. That an excess of the biliary secretion, combined with a more or less considerable degree of acrimony of that fluid, is the immediate cause of cholera and of bilious diarrhœa, and is

manifested by the appearance of the evacuations in these diseases, is an opinion which has been very generally recognised. (See Cullen's First Lines, § 1453, 4, and § 1480.) But, of late years, pathologists seem to have begun to suspect that the doctrine had been established on insufficient grounds. Dr Abercrombie's observations on this point were formerly quoted. (21) But, in addition to his own testimony, Dr A. refers to a late intelligent writer on the diseases of India (Mr Tytler, Calcutta Transactions, III.), as expressing himself in the following manner, relative to the doctrine entertained by several systematic writers, that bilious diarrhœa arises from increased secretion of bile. "Not a single fact is produced by these authors in support of their opinion, and it seems to rest merely upon the popular notion that the colour of the fœces is derived from the bile; but this doctrine seems rather to be taken for granted than proved." Dr Holland, in his reflections on some points of the pathology of the colon (Medical Notes and Reflections, Chap. xiii.), seems to adopt similar views. "It cannot be doubted," says he, "that many of the various egesta from the bowels usually termed bilious, and treated as such, have no other relation to bile than that of mere admixture. They are separated from the vessels or glands of the larger intestines by exudation or secretion; and act upon the contents of the bowels, as well as upon the living parts of the system, according as they deviate in quantity or quality from the healthy state."

350. In the third place, some of the appearances of discoloration exhibited by the alvine evacuations have been supposed to be attributable, not to simple deficiency or excess of bile, but to vitiations in its qualities. Such, in particular, used to be the explanation given of the dark or black appearance which the stools occasionally present, assimilating them to ink or pitch, and to which the name of melæna has been applied. It is now, however, well understood that, in a large proportion of cases at least, this condition of the stools is caused, not by bile, but by a morbid secretion or exudation from the internal surface of the alimentary canal, and is consequently to be regarded as *prima-*

rily a symptom of disease of that surface, rather than of derangement or disease of the biliary organs. Mr Abernethy, who certainly was in no degree disposed to underestimate the importance of biliary derangements in the production of morbid phenomena, acknowledged that "there is great reason for ascribing the discharges in the disease called melæna, to a vitiated secretion from the surface of the alimentary canal;" and that "it seems probable that the stools which resemble pitch, are principally composed of diseased secretions from the internal surface of the intestines, since they do not seem either like the residue of the food, or like discharges from the liver." The liability of such discharges to be mistaken for vitiated bile must, no doubt, be increased by the fact that they are particularly liable to occur in diseases of the liver. "I have had frequent opportunity," says Mr Langstaff, "of remarking the morbid sympathy that exists between the liver and large intestines, when the former is diseased or disordered: the mucous glands of the latter secreting a ropy blackish mucus, sometimes mixed with blood, which is frequently discharged by stool, and induces many persons, who have not had the opportunity of correcting their judgment by the inspection of dead bodies, to suppose that such discharges proceed originally from the liver." (Med. Chir. Trans. viii. 292.)

351. From the appearances, however, which the bile occasionally exhibits in the gall-bladder, it seems not unreasonable to suppose that, in some instances at least, inky or pitchy stools may derive their characters from that fluid. Mr Marshall, on whose accuracy of observation we place much reliance, states that he has seen considerable quantities of black pitchy bile passed by stool, seemingly unmixed with any other substance. "The stools," he adds, "had no particular smell, and in every respect resembled the thick black bile as it is frequently found in the gall-bladder." It would be proper, in cases of this kind, to ascertain the effect on the stools of dilution with water; for if their black colour be dependent on inspissated bile, it will, by such dilution, be changed to yellow. "Sanguis utut ater," says Lorry in his Treatise

de Melancholia, " si copiose diluatur, si linteo imprimatur, obscure semper rubescit: nullatenus vero melancholia (s. atra bilis) quæ diluta flavescit, et in varias partes secedit, flavamque diluta linteo maculam imprimit."

352. Another appearance, not unfrequently presented by the alvine evacuations, and likewise supposed to depend on some particular condition of the bile, is that usually designated as *green* or *greenish stools*. That the green colour of such evacuations does not belong to the bile as originally secreted, but is acquired by it subsequently to its entrance into the alimentary canal, has been taught by several writers on bilious affections. " From the effects of various acids upon bile out of the body," says Dr Powell, (p. 148-9,) " in producing a green colour of it, and from the similar appearance which is often found in the fæces, we are led to suppose that the same cause produces the effect in either instance. I have added the gastric acid to yellow bile, with a view to these effects, and have found the green muddy colour, and flocculent precipitation of the serous part, to follow in the same way as when other acids were used. This green appearance, then, is to be considered as a morbid alteration produced in the bile, by the application of an extraneous matter, after it has left its secreting organ; and nurses are well aware of the several appearances connected with it, from observing the stools of young children." Mr Marshall, also, in noticing that thick black bile, diluted with vinegar, forms a dark green substance, resembling chopped spinach, adds: " Alvine evacuations, similar to this substance, are sometimes passed; which is probably occasioned by a combination of acid and black bile in the common track of the intestines."

353. Notwithstanding this coincidence of opinion, however, the origin of green stools is a subject which still requires more full investigation than it has received; and more than one practical writer might be referred to who is disposed to regard such evacuations as the effect of morbid secretion from the intestinal canal, rather than of vitiated bile, or of any intermixture of bile with other fluids in the bowels. The anonymous author

of an excellent article on the effects of calomel in producing slimy stools in children (Lond. Med. and Surg. Journ. ii. 344), says: "I do not believe that the bile has much to do, in general, in producing the green and slimy stools of children. I have examined many bodies in which the lower part of the intestinal canal was found to contain a great quantity of green slimy matter, but where its contents were of the natural colour towards the upper part; I have also noticed the colour of the bile in the gall-bladder to be natural, in bodies where the contents of the bowels were perfectly unhealthy in appearance. There does not, therefore, appear to be sufficient reason for attributing the green or dirty colour of the stools, observed almost invariably in the diseases of children, to a morbid alteration of the bile, or to a superabundance of it." Dr Holland, in observing that the peculiar matter resembling coffee grounds, which sometimes comes away in such large quantity from the bowels, is often described as disordered bile, though he believes it to be separated, in great part, in the lower intestines, adds: "Those secretions, also, which resemble chopped grass or spinach, have probably the same origin; and even of the liquid which is called green bile, it is doubtful what proportion may come from the liver."

354. The influence of calomel in producing green stools, when administered to children on account of cerebral affections, of which the green stools are often regarded as a symptom, seems to us well deserving of investigation. We have seen in cases of this kind, the evacuations changed by a single dose of calomel, from a bright yellow to spinach-green.

355. May *white stools* occur in cases in which there is no jaundice, and, if so, how can this phenomenon be accounted for? The only explanation which it seems possible to give of the occurrence is, that the blood is deficient in the appropriate elements of the biliary principles, and that any fluid which the liver secretes, is, consequently, deficient in these principles; for, if the want of the due constitution of the bile depended, not on deficiency of proper materials in the blood, but simply on the liver not being capable of separating them from that fluid,

jaundice must arise from their retention, as in the class of cases already referred to (11).

356. Besides the occurrence of white stools without jaundice, depending on what Dr Coe terms "such a degeneracy of the bile that it has lost its yellowness, and, therefore, cannot tinge the stools, if it does pass the duct, or the skin and the urine, if it regurgitates into the blood," that author alleges that the same phenomenon may arise from the bile being detained in the gall-bladder, after its secretion, either from such a state of the coats of the bladder that all its pores and vessels are stopped up, as well as the ducts; or from such a viscosity of the bile that it cannot make its way into the blood any more than through the duct; and he refers to the case of large distention of the gall-bladder related by Mr Gibson in the *Edinburgh Medical Essays* (ii. 352), as one in which the stools were white without any other signs of jaundice presenting themselves.

357. The alvine evacuations are liable, in certain diseases of the liver, to experience other modifications besides those which depend on variations in the quantity and qualities of the bile, that may assist in leading the practitioner to a knowledge of the existence of the disease, and of its particular nature.

358. We have seen, in regard both to abscesses (93) and to hydatid cysts in the liver (121), that in a considerable proportion of the cases, in which they experience perforation, they discharge their contents into the intestinal canal. These matters will, of course, in such cases, appear in the alvine evacuations, and, if other symptoms of hepatic disease exist, will enable us to decide as to its nature; otherwise, we may be left in uncertainty as to the quarter from which the pus or the hydatids have proceeded.

359. That, subsequently to the formation of an abscess in the liver, its purulent contents may be absorbed, and in finding their way, by some channel, to the mucous surface of the intestinal canal, may be poured into that canal and discharged by stool, is an opinion which has been long entertained, and in support of which numerous cases have been recorded. It may, however, admit of doubt whether, in some of the cases that have

been explained on this principle, a communication may not have been established between the abscess and the biliary passages, so as to allow of the pus being conveyed through the gall-ducts into the duodenum. And it may also admit of doubt whether in some of these cases, as in one related by Dr Conwell (case 224), the purulent or puriform fluid observed in the stools, may not have proceeded from the inner surface of the bowels. Dr Malcolmson says that shivering, evening fever, emaciation, tumefaction of the side, and puriform discharges from the intestine, not unfrequently take place where there is no formation whatsoever of matter in the liver; and that in many cases which are supposed to have recovered from abscess, it had evidently never existed.

360. When biliary concretions find their way into the intestinal canal, either along the gall-ducts, or by preternatural passages, they are, in a large proportion of cases, speedily discharged with the alvine evacuations. It is obviously only in those cases in which the passage of the concretions, through the biliary ducts, or along the intestinal canal, has occasioned morbid phenomena, that the evacuations will be examined with a view to their discovery. In general, therefore, the concretions found in the alvine evacuations have been of large dimensions.

361. Cases occasionally occur in which all the symptoms of *ileus* manifest themselves, and in which the abatement or cessation of these symptoms, when a favourable termination occurs, is simultaneous with, or shortly succeeded by, the discharge of a gall-stone from the intestinal canal. How does the gall-stone operate, in cases of this kind, in producing the *ileus*? and, in particular, is it during the passage of the gall-stone along the ducts, or subsequently to its entrance into the alimentary canal, that it exerts this operation? or may a gall-stone in either of these situations produce the same effect? Certain it is, that, of the cases in which *ileus* from gall-stone has proved fatal, in some it has been found, on examination after death, that there was a body of this kind in the gall-ducts, and not in the intestinal canal (Abercrombie, p. 363); and in others, in the intestinal canal, and not in the

ducts, (Abercrombie, p. 125, and Reynaud.) And, in a remarkable case of ileus terminating fatally, quoted by Cruveilhier from M. Monod (Livr. xii. Pl. 4, 5), whilst one calculus was found in the jejunum (above which, as far as the lower half of the œsophagus, the alimentary canal was distended with a brownish-yellow fluid), another gall-stone was sticking in an ulcerated communication between the gall-bladder and duodenum; and there were other morbid appearances which Cruveilhier thinks, without, as it appears to us, very sufficient grounds, more likely than the gall-stone in the jejunum, to have produced the ileus. In a case of unusually large gall-stone discharged by stool, after a very alarming attack of iliac passion, Dr Craigie was strongly impressed with the belief that the concretion produced this effect during its passage through the cystic and common ducts. (Edin. Med. and Surg. Journ. xxii.)

362. It would appear, from a case related by Puy-Royer, that obstruction of the intestinal canal, giving rise to ileus, may depend, not on a single biliary calculus, but on an agglomeration of several. In the case in question, the cavity of the ileum was found to be exactly filled with agglomerated biliary calculi. They formed, by their union, a continuous cylinder, which separated, on drying, into several pieces. The gall-bladder contained many similar concretions, and one of them obstructed the lower extremity of the choledoch duct, which was dilated, above this, to an extraordinary degree.

363. The occasional supervention of hepatic affection in the progress of *dysentery* has been already noticed (234). But it has also been supposed that an opposite relation might subsist between these two affections, that the liver complaint might be primary, and the dysentery consecutive.

364. Respecting the connection between dysentery,—as it presents itself in India, or in other hot climates,—and hepatic affection, three different doctrines may be said to have been proposed. The first, That dysentery invariably has its origin in functional or structural disease of the liver; the second, That though in these, as in other countries, there is a form of dysentery independent of liver disease, there is another form

which has its origin in unctinal or structural disease of that viscus, and which may, therefore, with propriety, be termed hepatic dysentery or flux; and the third, That when dysentery and hepatic affection co-exist, the co-existence is accidental; that it merely marks the influence of the same causes in inducing both forms of disease, and does not imply any dependence of the dysentery upon the hepatic affection.

365. The first of these opinions, which was advocated by Curtis, seems to be now very generally abandoned; and as to the second, it would not, we believe, be difficult to shew that there is far from being a coincidence, among those who recognise a hepatic form of dysentery, with respect to the nature and characters of the disease which they so designate. The last opinion is probably that which rests on the most solid foundation. "As morbid states of the liver," says Mr Marshall, "occur independently of dysentery, and dysentery uncombined with diseased liver, may we not suppose that the operation of the same remote and exciting causes which produce morbid affections of the liver, may likewise occasion inflammation of the villous coat of the intestines? However frequently inflammation of the large intestines is found combined with induration or abscess of the liver, it is difficult to conceive that the former disease can be related to the latter as cause to effect." (P. 178-9.)

366. M. Andral mentions, that he has sometimes seen diseases of the liver, which had advanced slowly without affecting the constitution in any considerable degree, and without being accompanied with any disturbance of the digestion, become complicated, in consequence of the supervention of gastro-intestinal inflammation, with all the symptoms of cholera morbus, such as very copious vomitings, very large alvine dejections, sudden chillings of the cutaneous surface, and fatal termination in two or three days. In such cases, on opening the body, there has been found a very bright injection of the greatest part of the gastro-intestinal mucous membrane, without any other alteration; so that the inflammation was more remarkable by its extent than by its intensity in the several points which it occupied.

367. The same author points out the supervention of *continued fever* as another mode in which chronic diseases of the liver are liable to terminate, but one likewise, as he conceives, implying the supervention of intestinal inflammation. He states that persons who, though they have long laboured under such diseases, are still far from being exhausted, may be suddenly seized with fever of this type; their tongue reddens, dries, and blackens; their abdomen becomes tympanitic; diarrhoea supervenes; they fall into a completely adynamic state, and sink rapidly. On opening their bodies, traces of acute inflammation are found in the abdominal canal: this sometimes appears to have been intense. The mucous membrane is very red, softened, ulcerated at several points, and the severity of the symptoms is in direct proportion to that of the lesions. Sometimes, on the contrary, the gastro-intestinal inflammation seems very slight; nothing is observed in the mucous membrane, or beneath it, but a vascular injection, of greater or less extent; but this inflammation supervenes in a person already exhausted by a chronic affection of an important organ; and, consequently, in conditions favourable to the development of a state of very great prostration, on the occurrence of any intermittent inflammation, however slight it may appear. "Under whatever form," concludes this accurate observer, "attacks of gastro-enteritis shew themselves during the course of chronic affections of the liver, it is important to know that they are one of the frequent causes of premature death, in a great number of persons labouring under these affections." (Clin. Med. iv.)

368. Another mode of consecutive affection, connected with the abdominal cavity, by which some of the diseases of the biliary organs may come suddenly and unexpectedly to a fatal termination, is *peritonitis*, produced by the rupture of a bag or cyst, containing a natural or preternatural fluid,—as of the gall-bladder or ducts, or of an abscess or cyst in the liver,—and the consequent effusion of its fluid contents into the cavity of the peritoneum. The phenomena which indicate this event correspond with those observed in other effusions into the cavity of the peritoneum, as in cases of rupture or perforation of the stomach or intestinal canal; viz. violent pains of the abdo-

men, exceedingly augmented by pressure; nausea and vomiting; collapse of the countenance, of the animal powers, and the the vital functions; a rapidly sinking pulse; a cold, clammy state of the face and of the extremities; terminating, after no very considerable period, in death.

369. There is a subject which, though more interesting perhaps in a physiological than in a diagnostic point of view, may here be briefly noticed, viz. the influence of those causes which prevent the mixture of the bile with the chyme in the duodenum, in impeding the general nutrition of the body, or, in other words, in producing emaciation. Sir Benjamin Brodie, conceiving his experiments (193) sufficient to prove that the office of the bile is to change the nutritious part of the chyme into chyle, and to separate from it the excrementitious matter, endeavoured to explain how it is that, if the bile be of so much importance in the animal economy, persons occasionally live for a considerable time, in whom the flow of bile into the duodenum is interrupted. "On this point," says he, "it may be remarked, *1st*, That it seldom happens that the obstruction of the choledoch duct from disease is so complete as to prevent the passage of the bile altogether; and the circumstance of the evacuations being of a white colour, may prove the deficiency, but does not prove the total absence of bile. *2dly*, That in the very few authenticated cases which have occurred of total obliteration of the choledoch duct in the human subject, there has been, I believe, always extreme emaciation, shewing that the function of nutrition was not properly performed. In my experiments, I found that the more fluid parts of the chyme had been absorbed, and probably this would have been sufficient to maintain life during a limited period of time." (P. 343.)

370. Pathological observations have also been adduced in support of the physiological doctrine, espoused by Tiedemann and Gmelin, that the bile has little to do in the process of chylification. We are informed by Dr Elliotson in his Physiology, that Dr Blundell has notes of the cases of two infants four or five months old, in whom the hepatic ducts terminated blindly, so that no bile entered into the intestines, and the

stools were white, like spermaceti, and the skin jaundiced. But the infants grew rapidly, and throve tolerably, notwithstanding. He therefore saw, adds Dr Elliotson, that nourishment could be accomplished without the mixture of bile and chyme. Drs Graves and Stokes allude to two cases of intense and long continued jaundice, in which, after the first attack of the disease, the derangement of the digestive organs subsided, the appetite returned, the bowels became regular, although the stools did not contain a particle of bile, and nutrition continued unimpaired, although the disease had in one case lasted for eight months, and in the other for two years. These facts, they add, are strongly confirmatory of the opinion advanced by Tiedemann and Gmelin, that the bile is to be considered rather as an excrementitious fluid than as necessary for the process of digestion.

371. It seems, however, to be overlooked, in these references to the doctrine of Tiedemann and Gmelin, that, whilst those physiologists look upon the bile as in a great measure an excrementitious matter, they regard its secretion as tending principally to maintain the blood in such a state of combination as to enable it to serve for nutrition in the different organs. In either view of the case, therefore, as Dr Cursham has justly remarked (*Lond. Med. Gaz.* 29th May 1840), emaciation might be expected to result as the consequence of the bile not effecting its entrance into the intestinal canal; according to the one supposition, from imperfect chylication; according to the other, from an impure condition of the blood, rendering it unfit for nutrition. Both hypotheses agree as to the effect produced, though they differ as to the mode in which it is accomplished.

372. In a paper in the *Transactions of the Medical and Physical Society of Calcutta* (v. 195), Mr Twining has related five cases of occlusion of the biliary ducts, seated, in one instance, in the hepatic, in another, in the common choledoch, and in the three others, in the cystic. In the case of occlusion of the hepatic duct, the patient was emaciated and pale, and in that of obliteration of the common choledoch duct, the patient was pale, emaciated, and miserable; whilst in the only

one of the three cases of obliteration of the cystic duct, in which allusion is made to the patient's habit of body, he is stated to have been a stout and fat man. Other instances might be adduced illustrative, if not of the influence of impediment to the flow of the bile into the intestinal canal, in producing emaciation, at least of the co-existence of these two conditions.

SECTION V.

OF THE CONDITION OF THE URINE, CONSIDERED AS A SYMPTOM OF DISEASES OF THE BILIARY ORGANS.

STATE OF THE URINE.

373. Next to the altered conditions of the alvine evacuations, we may notice those of the urinary secretion, which manifest themselves in the various forms of disease of the biliary organs.

374. In cases of jaundice, the urine is of a deep yellow colour; it may assume this colour previously to its manifesting itself on the skin, and may exhibit it even in cases of disease of the liver in which the skin preserves its natural appearance. We may consider this symptom, therefore, as a more delicate test of the existence of bile in the blood, than yellowness of the skin. The urine, in some cases of jaundice, becomes loaded with bile, till it assumes a colour deeper than porter, but of a green tint. Dr Lombard states, that in the examination of jaundiced urine, he has almost always found it extremely acid. It powerfully reddened turnsol paper, and the degree of acidity appeared to be connected with the intensity of the jaundice tinge.

375. It is proper to keep in remembrance, however, that the urine may exhibit a green tinge, independently of its containing bile. In various diseases connected with a deranged condition of the kidney, the red part of the blood, mingled

with a smaller proportion of serum, finds its way into the urinary bladder, and becomes mixed with the urine. If there be only a small quantity of the colouring matter of the blood present, it may remain for a considerable time either in a state of solution, or of mere suspension, in the urine, without interfering with its transparency, but at the same time communicating to it a greenish tinge, so precisely like that produced by the colouring matter of bile, that it would be impossible to distinguish the one from the other by mere inspection. The addition, however, of muriatic or nitric acid to bilious urine causes, in most cases, after some time, a deposit of a green colour to take place; a circumstance not observable in urine impregnated with red particles of blood. (Brett, Lond. Med. Gaz. xvii. 896.)

376. Some experiments published in 1815 by Mr Rose, surgeon at Bottesdale, and by the late Dr Henry of Manchester, (*Ann. of Philos.* v.), led to the conclusion that, in hepatitis, both of an acute and of a chronic character, the urine contains no urea, and that this might therefore be regarded as a diagnostic symptom of the disease. But the investigations of Dr Prout* and of Dr Davy† have tended to overthrow, rather than to confirm this belief. The former, indeed, professes himself disposed to assert that, generally, in this disease, there is an excess of urea in the urine, rather than a deficiency.

377. As, in cases of hepatic abscess or hydatid, a communication may be established with the urinary organs, it follows, that the contents of those cavities may be discharged through the urethra. And, it has been supposed, as already remarked (82), that, in cases in which the contents of an hepatic abscess have been re-absorbed into the system, the purulent matter may be, in whole or in part, eliminated from the system by the urinary passages, as well as by the alimentary. Of thirteen cases of purulent discharges in hepatic diseases related by Dr Mouat in his first publication upon this subject (*Calcutta Quart. Med. Journ.* July 1837), in eleven pus was passed by urine, and in

* *Inquiry into the Nature, &c. of Gravel.* 1821. (P. 11.)

† *Account of the Interior of Ceylon,* 1821. (P. 490.)

three of these, by this channel exclusively. According to Dr Conwell, when a hepatic case begins to improve by this process of re-absorption, the urine first assumes the appearance of decoction of cinchona, and is more or less opaque and turbid; in a few days, it becomes quite opaque and white, as if blanched with cream or pus, and it is frequently stained more or less with bile.

SECTION VI.

OF MORBID CONDITIONS OF THE RESPIRATORY FUNCTION, CONSIDERED AS SYMPTOMS OF DISEASES OF THE BILIARY ORGANS.

378. Considering the position which the biliary organs occupy in relation to the cavity of the thorax, the share which the diaphragm has in the mechanism of respiration, and the yielding nature of that muscular and membranous partition, it is not surprising that various diseases of the liver and its appendages should be liable to occasion derangements in the exercise of the respiratory function.

379. Morbid conditions of the biliary organs may be supposed to affect the exercise of the respiratory function, 1st, By compression, in consequence of their enlargement; 2d, By dragging down the diaphragm, in consequence of their increased weight; 3d, By the propagation of disease, particularly of inflammation, from the biliary to the respiratory organs; 4th, By the escape of a fluid, natural or preternatural, generated in the biliary organs, into the cavity of the pleura, or the substance of the lungs; and 5th, it is conceived, By nervous communications of the character usually termed Sympathetic, or by what is termed by some the Propagation of Irritation.

380. The principal deviations from the ordinary exercise of the respiratory function, arising, in one or other of these modes,

from morbid conditions of the biliary organs, are, 1st, Dyspnœa, assuming, more or less, the character of asthma; 2d, Cough; and 3d, peculiar modifications of the Expectoration.

381. It is easy to perceive, that any considerable augmentation of the liver upwards must impede that flattening of the diaphragm on which inspiration so much depends, and that expansion of the pulmonary texture which follows as its consequence. The liver has often been observed so much enlarged, as to mount up to the third true rib, and to occupy almost all the space which should have been filled by the right lung. Nor is the injurious effect of this increased bulk confined to the one side alone; for, in consequence of the compression of the right lung, the blood is carried in excess to the left, producing there all the consequences of pulmonary sanguineous congestion. It is obvious, that the amount of difficulty of respiration will hold pace with the progress of hepatic enlargement; and that it will be particularly laborious when the patient lies on the left side.

382. Difficulty of breathing may arise as a consequence of hepatic inflammation. It is usually attended with pain in the chest, so as readily to lead to the belief that the lungs or the diaphragm are the seat of the disease, in cases in which it is proved, by post-mortem examination, that the inflammation was confined exclusively to the liver. The difficulty of breathing, in such a case, is probably to be attributed to the pain excited by the motions of the diaphragm, which induces the patient, unconsciously, or nearly so, to transfer the performance of the respiratory movements to other parts. Dr Nicoll states, that, according to his experience, when the respirations have been very quick throughout the course of hepatitis, there have always been extensive adhesions of the liver to the diaphragm; and that, when no adhesions, or scarcely any, existed, the breathing has been little disturbed in any way, except in the very last stage of the disease.

383. M. Portal conceives that difficulty of breathing may arise from other morbid affections of the biliary organs, besides those hitherto referred to, particularly from biliary cal-

culi retained in the gall-ducts and in the gall-bladder itself, from abscesses and ulcers in the liver, &c. He conceives also, that, besides these anatomical or organic causes of dyspnœa, there are others not appreciable to the senses, but which are not less real, such as excessive sensibility of the nerves of the lungs, and irritability of the muscles of the chest, depending on various morbid conditions of the liver.

384. Hepatic cough, as it is termed, seems to manifest itself sometimes in cases of inflammatory affection of the liver, and sometimes in cases of disease, and particularly of enlargement of that organ, unattended by inflammation. Dr Pemberton mentions (p. 20) that he never knew cough to occur as a symptom of acute hepatitis, till after the pain had seized the patient at least forty-eight hours, but that, after this period, it is a very common, and almost constant symptom. The cough, he remarks, is sometimes dry, and sometimes loose; *dry* when it arises from the inflamed membrane of the convex surface of the liver irritating the diaphragm; *loose* when it arises from the general inflammatory diathesis, producing an increased secretion from the mucous membrane of the lungs; that is, probably, when, either by extension from the liver, or by community of cause, bronchitis accompanies hepatitis. The occurrence of cough in cases of non-inflammatory enlargement of the liver has been accounted for on the supposition that the increased weight of the organ, by dragging down the diaphragm, stretches and irritates the respiratory nerves; and it has been supposed also that this influence of the enlarged liver over the respiratory organs may be exercised through the medium of the stomach, in cases in which the liver, by an increase of size transversely, or from the one hypochondrium to the other, produces pressure upon that organ.*

* See, on this subject, a valuable paper in the Transactions of the Association of Physicians in Ireland (vol. iii. 245), by Dr W. Brooke, entitled "A well-marked Case of Liver-Cough, with some Cases and Observations tending to shew how frequently the Lungs, and other Viscera, sympathise with derangements in the Liver, whether organic or functional;" and in vol. iv., see sequel of the same case.

385. We have seen that, under particular circumstances, the contents of an hepatic abscess or hydatid cyst may find their way into the interior of the lungs, from whence they will be ejected by expectoration. (90, 121.) In the case of an abscess so discharged, it has been alleged that, in some instances at least, we may be assisted in determining the source of the purulent expectoration, by its being mixed with a larger or smaller quantity of bile. Dr Abercrombie conceives this belief to be without foundation; for, says he, "as the abscess of the liver is generally lined by a cyst of coagulable lymph, it is cut off from any connection with the biliary ducts." (P. 334.) Whilst we admit the general accuracy of this statement, and, therefore, that bile is not to be looked for in all instances of expectorated hepatic abscess, it seems not difficult to conceive circumstances in which the biliary tubuli or ducts may discharge their contents more or less freely into the cavity of an abscess, as seems to have happened in two cases, mentioned by Mr Curtis (p. 98), of abscess of the liver discharging through the lungs, "where the ulcer had extended deep, and eroded the gall-ducts, and much bile was brought up by coughing mixed with sanious matter, plainly distinguishable not only by the colour, but by the bitterness of taste." A mixed bilious matter was coughed up also in the two cases of hepatic abscess in which the liver and lungs communicated, that are mentioned by Sir James Macgrigor. And among the proofs of "the imperfect nature of the adhesive process in very many cases of abscess of the liver," Dr Malcolmson adduces "the frequency with which the purulent matter, either in the cavity or when coughed up through the lung, is found mixed with bile;" and he mentions, that, in one case, he found that the matter of an hepatic abscess had passed into the gall-bladder, by means of one of the hepatic ducts which opened on the surface of the abscess.

386. It is more difficult to explain some cases that have been recorded, in which bile nearly, if not altogether, pure is said to have been expectorated. (See in the 1st volume of the Medical Commentaries, the "case of a woman who spat, from her lungs, a great quantity of pure bile, by the late Professor

Simson of St Andrews;”—in the 18th volume of the same work, “a curious case of expectoration of bile, by Dr Gordon, physician in Aberdeen;”—and in the 1st volume of the Edinburgh Medical and Surgical Journal, a “case of hepatitis followed by bilious vomiting” (expectoration?) by the present Professor Monro.)

387. Cases have been related which would seem to shew that the contents of an hepatic abscess may find their way to the inner surface of the bronchia, as well as to the kidneys and intestinal canal, by a process of metastasis or transference, no preternatural communication existing between the liver and the lungs.

SECTION VII.

OF DROPSY AND HÆMORRHAGE AS SUPERVENING IN THE PROGRESS OF DISEASES OF THE BILIARY ORGANS.

DROPSY.

388. Several of the diseases of the liver are liable, in their progress, to be attended with ascites, caused in many cases, as there seems just reason to believe, by the obstruction which the morbid condition of the organ occasions to the flow of blood through the ramifications of the vena portarum; an obstruction which probably will not exist long without being followed by a diminution of the bloodvessels themselves.

389. In endeavouring to avail ourselves of ascites as a diagnostic symptom, the first question to be determined is, whether we have any means of distinguishing this effusion as occurring in consequence of disease of the liver, from effusion of the same nature when supervening to other diseases, as those of the heart, or of other abdominal viscera? In the latter class of cases, as the obstruction operates on the vessels of the *common*

circulation, the dropsical effusion commences, at the extremities of these vessels, in the feet and ankles, and gradually extends along the legs and thighs to the cavity of the abdomen; whereas, in the diseases of the liver, as the obstruction affects the *portal* system, the effusion commences where the extremities of that system ramify, viz. within the cavity of the abdomen. From this explanation, however, it obviously follows, that if any tumour, whether belonging to the biliary organs or not, should press upon the trunk of the vena portæ, so as to impede its circulation, primary ascites will be produced equally as when the compression is exercised upon its various ramifications.

390. The second point which requires to be determined, relative to ascites as a diagnostic symptom in the diseases of the liver, is, which of these affections give rise to that state, and consequently are indicated by it? Now, in so far as the dropsical effusion depends on mechanical obstruction of the circulation, this is not a necessary nor frequent consequence of those diseases in which large circumscribed masses, solid or fluid, foreign to the structure of the liver, are formed, such as malignant growths, abscesses, or hydatids; for the influence of these, as Dr Bright remarks (Reports, i. 107), as long as from their situation they make no immediate pressure on the large vessels, is often very small in favouring serous effusion. But it is those diseases of the liver in which its proper tissue undergoes, throughout its whole extent, condensation or induration, such as the various forms of tubercular degeneration, that principally give rise to dropsy. Dr Saunders pointed out what he called the scirrhous or indurated state of the liver as that which, by the impediment it occasions to the free passage of the blood through that organ, more particularly disposes to ascites. (P. 300-304.) M. Andral, in admitting ascites to be a common occurrence in the different forms of hepatic induration, insists particularly on its almost uniform existence in cases of diminished size or atrophy of the liver, of which indeed it may be the only discoverable symptom. Dr Bright has described three morbid conditions of the liver, which he conceives to be distinct, and

which all terminate in dropsical effusion into the cavity of the abdomen. (Reports of Medical Cases, i. 107.)

391. But though ascites accompanying hepatic disease seems, in a large proportion of cases, to depend on mechanical obstruction to the circulation, this is probably not universally its cause; for inflammatory affections of the liver may be supposed capable of inducing in the peritoneum, over a larger or smaller extent, the state which it has been proposed not inaptly to designate as hydro-phlegmasia. Cruveilhier insists on the dependence of dropsy, as occurring in cancer of the liver, on the continual irritation of the peritoneum excited by the tumours.

HÆMORRHAGE.

392. The same physical impediment to the free passage of the blood in the vena portarum, through the parenchyma of the liver, which in one case leads to dropsical, may, in another case, produce hæmorrhagic effusion. But the liver, by its enlargement, may press upon, and cause impediment to the circulation through, venous trunks that form no part of its own constitution. The hæmorrhages that occur in hepatic diseases, therefore, may or may not proceed immediately from the portal system.

393. From the earliest periods of medicine, the discharge of blood by the nostrils, or *epistaxis*, seems to have been regarded as frequently depending on affections of the liver and the spleen. In more recent times Dr Donald Monro, in his "Account of the Diseases most frequent in the British Military Hospitals in Germany," in stating that the jaundice was very frequent, and in a manner epidemical, among the troops, for some time before they left the field, at the end of the campaign of 1760, observes, "several who had been reduced by fevers or other complaints, before the jaundice appeared, were attacked with violent hæmorrhages from the nose; and two had like to have died of them before the bleeding was stopped. The hæmorrhage did not prove critical, but seemed to depend on a dissolved state of the blood. It commonly stopped soon." M. Latour relates a case of nasal

hæmorrhage occurring in the last stage of jaundice (Hist. &c. des Hæmorrhagies, obs. 902), and another of fatal issue, which was dependent on obstruction of the liver (Obs. 745); and M. Lombard refers to the case of a young man who had been affected for six weeks with a jaundice that had resisted all the means of treatment employed against it, though it did not appear to be connected with organic disease of the liver, in whom there occurred frequent attacks of epistaxis attended with the loss of a great quantity of blood, in one of which the patient died, nothing being found capable of arresting the hæmorrhage. (Clin. Med. de l'Hop. de Genève.)

394. The hæmorrhage originating in hepatic affection, sometimes takes place from the lungs instead of from the nostrils. M. Barthez, in his *Nouv. Elem. de la Sci. de L'Homme* (ii. 58), makes particular reference to *hæmoptysis* as being liable to occur as a consequence of obstruction of the liver. He rejects the explanation proposed by some of the older authors, of this species of hæmoptysis being attributable to rupture of the veins of the liver, and conceives that it must be produced by a sympathetic correspondence of affection between the veins of the liver and those of the lungs, though of the primordial causes of this sympathy, he acknowledges we are entirely ignorant. There can be little doubt, however, that in most of the cases in which hæmoptysis occurs as a consequence of hepatic affection, it is attributable to the pressure of the liver upwards, diminishing, as has been already shewn (381), the amount of pulmonary substance through which the blood sent to the lungs is able to circulate.

395. In other instances the discharge of blood dependent on disease of the liver, takes place from the surface of the alimentary canal, whether of the stomach, producing hæmatemesis, or of the intestines, and is probably attributable to distention of the trunk and abdominal branches of the vena portæ. (Latour, Obs. 743, 746, and 744.) Dr Law, from having found in a succession of cases of hæmatemesis dependent on disease of the liver, which proved fatal under his own observation, that that organ was in a granular condition, has been led to conceive

that this is the only diseased state of the liver which gives rise to vomiting of blood. (Dubl. Med. Trans. i. 105.) This seems, however, to be too hasty a generalization.

396. In other instances again, the hæmorrhage may take place simultaneously from the mucous lining of the air passages and of the alimentary canal. Dr Heberden mentions, that in the advanced state of what he calls inflammatory scirrhi of the liver, "the blood will gush out in great quantities from the nose, the gums, the stomach, the navel, and with the stools; which is probably," says he, "to be attributed to the obstruction which it meets with in the scirrhus liver;" and Mr Langstaff states, that he has noticed that, in most organic affections of the liver, nasal, stomachic, or intestinal hæmorrhages are not unfrequent occurrences, which he supposes may be considered to arise from excessive determination of the blood to the mucous surfaces of those parts, and nature relieving their over-distention by hæmorrhagic profluvia. (Med. Chir. Trans. viii. 292.)

397. To these statements respecting the connection of hæmorrhage with diseases of the liver, we may add those made by Dr Bright in his remarks on jaundice. That accurate observer states, that, should death occur in jaundice from *congestion*, it will probably have been preceded by the passage of blood, more or less freely, from the lungs or the intestines; and the examination of the body will demonstrate that the liver has only partaken with other organs in the congested state of the venous system: that in jaundice from *organic deposit*, at an advanced stage, ecchymosis takes place in various parts, and blood escapes from different surfaces: and that in jaundice from *inflammatory action* in the liver, the tendency to hæmorrhage sometimes comes on very early, and is excessive. (Guy's Hosp. Rep. i. 605, 9, 14.)

SECTION VIII.

OF THE OCCURRENCE OF PYREXIAL SYMPTOMS IN DISEASES
OF THE BILIARY ORGANS.

398. There is great variety as to the occurrence of pyrexial symptoms, singly or collectively, in diseases of the biliary organs, both in respect of different affections, and even of the same affection in different persons. It is, of course, in affections of an inflammatory character that those symptoms are most constant and best marked; but, on the one hand, more or fewer of the symptoms of pyrexia may be absent in cases of inflammatory hepatic affections; and, on the other hand, more or fewer of them may present themselves in diseases not primarily nor necessarily inflammatory; by either of which contingencies the practitioner may be embarrassed in his diagnosis.

399. There are several morbid conditions of the biliary organs which *rigors* are liable to attend, more particularly the commencement of inflammation, the supervention of suppuration, and the onward passage of gall-stones. The occurrence of this symptom, therefore, in cases in which we have grounds for believing that the biliary organs are affected, will not of itself serve to determine the precise nature of the disease, but must be considered in connection with the previous history of the case, and with the co-existent morbid phenomena.

400. Acute hepatitis, according to the summary statement of Dr Pemberton (p. 19), commences with rigors, shiverings, and an accelerated pulse. The more guarded language of Dr Saunders more correctly expresses the fact in regard to the rigors. "Hepatitis," says this author (p. 258), "is generally preceded by some degree of *horripilatio* and rigor, which, in some cases however, are so slight as to evade the attention or recollection of the patient." Mr Annesley conceives that there is a difference, in respect of liability to rigors, between mem-

branous and parenchymatous hepatitis. He informs us (i. 416) that, in the East Indies, inflammation of the *substance* of the liver seldom commences with a well marked rigor or chill, unless after exposure to a powerful exciting cause operating upon the system from without, as cold or wet, currents of air, night-dew, or malaria; and that when chills or rigors do mark commencing inflammation of the internal structure of the organ, there are generally one or more of the symptoms characteristic of congestion also present. But, according to the same authority, when the *surface* of the liver becomes the seat of inflammation, the febrile signs, which are more prominent than in inflammation of the substance, often supervene to slight rigors or chills. (P. 423.)

401. With regard to the connection between the occurrence of rigors and hepatic suppuration, Dr Saunders observes, that, during the formation of pus, frequent rigors take place (p. 261); and Dr Pemberton mentions (p. 35), "abatement of pain, with pulse increasing in frequency, attended with repeated chilly fits," as indications of suppuration being at hand. But here again these general statements require to be received with limitations. Mr Twining states, that "rigor is not a general attendant on the formation of abscess of the liver, and that symptom was not observed in the majority of the cases which I have seen" (i. 295); and Mr Annesley, that in the supposition of abscess of the liver, the presence of rigors can seldom be expected, but slight shudderings and formications are more frequently observed.

402. Even when rigors occur in the progress of hepatic disease, they are not diagnostic of the formation of purulent matter, for, 1st, hepatic disease is often complicated with ague, and the rigors may belong to the febrile paroxysm. 2d, Rigors may proceed also from that state of stomach which is induced by irritation and spasm of the gall-ducts, and by the irruption of bile into the duodenum; and, 3d, as Dr Nicoll points out, a slight exposure to cold, when the system is at the same time under the influence of mercury, generally brings on rigors more or less intense, and of longer or shorter duration. When, how-

ever, rigors or horripilations supervene to the more active forms of hepatic disease, then more dependence may be placed upon them, as characterizing the formation of matter in the liver; but it is chiefly by the manner of their supervening to the antecedent symptoms, and by the relation which they bear to the phenomena succeeding them, that we should be guided in our judgment respecting their cause. (Annesley, p. 527-8.)

403. The liability of rigors to occur in cases of jaundice, particularly when it depends on gall-stones, has frequently been noticed. "In other diseases of the bowels," Dr Heberden observes (p. 246-7), "it is a very alarming symptom to have the patient subject to fits of shivering: but very strong ones now and then happen in the jaundice, and last an hour, and return every day, for two or three times, without being followed by any other complaint. It is difficult to guess satisfactorily at the cause of this; but whatever it be, I have suspected that this symptom happens at the time of the stone passing into the intestines." Dr Powell also notices (p. 93-4) that when a biliary concretion is passing through the ducts, "the attack often commences suddenly, with shiverings, which afterwards occasionally recur." And Dr Pemberton remarks (p. 49), that in jaundice from spasm or from gall-stones, sometimes there are shiverings, and sometimes not: and that when these shiverings occur, it may be observed that they come on after the pain has continued some time, and do not precede the pain, as is the case with those shiverings which attend inflammation.

404. Inflammatory affections of the liver, especially when of an acute character, and when seated on the surface of that organ, are, like those of other organs, generally accompanied from an early stage of their progress (whether or no they may have been ushered in by shiverings) with those symptoms which mark the state of pyrexia to be actually formed, particularly *increased frequency of pulse* and *heat of skin*; and these symptoms may continue, in greater or less intensity, during the subsequent course of the disease.

405. Mr Annesley informs us, that in active inflammation of the *substance* of the liver, as it presents itself in India, the

pulse is, at a very early period of the disorder, scarcely affected, but it soon becomes accelerated towards night; it is often slower and more oppressed than usual, and occasionally irregular or remittent. (P. 416-17.) As the disease of the internal structure of the liver advances, the pulse becomes quicker, fuller, and more irritable in its beat, during the evening and night, and it is often oppressed and embarrassed during the morning and day, and sometimes throughout, unless copious depletions have been practised early in the disorder. (P. 417.) As the inflammation advances to an acme, the febrile symptoms, particularly towards evening, become more marked. The pulse is more frequent, and its beat irritable, but it often varies greatly, both in frequency, regularity, and development; so that, viewed singly, but little dependence can be placed upon this symptom. (P. 419.)

406. When the *surface* of the liver becomes the seat of inflammation, the pulse is generally much accelerated and hard. (P. 423.) This form of hepatitis is also attended with great heat of skin, and with a more unnatural dryness of it, than when the disease is seated in the internal structure. (P. 424.)

407. In the conjunction of inflammation of the *surface* and the *substance*, the pulse is frequent, irritable, sometimes small, and irregular in frequency, fulness, and strength. The skin is hot and dry on the trunk of the body, or hot and greasy to the feel. (P. 429.)

408. In his enumeration of the symptoms by which the practitioner is to be guided in determining the existence of chronic inflammation of the internal structure of the liver, Mr Annesley mentions slight acceleration of the pulse towards evening, with an irritable beat, and considerable heat and restlessness through the night; burning heat of the palms of the hands and soles of the feet in the evening, and chilliness in the morning.* (P. 472.)

* On *nocturnal accessions of fever*, as an important ground of *diagnosis* in hepatic affections, and particularly in chronic hepatitis, see a letter from Dr Kennedy in the second edition of Sir George Ballingall's *Practical Observations on Fever, &c.* p. 301.

409. At the commencement of the formation of pus, according to Mr Annesley the pulse is generally soft and full, is subject to acceleration in the evening, and as the organic change advances, becomes more irritable, quick, and contracted. (P. 529.)

410. "When an extensive collection of matter has taken place in the liver," observes Mr Twining (i. 295), "the pulse almost always rises above 100, and becomes softer and more readily accelerated by any exertion, or by change of posture from the recumbent to the erect position. In many patients, frequent cold perspirations are observed, attended with anxiety, debility, and a sunk countenance; in other cases, profuse sweating occurs at night. Sometimes in emaciated subjects, the pyrexia assumes the character usually observed in pulmonary hectic."

411. Dr Conwell explains the varying intensity of the symptomatic fever which attends hepatic abscess, conformably with his doctrine of the entrance of pus into the circulatory system. When the purulent matter of hepatic abscesses passes gradually through the hepatic veins into the general circulation, as happens in many cases, then, he alleges, there is little additional disturbance of the circulatory system. If a larger quantity passes suddenly, it excites collapse, sinking, cold sweats, and faintness. If, in small quantity, these symptoms are less marked. The pus then becomes excreted from the blood with the urine, and the disease is thus naturally cured.

412. But whilst from the high authorities from which these statements, respecting the characters of the pyrexial symptoms, and more particularly of the pulse, in the inflammatory affections of the liver, are derived, they may be considered as very correctly expressing the general results of clinical observations, it must be allowed that they are very far from holding universally true, the greatest diversity occurring in the proportion which the pyrexial symptoms bear to the local, and each of these classes of symptoms, respectively, to the apparent intensity of the affection as revealed by post-mortem examination.

413. Sometimes the pyrexial symptoms manifest themselves

in cases of hepatic inflammation in which the local symptoms are obscure or absent, so that, whilst we are warned of the existence of disease, we find it difficult, if not impossible, to localize it, or we mistake it for idiopathic fever. "The local symptoms suited to reveal the hepatic affection," says M. Andral, "may be very obscure, and nothing be observed but a continued fever, of which the examination of the dead body alone can prove the non-essentiality." In a case related by this author, a fever of this character was produced by an abscess formed in the liver.

414. In some cases of inflammatory hepatic affection, the constitutional symptoms are wanting, although the local be sufficiently distinct to indicate the existence of disease in the liver, in which case, though the seat of the disease be ascertained, its nature may remain unknown. This absence of the pyrexial symptoms concurring with the presence of the local, occurs rarely in acute hepatitis, but not unfrequently, as Andral observes, in the numerous shades of chronic hepatitis, and even in cases in which collections of pus are hollowed out in the substance of the liver.

415. In other cases of inflammatory affections of the liver, even though running a rapid course, and more especially in those in which the *substance* of the liver is the main seat of disease, both the constitutional and the local symptoms may be wanting in the early stage, so that the affection shall have made considerable advancement before we become aware of the existence of disease. In proportion to the more chronic character of the inflammatory affection of the liver, will be the obscurity of both its constitutional and its local symptoms.

416. Of the non-inflammatory structural diseases of the liver, several which, in their first stages, are unattended with pyrexial symptoms, are liable, in their more advanced periods, to exhibit this class of phenomena. The fever, however, is sometimes so little marked, that it might easily be overlooked. "Often before the physician is aware of it," says M. Portal, in reference to the occurrence of fever in the advanced periods of what he terms hepatic obstructions, comprehending a num-

ber of the organic diseases of the biliary organs, "the patient experiences for some time heat in the palms of the hands, in the head, feet, and cheeks, with remarkable redness over the cheek-bones. This heat increases after taking food, and during the night; it becomes at length habitual, constant, and without any interruption, pungent with a great dryness on the skin, and with accessions during the day, and particularly in the evening and during the night."

417. The liability of the pyrexial symptoms that attend the more advanced periods of some of the chronic affections of the biliary organs, to become complicated with those symptoms which constitute the nosological character of hectic fever, and which attend all the different forms of consumption, viz. sweating, diarrhoea, emaciation, &c., has led some medical authorities to recognise a hepatic form of phthisis. Many of the cases which have been so designated, have no doubt been cases of chronic inflammation, which have passed on in a very slow and insidious manner to the formation of pus, in one or in several portions of the hepatic substance. But the process of softening to which heterologous morbid growths are subject, and which may possibly have some analogy with the suppuration of healthy tissues, seems to be also liable to be accompanied with hectic paroxysms.

418. M. Andral has well remarked, that in certain cases of chronic affection of the liver, though there be not habitually fever, yet, at periods more or less distant, there supervenes a febrile attack, which may last some hours only, or may continue for several days. This accidental fever depends most frequently on a temporary aggravation of the affection of the liver, which passes from its chronic to an acute state. In this case, at the same time that the fever manifests itself, we often see the local symptoms of the hepatic affection become much more marked. The pain, for example, may appear, if it did not previously exist; or if it did, it may become more severe. Sometimes, again, the irregular returns of these febrile paroxysms appear to be less connected with the disease of the liver itself, than with an intercurrent inflammation of the alimentary canal.

419. We may notice, in connection with the pyrexial symptoms, a statement of Dr Stoker's with regard to the difference in the appearance of the buffy coat of the blood in pulmonary and in hepatic inflammation, which he conceives may often serve as a useful diagnostic mark between these affections. "In simple pneumonia," he says, "the coat on the blood is generally of a colourless white; but when tinged, it is with bright red, the depth of the tunic seldom exceeding a few lines; and to this probably it is owing that the cupping on the surface of such blood is generally remarkable; the thin and tenacious film contracting as it forms, and drawing, towards the centre, the external margin, at the circumference of the less contractile crassamentum. In simple forms of hepatic (inflammatory) disease, on the contrary, the buffy covering is generally darker through its whole substance than in pneumonia, and is externally yellow. It occupies a large proportion of the solid part of the blood, and is not often cupped; when it is cupped, there is reason to suppose that the lungs are partly engaged." Dr Stoker refers also to Mr Todd as being satisfied that, on inspecting the cups of blood taken in different diseases, he could frequently pronounce what organs were primarily or chiefly engaged in those who had been bled; blood with a white and cupped surface indicating the lungs to be the seat of disease, and blood with a dark yellow colour and equal surface, the liver. "From the difficulty of ascertaining any infallible diagnostic between certain forms of pulmonary and hepatic diseases (which have so many symptoms alternately or in common), the foregoing observations," adds Dr Stoker, "will, if found applicable in practice, be justly appreciated." (Patholog. Observ. part i. p. 41.)

SECTION IX.

OF MORBID AFFECTIONS OF THE NERVOUS SYSTEM ACCOMPANYING, OR SUPERVENING ON, DISEASES OF THE BILIARY ORGANS.

420. That the mental depression with which indigestion is frequently accompanied, depends, in part at least, on *deranged biliary secretion*, is a matter of common belief. The influence of *inflammatory affections* of the liver in inducing the depressing passions, has been noticed by several accurate observers. Sir George Ballingall, in remarking that the class of patients (soldiers) to whom his experience in India had been chiefly confined, is perhaps not the most favourable for making observations on the state of mind accompanying disease, adds, " Yet, whenever I have had an opportunity of turning my attention to this point, I have observed that in cases of hepatitis, the mind is, in general, obviously affected; and an apprehension and alarm exists, which no external symptom seems to justify. The patient is generally overcome with a degree of languor, listlessness, reluctance to exertion, and aversion to enterprise, for which no adequate cause is conspicuous." " While the patient is apt to indulge in this desponding state of mind, he does not always relinquish his hopes of benefit from the employment of medicine, but, in some instances, seems to entertain an almost superstitious faith in its power; he delights in detailing his miserable feelings to others, particularly to medical men, while, at the same time, it is obvious that he labours under the greatest difficulty in explaining his sensations accurately. From this, he is apt to suppose that his medical attendant does not perfectly comprehend the nature of his complaints, and thinks that if they were completely understood, he might yet be saved."

421. It was observed by Baglivi in his *Practice of Physic* (Lib. i. Op. Omn. p. 83), that " cases of jaundice are never to be slighted, for, under the mask and character of jaundice,

there are often concealed great, dangerous, and sudden diseases; and jaundiced persons," he adds, "very often die suddenly, as Dodonæus remarks." Baglivi himself mentions a case of sanguineous apoplexy succeeding to jaundice from calculi. (*Diss. de Bil. Nat. &c. Op. Omn.* p. 433.)

422. Morgagni related (*Epist.* xxxvii, 2-6.) several cases of jaundice, in which, at an early period of their progress, symptoms of cerebral affection, delirium, and convulsions, manifested themselves, terminating, after a variable period, in death. The dissection of the bodies of these persons exhibited no morbid appearances sufficient to account in any measure either for the jaundice or for the cerebral symptoms and fatal termination.

423. At a more recent period, Dr Powell, in his *Observations on the Bile, &c.*, published in 1800, mentions (p. 83) that it had happened to him to meet with two cases within a short time of each other, where a jaundice of some continuance was succeeded by decided apoplexy and death; the patients were both females and young, and did not appear likely to be affected with such a disease as apoplexy. "I regretted," adds Dr P. "that circumstances prevented an examination of these cases after death, because I could not help suspecting more than an accidental occurrence between the two diseases."

424. But the sudden termination of jaundice in cerebral affections has attracted a much larger share of the attention of medical men since the publication (in 1822) of Sir Henry Marsh's *Essay on Jaundice*, in the 3d volume of the *Dublin Hospital Reports*; and various explanations have since been attempted of the relation subsisting between the hepatic and the cerebral affections. "It happens not unfrequently," says Sir H. M., "that patients labouring under jaundice are seized suddenly with symptoms of cerebral disease, and die phrenitic. Upon looking into several cases of this kind, I find that this form of disease exists principally in persons whose nervous system has, from any cause, been previously injured and weakened." Sir Henry refers to a case published by Dr Cheyne (*Dubl. Hosp. Reports*, i. p. 282), as the first of

this kind which excited his attention ; but he narrates at least four additional cases of the same description, which had fallen under his own observation or that of professional brethren, and to these he subjoins an epitome of the cases related by Morgagni. "It may be said," he adds, "that in these cases of icterus, the affection of the brain was an accidental circumstance, unconnected with the original disease, and arising from causes quite distinct from the presence or absence of bile in the circulating system. That jaundice is not the only, or even the principal, cause is very certain ; for we often observe patients to be deeply jaundiced, and yet free from cerebral disorder. But that, under certain circumstances, in certain conditions of the nervous system, phrensy may be excited, either by the bile conveyed to the brain, or in consequence of the sympathy which exists between the cerebral and hepatic systems, is an assertion, the truth of which, I conceive, the facts stated sufficiently establish. In practice, it is important we should be aware that an icteric patient, who has a weak and irritable nervous system, must be closely looked after, lest alarming symptoms should unexpectedly arise ; and in cases of this kind, we should be very guarded and cautious in our prognosis."

425. Dr Abercrombie, in his work on Diseases of the Stomach, &c. published in 1828 (p. 373), after remarking, that jaundice, even when arising from causes apparently transient, is never to be looked upon as free from danger, many cases being on record, in which death took place in a very unexpected manner, and in which no morbid appearance could be discovered, capable of accounting either for the jaundice, or for the fatal event, says ; "Several years ago, I saw a woman who became suddenly jaundiced a day or two after accouchement. There was no other symptom, and no danger apprehended, until, after two or three days, she became *comatose*, and died. There was very slight effusion in the brain, and no morbid appearance could be discovered in any other organ."

426. At a meeting of the Westminster Medical Society, 30th January 1830, Mr Gilbert Burnet related the case of a dissipated young man, in whom an attack of jaundice, at an early period

of the disease, terminated in coma and death. "An examination of the body was not permitted; but, from the absence of uneasiness in the region of the liver, and the peculiar lividness or greenish tint which prevailed, Mr Burnet professed himself inclined to consider this to be one of those cases of jaundice, in which the bile is not eliminated from the blood, as contrasted with those more ordinary forms of icterus in which it is freely secreted, and subsequently re-absorbed; or, at least, that the non-elimination was the more serious part of the case, as it is always the most serious form of jaundice; and he put it to the consideration of the Society, whether death, in these instances, might not, in some measure, resemble apoplexy? in that the coma and oppression of the sensorium might be accounted for by supposing that the blood, vitiated by the admixture of bile or the non-separation of its elements, would be as unfit to excite the brain to the due performance of its functions, as the circulation of venous blood there, is in apoplexy." (Lond. Med. Gazette, v. 631.)

427. In the 4th volume of the Dublin Medical Journal (January 1834), Dr Griffin mentions that the question, On what morbid state the occurrence of coma and sudden death in jaundice depends? had been very forcibly impressed upon his attention, by the occurrence of four cases of jaundice, under his own observation, in one family, and within a few weeks of one another, which, though unattended with any unusual or remarkable symptoms indicative of impending danger, ran rapidly into coma, and, in two, terminated in death. Dr Griffin's reflections seem to have led him to the conclusion that, in cases of the kind alluded to, the jaundice is secondary, or symptomatic only, depending on some oppressed or actually diseased state of the brain, making for some time an insidious progress, and at length manifesting itself by suspending the functions of the liver.

428. "An endeavour has been made," says Dr Griffin (p. 355), "to draw some distinction between cases of jaundice in which the bile is not eliminated by the liver, and those in which it has been secreted and re-absorbed. That such distinction exists, and that the former are of a more dangerous nature than the latter, inasmuch as they necessarily include either paralysis

or great disorganisation of the organ (the liver), no one can deny; but it does not follow from this, that the system sustains more injury by the want of elimination of bile, than by its secretion and re-absorption. The cases usually end fatally, not because the blood is more vitiated, but because the vitiation, such as it is, arises from, and is accompanied by, more serious disease. If, then, we cannot account for these cases of sudden coma by any absolute effects of retained bile, it only remains for us to inquire whether they might not be explained on the supposition of previous cerebral disease."

428. The explanation of the greater tendency to coma and death in the one of these classes of cases than in the other, to which Mr Griffin objects, has been ably maintained by Dr Alison (Edin. Med. Surg. Journ. 1830, xliv.), whose attention had been particularly directed to this form of jaundice by cases that had occurred from time to time in the wards of the Royal Infirmary of Edinburgh, and been made the subjects of clinical prelection. "I apprehend," says Dr Alison, "that we have now sufficient evidence to establish two points; 1st, The frequent occurrence of jaundice in cases where the bile-ducts are pervious, and appear empty after death; and 2d, The peculiar (I would not say either the uniform or the exclusive) tendency of such cases of jaundice to produce delirium and coma, and prove rapidly fatal. If it be true, that the cases of jaundice thus dependent on suppression of the secretion and retention of the biliary matter in the blood, are also those in which the nervous system is apt to be peculiarly and dangerously affected, another important inference may be drawn from these facts, viz. that the retention, in the blood, of matter destined to excretion, is much more generally hurtful to the living body, than the re-absorption, into the blood, of matters which have been secreted at their appropriate organs, but not thrown out of the body in consequence of obstruction to their outlets. At first view, this appears improbable; but it is supported by the analogy of other facts. And if it be true, as stated by Dr Prout, that nothing is absorbed in the living body without having been previously acted on by the fluids of

the body, and undergone a process more or less analogous to digestion, this difference between the noxious qualities of excretions retained and excretions re-absorbed, may be easily understood. It is probable that there may be cases, where the re-absorbed bile is likewise the cause of fatal coma; and when we reflect how very variously other narcotic poisons affect the nervous system in different individuals, it is not surprising that this difference should be observed. But that the retained bile has the peculiarly noxious quality, seems to be clearly shewn by the very large proportion of cases of jaundice early fatal in the way of coma, in which the bile-ducts have been found pervious and empty."

429. Whichever of these explanations respecting the connection subsisting, in the cases that have been referred to, between the jaundice and the coma, may be regarded as the correct one, whether the brain be considered as the *proto-pathic*, and the liver as the *deutero-pathic* organ, or the converse,—the fact which these cases establish, of a frequent connection between those two morbid states, is of the highest importance in practice.

CHAPTER IV.

MODES OF TREATMENT BEST ADAPTED FOR REMOVING
THE SEVERAL MORBID CONDITIONS OF THE BILIARY
ORGANS, OR FOR DIMINISHING THEIR INJURIOUS OPE-
RATION ON THE ECONOMY.

430. In the treatment of the diseases of the biliary organs, medical practitioners, and particularly those of Great Britain and the British Colonies, have been accustomed to place great reliance on the efficacy of mercury, either as the sole remedial agent, or as a most powerful auxiliary to other means. This substance has been supposed not only to fulfil, with an efficacy superior to all other remedies, every indication which the treatment of the diseases of the biliary organs suggests or requires; but also to produce beneficial effects in the removal of these diseases, of which pathologists can afford no *rational* explanation, which are not consequently reducible to therapeutical indications, and which may, in that respect, be designated *specific*.

431. Besides mercury, other remedies have been supposed to exist, possessed of peculiar or specific powers over the diseases of the biliary organs, though none have attained such high repute with the medical profession. In the view which we purpose to take of the treatment of this class of diseases, we shall, in the first place, consider the several rational therapeutical *indications* which diseases of the biliary organs present, and the modes of effecting these, independently of the employment of supposed specific remedies; and, in the next place, we shall consider the opinions of medical men as to the employment of specific remedies, and particularly of mercury, in the treatment of affections of the biliary organs.

432. In attempting to exhibit a general view of the principles upon which the treatment of the diseases of the biliary organs should be conducted, it will be convenient to consider them under the following heads: *1st*, Simple functional derangements, including concretionary obstructions; *2d*, Congestive and inflammatory affections; *3d*, Organic alterations of a mild or of a malignant character; and, *4th*, Preternatural collections of fluid.

433. The view which we formerly took of the simple functional or dynamical derangements of the biliary organs, seems to suggest the four following indications of treatment, as applicable to their several forms, viz. *1st*, To diminish biliary secretion when excessive; *2d*, To increase this secretion when deficient; *3d*, To correct it when vitiated; under which head may be included the consideration of all questions relative to the powers of remedies in preventing the formation of biliary calculi, or in promoting their solution when actually formed; and, *4th*, To promote the excretion of the bile, or the expulsion of biliary concretions, whether the seat of retardation of either of these two substances shall be the gall-ducts or the intestinal canal. With the last of these indications may be conjoined those of removing spasm of the biliary passages, and of relieving pain in these passages.

434. It must not be forgotten, however, that the necessity of attending to these several indications is not confined exclusively to those diseases which are of a strictly dynamical character; for there are no diseases of the biliary organs in which one or more of the several functional derangements these indications are intended to obviate, is not liable to occur.

435. The indications of treatment more peculiarly applicable to the other classes of the diseases of the biliary organs above enumerated, seem to be, *5th*, To remove vascular turgescence, and subdue phlogistic diathesis and local inflammatory action; *6th*, To promote absorption of matters foreign to the natural substance of the organ; *7th*, To improve the general health; and, *8th*, To give vent to preternatural collections of fluid.

FIRST INDICATION,
TO DIMINISH BILIARY SECRETION.

436. Conformably with the plan above sketched, the *first* indication which falls to be considered relative to the treatment of diseases of the biliary organs, is that of diminishing the hepatic secretion when this is in excess. (21.) Independently of any power which may be attributed to mercury of *diminishing* the amount of the biliary secretion, by a direct action on the secretory apparatus of the liver, a matter afterwards to be noticed, it is only by avoiding those occasional causes which give rise to an increased biliary secretion, that we can expect to fulfil this indication, viz. by avoiding, as much as possible, exposure to excessive degrees and rapid alternations of temperature, and by the substitution of a diet chiefly farinaceous, in place of one consisting mainly of animal food. (24, 27.) The efficacy of these measures, in diminishing the hepatic secretion, may be supposed to depend on their exerting some intermediate operation, either in the way of modifying the qualities of the blood, or of removing a congestive state of the vascular system. If the excessive biliary secretion shall appear to depend on any morbid condition of the alimentary canal, it is obvious that to remove this must be a fundamental object of concern to the practitioner.

SECOND INDICATION,
TO INCREASE BILIARY SECRETION.

437. The *second* indication which we have mentioned is that of increasing the biliary secretion when deficient. (9.) It may be presumed that the ancient physicians, in applying the term cholagogue to a certain class of medicines, whatever speculative views they might entertain as to their mode of operation, were at least impressed with the belief that the administration of these

substances is followed by a discharge from the bowels of an increased quantity of bile. As the total or partial deficiency of bile in the alvine evacuations may be supposed to depend on one or other of three circumstances,—non-secretion from the biliary pores, non-excretion from the ducts, and non-evacuation from the bowels ; so the presence of an unusual quantity of bile in the alvine evacuations, after the administration of a particular medicine, may be supposed to indicate a power in that medicine, either, *1st*, To produce an increased secretion of bile ; or, *2d*, To promote the excretion of bile formed independently of it,—to emulge the gall-ducts, as it is usually expressed ; or, *3d*, To empty the part of the intestinal canal into which the bile is discharged. But it may possibly be, also, that these are not necessarily separate or incompatible virtues or powers. A medicine, of which the primary operation is to clear the duodenum, may be conceived by that very action to facilitate the flow of bile from the gall-ducts ; and this easier flow, in its turn, may be supposed to promote the secretion. It is not wonderful, therefore, that a great diversity should subsist in the explanations stated, or glanced at, by different medical men, as to the exact mode of operation of *cholagogue* medicines.

438. The cholagogue medicine on which most reliance is placed, in this country and its colonies, is undoubtedly mercury ; and we shall afterwards find that, in the estimation of many, the benefit which attends its exhibition in biliary affections, primarily originates in its specific power of increasing the energy of the secretory apparatus of the liver, and thereby increasing the amount of the biliary secretion, just as digitalis and other substances increase the amount of the renal secretion. But, by other practitioners, the benefit resulting from its administration is attributed to its action on the upper portion of the intestinal canal, an action not peculiar to itself, in however high a degree it may possess it, but common to it with several other medicines of a purgative character. Thus Dr Saunders, in remarking that, “ in some cases, the resistance to the secretion of bile may arise from the viscosity of the fluid obstructing the extremities of the common duct, as it enters the duodenum,”

adds, "this will be removed most effectually by calomel, scammony, or jalap, which seem in their operation to stimulate and evacuate the duodenum, while many other purgatives act most forcibly on the large intestines."

439. Along with the indication for increasing the amount of the biliary secretion when deficient, we may consider the question whether medicine affords us any means of counteracting the injurious effects which arise from a deficient secretion of bile, or from its non-excretion into the duodenum, so long as one or other of these morbid states continues? There are obviously two ways in which these states may operate injuriously on the economy; the one, depending on the absence of the bile from the situations in which it is usually met with, is limited to the function of digestion; the other, depending on its presence in unusual situations, extends to the general economy, and particularly affects the exercise of the functions of the nervous system.

440. (*1st.*) So far as the function of digestion is dependent, for its due exercise, on a proper intermixture of bile with the alimentary matters, it must be impeded by a deficiency of that fluid, whether occasioned by non-elimination or non-excretion. If we were acquainted with the precise purpose which the bile fulfils in this function, we should be assisted in judging what aid medicine can afford for remedying its deficiency. Those, for instance, who imagine that it exerts a chemical action in correcting acescency, naturally suppose that its place may, in part at least, be supplied by alkaline medicines. Those, again, who conceive that it is by stimulating the peristaltic action of the intestines that the bile promotes the function of digestion, must consider the administration of laxative or purgative medicines as the proper method of compensating its deficiency; and particularly those laxatives or purgatives which are supposed to act on the upper portion of the alimentary canal. If, leaving out of view such speculative judgments as to the best means of supplying the deficiency of bile, so far as the function of digestion is concerned, we inquire into the results of experience in the treatment of that class of cases, the symp-

toms of which are supposed to depend on this cause, we find that the most beneficial measures of treatment consist in, 1st, the careful regulation of the diet, so as to render it of as easy digestion as possible; 2d, the administration of bitter tonics; and 3d, that of laxative or purgative medicines, to such an extent as is found requisite to keep the bowels gently open. "The temporary defect of bile," says Dr Saunders (p. 254), "may be supplied by various bitters, occasionally united with rhubarb, aloes, and the like."

441. The bile of different species of the lower animals was formerly much used, with a view to the fulfilment of this indication. "Thickened to the consistence of an extract, or employed as an excipient in aperitive or purgative pills, the bile of animals," says M. Portal, "is frequently prescribed in the intention of compensating for the natural bile. It has been recommended in cases in which the natural bile did not flow from the liver to the duodenum freely, and in sufficient quantity for the process of digestion." "The bile of the calf," the same author observes, "is most commonly used in the dose of half a drachm to a drachm." (P. 62.) Nor has this remedy, even at the present day, altogether lost its reputation. "We recently saw," says a late writer, "two instances of the most obstinate and long protracted jaundice, where the patients were reduced to skeletons, and the skin, for many months, was the colour of mahogany, and where inspissated ox-gall produced the best effects; tinging the motions, lessening the irritability of the stomach, and increasing the peristaltic action of the intestines. In both instances, recovery ultimately took place, after all hopes had been abandoned by physicians and friends." (Johnson's Med. Chir. Rev., July 1831, p. 91.)

442. (2d.) Whatever may be the purpose of the bile, or its importance as a *secretion* destined to answer some end in the economy, it cannot be doubted that the formation of this substance is of not less consequence as an *excretion*, securing the elimination from the system of some principles which, if allowed to accumulate, are calculated to exert a noxious operation upon it. When, therefore, the bile is either not secreted,

or is reabsorbed after being secreted, have we any means of correcting its injurious operation on the economy, and particularly on the nervous system; of overcoming the languor and oppression which are the ordinary accompaniments of jaundice, or the coma which, as we have seen, in some cases supervenes? Little, we fear, in the way of palliation is in our power in these respects. In the very small number of cases in which an attack of coma supervening on jaundice has been successfully combated, the means from which benefit seems to have been derived, have been, 1st, the free use of purgatives; and, 2d, such applications to the head as are suggested by the apprehension of an inflammatory affection of the brain.

THIRD INDICATION,

TO CORRECT VITIATED BILIARY SECRETION.

443. The *third* indication which we have to consider, is that of correcting the biliary secretion when vitiated (32), under which head fall to be included the prevention and the solution of biliary concretions,—so far as it is in the power of medicine to promote these objects.

444. The degree of control over the acid or alkaline character of the urine which medical men have derived from their improved acquaintance with the morbid conditions of that fluid, has excited hopes of farther therapeutical triumphs resulting from a more intimate knowledge of the vitiations to which the various glandular secretions are subject. But in whatever anticipations on this head the sanguine may indulge, it cannot be pretended that any knowledge which we at present possess of the biliary secretion in health or disease, enables us to lay down any rational indications for the correction of its morbid conditions, with one exception, perhaps, to which we shall presently allude. That we possess empirically a knowledge of remedies, from the use of which such consequences result, is a very general belief among practitioners; but the remedies to which such virtues are ascribed, do not seem to differ from those that are

supposed to possess the power of increasing or diminishing the biliary secretion.

445. The prevention of the formation of biliary calculi must obviously depend mainly on the avoidance of those causes which we formerly noticed as conducing to their production. (214.) It has been alleged, however, that, among the various remedies employed against biliary concretions, there are none which have been nearly so successful as alkalies taken for some continuance; and to explain their efficacy, it has been conceived that, by impregnating the blood, these substances supply to the biliary secretion an additional quantity of that principle, upon a deficiency of which the formation of biliary calculi depends, and thereby render the bile not only less disposed to concrete, but even capable of softening and dissolving concretions already formed. This statement of the beneficial operation of alkaline medicines in at least preventing the formation of gallstones, accords with the chemical principles on which, as we formerly saw (46), the formation of cholesterine concretions was explained by Muratori, agreeably with his comparative analysis of healthy bile, and of bile containing calculi.

446. Amongst the expectations of advantage to be derived in the treatment of diseases from the study and advancement of animal chemistry, which have at different times been entertained, must be included, that of discovering means by which the solution of biliary calculi within the body may be effected. Accordingly, those agents which were found capable of dissolving these calculi, when brought in contact with them out of the body, have at different times been recommended as proper for internal administration in cases in which biliary concretions are suspected to exist. Of the supposed solvents of biliary concretions, the medicine which acquired the widest reputation seems to have been a combination of sulphuric ether (three parts) with spirit of turpentine (two parts), recommended by Durande, a physician of Dijon, administered at first in a very small dose (2 scruples). This remedy has been much commended, not only by its author, but also by Sæmmering, Richter and others, who attribute to it, without hesitation, the pro-

perty of dissolving biliary calculi ; while those who object to recognise in it such a power, on the ground that the substances of which it is composed cannot possibly be carried into the gall bladder or ducts so little changed as to preserve any sensible degree of power, admit it to be established, by a considerable number of facts, that the remedy of Durande occasions or facilitates, in certain cases, the expulsion of biliary calculi ; and this they suppose it to effect, by calming the spasm of the parts containing them. (Bricheteau, Mem. Soc. Med. d'Emul. ix. 208.)

FOURTH INDICATION,

TO PROMOTE EXCRETION OF BILE, &c.

447. The *fourth* indication of treatment which we have specified is that of promoting the excretion of the bile (50), or the expulsion of biliary calculi, in the first place from the gall-ducts, and in the second place from the intestinal canal.

448. When an accumulation of bile occurs in the biliary passages in consequence of torpor of the powers by which it is usually propelled, or of some slight mechanical obstruction, the administration of emetics, by calling into action the diaphragm and abdominal muscles, which in that state forcibly compress the liver, seems calculated to effect this indication. "Nor," says Dr Coe, "does this only appear reasonable in theory, but it is also found to be true in fact."

449. When by such means an accumulation of bile is thrown into the alimentary canal, much benefit is derived, in the way of promoting its easy passage, from the copious use of diluents, with or without purgative, or rather laxative, medicines. "In general," says Dr Saunders, "bile is a purgative sufficiently stimulating for its own evacuation, only requiring the assistance of warm water for facilitating its discharge. If, however, in some cases it irritates without purging, I would recommend the use of small doses of the neutral salts, such as soluble tartar (tartrate of potass), sal catharticus amarus (sulphate of mag-

nesia), and the like ; and in all cases," he correctly adds, " they do most good under dilution."

450. We come next to inquire how far the medical art possesses any means of facilitating the passage of a biliary concretion through the gall-ducts into the intestinal canal. (139.) It is obvious how much our speculative views on this matter must depend on the opinions we entertain respecting the causes which retard or propel a biliary concretion in its course ; whether we suppose the resistance to be simply the physical coherence of the coats of the ducts, or to be in a greater or less degree dependent on vital spasmodic contraction ; and whether we suppose the power by which this resistance is to be overcome, to be, 1st, as some imagine, the muscular contraction of the ducts themselves ; 2d, as is conceived by others, the compression of surrounding parts ; or, 3d, as has also been suggested, the pressure of a fluid accumulating by continued secretion behind the obstacle.

451. The measures which in practice have appeared most serviceable in fits of gall-stones, and, as has been generally supposed, most useful in promoting their escape into the alimentary canal, have been opium, the warm bath and warm fomentations, emetics, and sometimes blood-letting.

452. The beneficial operation of *opium*, and perhaps of other narcotics, has been considered a strong argument in favour of attributing the detention of gall-stones in the ducts, in part at least, to spasmodic contraction, of which they are supposed to effect the removal. The difficulty, however, has been suggested, that, in allaying this spasm, narcotics must, at the same time, put a stop to any muscular power by which gall-stones can be supposed to be propelled. But, whatever degree of influence opium may be supposed capable of exerting upon the onward course of a gall-stone, it is acknowledged on all hands, that, with a view to the alleviation of the pain attending this, it must be administered during a fit, and that in very considerable quantity. Dr Pemberton says, that the quantity administered ought to have no limit but the absolute abatement of the pain ; and, till that object is obtained, the patient should take

a grain of solid opium, or twenty-five drops of Tinct. Opii, every hour. A starch clyster, he adds, (℥ iv. c. Laudan. g. xl.), repeated every sixth or eighth hour, will frequently produce immediate relief. The mode of administration recommended by Dr Powell is not less decided. "It is not sufficient," says he, "to administer small, or even ordinary doses, which are too little to produce any definite effect, but rather to give a large one in the first instance, and to follow this up by the repetition of smaller at certain intervals, which will prolong the powers of the medicine, and sometimes the concretion will pass while the patient is under its influence." M. Bricheteau, in noticing that Haller had often recourse to opium, in fits of gall-stone, to calm the spasms and pains of the affected parts, adds, "I have seen it several times fail. On the other hand, I have often had to congratulate myself on having administered the tincture of castor, in small doses, in antispasmodic potions." (P. 209.)

453. Immersion in the *warm bath*, and the use of *warm fomentations* externally, as with hot flannels, or a bladder half filled with hot water, or internally in the way of clysters, are usually recommended to be had recourse to during a fit of gall-stone, in the belief that their employment tends to diminish the force of muscular contraction, and thereby to facilitate the passage of the stone. According to Dr Powell, in order that the warm bath may produce the most powerful relaxant effects, its temperature should be from 100° to 110°, and certainly not less than the lower of these degrees; and the immersion should be continued till an incipient faintness is produced, which, whether it take place after a longer or a shorter time, is the best criterion to regulate its duration, for where faintness has not followed, the bath has not seemed to have any good effect. This may be repeated according to the violence of the symptoms; and the feelings of the patient will, while the fit continues, lead his own wishes to a repetition.

454. M. Bricheteau, in giving a very unfavourable statement of the results of the ordinary means of treatment in a fit of gall-stone, mentions that, having in one case formed the idea of applying two bladders filled with *ice coarsely pounded*, before

and behind, in the direction of a line traversing the epigastrium, though, on its first application, it seemed only to produce a change in the *nature* of the sufferings, it was found, when the ice was melted, that the frightful pain the patient had been enduring for thirty-six hours was gone. Subsequently to that case, M. Bricheateau has several times had recourse to the same means, under similar circumstances, and it has always, he says, succeeded, not in curing the disease, but in putting a stop to the paroxysms, and in postponing them considerably. (l. c. p. 207.)

455. In a fit of stone in the biliary ducts, *blood-letting* may be requisite for the removal or for the prevention of inflammation. But the intention in which it is generally had recourse to, in cases of this kind, is similar to that on which the employment of opium and the warm bath is founded, viz. to produce relaxation of the general muscular system, and through it, as is conceived, of the biliary ducts. "In strong sanguine constitutions," says Dr Coe, p. 242, "emptying the vessels will help to relax the fibres, and by that means promote the dilatation of the ducts for the expulsion of the calculi, and, moreover, render the use of other medicines both more safe and more effectual. For these reasons, we order bleeding in a fit of the stone in the urinary passages; as also sometimes for women in labour, or just before it is expected." As to the manner of venesection proper in cases of this kind, Dr Powell recommends that it should be performed once in rather a large quantity, and no more; "for, in the relaxation of muscular contraction and diminution of increased action, the effect will not be in proportion to the quantity lost upon the whole, but to the celerity with which that quantity is taken away; and twenty ounces of blood lost at once, will be much more efficacious than forty taken at repeated times, even though the intervals be but short between each." P. 151.

456. The administration of *emetics* during a fit of gall-stone has been generally recommended by practitioners, partly on the idea of their contributing to produce the state of general muscular relaxation, and partly on the same principle of exciting

the action of the diaphragm and abdominal muscles, to which we have alluded in speaking of the propulsion of the bile (446). Among the advocates for their use may be mentioned Dr Coe, Dr Heberden, and Dr Saunders, the latter of whom speaks in the following terms: "The passage of gall-stones may be promoted by gentle vomits, and, for this purpose ipecacuanha is frequently given; but its action will be assisted, if it be exhibited in small doses, and divided, so as to occasion for a time a degree of nausea, but ultimately to produce the full effect of an emetic. Tartarised antimony, as producing a much greater degree of muscular relaxation than ipecacuanha, and, on ordinary occasions, a more complete evacuation of the liver and gall-bladder, may be preferable. For the same reason, tobacco deserves a trial, as the sickness which it occasions resembles sea-sickness more than any other; and it is probably on this principle that sea-sickness has been so very efficacious in those cases." Dr Powell's experience is unfavourable to the use of emetics. He thinks that, when they have been administered, the duration of the disease has not been shortened, nor any single symptom alleviated in its violence. Dr Pemberton conceives that the explanation which he has given of the manner in which the passage of a gall-stone through the ducts is effected, may serve, in some measure, to explain the contradictory results obtained as to the power of emetics in forwarding one: "The effect of an emetic is not only to produce relaxation of the whole body, but also to increase the secretion of bile. This increased quantity of bile, if its exit be prevented, will mechanically increase the distention of the duct, and thus will a passage be opened for the calculus. But if the stone, in consequence of its angles, does not completely close the duct, the bile will pass off, and no distention take place."

457. "There is a difference of opinion," remarks Dr Stokes, (Lond. Med. Surg. Journ. 29th March 1834), "with respect to the employment of emetics. The object of their exhibition is to force the calculus through the ducts by the shock given by the sudden and violent contraction of the abdominal muscles, and also to relieve spasm by their subsequent relaxing

effects. Some practitioners of high authority, however, state that this practice is not unattended with danger, and give cases of the rupture of the gall-bladder after the exhibition of an emetic. I am sure the practice, in some cases at least, is dangerous. A distinguished medical friend of mine has related to me the particulars of a case of this kind, in which the exhibition of an emetic was followed by rupture of the gall-bladder and fatal peritonitis. In this instance, the case was not so deplorable, so far as the patient was concerned: he was labouring under extensive disease of the liver, and only exchanged a lingering for a sudden death; but this furnishes no excuse for a medical practitioner. If I were to hazard a conjecture, I would say, that emetics can be employed with safety only in the early stage of the disease, when there is no obstruction from organic disease; for the longer the jaundice has lasted, the greater is the chance of obstruction from organic disease. Again, you should never use them when there is evidence of a distended gall-bladder. If you can feel the tumour formed by the gall-bladder in the right hypochondrium, you may be sure something has been going on for a long time, and you should be cautious in giving an emetic. Never use it, then, where you can feel a tumour in the region of the gall-bladder. If you give it at all, give it in the early stage, and after premising venesection, leeching, and the use of the tobacco injection."

458. When gall-stones give rise to symptoms of ileus (361), the means to be employed for overcoming the obstructed state of the alimentary canal must be the same as when this state arises from other causes. Indeed, it often happens in cases of this kind, that we are ignorant of the immediate cause of the symptoms till the case terminates, either favourably by the discharge of the concretion, or in death.

FIFTH INDICATION,

TO SUBDUE PHLOGISTIC DIATHESIS, &c.

459. We have next to consider the means of effecting the *fifth* indication of treatment, that, viz. of removing vascular turgescence, and of subduing phlogistic diathesis and local inflammatory action. It seems to be now very generally allowed that, whatever assistance the medical practitioner may seek to derive, in the treatment of the inflammatory affections of the liver, from the administration of specific medicines, these must be used as auxiliaries to the antiphlogistic measures that are required and usually employed in similar affections of other organs, and not as substitutes for them. It is not on the ground of antiphlogistic remedies being unnecessary, or unsuitable to these affections, that the utility of mercury, in particular, is now maintained by its more judicious advocates, but on the ground of these remedies being insufficient of themselves, however diligently they may be employed, and of their requiring to be supported by this additional power.

460. As respects the practice of general *blood-letting* in the inflammatory affections of the liver, when the symptoms are well marked, it must be conducted on the same general principles as in inflammations of other organs. When the symptoms are of a more obscure character, as, perhaps, from the inflammation affecting the substance, rather than the surface of the organ, we may possibly derive from the appearance of the blood drawn, a more precise guide as to the length blood-letting should be carried, than is furnished by the external phenomena. Generally speaking, it may be said that the difficulty of overcoming acute inflammation of this organ, and of preventing it from assuming a chronic character (even should the occurrence of any more active termination be obviated), is a strong reason for prosecuting blood-letting vigorously at an early period. The quantity to be drawn must, of course, be influenced by the conditions of the patient; and those recently arrived in

a warm climate, admit of and require a more copious detraction of blood than those who have been resident for a time in such a climate.

461. When, from the previous employment of general blood-letting, from the constitution of the patient, from the slightness of the attack, or from the stage at which the disease has arrived, farther general bleeding seems inexpedient, notwithstanding the continuance of some degree of phlogistic diathesis or local inflammatory action, great benefit may result from the more or less ample detraction of blood locally. The local detraction of blood may be rendered necessary also, by the state of vascular turgescence, or congestion.

462. When blood is to be abstracted locally, on account of hepatic affection, we have to determine, *first*, the situation, and, *second*, the manner in which the operation should be performed. As to the first of these points, some conceive that more benefit results when the blood is drawn from certain distant parts, as the anus or the sacrum, rather than immediately from the region of the liver.

463. "When there is pain, or even merely uneasiness, in the hepatic region," says M. Regnault, "the application of leeches to the anus is, in almost all cases, indicated. This means is truly powerful, and its happy effects are particularly seen in acute hepatitis. When the inflammation is seated in the part of the liver immediately under the integuments, the application of leeches to the painful part answers well; but, in every other case, they should be applied to the anus, to the number of ten, fifteen, and even twenty, according to the strength and constitution of the patient. It is unnecessary to adduce on this subject the authority of theory, since experience irresistibly demonstrates the utility of this means, which is almost always preferable to general blood-letting, in cases of hepatitis, unless the constitution be very plethoric; and even then it is proper to have recourse to leeches after a vein has been opened." (Sur les Alterations, &c. du Foie.) "In all cases of sanguineous congestion of the portal system, or its abdominal sources," says Dr Conwell, sect. 185, "after ade-

quate general bleeding, local depletion is most efficaciously performed by the application of leeches around the anus, over the abdominal parietes and the perineum, as the blood drawn from those parts reduces the quantity about to be poured directly into these sources of the portal system, whether it be derived from arterial or venous capillaries." Regnault also conceives, that the application of leeches to the anus renders the circulation in the liver more easy, by unloading the vena portarum and the whole abdominal venous system.

464. As to the second point, there can be no doubt that, for abstracting blood from the hepatic region, leeches are preferable to cupping, for the reason specified by Mr Annesley, viz. that the pressure of the number of glasses which are requisite to the abstraction of a sufficient quantity of blood, is, in some instances, productive of so much pain as to aggravate the disease. (P. 586.) This will be a motive with the practitioner, when leeches are not to be had, to apply the cupping-glasses to the sacrum, rather than to the hepatic region. Indian practitioners speak, with great satisfaction, of the efficient manner in which the leeches of that country fulfil their functions. "More than double the number of European leeches," says Mr Annesley, "will not equal in their operation the leeches of India." The same very respectable author recommends strongly, that, after blood has been drawn from the region of the liver by leeching, measures should be taken for arresting the bleeding from the bites, as by the application of the muriated tincture of iron; and that a large hot poultice should then be placed over the situation where the more urgent symptoms were experienced, and frequently renewed. The propriety of arresting the bleeding from the leech-bites, Mr Annesley rests partly on the difficulty there may be of doing so afterwards, and partly on its being much better that an ascertained quantity of blood should be withdrawn, than an indefinite loss of this fluid be occasioned by allowing the bleeding to continue afterwards. But in this country, where it is often very desirable, for economical reasons, to avoid a large employment of leeches, the application of hot poultices to bleeding leech-bites

is often found very advantageous. The propriety of repeating the local, like the general bleedings, must be determined by the particular circumstances, antecedent and present, of the individual case. "Local bleeding may be required," observes Dr Malcolmson, "even when there is no doubt of abscess having formed, as the irritation it causes is constantly inducing renewed inflammation in the surrounding hepatic substance, or in the peritoneum or other viscera."

465. The powerful assistance to be derived in the subduing of phlogistic diathesis from the free administration of *purgative medicines*, is a point of practice so well established among British physicians, that its credit is not likely to be shaken by those glowing apprehensions which the followers of the Broussaian doctrines are wont to express, of the mischief that must result from its employment, in the production or aggravation of the gastro-enteric inflammation which they regard as so constant an attendant of febrile maladies. Even in inflammation of the liver, of which the Broussaists believe gastro-enteritis to be the frequent, if not the universal, precursor, British medical practitioners hold it as established, that purgatives are the remedies next in efficacy to blood-letting; and are satisfied that, both on account of the beneficial influence they may have upon the upper part of the intestinal tube, and their utility in lessening the force of the circulation, they should not be omitted in this disease.

466. As to the selection of the particular purgative to be employed (setting aside at present the claims of calomel, which will fall afterwards to be noticed), the neutral salts seem to be those most likely to answer the indication, and which stand highest in the opinion of practitioners. The observations of Dr Saunders upon this point seem to us very judicious. "As subservient to the intention of resolution," says he, "medicines promoting alvine evacuations are highly expedient. For this purpose, those which are of a saline nature appear to me to claim a preference; and perhaps it is adding not a little to their efficacy to exhibit them in a diluted form, in which state they not only seem to be more strictly antiphlogistic, but are

less liable to occasion nausea and other disagreeable sensations in the stomach." Even when calomel is administered, it is acknowledged to be proper that, in being given over-night, it should be followed up in the morning by some other purgative—as some of the neutral salts, the infusion of senna, or castor-oil. "The neutral salts," says Sir G. Ballingall (p. 104, 5), and his opinion seems to coincide with that of the most judicious practitioners, "is the remedy to which I am disposed to give the preference; but each has its advocates, and perhaps its peculiar advantages."

467. Not less judicious is the recommendation of the same author, that, when purgatives appear tardy in their operation, there ought to be no delay in assisting them by the employment of injections. "When by these means copious evacuations are procured, they seldom fail of producing the most beneficial effects, relieving the indescribable sense of tension, stuffing, and oppression about the region of the liver, and making the patient feel comparatively light, easy, and cheerful."

468. In the congestive, as well as in the more decidedly inflammatory affections of the liver, great benefit will be derived from keeping up a pretty free discharge from the lining surface of the alimentary canal, by the administration of purgatives. (Annesley, i. 399.) In reference to that form of hepatic hæmorrhage in which there is a discharge of blood into the biliary passages, and the consequent black discoloration of the bile (64), Dr Saunders says, "It is best cured by gentle purging, which will diminish the quantity of blood returned by the vena portarum, and the liver will thereby be relieved by an artificial diarrhœa acting on the extremities of the exhalants of the intestines." "In such a diseased state of the organ, I have never seen mercury useful."

469. Any disposition which the practitioner might entertain, from a reliance on the antiphlogistic influence of *emetics*, to have recourse to the employment of these remedies in the treatment of hepatitis, is discouraged by the strong dissuasion of Mr Annesley, who affirms that, where any inflammation of the liver, or even a tendency to it, exists, the acute character of the disease

is greatly increased by their exhibition. "When emetics are exhibited in hepatitis, they often afford relief for a short time after their operation; but the inflammatory symptoms are soon afterwards increased if they previously existed, or, in the more chronic cases, where they never were very manifest, they become for the first time developed." It is only, therefore, as a test of the existence of inflammatory affection, and of the expediency of adopting a decidedly antiphlogistic treatment, that, in Mr Annesley's opinion, emetics are to be used in suspected cases of hepatic inflammation.

470. The use of *counter-irritants*, and particularly of *blisters*, in the more advanced stages of acute hepatitis, and in the more chronic forms of that disease, is frequently productive of the most beneficial results. Dr Saunders says, that "blisters, applied to the region of the liver, co-operate very strongly with the views of blood-letting; and, therefore, in attempting resolution, recourse should be had to them very early." But Mr Annesley (i. 632) very properly cautions us against resorting to blisters, until after vascular depletions have been employed so decidedly as to subdue the inflammatory action present;—otherwise, they often tend to prolong this action, and thus a reiteration of the depletory measures is required for its removal; and he thinks that, even in the more chronic forms of the disease, their use should be preceded by other measures. "The employment of counter-irritant agents of any sort," says Dr Malcolmson, E. M. S. J. lii. 358, "in the early stage of the treatment either of hepatitis or dysentery, I have long given up, as they conceal from the patient the internal pain, prevent the careful manual examination of the part, and interfere with the use of local bleeding, fomentations, &c." Baron Larrey, in his *Campagnes d'Egypte* (ii. 45), states, that Dumas, in the *Travaux de la Société Philomathique*, proves, by a series of observations and experiments, that cantharides flies are hurtful in all bilious affections. He himself recommends that the epispastics employed in hepatitis, should be composed of *garou* (daphne Gnidium), euphorbium, ammonia, boiling water, or any other substance which produces the same effect.

471. When a blister has been applied, the next practical question for consideration is, How the blistered surface ought to be dressed? whether so as to maintain a discharge for some length of time, or so as to obtain a speedy renewal of the cuticle, and the power of repeating the blister, if this shall appear expedient? The weight of authority seems decidedly in favour of the latter plan. "It has been advanced by some," says Dr Saunders (p. 314-15), "and experiment seems to have justified the position, that a quick succession of blisters to the vicinity of an inflamed organ prevails more over the activity of inflammation than the long-protracted discharges from a single vesication. My own experience having abundantly confirmed the truth of this doctrine, I cannot recommend it to the practitioner in too strong terms." The expediency of this mode of employing blisters in hepatic inflammation, so far as warm countries are concerned, is urged by Sir George Ballingall on another ground. "Blisters," says he (p. 108), "are a never-failing source of relief in almost every stage of the affection." "Every consideration, then, induces us, without hesitation, to have recourse to blisters; and, in regulating their application, I shall barely observe, that I think the repeated application of fresh blisters preferable to the establishment of blister-issues, particularly in a warm climate, where dressings are apt to become rancid, and where sores, if not particularly attended to, are apt to degenerate into troublesome ulcerations."

472. As another means of counter-irritation, applicable to the more chronic forms of hepatic inflammatory affections, some practitioners have recommended the introduction of a *seton*, or the establishment of an *issue*. "They should be made much below the region of the liver," says an eminent Indian practitioner, "and so far anteriorly as to allow the patient to dress and attend to them himself. After a discharge has been established from them, poultices, applied directly over them, and frequently renewed, are generally beneficial." Was it from a neglect of this precaution that Sir G. Ballingall was led to allege (p. 109), as to the use of the seton, that "the beneficial irritation on the surface, which it occasions at its first introduc-

tion, soon subsides, and the discharge, in general, is not sufficient to produce very material benefit?" Dr Dick mentions, in a letter afterwards to be more particularly referred to, that, in chronic cases of liver complaints, he had, for several years previously, trusted to a seton or issue made in the side, and with success far beyond his expectations.

473. As a most important part of the antiphlogistic plan of treatment, it cannot be necessary to insist on a rigid adherence to a conformable system of *diet*; a measure which, for various obvious reasons, is more directly, if not more forcibly indicated in the inflammatory affections of the liver, than in those of almost any other organ.

474. There is, perhaps, no class of inflammatory affections, in which it is more necessary than in those now under consideration for the practitioner to be on his guard against having his apprehensions lulled by the improvement that may occur under the use of the measures which he employs. It has been very wisely observed by Mr Twining (i. 225), that, "in almost every case of acute hepatitis, the more urgent symptoms are mitigated long before the internal disease is completely subdued. The history of a large proportion of the abscesses of the liver that prove fatal, would shew us a remission of acute symptoms, after a few days of very judicious treatment; which remission appears to have occasioned a deviation from a proper course, both in diet and medicine. A gradual return of an unfavourable state is the consequence, and a more intractable disease becomes established, although the symptoms are usually more slow and less urgent than at first; but the result is the loss of the patient's life. Even where the early treatment of a severe case has been exceedingly deficient, a deceptive cessation of acute symptoms sometimes occurs at a particular period of the disease, and that is at the time when inflammation and vascular engorgement have gone on until effusion or interstitial deposit has taken place; the morbid tension of the vessels is thereby much decreased, and an incautious person is led to remit his attention just at the moment that the utmost vigilance is requisite, and, in fact, when the greatest science and skill can hardly

save life." "The tendency to relapse in hepatitis," Dr Malcolmson remarks, "is very great; if, indeed, the cure be not often merely apparent, and subsequent attacks are, in general, attended with similar symptoms to those of the first, shewing that the injured part continues for a long time liable to suffer from the slightest causes of disease. A large proportion of abscesses in the liver take place in the situation of former attacks of hepatitis, or as a consequence of them, few cases with acute symptoms terminating in abscess on the first admission into hospital." (E. M. S. J. lii. 368.)

SIXTH INDICATION,

TO PROMOTE THE RE-ABSORPTION OF SOLID DEPOSITIONS.

475. When solid matters, foreign to the natural structure of the liver, have been deposited in that organ, interstitially or in masses, so as to produce its various forms of induration and enlargement (105, *seqq.*), what expectations are we warranted in entertaining of these matters being re-absorbed into the system,—either by the unassisted efforts of nature, or under the influence of remedies, internal or external,—so that the organ shall be restored to a healthy condition?

476. There are few questions in therapeutical science in a more unsatisfactory state, than what relates to the extent of the power of medicine in producing the removal of substances deposited, in the progress of disease, in the various textures and organs of the body. The medical systems, during the prevalence of which the terms of resolvent, deobstruent, and fundant medicines were invented, have passed away, and the particular facts which led to the recognition of such therapeutical agents as were meant to be designated by these terms, though not rejected as erroneous, do not seem as yet to have been satisfactorily incorporated in the prevailing systems of modern times.

477. Surgeons know, by daily experience, that swellings of lymphatic glands situated near to the surface of the body, as those of the neck, the axilla, and the groin, as well as enlarge-

ments of the external secretory glands, as of the mamma and testicle, in many instances gradually diminish, and finally disappear, either spontaneously or under various modes of treatment. In a large proportion of the cases in which such favourable changes occur, there can be no doubt that the enlargement depends upon chronic inflammation, modified frequently by a scrofulous constitution. But whether this be invariably the nature of the enlargements of external organs which undergo resolution, or what forms of new or morbid growths, organised or inorganised, mild or malignant, occurring in the same organs, are susceptible of re-absorption, so as that the organ or texture may regain its natural dimensions at least, if not its healthy structure, is a point far from being satisfactorily determined.

478. The possibility of causing the restoration to a healthy condition of external parts that have taken on the state of scirrhous or carcinoma, by the administration of internal remedies or the use of external applications, and of thus superseding the necessity of many surgical operations, is an idea too agreeable to the humanity, too flattering to the vanity, and too promising for the interests of medical men, to be readily abandoned. And if hemlock, nightshade, and aconite, with mercury and arsenic, have fallen from the lofty position of specific remedies in cancerous diseases which they once held in the estimation of medical practitioners, the carbonate of iron, iodine, and pressure may be considered as having, in some degree, succeeded to their honours.

479. But if, in recent times, the number of surgical operations, in cases of enlargements of the organs to which we have referred, has been diminished, we suspect that this is attributable partly to the evidence which morbid anatomy has supplied, that many of the swellings which used to be regarded as of a malignant character, are merely the products of chronic inflammation, and, as such, susceptible of resolution; and partly to a more correct knowledge of the cases of malignant growth, in which operation is likely to be prejudicial rather than advantageous. Little influence, we fear, in producing this result, can be attributed to greater efficaciousness on the

part of the remedies which are now employed with a view to promote the re-absorption of morbid growths, as compared with those which were formerly in vogue.

480. It is obvious, that whatever uncertainties attend our judgments as to the possibility of the resolution of particular forms of structural degeneration when occupying external parts, these difficulties must be greatly increased when we come to pursue a similar inquiry with regard to internal organs like the liver. Of the great effects which medicine has had in reducing enlargements of this organ, many testimonies are to be found in the records of medicine; but whether, in any of these cases, the affection causing the swelling was different from vascular turgescence or chronic inflammation,—whether, for example, any case of granular degeneration or cirrhosis of the liver, or of its fatty degeneration, or of its occupation with cancerous matter, has ever undergone spontaneous recovery, or been restored to a healthy condition by the powers of medicine,—are matters respecting which, we believe, our only information is of the nature of conjecture.

481. Since *Iodine* came to enjoy so high a reputation for its powers in causing the removal of morbid structures seated on the outer parts of the body, and the restoration of the diseased organ to a healthy state, fond anticipations have been entertained of benefit to be derived from its use in cases of enlargement of the liver. The results obtained by different practitioners from the use of this medicine, however, do not seem to have corresponded. Dr Abercrombie mentions that, in several cases of chronic affections of the liver accompanied by jaundice, he has seen very good effects from the external use of iodine in an ointment containing half a drachm to an ounce of axunge. (P. 360.) A favourable statement of its efficacy in this class of cases has also been given by Dr Milligan (Lond. Med. Phys. Journ., 1828) and others. Mr Twining, on the other hand, states (Calcutta Trans. vi. 387) that, as far as he has been made acquainted with the effects of iodine administered in chronic hepatic disease, that practice appears to have been remarkably unsuccessful; and he points out an effect arising from its administration in other complaints, which renders

it necessary to be particularly cautious in employing it in affections of the liver. Out of twenty-three Europeans for whom he had prescribed it internally, for the cure of various diseases not considered hepatic, five became affected with pain in the right side. "The observations of our professional brethren in Europe," observes Mr Twining, "afford reason to believe, that iodine, administered in large doses, is liable occasionally to excite pain in the region of the liver; and, in some instances, the existence of hepatitis, in such cases, has been proved by post-mortem inspections. Dr Christison alludes to two instances (reported by Rust and Zinc), in which hepatitis occurred in persons who had recently taken large doses of iodine, and thinks it is not impossible that iodine possesses the power of inflaming the liver." A reviewer in the *British and Foreign Medical Review*, in referring to these observations, remarks, "Experience varies greatly on this point. A case recently fell under our own observation, in which the employment of iodine for chronic enlargement of the uterus was followed by acute pain in the hepatic region, extending thence to the right shoulder, and requiring the free application of leeches and mercurial purgatives for its removal. On the other hand, a chronic enlargement of the liver, to such an extent that the organ extended below the umbilicus, the sequel of remittent fever in a youth of seventeen, was entirely dispersed by frictions with a strong ointment of iodine and a course of purgatives." (iii. 354.)

SEVENTH INDICATION,

TO IMPROVE THE GENERAL HEALTH.

482. In the chronic forms of biliary, as of other diseases, whether assuming a dynamical or a structural character, there can be little doubt that a large share of the benefit which the patient can derive from medical management, must depend, not so much on the administration of courses of medicines, however ingeniously combined or varied, as on the due regulation of what we have not yet any better name to designate than the

non-naturals, viz. the diet, the evacuations, the clothing, the exercise, and the occupations of the patient.

483. With respect to the regulation of the *diet*, there are obviously two precautions of great importance to be attended to, 1st, That in respect of quantity and of quality it shall be such as to be of easy digestion; and, in the 2d place, where there is any tendency to febrile action, that it shall be of a strictly antiphlogistic character. With a view to the first of these objects, every thing unsuitable for a weak or dyspeptic stomach ought at once to be discarded; and, with a view to both objects, the farinaceous substances of which, during the progress of acute attacks, the nourishment must mainly or solely consist, should continue to form a large proportion of the diet in the more chronic stages of the disease. With this may be combined a due proportion of milk—to which, if necessary, to make it agree with the stomach, fifteen or twenty drops of the aqua potassæ, or, in place of this, a fourth or third part of lime-water may be added; at dinner-time a small quantity of soup, or a bit of plain-dressed animal food may be substituted for the milk. Where it seems desirable to make some stimulant addition to the patient's drink, a little white wine and water, or, probably in most instances still better, a proportional quantity of spirits and water, are the most expedient forms in which it can be administered.

484. On every consideration, the maintaining an *open condition of the alimentary canal* by laxative or purgative medicines, in such quantities as may be required to effect the purpose, is a matter of primary importance in the treatment of the diseases of the biliary organs, both dynamical and structural. If the bile is deficient, we may suppose the purgative to act beneficially by supplying its place, and possibly by promoting its secretion. If the bile is in excess, or of a vitiated quality, a laxative, combined with plentiful diluents, will enable the bowels to throw off, in a small number of motions, and with comparatively little uneasiness, matters which, if left to themselves, would probably occasion frequent and painful purging. It is not smart purgation, as in the case of inflamma-

tory affections, that we mean here to recommend, but merely a gently open state of the bowels, the regular maintenance of which will, we believe, in most cases of chronic affections of the biliary organs, be found to require the aid of laxative medicines. The articles to be employed for this purpose, and the length to which their administration should be carried, are points which must be left to the discretion of the practitioner, guided by the previous habits of the patient, and the visible effects which they produce.

485. *Warm clothing* is at all times an object of primary importance in the treatment of chronic diseases, as, by favouring the course of the circulation to the extremities and surface of the body, it diminishes the risk of the supervention of an acute attack upon a chronic affection, which there is at all times so much reason to apprehend. It is beneficial, also, with a view to the promotion of digestion, for the stomach, as Dr Saunders remarks, "is greatly assisted in its energy and power by warm clothing, especially on the lower extremities of the body."

486. The observations which we had occasion to make (214) on the prejudicial operation of habits of bodily inactivity upon the biliary organs, suggest the propriety and importance of attention to *exercise* in the treatment of their chronic affections. It is not necessary to enter here on a consideration of the most advantageous modes in which exercise may be taken in such cases, since this is a point which must be determined not only by the means of the patient, but by his particular condition at the time, in respect of strength, &c. Exercise of the more active kinds will, of course, be best adapted for diseases of a dynamical, and those of a more passive nature for diseases of a structural character. It is in cases of dynamical deficiency of bile, probably, rather than of that dependent on structural alteration, that a sea-voyage has seemed to prove beneficial by contributing to restore the secretion of healthy bile.

487. When the disease has been brought on by the unhealthy character of the climate or locality, a change to a *better residence* will of course be conducive, if not essential, to recovery.

488. Of the benefits to be derived by those labouring under affections of the biliary organs, from resorting to a *watering-place*, the public has been long and is strongly convinced; and the general prevalence of the belief may probably be admitted as sufficient evidence of the fact. But what portion of the benefit actually derived depends on the superiority of the natural mineral waters over any imitation of them that can be made, or over other medicines of like quality; what share is attributable to the more regular use of medicines of this kind into which patients are led; how much depends on relaxation from business, or removal from causes of anxiety; how much on the regular habits of life which are generally pursued in such places; how much on change of air, or on the exercise which forms a part of the system of regimen,—are points which, in individual cases, it is often extremely difficult to determine, and respecting which no universal conclusions can be established.

489. The mineral waters in this country which have enjoyed most reputation for their beneficial effects in diseases of the biliary organs, are those of Bath and Cheltenham,—the former a chalybeate of high temperature, the latter a combination of saline and chalybeate.

490. The virtues of the Bath waters in jaundice, particularly as arising from biliary concretions, and in obstructions of the liver, were duly insisted upon by Dr William Falconer, who long practised in that city, in his various treatises relative to these waters, published from 1770 to 1790. Their beneficial operation, Dr Falconer attributed partly to their diluent, partly to their diuretic, partly to their antispasmodic, and partly to their stimulant powers.

491. Dr Heberden, in his *Essay on Diseases of the Liver* (Trans. Coll. Phys. ii.), had observed that “the waters of Bath have some credit of being serviceable in a jaundice. But it must be observed, that icteric patients generally recover, wherever they are; and it may be doubted whether they recover the sooner from the use of these waters. However, there can be no medical reason for dissuading any one, in a simple jaundice, from going to Bath; because the waters are perfectly safe,

and the proper medicines may be taken there, as well as anywhere else; while the vacancy from care in such public places, together with the change of air, and water, and objects, may be of some use to the general health, and thereby facilitate the cure of this, as they often do of many other chronic disorders."

492. Dr Falconer was not satisfied with this estimate of the influence of the Bath waters in curing the form of jaundice dependent on obstruction of the gall-ducts by biliary concretions. Whilst admitting that they do not exert any solvent effect, he attributes great efficacy to them in promoting the expulsion of gall-stones. "I believe," says he, "that more gall-stones have been observed to be voided during a course of the Bath waters, than of any other known medicine."

493. With respect to the employment of the Bath waters in the organic diseases of the liver, Dr Heberden had observed; "Bath waters are in no cases more useful than in remedying many of the injuries done to the constitution by drunkenness; but where the liver has become scirrhus, and an hectic fever shews these scirrhi to be in an inflamed state, there the Bath waters will aggravate all the symptoms, and contribute no otherwise to end the disease than by hastening the patient's death."

494. Dr Falconer seems to have admitted in respect of what he termed obstructions of the liver, that it is in the beginning of the disorder, before any inflammation or confirmed obstruction has taken place, that benefit is to be expected from the use of Bath waters. In his dissertation of 1790, which may be considered as embodying the results of his own personal experience, he says: "In liver complaints that have proceeded no farther than a simple obstruction of the biliary ducts, whether contracted in hot climates or at home, the Bath waters are likely to be of service; but I apprehend most of those that are produced in hot climates are of a more complicated nature, and too deeply rooted to be safely treated by *any medicines that excite the circulation*. This, however, is conjecture only, and should not absolutely determine against a cautious trial of their effects, provided that no internal hardness be sensible to the

touch, and fixed inward pain, soreness, or tendency to fever, be not among the symptoms."

495. Respecting the influence of the waters of Cheltenham over the diseases of the biliary organs, the most authentic information which we possess is that furnished by Dr Saunders in a memorandum of date 12th December 1802, prefixed to the third edition of his work on the diseases of the liver. "During a short residence at Cheltenham, this summer, the author was consulted by many invalids; and had an opportunity of conversing with others who were under the use of the purgative saline waters of that place. He soon perceived that they were very indiscriminately used in a variety of opposite diseases; and that their effects were such as might have been expected from so injudicious an application of their medical powers. The cases in which they appear to be useful are evidently connected with a turgescence and congestion of the hepatic system in full and oppressed habits, where the secretion of the bile is inconsiderable, and where the habit is costive.

"They are of more use in sanguineous constitutions than in pallid and chlorotic habits.

"In diseases of simple dyspepsia, with flatulency and acidity, and in cases of indurated and scirrhus livers, he has not perceived any useful operation from them.

"They are chiefly useful when their purgative operation is such as to relieve from a sense of distention immediately consequent on their being taken into the stomach; they lose their effect by daily repetition, and ought frequently to be alternated with other purgatives, or aided in their operation by other means. In very delicate exsanguine chlorotic habits, he found the purgative plan universally improper; and in such cases recommended a chalybeate spring lately discovered at Cheltenham, from which the greatest advantage was derived. He met with many persons who had returned from the East and West Indies with very torpid bowels and diminished secretion of bile; in such cases, the purgative water was useful, and may be proper as preparatory to the future use of a more tonic plan of treatment.

"The daily exercise and general habits of temperance prac-

tised at Cheltenham, contribute not a little to promote the recovery of such invalids.

“ In irritable and feverish habits, with thirst and general languor, evidently arising from some local and visceral affection, the waters of Cheltenham are less calculated to do good. In cases of jaundice, from some resistance to a free discharge of bile, and a sense of heat, distension and fulness, increased soon after eating, the Cheltenham water is useful. In cases of jaundice from gall-stones, also, it is useful, but should be drank warm.

“ In calculating the number of persons, and the variety of disorders among the invalids at Cheltenham, he thinks he may fairly conclude that one-third of the whole was benefited, one-third derived no advantage, and the other third was evidently hurt by persevering in the purging plan. Among the last cases, symptoms of languor, flatulency, thirst, and debilitated digestion were induced, or much increased.”

EIGHTH INDICATION,

TO GIVE VENT TO PRETERNATURAL COLLECTIONS OF FLUID.

A. *Opening of Abscesses.*

496. When the practitioner is made aware of the existence and of the seat of a hepatic abscess (76), by the supervention of the general symptoms indicative of suppuration (401, 409, *seq.*) and by the sense of fluctuation (311), is it his duty to proceed to give vent to its contents? If he does not, one of several occurrences may take place; 1. Perhaps the contents of the abscess may be re-absorbed, and the patient recover his health. (81.) 2. The patient may die of the progress of the disease, without any evacuation of the contents of the abscess. 3. The abscess may discharge itself into the cavity of the peritoneum. (85.) 4. It may establish a communication with some hollow organ and be discharged. (89 to 97.) 5. It may point and burst externally. (88.)

497. The possible occurrence of the second, and particularly

of the third of these events, is a strong inducement, unless there be countervailing reasons, for giving external vent to the contents of an abscess whenever this is practicable. Indeed, to justify us in abstaining from doing so, it would be necessary to shew that the risk of the occurrence of either of these two modes of termination is very small, and that those included under the fourth and fifth heads are attended with less danger than operation.

498. Different practitioners have held out different estimates of the success which has attended the artificial opening of hepatic abscesses. Mr Curtis mentions (p. 100), that, in the year 1782, out of ten patients in whom such abscesses were opened in Madras Hospital, only two were saved; and that, in the summer months of 1783, a still greater number underwent this operation, and only three or four were recovered by it. Dr O'Brien, from the results of some cases which fell under his observation, is disposed to conclude that where the abscess is not confined merely to the investing membranes, but involves the substance of the liver to any extent, it is probable an operation will never succeed; and he thinks it is doubtful whether it does not hasten the patient's death, as the sanious unhealthy discharge is likely to become more acrid by the admission of air to the cavity of the abscess. (Trans. Assoc. Phys. in Ireland, i. 54.) Mr Marshall thinks it is only when the abscess is small that a recovery can, with any degree of confidence, be expected from affording a passage to its contents externally (p. 150); and Sir George Ballingall states, that although he had, in several instances, opened abscesses of the liver, no one of his patients had eventually been restored to permanent health.* (P. 102, 109.)

499. A more favourable estimate of the advantage to be derived from the practice of opening abscesses of the liver, was

* Dr Malcolmson mentions (Med. Chir. Trans. xxi. 101), as a circumstance which greatly diminishes the chance of a successful result from operation in hepatic abscesses, the fact that, in consequence of the tendency of the liver, when enlarging, to encroach on the cavity of the chest, abscesses in that organ are very liable to cause adhesion of the diaphragm to the costal pleura, and then to make their way through that muscle and the in-

formed by the late Dr James Clark of Dominica. (Medical Commentaries, xiv. 317.) He had performed the operation on thirteen patients, "all," says he, "that have fallen under my care, or, at least, all whose consent I could obtain to have the operation performed on them." In eight of these, the recovery was complete. In two, death was caused by other diseases, dysentery and fever, supervening at sufficiently long periods after the operation to shew that its results would otherwise have been advantageous; so that in three only did death occur in consequence of the progress of the disease for which the operation was performed; and in none does it appear, that the fatal termination was promoted or accelerated by the measure. Dr Clark expresses his conviction that, where there is a single abscess, and that is opened early, or as soon as a fluctuation of pus can be discovered, even if the patient be considerably emaciated, there is the greatest reason to expect his recovery; and he states, that he never knew any person recover after the abscess had burst.

500. Baron Larrey gives a very favourable report of the success of the practice of opening hepatic abscesses in Egypt. After detailing three cases of cure, he says, "From ten to twelve similar cases have presented themselves in the same hospital, and the disease has had the same favourable termination. Several persons having refused to allow these hepatic collections to be opened, have died from the effects of the disease. Those

tercostal spaces to the surface. For, owing to the great thickness of the parts through which the matter has, in such cases, to pass, it generally happens that, before it can be reached, it has extensively wasted the substance of the liver, and, by burrowing through its softer parts, has produced irregular cavities, that are usually crossed by bundles of vessels and membrane, with portions of hepatic substance. But, even under these circumstances, Dr M. conceives that, as adhesion has always taken place previous to fluctuation being perceptible, the operation may be performed without danger, and should on no account be deferred. Dr Malcolmson by no means agrees in Dr O'Brien's "sweeping inference, that an abscess affecting the substance of the liver will never be cured by operation; and that all the successful cases on record have been abscesses of the peritoneal coats; a form of disease," he adds, "far more rare than the remarks of Dr O'Brien, &c. would lead us to believe." (Edin. Med. Surg. Journ., lii. 378. See also p. 381.)

who have been operated on in time have been perfectly cured." (Mem. de Chir. Milit. ii. 51, 54.)

501. Many individual cases have been recorded in which hepatic abscesses have, in temperate climates, been successfully opened. It may be feared, however, as Dr Malcolmson suggests, that the unsuccessful ones too often remain unpublished. What influence may climate and previous mode of treatment (particularly as regards the practice of blood-letting, and the administration of mercury) be supposed to exert over the issue of cases in which this operation is performed?

502. We have seen (84 seq.) that, in a considerable proportion of cases of abscess of the liver, no adhesion takes place between its coats and the parietes of the abdomen. This fact suggests several inquiries connected with the operation which we are considering; 1st, Have we any means of distinguishing between the cases in which such adhesions do, or do not exist? 2d, Is the non-existence of such adhesions, supposing it to be ascertainable, a positive contra-indication to the operation of opening a hepatic abscess? And, 3d, Have we any means of bringing about adhesions, where they do not exist, previously to opening such an abscess?

503. (1st.) According to Mr Annesley, when adhesions have not formed, although a circumscribed tumour may point outwardly, there will seldom be much redness of its external surface; such an appearance always indicating that adhesions have formed, or are far advanced in the process of formation. When this external redness is observed, with diminution of that surrounding fulness which accompanies the formation of the abscess, and with fluctuation of matter in the tumour, then the operation may be undertaken, Mr Annesley conceives, with every prospect of success. Mr Marshall mentions that, in some cases of abscess of the liver occurring in Kandy, in which, in consequence of a bulging appearance under the false ribs of the right side, it was supposed that a considerable adhesion might have taken place between the liver and the parietes of the abdomen, dissection after death invariably shewed that the connection was not sufficiently intimate to render an operation for evacuating the contents of the abscess successful. (P. 150.)

“ Mr Hawkins,” says Dr Malcolmson, “ thinks that the fear of adhesion not having formed when abscess of the liver appears externally, deserves little consideration ; but my own experience has furnished me with several striking examples in which fluctuation was very perceptible, without adhesion having taking place, or the matter being in contact with the abdominal parietes, and in three instances the tumour was defined, somewhat pointed, soft in the centre, and surrounded by a hard margin.” “ When the skin is red at the most prominent point,” adds he, “ no danger need be apprehended.” (Edin. Med. and Surg. Journ. lii. 391-2.)

504. (2d.) Mr Annesley lays it down as one of the rules relative to the opening of a hepatic abscess, that it should not be done before the part at which it points has formed adhesions to the opposite part of the abdominal parietes. Dr Malcolmson thinks that, notwithstanding the opinions of several authors to the contrary, it is impossible to believe that, when there exists no adhesion of the covering of the abscess to the parietes of the abdomen, the pus would not, in the event of an operation being performed, be effused into the cavity of the abdomen, and destroy the patient. (Med. Chir. Trans. xxi. 103.)

505. But in taking a review of the cases on record in which hepatic abscesses have been artificially opened, we find little reference, on the part of those who relate them, to the question whether or not there existed, previously to operation, adhesions between the surface of the abscess and the abdominal parietes. And, notwithstanding the apparent inattention to this point, there is no evidence of the contents of the abscess having, in any of these cases, escaped, subsequently to operation, into the cavity of the abdomen. To say nothing of the considerable number of recoveries that are related as having occurred after the opening of hepatic abscesses, it appears that, even in those cases in which death has taken place, it was attributable rather to the advanced state and the extent of the disease than to any prejudicial effect induced by the operation. We confess, therefore, that we entertain considerable doubts (doubts which are participated in by Mr Marshall from reflection upon

his own observations), as to the validity of those apprehensions so strenuously urged by Mr Annesley and Dr Malcolmson respecting the necessary escape, into the peritoneal cavity, of the contents of an abscess, not adherent to the parietes, on its being artificially opened. We may observe, that Dr Clark of Dominica mentions expressly that, in one of his cases (the third), the liver did not at the time of operation adhere to the peritoneum as usual, in consequence of which, after making some fruitless attempts to get the orifice in the liver to correspond with that in the abdomen, he was obliged to make a second incision into the liver, more than an inch deep, before he reached the abscess. Six days after, he found that the liver adhered to the peritoneum all round the orifice.

506. Since the doubts expressed in the preceding paragraph presented themselves to our mind, we have had an opportunity of seeing some of the numbers of the Madras Quarterly Medical Journal, which had not previously fallen under our notice; and from these we find, that the question as to the safety of opening hepatic abscesses previously to the formation of adhesions, has been attracting much attention amongst the medical gentlemen of that presidency, since the arrival of Deputy-Inspector Dr Murray from the Cape of Good Hope.

507. In the third number of that Journal for July 1839, after communicating a case of hepatitis terminating in suppuration, without peritoneal adhesion, in which he punctured the abscess at an early stage, and with successful results, Dr Murray states, that he has opened many hepatic abscesses, where no adhesion existed between the liver and external parietes, and in a good many instances the patients recovered, and in none did any matter escape into the peritoneal cavity after the operation, an occurrence of which surgeons are so much afraid.* "The escape of matter seems," he says, "to be prevented by the constant state of apposition of the viscera in all their

* The editor of the Journal, Mr Rogers, mentions his having "seen an officer just returned from the Cape, in whom Drs Murray and Abercrombie punctured a large hepatic abscess last year, when no adhesion existed between the liver and external parietes, and the operation proved perfectly successful."

parts." "If the abscess be not very extensive, and if the operation be performed before the patient's constitution begins to break up, I consider that there is a good chance of success; and, under any circumstances, the introduction of the trochar into the parenchyma of the liver seems to do no serious harm, even if we miss the abscess. The point to be considered before operating is, whether the patient appears to have any fair chance of cure by a natural process, as by absorption, or rupture into the alimentary canal; if not, I think the abscess should be punctured forthwith, and the chief precaution required is to avoid the gall-bladder."

508. In the succeeding number of the same Journal (October 1839), in which several other cases are related illustrative of the safety and advantage of the early puncturing of hepatic abscesses, Dr Murray says; "I believe it is now the opinion of most, if not all, the Queen's medical officers in this command, that the sooner an abscess in the liver is opened after its existence and site are ascertained, the better; and that there is neither much danger of effusion of the matter into the cavity of the peritoneum, even when no adhesion exists between the liver and external parietes, nor of hemorrhage from cutting pretty deeply into the substance of the organ, unless the operator be so ignorant and rash as to plunge his trochar into the large vessels situated near to the back-bone. Surely the earlier the abscess is punctured, the better the condition of the liver and of the patient's constitution will be to institute the desirable process of adhesive inflammation and cicatrization, and the less degree of collapse and recession of the viscus there is likely to be from the parts naturally in apposition to it. I must further mention, that, from two cases lately reported to me, I have strong reason to believe, that in hyperæmia, hypertrophy, or inflammatory enlargement, the liver may be punctured, and blood thus abstracted from it (as the natives do in cases of enlarged spleen, a much more vascular organ), not only with perfect safety, but with singular advantage." Hence Dr Murray conceives, that where doubts are entertained as to the existence, or as to the precise seat, of hepatic abscess, the surgeon need

have no scruple in puncturing the liver with a suitable instrument, for the ascertainment and determination of the point or points in doubt.

509. In the 6th No. (April 1840), which contains several additional cases confirmatory of the same practice, Dr Murray resumes his observations. (P. 238.) "There is at present," says he, "too great reluctance on the part of most practitioners to explore enlarged livers, even when there are strong characteristic symptoms of existing abscess, from apprehension of danger in the operation. A deterring story is told here of a patient once dying of a hemorrhage, in consequence of a trochar having been pushed into his liver; but I can call to mind seventeen cases, within the last few years, wherein I performed this operation without any bad consequences, by which six of the patients were recovered, and are alive at this day I believe. I consider that, with a good anatomical and pathological knowledge of the region in our mind's eye to enable us to avoid the large hepatic vessels, the gall-bladder, the colon, and the stomach, there is abundance of evidence to authorize us, nay that it is our bounden duty, to explore the liver without hesitation or delay, in most cases where pathognomonic symptoms of abscess in it exist, and the disease is interfering seriously and prejudiciously with the functions of the organ and with the general health of the patient."

510. Dr Horner of Philadelphia has related (*Amer. Journ. of Med. Sci.* xiv. 87) a "case of hepatic abscess in which tapping was performed before adhesion to the side had occurred," which seems well deserving the consideration of practitioners, as suggesting a mode of conducting this operation which (even admitting the apprehensions usually entertained as to the risk of opening unadherent hepatic abscesses according to the ordinary method, to be well-founded) would render the non-existence of adhesions in such cases of comparatively little importance. The following was the plan of procedure pursued on this occasion by Dr H. "An incision was first made horizontally, on a line with the anterior end of the eighth rib on the right side, a little in front of its cartilage, and through the side

of the abdomen, which brought the liver into view; the latter was seen to rise and fall with the diaphragm in respiration; moreover, a knife-handle was introduced between the surface of the liver and of the contiguous part of the abdomen. These two facts made clear the thing apprehended, to-wit, want of adhesion. In this dilemma, I determined to stitch the liver to the side, which was accomplished with a large crooked needle, armed with a ligature of kid-skin of bulk sufficient to fill up the hole made by the needle. One stitch was made in this way parallel with the upper margin of the incision, at the distance of four lines from it, and another in the same manner below. The liver being thus fixed closely to the side, a trochar and canula were plunged into the abscess, and five gills of purulent matter were immediately discharged, to the great relief of the patient; the matter continued to flow during the night, so that three or four more gills were discharged. The operation being ended, a bandage was put around the abdomen, so as to keep its viscera as still as possible. The canula was left in for fifty-four hours, and then a piece of a flexible catheter was substituted, the abscess discharging all this time small quantities of pus and serum mixed." No sign of peritonitis followed this operation, and the death of the patient, which happened on the 5th day, seemed to depend on his previous exhaustion. On post-mortem examination, it was found that an adhesion between the liver and side had occurred immediately around the puncture of the trochar, which, along with the stitches, had prevented any pus from getting into the cavity of the peritoneum, and this membrane was perfectly sound. Though life was not saved by this operation, Dr H. considers that it holds out an encouragement for opening hepatic abscesses, even when adhesion to the side has not occurred, provided the liver be secured in the mode pursued by him, or by an equivalent process; and declares his only regret, after a deliberate review of the case, to be, that he did not resort to this treatment when the abscess first fluctuated. Dr Malcolmson, in referring to the American Quarterly Journal of Medical Science, says, "An American author has published some cases in which he punctured hepatic abs-

cesses, and finding no adhesions, stitched the liver to the side; and even recommends the practice to be adopted whenever fluctuation is discoverable. It is needless to object to such barbarous practice; but the cases shew that the fear of opening such abscesses previous to adhesion having taken place, is far from imaginary." (Edin. Med. and Surg. Journ. lii. 392, note.) We have not happened to meet with any other case in which the practice in question has been pursued besides the one which we have quoted from Dr Horner; and we cannot admit the applicability to it of the harsh expression of *barbarous*. By that term, as applied to a surgical operation, may be understood one that unnecessarily exposes the patient to an intense degree of suffering, or one that is obviously founded on unscientific principles; and there is certainly nothing in the relation of Dr Horner's case to lead us to impute to it either of these characters.

511. (3d.) But, whatever foundation there may be for Dr Murray's views respecting the safety of puncturing unadherent hepatic abscesses, or whatever be the merits or demerits of Dr Horner's plan of operation, it would unquestionably be desirable to secure, if possible, the existence of adhesions, before the operation of opening a hepatic abscess be commenced.

512. Two modes of opening hepatic abscesses have been recommended, as calculated to increase the chance of adhesions taking place previously to the discharge of their contents. One of these is the application of caustic potass, a method pursued long before the existence of adhesions became an object of consideration. Respecting this method, however, Mr Twining gives the following testimony. (i. 302-3.) "When patients would not permit the abscess to be opened by incision, I have, in many instances, applied the potassa fusa to the most prominent part of the tumour, but do not consider that any benefit has been derived from attempts to open the abscesses in this way. On inspecting the bodies of these subjects afterwards, adhesions of the peritoneal coat of the liver to the parietes of the abdomen have very rarely been found."

513. Drs Graves and Stokes observe, respecting the mode of opening hepatic abscesses by caustic, that it is so tedious, that, before it effects our object, the abscess will probably have enlarged to a fatal extent ; nor does it, as was supposed, insure the formation of adhesions, a fact established, they conceive, by a case which they have related. (Dubl. Hosp. Rep. v. 106.) None of these authors have alluded to an effect of the application of the caustic which had forcibly struck Dr Dick, and with the importance of which, from what we have seen in respect of abscesses seated in other parts of the body, we are strongly impressed. Dr Dick told Mr Abernethy and Sir C. Bell, in consultation on a case of lumbar abscess, that, in his practice in India, having under his care a case of abscess of the liver, pointing outwards, he wished to open it gradually, and for this purpose had applied caustic ; but instead of finding that he attained, in any degree, his object of opening the abscess, he soon discovered that it was lessening, and that its walls had become much thickened. In short, the matter was absorbed, and the patient restored to health. Other cases of similar success followed, and he was thus led to consider severe counter-irritation as a most important means of producing the re-absorption of matter. (Treatise on Diseases of the Liver, by George Hamilton Bell, Esq. 1833, p. 47.)

514. The second method of opening hepatic abscesses, with a view to produce adhesions previously to the discharge of their contents, which was proposed by Dr Graves, is that of making an incision of some length through the integuments, over the most tumid part of the hypochondrium, dividing some layers of muscle, and keeping the wound open by plugging it with lint. (Dubl. Hosp. Rep. iv. 39.) This practice, Mr Twining says (i. 302), will assuredly be followed by the adhesions required, and it may also solicit the advance of the abscess towards the part where the incision is made in the parietes of the abdomen. Mr Twining, however, mentions no cases in which he had reason to believe adhesions actually to have been produced by this plan of opening hepatic abscesses. Drs Graves and Stokes state, that, in a case in which they had recourse to it

that terminated fatally, though there were several superficial hepatic abscesses, no adhesions had formed except immediately below the incision. (Dubl. Hosp. Rep. v. 107.) In a case described by Dr Malcolmson, in which it was practised, on opening the body after death, it was found that no adhesion had taken place between the abscess and the parietes of the abdomen. (Med. Chir. Trans. xxi. 97.) We suspect that the proofs of the efficiency of this mode of opening hepatic abscesses, in producing adhesions, remain still to be collected.

515. A variation on this plan of procedure has been proposed by M. Begin, who recommends that in all cases of collection of fluid in the abdominal cavity, in which, from the absence of swelling of the integuments, of greater or less extent, deep, and accompanied by heat and pain, we have not a certainty of the existence of adhesion to the abdominal parietes, the operation for opening such collections should be performed in the following manner. An incision should be made, with due caution, down to the peritoneum; this membrane should be raised with a pair of forceps, and divided, as if it were a hernial sac that was the subject of operation. An opportunity will then be afforded of ascertaining whether the sac containing the fluid adheres to the abdominal parietes, or whether they move freely on each other. In the former case the operation may be at once completed by opening the sac and giving vent to its contents. In the latter case, by applying simple dressings to the wound, adhesion will be established in the course of a few days, and the operation may then be proceeded with. (Journ. Hebdom. 1830, i. 417.)

516. Sir George Ballingall conceives (p. 109) the introduction of a seton to be by far the most advantageous mode of opening abscesses in the liver, when they point externally; but we do not find that he has anywhere explained the grounds of this preference; whether he supposes that it increases the probability of adhesion taking place, or that it tends to prevent the immediate escape of the contents of an abscess, where adhesion does not exist, into the cavity of the peritoneum.

517. Such are the various plans that have been suggested for obviating the evil consequences that might arise from the open-

ing of hepatic abscesses, in cases in which they have not formed adhesions to the abdominal parietes. When we are not deterred by any doubts respecting the existence of adhesions, from giving immediate vent to the contents of a hepatic abscess, ought we to prefer, as the instrument for effecting this, the abscess-lancet or the trochar? To the use of the latter instrument, Mr Annesley objects, that the pus, which is formed in abscess of the liver, is often full of large flakes, and sometimes contains large coagulated clots of a cheese or curd-like matter, which will not pass through the largest trochar, the more fluid portions only coming away. These clots remaining, act as foreign substances in promoting continued suppuration of the organ, and febrile excitement of the system. The following is the method of proceeding which he has been in the habit of pursuing. "Having made the external incision large, and with caution, until the peritoneum is fully exposed, the fluctuation of the abscess will be distinctly felt. An abscess-lancet should then be introduced, and the tumour laid open to the full extent of the external wound, which ought to be from two and a half to three inches in length. Care should always be taken that the opening do not extend beyond the limits of the adhesions which have been formed. The purulent collection being fully evacuated, the cavity should be filled with lint, which gives a mechanical support to the excavated parts, and the wound dressed with compresses and bandages in the usual way." In reference to these directions, Dr Malcolmson observes, that "where the matter presents itself between the ribs, and the opening is necessarily limited by the bones, and, even when large, is often closed by the motion of the parts, this plan is not only ineligible, but impracticable; and even in a case similar to the successful example published by Mr Annesley, I believe the extensive incision necessary to lay open an abscess of any extent, would be attended with no advantage equivalent to the risk of cutting the peritoneum beyond the incisions, and the consequent effusion of purulent matter into the abdomen." (Edin. Med. and Surg. Journ. lii. 389.) We do not find that those who have been engaged in the performance of the opera-

tion have experienced the inconveniences which Mr Annesley suggests, from the use of the trochar.

518. "Taking all circumstances into consideration," says Dr Murray (Madras Quart. Med. Journ., No. iv. p. 485), "I should have no hesitation in coming to a decision how to act, if a case of decided or strongly suspected hepatic abscess were presented to me for treatment. I would, in the first instance, introduce an exploratory needle, or, in preference, a very slender flat trochar, at the most bulging part of the liver; and having ascertained the existence and site of abscess, I would then make (or not?) an incision through the integuments over it, down to the peritoneum or pleura (as may be), through which I would acupuncture the liver in five or six places around the prominent point, to excite adhesion between the two layers of the lining and investing membrane; and in two or three days afterwards, I would introduce a common sized trochar at this part. I have here," continues Dr Murray, "questioned the necessity of Dr Graves' incision; and, on mature deliberation, I regard it as superfluous, conceiving that the acupunctures alone will suffice to bring about adhesion; and the operative process thus simplified would be little painful, safe, and likely to prove frequently successful in a disease allowed to be attended with imminent danger if no operation be performed at all, or if the evacuation of the matter be delayed till the liver becomes extensively disorganised, and the patient's constitution undermined." It does not appear, however, from the reports of the cases in which Dr Murray has operated, that he has himself had recourse to acupuncture, or to any other device for procuring adhesion, previously to the use of the trochar.

519. As to the most advantageous situation for puncturing, Dr Murray makes the following observations (No. vi. p. 239): "I am of opinion, that all our punctures should be made from the abdominal cavity, entering the trochar or explorer under the edge of the cartilages of the seventh, eighth, or ninth ribs, as circumstances may indicate. We may often, indeed, get nearer to the abscess through one of the intercostal spaces,—and I think *primary* exploration may sometimes be advantageously

made in this situation by a very minute, flat, canular instrument,—but, from not having seen any patient recover where the matter was evacuated in this direction (through the diaphragm); from finding that the action of the fibres of the diaphragm impedes the free discharge of the matter, somewhat like a valve; from observing that air sometimes enters the wound when made here; and from considering that the opening is not so dependent through the walls of the thorax, as when made through the abdominal parietes, I beg to recommend the latter mode in *all cases*, and I must also say that I would prefer a long trochar to any other instrument, as the stilette can be withdrawn occasionally during the operation, to ascertain if any abscess has been penetrated; and the canula can be left *in situ* afterwards, if thought desirable.”

520. Before quitting the consideration of the surgical operations for hepatic abscess, it is proper to remind the practitioner that in that class of cases in which the contents of such an abscess find their way through the diaphragm into the cavity of the pleura, so as to produce empyema, it may be necessary to have recourse to the operation of paracentesis thoracis.

B. *Opening of Serous and Hydatid Cysts.*

521. We have in the next place to inquire how far the opening, by surgical operation, of serous and hydatid cysts imbedded in, or attached to, the substance of the liver (117), is a safe or expedient practice. Each of the two forms of tumour, the simple cyst and the hydatid, it must be kept in mind, may exist in two different conditions—the uninflamed, or the inflamed and suppurating.

522. M. Lassus, in some researches and observations upon encysted dropsy of the liver, under which term he seems to have included both simple and hydatid cysts, expressed himself strongly against the expediency of operation in such cases. “It is,” he says, “an act of unskilfulness knowingly to open a true encysted aqueous tumour; for it is to accelerate the death of the patient, the detersion, the destruction, or the excision of the cyst being

absolutely impracticable by any procedure whatsoever." (Journ. de Medec. par Corvisart, &c., i. 115., and also Pathol. Chirurg. i. 279). More recently M. Cruveilhier has collected a number of cases (many of them the same as had been previously adduced by Lassus in his memoir) in support of the assertion, that, almost invariably, death has closely followed the artificial opening of acephalocyst tumours of the liver. (Dict. de Med. et Chir. Prat., art. *Acephalocystes*). It seems deserving of consideration how far this calamitous result is attributable to the fact noticed by him, that practitioners, from being unacquainted with the nature of the organic lesion, have in many instances, after opening the tumour, proceeded in the subsequent treatment as if at hazard, without rule and without principles.

523. The inducements to evacuate the contents of such tumours by operation, may be either, 1st, To obviate mischief which may eventually arise; as from their suppuration, or from their rupture, spontaneously, or in consequence of violence, into the cavity of the peritoneum, or in some other unfavourable direction; or, 2d, To relieve the uneasy feelings, or remove the injurious effects which they are actually occasioning.

524. On the other hand, the grounds of objection to operation in such cases, or the dangers to be apprehended from it, seem to be, 1st, the escape of the contents of the perforated cyst into the cavity of the peritoneum, in case of non-adhesion of its coats to the parietes of the abdomen; and, 2d, the inflammation of the internal surface of the cyst, from the admission of air, to an excessive degree, or in a noxious form; in short, those evil consequences which are very liable to result when atmospheric air is admitted into any large suppurating cavity. It is obviously, therefore, a primary question with the surgeon, how far the operation can be conducted in such a manner as to diminish or obviate the risk arising from these two sources.

525. (1st.) The same measures which have been suggested as calculated to produce adhesions of the outer surface of a hepatic abscess to the abdominal parietes (512), may be supposed capable of producing this effect in respect of a simple

serous or a hydatid cyst; and accordingly the application of caustic, once and again, for the purpose of opening such tumours, has been repeatedly practised.

526. (2d.) The modes of operation, in cases of this kind, that have been recommended and pursued in recent times, seem to have had for their more particular object the prevention of the admission of air into the perforated sac.

527. Mr Hawkins (Med. Chir. Trans. xviii. 167) thinks himself justified in inferring from the cases in which *aqueous* encysted tumours of the liver have been successfully operated upon, that the best mode of proceeding when they are nearly uninfamed, and the cysts are thin and membranous, is to puncture them with a trochar, taking care that no undue pressure is employed, which might induce too much inflammation; and that moderate pressure is continued during the whole time the fluid continues to flow, as well as when the canula is withdrawn, so that no air can enter the sac. If, therefore, the contraction of the abdominal muscles and diaphragm does not seem to empty the cyst readily, the use of a cupping-glass over the canula is a better mode of proceeding than using undue force with the hands. The great object after the evacuation is to heal the puncture, which readily takes place, and to keep the sides of the cyst in contact by pressure, which may be done by long straps of adhesive plaster round the abdomen, and a moderately tight bandage. But if suppuration has taken place, Mr Hawkins thinks that after the abscess has been punctured with the trochar, a gum catheter may be introduced to give exit to the fluid which may be subsequently evacuated; and that, after the puncture, pressure may be employed by the side of the catheter to produce as much diminution of the size of the cyst as the degree of inflammation present in the case will allow.

528. When a *hydatid* encysted tumour is to be opened, whether in a simple or an inflamed state, puncture by the trochar, Mr Hawkins conceives, is the method to be preferred. It might, he observes (l. c. p. 171), be thought that the orifice made by the trochar would not be sufficient to give exit to the hydatids, but their figure becomes so altered, or they

are so readily broken down and burst, that they will pass through a very small opening. Cases in which a complete incision with the knife has been made at once, do not seem, on the whole, this surgeon alleges, to have been so successful as when a small opening has been employed; and this can be enlarged subsequently, if it is found insufficient, with less risk of opening the peritoneal cavity than if the same sized opening be made at once. The opening having been made, and the contents of the cyst evacuated, so far as may be possible, if there is not an appearance of pus, an attempt should be made to procure its obliteration by adhesion, and if this fails, the puncture can readily be re-opened. But if the contents be at all purulent, the propriety of attempting wholly to close the orifice is much more doubtful, and it will probably be less hazardous to leave it open, lest dangerous symptoms should be produced by the confinement of matter becoming foul in consequence of the opening.

529. When a hydatid encysted tumour has been opened spontaneously, or by art, much good, Mr Hawkins remarks, appears to have been derived, in case of the discharge putting on an unhealthy character, from washing out the cavity with warm water, or from injecting into it some gently stimulating applications, a short time after the first opening had been made. This practice, Mr Hawkins thinks, induces a more healthy secretion in the cyst, and facilitates the adhesion of its sides by lymph; and it is not followed by inflammation to a hurtful extent, if proper care be taken.

530. M. Recamier of the Hotel Dieu of Paris has had occasion to operate in a considerable number of cases of simple serous or hydatid cysts of the liver; and as the results of his operations have been very satisfactory, we shall here state the method which he pursues. (Rev. Med. 1827, iii. 436.)

531. In order to ascertain decidedly the nature of the tumour, M. Recamier recommends that a small and very fine trochar be plunged into it, on the canula of which a cupping glass is afterwards to be applied, in order to draw out a little of the fluid. After having acquired a certainty of the tumour being a hydatid cyst, by the examination of the fluid discharged,

caustic potass is to be applied, and at the bottom of the wound thereby occasioned, a second application of the caustic is to be made, in order to produce at once the opening of the cyst, and its adherence to the parietes of the abdomen. After the evacuation of the hydatids, the sac is to be filled with an emollient fluid, such as honeyed barley-water, and this injection is to be renewed every day.

532. M. Cruveilhier doubts whether, in the present state of science, we should be justified even in making a puncture with a very fine trochar, into a tumour of this kind, unless it could be satisfactorily ascertained that adhesion existed, and there were a well marked tendency of the tumour to proceed outwardly. He acknowledges, however, that in five instances in which M. Recamier has employed the method described, his happy boldness (*heureuse audace*) has been justified by the most complete success.

533. M. Begin, in the memoir formerly referred to, represents the preliminary puncture as useless, because, if fluctuation be manifest, it is of little importance to know what is the nature of the fluid which the tumour contains. Whether it be pus, serum, bile, or hydatids, the indication remains the same. The necessity of operating, under such circumstances, results, not from the origin, or from the composition of the effused matters, but from the symptoms induced by the tumour, by the danger which its presence and its increase occasion to the patient; and, this being the case, fluctuation alone is sufficient to warrant its being opened. M. Begin also considers this exploratory puncture as by no means free from danger; and he regards his own mode of securing the formation of adhesions, formerly described (515), as safer and more certain than that by caustic. The observations already made in respect to the opening of abscesses (507, seq.) seem to shew, that the apprehensions about exploratory punctures of aqueous or hydatid cysts in the liver are exaggerated; and perhaps also to suggest the expediency of an operation being performed, in this class of cases, at an earlier period than has heretofore been usually practised.

C. Opening of Distended Gall-Bladder.

534. In consequence of the difficulty that occasionally attends the discrimination between abscesses of the liver and distended gall-bladder (163, 312), it has sometimes happened that tumours of the latter description have been punctured by mistake. Again, when inflammation has occurred in the gall-bladder, particularly as a consequence of the existence of calculi, and suppuration has supervened, the matter has occasionally made its way, as was formerly described (152), through the parietes of the abdomen, and been discharged externally either by a spontaneous or by an artificial opening, being in some instances accompanied by one or several gall-stones. These results have suggested the inquiry, under what circumstances tumours connected with the gall-bladder, or with the gall-ducts, become proper objects of surgical operation ?

535. M. Petit mentions two cases of puncture of the distended gall-bladder which proved fatal, but with few particulars. In the one case, two pints of very green and viscid bile were discharged; and in the other about a choppin of green bile. (Mem. de l'Acad. R. de Chir. 12mo, i. 256.) In a case communicated to Mr Andree, p. 18, by Mr Cline, the particulars are more circumstantially narrated:—" S. M., aged 16, had a troublesome cough for several months, attended with pain in the right hypochondriac region. On the same side, a tumour gradually formed, and distended the cavity of the abdomen; fluctuation being distinctly felt, a trochar was introduced. By this operation more than twenty ounces of bilious fluid was discharged. During the evacuation, he complained of great pain in the part, and in his right shoulder; symptoms of inflammation soon followed, and he died on the seventh day after the operation. He had been in a bad state of health about twelve months preceding his death, but without any suspicion of obstruction to the passage of the bile; for his skin had not been discoloured, nor his stools apparently altered. Mr Cheston examined the body, and found the gall-bladder containing

about two quarts of bile, extending from its usual situation down to the pelvis, and adhering to the peritoneum, omentum, and part of the stomach, all of which were inflamed. The biliary ducts were greatly inflamed, except where the ductus communis choledochus enters the duodenum, which part was contracted, but admitted the bile, with some difficulty, to be pressed into the intestine."

536. Under this head may be mentioned also, the case of a girl of 14, in whom an enlarged biliary duct was opened by Mr Todd of Dublin (Dubl. Hosp. Rep. i. 325), on the supposition of its being hepatic abscess, and about two quarts of viscid green bile drawn off through a canula. The girl died on the evening of the second day; and on examining the body, a large quantity of serous fluid mixed with green bile, was discharged from the abdomen; the peritoneum was inflamed in several parts; and flakes of coagulable lymph adhered to its surface, and floated in the fluid.

537. We are acquainted with two cases only in which puncture of the gall-bladder has not been attended with a fatal result. In one of these, Petit's fourth case (l. c. p. 258), in which the tumour was opened contrary to his advice, on the supposition of its being a hepatic abscess, a fistula formed, from which, by dilatation, a biliary calculus was afterwards extracted. The other case is related by Drs Graves and Stokes. The distended gall-bladder co-existed with hepatic abscess, and was punctured without injurious consequences. These gentlemen supposed that this operation had proved fatal in every instance except that which they have detailed. "Had the smallest quantity of bile," say they (Dubl. Hosp. Rep. v. 104, 5), "found its way into the peritoneal cavity, peritonitis must have ensued, a result most probably prevented by the existence of adhesions at the point where the puncture was made."

538. M. Petit, in reasoning on the different results of the two first cases related by him (535) as compared with the fourth (537), came to the conclusion that, to the successful issue of the operation of puncturing the gall-bladder, it is necessary that

there should exist adhesion of that sac to the peritoneum, so as to prevent effusion of bile into the cavity of the abdomen; and suggested the following as the characters by which the existence of such adhesions and their seat may be ascertained; viz. 1st, its being impossible to make the tumour change its position; 2d, sponginess and redness of the integuments; and 3d, the circumstance of there having been frequent returns of inflammation. (l. c. p. 288.)

539. M. Petit conceived that in cases of concretion in the gall-bladder, in which we are convinced, from the presence of the symptoms above enumerated, that that viscus adheres to the abdominal parietes, an operation may with propriety be performed for the extraction of the concretion. (l. c. p. 290.) But it does not appear that any of the cases related by him, for the purpose of shewing the possibility and propriety of such an operation, were independent of abscess of the abdominal parietes. He himself obviously requires *sensible fluctuation* as a condition of operation.

540. "Lithotomy," says Mr Andree, p. 44, "has been advised for the removal of biliary calculi. This, however, has arisen from the uncandid representation of a very uncommon case, but one which has, I know, occurred, to wit, of an abscess forming between the calculus, and the integuments of the abdomen. In this case, when the matter is let out, the stone may be felt by a probe or the finger introduced into the wound, and probably extracted. But the kind and wise process of nature in such cases is, first, to form a complete adhesion between the gall-bladder, or ducts, and the peritoneum, so that, when such abscess is opened, the cavity of the belly remains unexposed, that is, not cut into. One case of this kind I have seen, in which the abscess had been opened, and a fistulous aperture remained, leading to a gall-stone. Morgagni mentions three cases of the same description. The first was cured. The second had a fistula left, by which a thin yellow liquid was discharged; the third had an ulcer remaining, which, with its sanies, discharged bilious calculi at times."

541. It may be observed here, that when the gall-bladder be-

comes distended with bile, without there existing any mechanical obstruction of the ducts, as occasionally happens, it can sometimes be emptied by pressure. Thus, in the third case related by Petit, when he was proceeding to open a tumour in the hepatic region under the impression of its being an abscess, scarcely had he cut the skin, when he was sensible of the collapse and diminution of the tumour, which led him to suspect the real nature of the case ; and accordingly the patient soon afterwards discharged by stool, a large quantity of green bile. In his sixth case, the gall-bladder could sometimes be diminished in bulk by pressure, and sometimes underwent a spontaneous evacuation. Dr Bright, however, in noticing a case in which the gall-bladder had long been distended by an accumulation of its own secretion, in consequence of a biliary calculus being impacted in the cystic duct, and had become so thin as to give way under the ordinary manipulation during dissection, suggests the practical caution that the same thing might have happened during life ; in which event, peritoneal inflammation would have been almost infallibly produced. This struck him the more forcibly, because he had several times, during his attendance, taken the tumour in his hand, and made gentle pressure upon it as upon an elastic bottle ; observing, while he did so, that it felt as if he might possibly have overcome the obstruction, had he dared to make bolder pressure.

SECTION II.

SPECIFIC REMEDIES, PARTICULARLY MERCURY.

542. We come now to the consideration of the employment of specific remedies in the diseases of the biliary organs. In entering on this subject, we think it right at once frankly to avow our conviction that medical practitioners in general, both in the British Isles and in the British tropical colonies, have been in the habit of placing too great reliance, and of making

too free a use of Mercury in the diseases which they know or imagine to depend on morbid conditions of the biliary organs, and especially of the liver. There are unquestionably many cases of such diseases in which this medicinal agent appears to answer the ultimate purpose of its employment—the restoration of health—efficaciously and safely; but we are persuaded that, in many of the cases in which it has been customary to employ mercury, all the beneficial effects derived from its use could be obtained equally, if not more, agreeably and quickly, from other remedies, did not a reliance on this agent engender a supineness in the use of these; that there are many cases in which its employment aggravates the disease and retards its cure; and that there are many in which, whatever be its immediate effect upon the existing disease, it lays a foundation for serious, and, too often, irreparable mischief to the constitution.

543. Whilst entertaining these convictions, we shall not take upon ourselves to affirm in what cases of diseases of the biliary organs mercury ought or ought not to be had recourse to; but we shall suggest some considerations, and adduce some authorities, which we think will warrant the practitioner, who is anxious to arrive at a correct judgment on this subject, in confining his administration of mercury within considerably narrower bounds than has been the prevalent practice of British practitioners, particularly in hot climates.

544. In expressing doubts as to the accuracy of the conclusions at which so many eminent practitioners have arrived respecting the necessity and the advantage of the employment of mercury in the various forms of disease to which the biliary organs are subject, nothing can be less intended than to call in question the good faith in which they have communicated their observations to the public. But so numerous and complicated are the sources of fallacy to which medical men are exposed in judging of the powers which remedies exert over diseases, particularly those of a chronic character, that no part of the medical art illustrates more strongly the *πειρα σφαλερῆ* and *κρίσις χαλεπή*, which Hippocrates so justly ranked among the prime obstacles to its advancement.

545. In particular, it may be observed, that when a routine system of practice for the treatment of any disease becomes generally established, there are two errors into which those who follow it are extremely apt to fall. The *first* is that of ascribing all the *beneficial* changes which may occur in the progress of a case of this disease, to the remedies employed, overlooking entirely the share which natural processes may have had in the production of these beneficial changes; and when the routine consists in the employment of a supposed *specific* remedy, overlooking also the beneficial influence of other curative means that may be had recourse to simultaneously.

546. The second error liable to arise out of the establishment of a routine system of practice in any disease, is that of ascribing entirely to the malady, or to peculiarity of constitution, any *prejudicial* changes that may occur in the progress of a case so treated, without a suspicion being excited that the remedy can have had any share in producing them. Of both these forms of error, the history of the treatment of Iritis with mercury, if impartially recorded, might, we are persuaded, afford abundant illustrations.

547. The full exposure that has now been effected, in different quarters of the globe, of the delusion under which the medical profession and the public long laboured with respect to the supposed necessity of the free administration of mercury in the treatment of venereal complaints, and of the surprising manner in which they shut their eyes to the injurious consequences too frequently resulting from that mode of practice,—persuading themselves that they witnessed the destructive operation of the disease in morbid phenomena which were actually, for the most part, the genuine consequences of the remedy; that exposure, we say, certainly tends to diminish, in some degree, the reluctance of the inquiring physician to avow some doubt as to the necessity, advantage, and innocuousness of the same remedy in another class of diseases, in which it has been considered to be not less required, nor less beneficial.

548. We are well aware that by many who have, during their practice in hot climates, witnessed the diseases of the biliary organs, on a much more extensive scale than can fall to the lot of European practitioners, and who feel confident in appealing to their personal experience as to the benefits to be derived in the treatment of these maladies from the free administration of mercury, the mere hinting a doubt on the advantages of this plan of treatment may be deemed presumptuous. But, even at the risk of exposing ourselves to this degree of censure, we shall venture to express a hope that in the progress of the improvement which medical practice in India cannot fail to make, under its present zealous and judicious mode of cultivation, it will be established that the necessity for the administration of mercury in the treatment of hepatic affections, as well as of some other diseases for which it is at present in general very liberally administered, is much less than even those authors who have most strenuously enforced the propriety of caution in its employment, have conceived; for a few denials of its mischievous action on the economy of a considerable portion of those who are submitted to its operation go but a short way to overturn the ample evidence of the fact which stands recorded in medical writings, and of which few practitioners can have failed with their own eyes to have witnessed illustrations.

549. In taking a review of the several diseases of the biliary organs in which the administration of mercury has been supposed to be advantageous, and of the mode of operation by which it has been supposed, in respect of each of these diseases, to produce this beneficial result, we shall follow the same order as we have done in considering the general treatment; directing our attention, in the first place, to its use in the Functional Derangements; in the second place, in the Congestive and Inflammatory affections; and, in the third place, in the Chronic and Structural alterations of these organs.

A. FUNCTIONAL DERANGEMENTS.

550. First, then, as respects the employment of mercury in the treatment of the functional derangements of the biliary organs, and its applicability to the several indications which we have pointed out as requiring to be fulfilled in their management.

551. That dyspepsia or indigestion, in a large proportion of the cases in which it occurs in our own climate, depends on a morbid exercise of the function of biliary secretion; that this deranged exercise of function may consist either in a deficient or in an excessive secretion; and that the bile, whether excessive or deficient, or even perhaps natural, in quantity, may at the same time be vitiated in quality—are opinions which, as we had formerly occasion to observe (8), have long been of very general acceptance among medical practitioners in the united kingdom. And connected with these pathological views respecting the origin of what are usually called bilious derangements or disorders, is the therapeutical dogma, which has not only been acted on very extensively by medical men, but has found especial favour with the public, that in whatever of the several respects that have been mentioned, the function of the liver may be deranged, it is in a great measure, or mainly, by the administration of mercury that the derangement is to be overcome, and the healthy action of this important organ to be restored.

552. Of the almost superstitious reliance placed by some practitioners on the beneficial operation of mercury upon the functional action of the liver, we cannot give a better illustration, perhaps, than is to be found in the following quotation:—
“The power which this medicine (calomel) possesses over the secretory functions of the liver is not confined, as it is generally thought, to increasing its activity when in a sluggish state; for it is equally efficient to reduce the secretory action when in ex-

* Ayre, *Practical Observations*, &c. 2d edit. p. 186.

cess, its tendency, when acting, being to *restore* the actions of the liver, whether deficient or excessive, to their natural and healthy state. In those cases where there is an impeded secretion of bile, this medicine has the power of restoring it, occasioning in many cases, at first, a very copious discharge; and where the secretion is in excess, as in the second stage of cholera morbus, its powers in subduing the inordinate action of the liver are equally distinguished; and where, again, the secretion is in a proper state, it appears to have but an inconsiderable effect upon the liver, though given in those doses in which it was before so active."

553. In reading these remarks, it is difficult to believe that they refer to any agent of a less intelligent and discriminating character than the Archeus of Paracelsus, or the Anima of Stahl. Few practitioners, indeed, avow in words so explicit as those which we have quoted, their belief that mercury is capable, in operating on the liver, of inducing the most opposite results, according to the immediate necessities of the economy; but it is not the less true that, by a belief of this kind, though unavowed, a large number of medical men have been guided in their practice.

554. It is but justice to the late Dr Trotter to observe, that, in his *View of the Nervous Temperament*, he was one of the first physicians in this country who opposed the fashionable practice of administering mercurial medicines in the treatment of the so-called bilious complaints. In that opposition he was ably seconded by Dr Saunders. "The general and indefinite term of bilious," says the latter eminent physician, "as applied, in popular language, to almost every affection of the stomach or intestines, and even of the nerves, producing irritation and symptoms of hypochondriasis, has given rise to a very general and indiscriminate use of mercury in this country. This has been done under a false impression, that all those symptoms originate, and are connected with a diseased or obstructed liver; the same term is applied whether the secretion be too copious or too scanty, whether the organ be too hard or too soft, too large or too small; in all cases

mercury, as a specific, chiefly on the authority of the East Indian practice, has been recommended, and is now in very general use. My own experience, however, has furnished me with the means of ascertaining, that even calomel, which is the most manageable preparation of mercury, cannot be employed with safety or success in a great variety of cases in which it has been recommended; it is, however, frequently preferred from having neither taste nor smell, and from its acting in a small bulk; but it ought seldom to be used by itself as an habitual purgative or laxative, as its operation in that case is extremely uncertain; sometimes it produces mucous and bloody stools, accompanied with tenesmus and prolapsus ani, irritating and exhausting the power of the intestines, and laying the foundation of painful and dangerous strictures of the rectum. It is generally improper in dyspeptic complaints, especially in delicate and irritable habits; at other times, instead of acting on the bowels, it forcibly determines to the mouth, and produces all the inconvenience of a salivation, when not expected or wished for. It enters into the composition of most of our worm medicines which are advertised for sale, and from the free and unskilful use of such in the hands of ignorant people, considerable debility, emaciation, and even convulsions in children, are induced." (Observations on the Hepatitis of India, p. 26.)

555. In reference to the same views, Dr Abercrombie has justly remarked, that mercury is often used "in an indiscriminate manner, and with very undefined notions, as to a certain specific influence which it is believed to exert over all the morbid conditions of this organ. If the liver is supposed to be in a state of torpor, mercury is given to excite it; and if it is in a state of acute inflammation, mercury is given to moderate the circulation, and reduce its action. Effects the most indefinite, if not contradictory, are also sometimes ascribed to it in regard to its influence on the secretion of bile, and in those affections which are commonly called bilious. Upon the principles of induction with regard to cause and effect, which are recognised in other sciences, it may be doubted whether all

these maxims can be right, but I will not take upon me to decide which of them is wrong. I leave the subject, therefore, with merely throwing out these doubts, the force of which must be felt by every pathological inquirer; and with hazarding the opinion that much of the prevailing doctrine on derangements of the liver requires to be revised and perhaps corrected. There are certainly many parts of it of which the pathologist must be allowed to doubt whether they are not at variance with the principles of philosophical inquiry."

556. That Mr Twining had not seen reason to believe in any self-regulating action of mercury upon the secretion of the liver, is obvious from the following observations on jaundice. "In every case of jaundice, where the stools are white, or of very pale grey colour, the employment of mercurials is of doubtful propriety; since we have evidence of the abundant secretion of bile, which is absorbed, so that its colour is visible in the eyes, urine, and skin, at the same time that we have reason to believe its transit along the common duct into the intestines is obstructed. Mercury, with a view of exciting biliary secretion, in such cases, would be as unreasonable as the administration of diuretics to a man with a distended bladder and whose perspiration had an urinous odour, shewing that urine was freely secreted, and absorbed into the system, while we knew that he had an impervious stricture of the urethra." (i. 383.)

557. Nor is it by its power of regulating the mere secretion of the bile, that mercury is conceived to prove efficacious in the dynamical affections of the biliary organs. By many it is alleged to possess the power of aiding the bile in its course through its ducts into the alimentary canal, in cases in which it accumulates in these passages, or the power of *emulging* the biliary ducts, as it is termed; though by what mechanism, physical or vital, this is effected, no one, so far as we are aware, has as yet undertaken to explain. "The mode in which alone calomel proves efficacious," says Dr Curry (Saunders, p. 332, note), "is by emulging the biliary ducts; and the evidence and measure of its salutary operation, is the quantity of bile which it eva-

cuates by stool. Though its effects, then, be ultimately that of a cathartic, yet it is not simply as such that it is useful, but by acting specifically, and being (if I may be allowed an antiquated expression) a cholagogue or evacuant of bile."

558. That mercury, in the form of calomel and of grey oxide, acts upon the intestinal canal as a purgative, is a fact of daily observation. In what manner medicines so acting, and more especially those the operation of which is exerted particularly upon the duodenum, may be supposed to affect the secretion and excretion of the bile, we have already pointed out (437); and the question is, whether the operation of calomel and blue-pill is more favourable in these respects than that of some other purgatives which also have been esteemed cholagogue?

559. Mr Annesley imagines (Sketches, &c. p. 398) that he has discovered a quality of calomel which at once proves and explains its possessing superior efficacy as a cholagogue. From experiments on dead bodies, confirmed by observations on the living, he has been led to believe that this medicine exerts a chemical action on the tenacious secretion which lines the mucous surface of the intestinal canal, so as to render it more fluid, much less tenacious, and more easily detached from the mucous surface. In this way, he conceives, it proves the means of removing such obstruction of the common choledoch duct, as this secretion is capable of occasioning; and thereby effects a discharge of bile into the intestine. When the secretion so acted on by the calomel has been removed by a cathartic draught, the influence of subsequent doses will, he conceives, be more readily propagated along the canals of the ducts to the gall-bladder and to the liver itself. The nature of this influence, or rather its fundamental effect, whether excretory or secretory, or both, is not very explicitly stated by Mr Annesley; but several of his remarks seem to recognise a power in calomel to increase the amount of the biliary secretion.

560. It but too frequently happens that the symptoms indicative, or supposed to be indicative, of bilious derangement, for the removal of which the administration of calomel is had recourse to, are the consequences of excessive

indulgence in the pleasures of the table ; and that many who are in the habit of taking this medicine at their own hands, have recourse to it in the expectation of rendering a perseverance in such indulgences compatible with the preservation of health. " I am frequently applied to, every hot season," says Mr Twining, (i. 50) " by pale, emaciated, and unhealthy men, long resident in India, who have been taking calomel at night and purgatives in the morning, because their stools are disordered with ' vast quantities of black filthy bile,' which is not diminished by persistence in their plan of calomel and purgatives ; at the same time that they are eating meat every day, and drinking plenty of claret, ' to support their strength.' Such patients are generally advised to omit all medicine except a compound rhubarb pill at night, and, if requisite, twenty or thirty grains of compound powder of jalap in the morning, to eat no vegetables, and to drink no claret, but to eat a moderate dinner of meat and bread, and some rice, if they like it, and to drink sherry and water. In less than ten days the majority of these invalids usually return to me, stating that they are worse than ever, as their livers are entirely inactive, their stools very pale or nearly white, and they are satisfied, that, without some calomel, they are not likely to exist long. At last, these poor people find that they are exhausted in constitution, fretful in mind, and having undertaken a business which they do not understand (viz. the task of regulating the functions of their livers) they are not likely to be very successful. Some of these patients who can be persuaded to relinquish the plan of perpetually vexing their livers, and injuring their constitutions by the habitual use of calomel, gradually get into a better state of health, by taking exercise, keeping the bowels free, and following such a system of diet as is proper to invigorate the constitution."

561. Mr Martin, in his Official Report on the Medical Topography and Climate of Calcutta, particularly insists on the fact that, when the use of mercury, in however small a quantity, is long continued, it proves highly injurious to the constitution, " Another extensive source of disordered health," says he,

p. 123. "I must here mention, as it has come frequently under my notice, the long continued use of aperient medicines containing the mercurial preparations. It is common for patients to obtain from their physicians aperient pills, for instance, containing some portion of calomel or blue pill. This may have been given with a particular view, or for an especial occasion only; but it often happens that the patient continues, for months, and even for years, that which was intended to be used but for days or weeks. The results are very lamentable. I have seen persons in a state of nervous irritability, bordering upon insanity, from this cause, with a sub-acute inflammation of the mucous digestive surface, and chronic ptyalism—all resulting from the long-continued and frequently unconscious use of mercury."

562. The facility with which calomel can be administered to children renders it a very favourite form of purgative medicine both with parents and practitioners; and on the supposition that the green and slimy stools,—(which, along with symptoms of general fever; may be said to form the most common characters of the diseases that affect children,)—depend on superabundance or vitiation of bile, calomel, from its alleged power of correcting the action of the liver, is conceived, where the alvine excretions present this character, to be a peculiarly appropriate remedy.

563. On this subject, the anonymous author of a valuable paper formerly referred to (353), remarks, "Calomel is generally inadequate to convert the green stools of children to their natural colour. I have almost always found that, when calomel purges are given, the excretions continue of an unhealthy colour and consistence as long as the mercury is persisted in. I do not mean to say that this will always occur; but, in the majority of cases, it will be found that the stools become even more slimy than before, and, in some instances, they will present a greenish flocculated appearance. I have much doubt whether, in cases such as I have mentioned, calomel purges have any superiority over other aperients. It may be asked, What is to be expected from this medicine more than from scammony, jalap, or rhu-

barb, when only a purge is required? But, admitting that the intestines are more effectually cleared out when a few grains of calomel are combined with another aperient remedy, it appears to me quite unnecessary to repeat the mercury so often as practitioners are generally in the habit of doing."

564. The same author suggests, that, "by attending to the state of the alvine excretions, the practitioner may determine, in most instances, when the further use of mercury is likely to prove hurtful." "If we find the stools continue slimy and green, after two or three doses have been administered in succession, we may rest assured that the mercury will not bring about a change for the better in their appearance. The longer we persist in the use of it, the more unhealthy the motions will appear. I have seen these continue of a greenish unhealthy colour for weeks, when it has been necessary to persist in the use of calomel in order to remove another complaint, or where it had been given with a view of correcting the alvine discharges. 'Ought the use of calomel to be dispensed with altogether in the common gastric complaints of children?' I should say, that, upon the whole, more harm than good results from the practice of giving mercury to young children, in simple gastric affections."

565. Mr George, in a letter on the injurious effects of mercury in some forms of disease, particularly notices a state of disorder in children, occurring more frequently in those of scrupulous temperaments, which is evinced by languor, loss of appetite, a diminution, and sometimes a total cessation, of the biliary secretion, with slight emaciation, more particularly of the extremities,—such a train of symptoms, in short, as would, he says, universally be supposed to demand the free and continued use of mercurial medicines, but in which his experience would declare that they are absolutely prejudicial. (Lond. Med. Gaz. xii. 569.)

566. The abuse of calomel in the treatment of the diseases of children in India, on the plea of these depending on hepatic derangement, is strongly reprobated by Mr Twining. "The domestic plans of regulating the function of pale and delicate

children's livers, and keeping their biliary secretions in fine order, by the frequent use of calomel, are neither more successful nor less barbarous," he says, than the practice above alluded to (560), as pursued by old residenters. "Although," continues he, "the absolute necessity of employing calomel in the treatment of some stages of many of the acute diseases of children in this country is acknowledged, it is lamentable to observe the vast injury that is inflicted on numbers of these poor pale unhealthy creatures by the calomel discipline intended to rectify the state of their biliary secretion, at the time that their systems are suffering from extreme debility and anæmia, and when the power of the constitution to form healthy red blood is still farther impaired by the use of mercurials."

B. CONGESTIVE AND INFLAMMATORY AFFECTIONS.

567. We come next to consider the employment of mercury in those affections of the biliary organs which depend on derangements of the circulation through these organs, viz. the congestive and the inflammatory; and here the first consideration which suggests itself is, that the alleged beneficial effects of mercury in these maladies are explained on very different principles, by different practitioners; being by some conceived to depend primarily on its operation on the liver, or on the intestinal canal, as others imagine, and secondarily through these organs upon the circulatory system; whilst others attribute these effects to its direct operation upon the circulatory system itself, or on the portion of the nervous system upon which the action of the circulatory system immediately depends.

568. Those who advocate the expediency of the administration of mercury in acute hepatitis, particularly in its earlier stages, do so upon one or other of the following grounds: *first*, that this substance, being possessed of a powerful antiphlogistic influence, is a highly beneficial remedy in all forms of inflammatory diseases, as they occur in all climates; *second*, that whatever be the influence of mercury in other inflammatory diseases, inflammation of the liver is, in a peculiar degree,

under its control; and, *third*, that whatever may be the case respecting the hepatitis of temperate climates, the ordinary depletory antiphlogistic treatment is not sufficient for the removal of the inflammatory affections of the liver as they present themselves in hot climates, which can only be subdued by the concurrent agency of mercury.

569. If the first of these propositions be admitted to be established, it necessarily follows, unless hepatitis can be shewn to be an exception to the general rule, that the use of mercury in this disease must be highly advantageous. Mr Twining accordingly conceives, that "the efficacy of mercury in hepatitis may be accounted for on the same principles on which its use in the remote stages of other inflammations depends."

570. Dr Hamilton, of Lynn Regis, in an article entitled, "An Account of a successful method of treating Inflammatory Diseases by Mercury and Opium," published in the 9th volume of the Medical Commentaries (1785), was the first who produced in the minds of British practitioners, a belief in the general antiphlogistic powers of mercury. He states that he was first led to this method of treating inflammatory diseases by information which he had obtained, so early as 1764, relative to the established method of curing the hepatitis in India, fortified by some trials which he himself made on that disease, and by the consideration of its beneficial operation, when administered in other diseases of an inflammatory character, as ophthalmia, syphilis, and inoculated smallpox. Rationally inferring that "the general cause of an inflammatory diathesis, be what it may, must be the same whether the inflammation is seated in the meninges, pleura, lungs, diaphragm, or any other internal membranous part," and that "the circumstance of locality can, therefore, make little or no alteration in the general intention of cure," Dr Hamilton thought it reasonable, from analogy, to conclude that mercury would prove equally beneficial in every kind of inflammatory disease as it had been found in hepatitis and the other affections already alluded to. In this belief he was confirmed by the results of his own further experience, in a great variety of inflammatory affections. Dr Hamilton

mentions his having observed a great variety in the *physiological effects* of mercury thus administered, and particularly specifies sweating, purging, and ptyalism : but, he adds, that he has seen large quantities of mercury given for a continuance, without affecting the mouth in the least, or producing any very large visible evacuation, and yet the patient be visibly relieved;—leaving it to be inferred that the antiphlogistic power of mercury is not entirely, if at all, dependent on its evacuant operation.

571. Two years later, viz. in 1787, Dr Lind published, in the 8th volume of the London Medical Journal, an account of the efficacy of mercury in the cure of inflammatory diseases and the dysentery, in which he ascribed the beneficial operation of mercury in that class of diseases, to its being possessed of directly antiphlogistic powers.

572. The degree of reliance that ought to be placed on mercury, in the treatment of inflammatory diseases, is at the present day a *quæstio vexata* in medical practice, particularly in this country. We think we can perceive within our own time, that the confidence reposed by the most observant practitioners in its antiphlogistic powers, has undergone a considerable diminution; and it gives us much pleasure to be able to quote the opinions that have been expressed on this point of practice by Dr Alison (History of Medicine, prefixed to the Cyclopædia of Practical Medicine, p. xcv. xevi.), in which we generally concur. After observing that mercury has been so highly recommended as a remedy for inflammatory affections by various practical authors within the last half century, that its virtues might be supposed to have been completely ascertained, Dr Alison proceeds to remark: “ But those who are aware of the fallacies attending the observation of the effects of remedies in acute diseases, particularly of such remedies as are only employed as auxiliaries to others of acknowledged efficacy, can easily understand that the virtues of mercury in inflammatory diseases may have been much overrated. It has been often represented that not only the purgative mercurial medicines, as general evacuants, and as means of acting particularly on the secretion of the liver,

are of peculiar importance ; but that the action of mercury on the system at large is the surest means of controlling those effusions, and particularly the effusion of coagulable lymph, on which the danger of several inflammatory diseases essentially depends ; and, in some instances, a less defined and more specific virtue in checking inflammation has been attributed to the constitutional affection from mercury. Thus, the remedy has been successively vaunted in the case of acute hydrocephalus, of cynanche trachealis or laryngea, and (generally in the form of calomel and opium) in that of pneumonia, bronchitis, pleuritis, pericarditis, peritonitis, hepatitis, and dysentery ; and reference has been often made to the effects which may be observed from it in inflammation of the iris, tending to effusion of lymph there, as demonstrative evidence of its peculiar efficacy. But it may be stated with confidence, that, in the opinion of many of the best informed members of the profession, there has been much exaggeration in all these statements. That there is something very peculiar in the effect of mercury in acute inflammation, particularly of the liver and of the mucous membrane of the bowels, in the hot climates, the numerous and concurrent authorities which might be quoted on the subject leave no reason to doubt ; but that any such decided effect can be observed from exciting the specific effects of mercury (marked by its action on the mouth) during the acute stage of any internal inflammation in this country, has certainly not been established to the satisfaction of most practitioners. That calomel is one of the most convenient purgative medicines in such diseases is certain ; and it is equally certain that it is one of the best corrigents that can be used along with opium, when the soothing effects of the latter medicine are demanded, because it both corrects its constipating effect, and probably aids in determining its action to the skin, and, when given with opium, much more generally represses than excites vomiting. When given so as to act only in these ways, it may be unquestionably held to be a useful, though not one of the most powerful remedies in inflammatory diseases. But when its action on the mouth has been excited in the course of acute internal in-

flammation (which is the only fair way of judging of any specific agency of the mineral on the inflammatory process), we have not only been very generally disappointed of seeing any improvement of the symptoms immediately follow that change, but are constrained to add, that we have more frequently seen an aggravation of them."

573. But, in the second place, whatever judgment we may be disposed to form respecting the general antiphlogistic powers of mercury, we cannot altogether regulate by this judgment our opinion as to the necessity or advantage of its administration in the inflammatory affections of the liver. "An opinion has for some time prevailed," says Dr Saunders (p. 325), "that mercury is a specific in every disease of the liver; and that even in active phlegmonous inflammations it will obviate suppuration. This opinion appears to have been founded on an idea that there is something *very peculiar* in the inflammation of the liver that is not met with in any other organ."

574. If mercury really exerts a greater influence over the inflammatory affections of the liver than over those of other organs, it is obvious that this effect must be in virtue of its peculiar mode of affecting the liver, whether this consists directly in favouring the excretion, or in promoting the secretion, of the bile.

575. "Why a medicine possessing such a property (that of emulging the biliary ducts) should be especially serviceable in hepatitis," Dr Curry illustrates by the following analogy: "Practitioners have daily opportunity of seeing the immediate and great relief afforded by drawing out the milk from the female mamma, where this gland becomes inflamed after lying in, or during the period of lactation: indeed, in many cases of inflamed breast, little else is necessary than emptying the lactiferous ducts at the beginning, and repeating it from time to time as the milk re-accumulates;—the inflammatory action of the vessels often subsiding spontaneously, when this cause of distention and irritation is removed. Though the means employed in hepatitis are necessarily different, yet the effect is the same; the general distention of the liver is lessened by

emulging it of its bile." In reference to this comparison Mr Twining says (p. xviii.), "We have been told that mercury is beneficial in hepatitis, in the way that the breast pipe or pump relieves inflammation of the female breast when milk abscess is impending. But a legitimate parallel cannot be established in the action of the respective remedies. The pipe relieves the inflamed breast by drawing off the superfluous milk, without exciting increased secretion. Has the action of mercury an analogous effect on the liver?"

576. In Great Britain, for many years past, the mercurial plan of treating hepatitis has been so generally pursued, that the experience of this country affords few data for judging how far the treatment of that malady admits of being safely conducted on the ordinary principles of the antiphlogistic method. Even in this country, however, its use in the early stages of hepatitis has been objected to by practitioners of very high authority. "Calomel is often recommended," Dr Pemberton remarks (p. 31), "in the early stages of inflamed liver. In a large dose as a purgative, I cannot object to it, but as a medicine to keep up a continued discharge from the bowels, I regard it as much inferior to the neutral salt recommended above (a drachm of sulphate of magnesia); and as a mercurial alterative at this period of the complaint, its use is wholly inadmissible. I may also, in the same manner, object to the early use of mercurial ointment, the effect of which would doubtless be to increase the action of the arterial system which is already too much quickened."

577. On the Continent of Europe, the mercurial treatment of hepatitis does not appear ever to have come into favour, though the Indian and English mode of practice in this disease has been repeatedly explained by the systematic medical writers of the different Continental nations, as by Pinel in France, Frank in Austria, and Vogel in Hanover. We are not aware, however, that there are any grounds for believing that the treatment of the inflammatory affections of the liver pursued on the Continent of Europe is less successful than that employed in this country; and even could it be shewn that such were

the case, it would still remain to be determined whether this difference in the result of practice was attributable to the less vigorous employment of the ordinary antiphlogistic means of treatment, or to the neglect of mercury. In looking into the various Medical Dictionaries which have, within the last twenty or thirty years, been published in France, we do not find any reasons for supposing that the results of the practice pursued by the physicians of that country, in this class of affections, have been so unsuccessful as to incline them to make trial of the mercurial mode of treatment. Thus, in the article *Hepatitis*, in the *Dictionnaire des Sciences Medicales* (vol. xxi. published in 1817), the only allusion to mercury is in the following terms: "The emphatic manner in which mercury is extolled by the English physicians throws some degree of suspicion on the encomiums which they so lavishly bestow on it. This is still a point of practice on which it would be desirable that experiments made dispassionately and without prejudice should throw the light necessary to the full elucidation of a property of mercury respecting which it is at least allowable to entertain doubts; and the more so that more than one writer of the three kingdoms attributes to this medicine the very equivocal power of effecting the resolution of collections of pus already formed." In the corresponding article of the *Dictionnaire de Medecine* (vol. xi, published in 1824), the only reference to the employment of mercury in hepatitis is an account of the mode of practice pursued in India, professedly derived from the writings of P. Frank; and in the *Dict. de Med. et Chir. Pratique* (vol. ix, published in 1833), besides the mention of calomel among the gentle purgatives proper to be employed, the only notice taken of mercury is to the following effect: "Mercurial frictions on the region of the liver, recommended even in the acute period of hepatitis, and by some English physicians to the length of salivation, do not in any case supersede the necessity of evacuations of blood, and of the other antiphlogistic means; and it is not yet well demonstrated that they have any share in the powerful action of these latter remedies." We believe it could be shewn, by a reference to the

medical records of the other Continental nations, that they afford as little support to the idea that mercury is indispensable to the cure of hepatitis.

578. In the third place, supposing it were established that hepatitis as it presents itself in temperate climates, may be successfully treated independently of the use of mercury, it might no doubt still be true, as many are disposed to believe, that in the hepatitis of hot climates, and of India in particular, this remedy is indispensable, or at least highly advantageous. Even Dr Alison, in the passage above quoted, is disposed to admit, in deference to the numerous and concurrent authorities, that "there is something *very peculiar* in the effect of mercury on acute inflammation in the hot climates, and particularly on inflammation of the liver and of the mucous membrane of the bowels,"—that is to say, in hepatitis and dysentery. For our own part, we confess that our knowledge of those fallacies to which Dr Alison has so justly referred, as throwing great difficulty in the way of a correct appreciation of the influence of remedies over diseases, leads us to suspect that in this part of the subject also fallacy may lurk, and that the influence of mercury over Indian hepatitis may have been much overrated.

579. If the use of mercury in the treatment of inflammatory affections of the liver is more requisite in hot than in temperate climates, it falls to be inquired whether this depends on intrinsic or on adventitious circumstances,—on the character of the malady, or on the conditions of the subjects in whom it occurs.

580. Respecting the character of the malady, it has frequently been maintained that the hepatitis of India is an essentially different disease from that of temperate climates, and that the maxims of practice applicable to the one cannot be relied on in respect of the other; but we do not find that the points of difference have been stated with such precision as to justify either the pathological or the therapeutical conclusion.

581. From the Army Statistical Reports, it does not appear that hepatitis, either in its acute or in its chronic form, kills a larger proportion of those whom it attacks in India than in Great Britain; the proportion of deaths to admissions, on

account of acute hepatitis, being, in Bengal, Bombay, Madras, and Great Britain respectively, *one* in 16, 17, 18, and 19; and on account of chronic hepatitis, *one* in $8\frac{1}{2}$, 18, $14\frac{1}{2}$, 11; or taking both forms collectively, *one* in $12\frac{1}{4}$, $17\frac{1}{2}$, $16\frac{1}{4}$, 15. It is to their much greater prevalence, therefore, that the larger mortality from these two forms of hepatitis in India, as compared with Great Britain, is attributable, and not to any more severe character of the disease.

582. In attempting to arrive at any definite conclusions as to the efficacy of a particular mode of practice in hepatitis, it would be desirable to know what proportion the mortality in cases of this disease bears to that in cases of inflammation of other parts, and particularly of other parenchymatous organs; and it would be requisite at the same time to keep in view the circumstances, independent of mode of treatment, on which the comparative fatality of each of these diseases may be supposed to depend. Besides the sources of danger common to all inflammatory affections, it is probable that each has some such sources more or less peculiar to itself, and it may not be out of place here to notice some of the circumstances which may be supposed to augment the mortality arising from hepatitis.

583. One great practical obstacle to the successful management of inflammatory affections of the liver seems to be, that, from the frequent obscurity of the symptoms which attend them, it is often very difficult to ascertain, in the first place, their existence, and, in the second place, their degree of intensity; and that the practitioner consequently is often left without any sufficient data to guide him in the choice, or in the adaptation, of his measures of treatment.

584. Another serious obstacle to successful practice in these affections seems to arise from the rapidity with which hepatitis is liable to pass into the suppurative stage, and that even, in many instances, without any very obvious symptoms having given warning of the morbid changes that are taking place in this organ.

585. As an additional obstacle may be stated, the great liability of the acute to terminate in the chronic form of hepatitis, which constitutes in itself a disease peculiarly difficult of removal.

586. How far each of these circumstances in the natural history

of the inflammatory affections of the liver, tending separately or conjointly to increase the amount of danger with which they are accompanied, operates with more force in hot or in temperate climates, we have not, perhaps, the means of determining. But it is probable that inflammatory affections of the liver are the more serious in their consequences in hot climates, from their liability to supervene upon or to become complicated with other diseases of a severe character, particularly those of the alimentary canal.

587. The other rational ground on which it has been supposed that a different method of treatment may be necessary in the hepatitis of hot and of temperate climates, is the existence of important differences in the condition of those who are the subjects of this disease; persons who have resided for some time in hot climates being considered unable to bear large depletions, particularly in the way of detraction of blood, and it being considered, consequently, desirable to subdue phlogistic diathesis by other means. Recent experience, however, seems to have proved that the apprehensions which have been entertained respecting the peculiar inability of old residents in India to endure depletions, in inflammatory diseases, proportional to the intensity of the inflammation, are exaggerated, and in a great measure groundless.

588. In judging of the weight which should be attached to the strong expressions of opinion respecting the indispensable necessity of the employment of mercury to the safe treatment of the inflammatory affections of the liver in India, that are to be found in the writings of all those who have practised in that country, it must not be overlooked that the relative influence of the ordinary antiphlogistic treatment, and of the administration of calomel, in acute inflammation of the liver, has been variously estimated by different practitioners; and that the proper period for the employment of the latter remedy has been no less a matter of discordant opinion.

589. Mr Curtis gives the following account of the mode of practice which was pursued at the Naval Hospital at Madras in 1782 and 1783. "Whenever the disease came on," says he, "with a

considerable degree of fever, with acute and constant pain in the side and shoulder, some bleeding was practised: but in other cases it was never done; and, indeed, to the extent to which it could well be carried in a warm climate, and in relaxed habits, it seldom procured much relief." "In all other circumstances, or as soon as the pain of the side, heat, and fever had been a little abated by the use of these remedies (bleeding, blistering, and a purgative or two), mercury was immediately had recourse to, and the course pushed on as quickly as possible, without any regard to the state of the bowels, even where there was a constant flux, with bloody stools and tenesmus; sometimes where even a good deal of heat, thirst, and general fever were present, provided the pulse was not hard, and the pain of the side had somewhat abated, or was not very constant and acute." Of the beneficial effects resulting from this employment of mercury, Mr Curtis speaks in the highest terms of eulogy. (P. 406-7.)

590. Dr Helenus Scott informs us (Med. Chir. Trans. viii. 173), that he had not been long in India before he became convinced that, "in obviating abscess of the liver, we can trust to nothing but the mercurial preparations. Whenever the habit is impregnated with mercury to a certain degree, which the state of the salivary glands and other constitutional effects sufficiently indicate, the patient remains quite free from the danger of abscess. I have long thought," this author goes on to say, "that, when such a misfortune does occur, it is to be attributed to want of medical skill, or to the application of the remedy at too late a period, after some change of structure, necessarily ending in abscess, had taken place. Though blood-letting, blistering, purging, together with the other parts of the antiphlogistic treatment, may occasionally be useful, they are not to be put in competition with a proper use of the oxides of mercury, without which we can seldom remove any severe affection of the liver, whether it be acute or chronic."

591. Notwithstanding the confidence with which the two authors whom we have just quoted insist on the superior importance of mercury, in the treatment of hepatitis, as compared with other remedies, and on the necessity of a speedy recourse

to it, numerous testimonies, and these proceeding from persons of not less authority as regards experience and judgment, establish the propriety of commencing the treatment of the inflammatory affections of the liver, in hot as well as in temperate climates, by active antiphlogistic remedies, so as to moderate or subdue the violence of the inflammatory action before the administration of mercury is entered upon.

592. "In the East Indies, where inflammation of the liver is endemic," says Dr Saunders (p. 328-9), "I am informed on the best authority that many judicious and successful practitioners seldom administer mercury until the violence of the inflammatory action has been moderated by bleeding, active purging, and the antiphlogistic plan of treatment." "In recent attacks of liver complaints," says Dr Dick (Saunders, p. 257), "*after* early bleeding, blistering, and the free use of laxatives, I never saw a case where suppuration came on if mercury were freely used, and continued till the mouth was sore; and if I be not much mistaken, it is in such cases that it has the best effects."

593. On the inexpediency of commencing the employment of mercury in the inflammatory affections of the liver, before their violence has been subdued by blood-letting, and other antiphlogistic measures, we have most valuable testimony from Mr Annesley, who particularly insists on the difficulty or impossibility of inducing salivation (the recognised test of the system being brought under the influence of mercury), as long as the inflammatory action is unsubdued. "The exhibition of mercury in hepatitis, whilst inflammatory action is acute, is often hurtful, and tends to the production of abscess, unless when given with the view of producing its purgative effects only." (i. 509.) "No person who possesses just views of the operation of mercurial preparations upon the system, can suppose that the specific operation of this mineral will be readily induced in the system, during inflammatory diseases, before depletions have been instituted; or can doubt, if the use of this agent be persisted in before such depletions have been performed, that the irritable state of the pulse will be increased, and the supervention of abscess of the

liver thereby promoted. We will not deny that if the disease of the liver be of a chronic form, and occur in those who possess a languid or weak circulation, the mercurial action may be speedily induced, full ptyalism ensue, and the disease be quickly removed. But if ptyalism be not soon produced, and the mercurial treatment be persisted in for too long a period, much serious mischief will often ensue, more particularly if any constitutional inaptitude to the specific influence of the mercury exist." (i. 592.) "To attempt to affect the system with mercury in the active forms of hepatitis, or in many cases of chronic disease, before the inflammatory action is sufficiently subdued by the more energetic antiphlogistic remedies, we consider to be the cause of its often failing to remedy the disease; and we are confident that, when thus prescribed, it is frequently prejudicial, and even calculated to increase the disposition of the inflamed organ to run into abscesses." (i. 631.)

594. In these views Mr Twining seems to have fully concurred. "I have advised," says he in his preface (p. xviii), "a very antiphlogistic treatment for those cases of acute hepatitis which threaten to terminate in abscess, because I am satisfied that no other plan is safe. We may trust to the candour and impartiality of Curtis's evidence in this matter; he bled his patients little and seldom, from a fear of debility, and he used much calomel. No comment is necessary on the result of such treatment; his work shews that he had a most extensive acquaintance with hepatitis terminating fatally by the formation of abscess. The utility of mercury in hepatitis is readily admitted, but it is subordinate to venesection."

595. That the number of the followers of the doctrines and practice of Curtis, in India, has, in recent times, been greatly diminished, we have much satisfaction in believing: but that they are wholly extinct, must not, we fear, be supposed. Dr Conwell, in observing (p. 354), that "ptyalism generally cures dysentery," gives the following insight into the state of medical practice in India, at the time he first became acquainted with it. "When I arrived in India twenty-five years since (*i. e.* in 1810), the senior surgeons placed no confidence in any other remedy (than ptyalism). General bleeding was

then discountenanced not only in dysenteric cases, but even in hepatitis; and I was publicly reprimanded for having bled Lieutenant Gwynne (of the 10th N. I.) at Jaulnah, for an acute attack. However, my patient's recovery consoled me." "It is common in India," said Sir George Ballingall, in 1818, "to look upon blood-letting as an evacuation which, if possible, it is upon all occasions desirable to avoid, and which ought never to be had recourse to, except in cases of extremity. Although this is a sentiment in which I have never permitted myself to indulge, yet I fear I have often been to blame for the omission of this important remedy. This, however, will perhaps be considered a venial fault in a young practitioner, by those who know how imperfectly the system of depletion, in the treatment of diseases, was established in India at the time of my leaving it, and how formidable the opposition with which its advocates had to contend." And after a farther interval of ten years, Mr Annesley writes (i. 588, 9), "It may appear, perhaps, incredible to many of our readers, after having perused the observations contained in the present volume, upon the habits and modes of living of many Europeans in India, that there should be still found practitioners who espouse opinions unfavourable to the employment of vascular depletions in the hepatitis of India, and who place their sole reliance upon the use of mercury or nitric acid for the removal of the disease. Yet such is the case, although we believe the number is daily diminishing, and more correct views are becoming very general."

596. So much for the expediency of having recourse to mercury in the early period of simple hepatic inflammation. We have next to notice the opinions of practical authors relative to the use of mercury in those cases which threaten to terminate, or have actually terminated, in suppuration. We have quoted (559, 561) the statement of Dr Dick and Dr Scott, that when the system is brought under the influence of mercury, as indicated by salivation, suppuration will not occur. This, however, does not correspond with the experience of Mr Twining, who, in concluding his observations on abscess of the

liver, remarks, (i. 343), "in the course of this chapter we find many instances in which ptyalism took place, and still the formation of abscess of the liver was not prevented." But even supposing the observation correct, it would remain to be considered whether we should regard the salivation as the preventive of the suppuration; or whether the possibility of inducing the state of salivation is to be held as an indication that the affection does not tend to suppuration.

597. The converse of the proposition referred to in the preceding paragraph, viz. that salivation cannot be produced while suppuration is going on, has been asserted by a considerable number of practical authors of high authority. Mr Marshall says on this point (p. 180), "When the liver contains an abscess, I suspect no quantity of mercury will cause ptyalism. Under such circumstances, the exhibition of mercury frequently occasions a soreness and heat of the gums, but rarely, if ever, ptyalism." Mr Annesley makes a similar statement, and grounds upon it his recommendation to desist from the use of mercury where hepatic abscess is suspected. "In those cases," says he (i. 647), "where the formation of matter is evident, the employment of mercury ought to be entirely laid aside, excepting as a purgative; for attempts to affect the salivary glands with it will generally fail, will merely add irritation to an already irritable pulse, and materially injure the powers of the system, those very powers on which the future recovery of the patient most materially depends." "In no case where hepatic abscess formed," say Drs Graves and Stokes, "were we able to affect the system with mercury, although exhibited in full doses." (Dub. Hosp. Rep. v. 107.) The only expression of doubt as to the impossibility of producing the state of salivation in cases in which hepatic abscess exists, which we have met with, proceeds from Mr Sievwright, surgeon of H. M. 45th regiment, who, in mentioning a case in which the gums had become swollen and sore, with well-marked salivary discharge, in consequence of mercurial action, although, on dissection, there were found to be one abscess in the liver, of the size of an orange, and several others dispersed

throughout its substance, adds : " This example serves to point out the erroneousness of the idea which some medical men have formed, viz. that where abscess exists, ptyalism can never be induced. Here we have an example in refutation of this opinion ; and I may take the present opportunity of remarking, that I have seen other cases illustrating the fallacy of this notion at the stations of Dinapore, Cawnpore, and Meerut, on the Bengal establishment, and that I have likewise met with similar examples, though comparatively rare, on the Bombay side of India." (Madras Quart. Med. Journ., No. II. p. 140.)

598. Dr Malcolmson's testimony as to the inexpediency of administering mercury during the progress of hepatic suppuration, seems to us particularly valuable : "I cannot conclude," says he (Med. Chir. Trans. xxi. p. 106), "without expressing my opinion on the practice of giving mercurial medicines, where it is known that abscess in the liver has taken place, as is recommended in some works of authority, and appears to be much practised in this country. I have perused the histories of a great many cases in which mercury, in various forms, was continued after the formation of matter, but have not met with one where it seemed to be otherwise than injurious ; except, perhaps, where cautiously prescribed for other symptoms supervening on some chronic cases : nor have I met in India with any judicious practitioner of competent experience, who approved of mercury in any form in such circumstances." "How certainly destructive," the same author remarks in another place, "is the treatment recommended and practised, of pushing the internal and external use of mercury, under the idea that the absorbents are in a state of such death-like torpor as not to admit the drug into the system ; and that, if it can by any means be introduced, it will either remove the disease of the surrounding parts, or cause the absorption of the matter ! And how few young or old practitioners will have the resolution to adopt what is styled 'a tardy irresolute practice, pregnant with mischief,' in withholding the supposed specific or antidote, even when satisfied in their own minds that it can do no good !" (Edin. Med. Surg. Journ., lii.)

599. On the whole, then, it would appear, that, according to the best authorities of the present day, the proper period of inflammatory affections of the liver for commencing the use of mercury, is not in their early stages, but after the violence of the attack has been in a great measure subdued by the ordinary antiphlogistic remedies. "It appears on attentive observation," says Dr Saunders (p. 329), "that the transition of active inflammation into a state of resolution, is not immediately followed by a healthy condition of the part; but it remains for a time debilitated and disposed to lapse into a chronic state. This will probably be found the proper period for the exhibition of mercury, which acts as a spur on the vascular system of this organ, and, by its moderately stimulating effects, occasions a degree of action which, when protracted to a proper length, terminates in health." Mr Marshall (p. 160) remarks, that, "should the acute symptoms subside without a return of health, and should there be no manifest proofs of the formation of pus in the liver, the use of mercury may then be tried, together with frequent moderate purgation. A mild degree of salivation is sometimes useful in this stage of the disease." "When active inflammation is removed," according to Mr Annesley, "then the mercurial action on the liver is necessary to elicit a free and healthy secretion of bile, and thereby to remove existing congestion and accumulations of acrid bile, as well as to restore the healthy and free state of the circulation of the organ." (i. 509.) And Dr Murray jun.,—while he holds that, in the treatment of hepatitis as occurring in India, chief reliance is to be placed on venesection, carried to syncope, at the very onset, and repeated at intervals not exceeding twelve hours, till the acute symptoms yield,—conceives that, after active inflammation is subdued, mercury should be administered. "It is not sufficient," says he, "that the gums should merely be made tender; ptyalism seems requisite to restore healthy action and function, and, when the active inflammation is subdued, it is generally induced by the fourth or fifth day, after which there will seldom be much uneasiness experienced in the side; but the gums ought to be kept tender by a continuance of the mer-

cury, in diminished doses, for a period proportioned to the previous obstinacy of the symptoms." (Madras Quart. Med. Journ. No. I. p. 79.)

600. Whether the effects supposed to be produced, at this stage of hepatitis, by the action of mercury, are really attributable to the remedy, rather than to some salutary natural processes of the economy which has been relieved by the antiphlogistic measures previously pursued; and whether, if dependent on the remedy, they might not as certainly be induced by other medicines besides mercury, are points which it must be left to further experience to determine.

601. Supposing, however, the use of mercury at this stage of the inflammatory affections of the liver to be expedient, the next practical question to be considered respects the mode of its administration. But if medical practitioners have differed as to the indications with a view to the fulfilment of which mercury should be administered in the inflammatory affections of the liver, scarcely less do they differ as to the mode in which its administration ought to be conducted,—whether the system ought to be brought under its influence, according to the technical phrase, by small doses repeated at short intervals and for a considerable length of time, or in large doses at more distant intervals, and discontinued when marks of the system having become affected shall present themselves.

602. In Mr Curtis's practice, the preparation of mercury most generally used was a pill composed of a grain and a half of calomel and two of rhubarb and soap. Two of these pills were given every night and morning (six grains of calomel per day); and if it was thought necessary to have the mouth soon affected, a drachm of mercurial ointment was also rubbed in along the side. "After the mouth became sore, the mercury was continued in smaller doses for two or three weeks, or until every symptom of the disease had disappeared."

603. To Mr Annesley it appears that, "to induce the mercurial excitement of the vascular system, indicated by slight soreness of the gums, and to exhibit mercury or calomel in small quantities frequently repeated, with this view, is to keep

up a state of slow inflammatory action in the secreting substance of the liver, which may of itself terminate in abscess; whilst, if the full operation of mercurial remedies be speedily induced and ptyalism become abundant, or derivation from the seat of the disease is occasioned to the mouth and salivary apparatus, the disease of the liver speedily subsides, and the functions of the organ are restored to their healthy state." (i. 594.) When the use of calomel is clearly indicated, therefore, it is most beneficial, according to Mr Annesley's experience, in large (scruple) doses, generally at not less than twenty-four hours between the administration of each dose. (Sketches, &c. p. 378.) "Those who prescribe five grains of calomel every three or four hours, with a view of inducing the constitutional effects of mercury, produce much greater irritation of the alimentary canal, are longer in obtaining their object, and exhibit much more calomel for the removal of the disease, than those who give twenty grains only at bed-time, with a purgative in the morning, and saline diaphoretics through the day. This latter dose acts as a sedative to the irritable stomach in this disease, while smaller doses increase the irritability of this viscus when it is present, and often induce it where it was previously absent."

604. The administration of large doses of mercury does not seem to find much favour in the eyes of Dr Malcolmson. "Innumerable cases clearly shew," says that intelligent writer, "how erroneous the notion is, still very generally prevalent, that an extreme torpor of the absorbents exists in severe hepatitis, dysentery, and remittent fever, and that this is the cause why the largest doses internally, and the most assiduous inunctions externally, will sometimes fail in introducing a sufficient quantity of mercury to saturate the system. And hence the use of calomel in scruples and drachms daily, and rubbing in mercurial ointment without reference to quantity, under the idea that all that has been taken or rubbed in before has not entered the system, and can therefore have no effect on the disease or on the constitution. But if it be true that the mercury is absorbed, and mixes with the circulating fluids, how injurious must such practices be, when the medicine em-

ployed is one of such unequalled value in these diseases, but at the same time so energetic in its effects on the various tissues and organs, and whose mischievous effects remain so long in the constitution that has been thus poisoned with it; and how little to be wondered at is it that many practitioners run into the other extreme of discarding it altogether, or of combining it with a severe and mischievous course of purgatives." (E. M. S. J. lii.)

C. CHRONIC AND STRUCTURAL DISEASES OF THE LIVER.

605. When we inquire into the purposes contemplated by practitioners in the administration of mercury in the chronic and structural diseases of the liver, we find that it is no longer the mere regulation of the secretion or excretion of the bile, nor the diminution of the force of the circulation, that are assigned as their motives; but the promotion of the absorption of such matters, not appertaining to the natural texture of the liver, as may have been deposited throughout its substance.

606. Of the power of mercury in stimulating the action of the absorbent system, many familiar illustrations might be quoted, as the disappearance of dropsical effusions under its administration alone, or in combination with diuretic medicines; the removal of the lymph effused in the inflammation of the iris; the diminution of indolent enlargements of absorbent or secretory glands; but these are salutary changes which nature occasionally accomplishes for herself, or with such aid only as is required to give fair play, as it were, to her own efforts; and with regard to mercury as to other resolvents, and perhaps all other medicines, it may be fairly questioned whether the practitioner ever effects, by its means, what nature never succeeds in accomplishing for herself—whether any of the structural alterations of the liver, not of an inflammatory character, ever disappear under, or in consequence of, its administration or use. A few quotations from authors of experience and intelligence will suffice to shew on how dubious grounds the administration of mercury in the chronic and structural affections of the liver at present rests.

607. Mr Thomas Clark, in his *Observations on Fevers and the Diseases of the West and East Indies* (p. 71-2), mentions that he had frequently known very bad effects produced (in liver diseases) by the too violent operation of mercury. "Nay, it has often appeared to me," says he, "that, even when it has removed the disease in the first instance, it has laid the foundation for a relapse, which proved fatal. The excessive debility occasioned by a violent mercurial course readily accounts to me for such consequences."

608. Dr Falconer, in his *Dissertation on the Bath Waters*, in speaking of the visceral obstructions which take their rise in warm climates, observes, "Mercury copiously rubbed on the pained part in the form of an ointment, or taken largely internally, is an approved remedy in liver complaints in those countries; but amongst us, that remedy, in the instances in which I have seen it tried (and I have seen several), appears to aggravate all the bad symptoms, and manifestly to hasten death."

609. Dr Dick, whose experience in liver complaints both in India and in England was very extensive, also notices the great liability of these complaints to return when treated with mercury. (Saunders, p. 257.) "In chronic cases, where there is no fever," he remarks, "but only an obtuse pain in the side and shoulder, with a fulness in the side and about the pit of the stomach, keeping up a constant uneasiness, mercury seems to me to have but little good effect: when used freely, it removes the symptoms at the time, but they generally return as soon as the mercury is left off. Having been repeatedly baffled in this way, and observing very often that such liver attacks succeeded long courses of mercury undergone for the cure of venereal complaints, I have, for several years past, trusted to a seton or issue made in the side, and with success far beyond my expectation."

610. Dr Pemberton has observed (p. 45-6), that, "if mercury is used where the structure of a viscus is totally destroyed, another source of disturbance is added to the system, without the diminution of any existing evil; so that, in fact, we subject the constitution to two sources of destruction, and thus the dissolution of the patient is rather accelerated than retarded."

A very similar view of the use of mercury in this class of cases is taken by Dr Saunders. "In hepatic diseases," says he, "where scrofulous tubercles are formed, and in other affections of the liver where the structure has been destroyed by interstitial deposit, with adhesive inflammation obliterating organization; where the absorption of parts has taken place, diminishing the bulk of the organ, with a structure both spongy and loose; if the jaundice accompanying these appearances be fixed and unremitting, I have never seen any advantage from the use of mercury. On the contrary, I am persuaded that life, which, under all these unfavourable circumstances, might have been prolonged by other means, such as a well regulated diet, and the moderate use of gentle, mild, opening medicines, has been shortened by mercury." (Observ. on the Hepatitis of India, p. 32.) And Dr Farre, after describing the tubera circumscripta and tubera diffusa of the liver, remarks (p. 22), "Patients suffering under these diseases are not, as far as I have observed, benefited by the operation of mercury. Few medical men now attempt to cure by these means tumours, in the restricted sense of that word, at or near the surface of the body; but it is more especially true that such efforts prove altogether fruitless when directed to the cure either of the tubera circumscripta or diffusa; for by the time the most careful examiners can distinguish them, the progress of the disease has been already so considerable, that the mercurial action tends only to exhaust powers which art will subsequently in vain attempt to restore." "The perfection of medicine," this author has sagaciously added, "consists, not in vain attempts to do more than nature permits, but in promptly and effectually applying its healing powers to those diseases which are curable, and in soothing those which are incurable."

611. To the same purport are the sentiments of Dr Cheyne (Dubl. Hosp. Rep. i. 278); "I shall now avail myself," says he, "of this opportunity of protesting against a rule of practice in these countries, which seems to have been established without sufficient consideration, namely, that a mercurial course ought to be instituted as soon as jaundice, from a diseased state of

the liver, shall appear. Mercurials probably always aggravate the symptoms of hepatic irritation, unless when they promote the flow of the bile. In this way, they prove quickly destructive to persons advanced in life, with the leaden complexion which arises from what are usually called schirrous livers, which may be irritated by mercury, but over which mercury no longer possesses any influence in encouraging secretion."

612. In reference to the same class of cases, Dr Abercrombie has observed, "Of the chronic affections of the liver, under the various forms which have been detailed, it will probably be admitted that a large proportion are beyond the reach of any human means. The treatment of these ought to be entirely palliative, consisting of a careful regulation of the diet and the bowels, with mild tonics, &c. This I conceive to be a point of much practical importance, because these affections often exist for a long time, without materially injuring the health of the patient; and by treatment entirely palliative, his life may be perhaps prolonged, and certainly rendered more comfortable. But when such cases are treated actively by courses of mercury, the strength uniformly sinks in a very rapid manner, and the patient's life is often evidently shortened."

613. "The salutary effects of mercury," says Dr Chapman, "may perhaps, under all circumstances, be mainly ascribed to the promotion of the biliary and other secretions, and failing to do this, it proves inert and unavailing, or causes a train of deleterious consequences. In the management of chronic diseases of the liver of every description, these are considerations which should invariably control its use, continuing or discarding it, according to the mode in which it affects the system. Numerous are the instances which I have seen of hepatitis, as well as of jaundice, in which the condition was most conspicuously deteriorated by a neglect of these practical maxims, and some where irreparable mischief was entailed by a lengthened perseverance in this mistaken course."

614. "The use of mercury," says Mr Marshall, in a MS. report of the sick treated at Fort Pitt, with a sight of which we have been favoured, "has been very generally recommend-

ed in what is called obstruction of the liver. If it be exhibited early in the progress of induration, and in very limited quantity, it may not do much harm. But if it be given in full doses after the healthy structure is obliterated, another disease will be added to the system, with little or no prospect of ameliorating the original source of physical disturbance. Frequent purging promises to be more useful in cases of this kind than the exhibition of any other class of medicines."

615. In the chronic liver enlargement, which is by no means uncommon in Bengal as a sequel to fevers both remittent and intermittent, Mr Martin believes mercury to be injurious: it injures the stomach and bowels, already overdrugged, without exciting any secretion from the organ chiefly affected, and on which this mineral, from repeated use, has lost its effect. (P. 236.) "In the indolent enlargement, with torpid action of the liver," says the same author (p. 239), "I have seldom found mercury of use."

616. We may introduce here, also, an observation of Mr Twining's, who, in speaking of enlargement of the liver as being not uncommon in Bengal, in children below four years of age, and of the means of cure, remarks, "Jalap and scammony, with calomel, are the most effectual purgatives, in the majority of cases attended with pyrexia;—but I am bound to say, that in nearly one-half of those cases of tumid liver which take place slowly in pale and delicate children, mercury is injurious." (i. 369.)

617. In multiplying, as we have done, our quotations relative to the prejudicial operation of mercury in the chronic and structural diseases of the liver, we are influenced by the apprehension that, numerous and eminent as are the authorities from which these warnings against its use, in this class of cases, have proceeded, they are too frequently neglected in practice; partly in consequence of vague notions entertained by many medical men of mercury being a *panacea* in hepatic diseases; partly from want of reflection on the great variety that exists in the diseases to which the liver is subject; partly from the difficulty experienced in distinguishing them from one

another when a diagnosis is attempted ; and partly, perhaps, also, from compliance with popular opinion.

618. Before concluding this part of our subject, we would request attention to the fact, that the authorities whom we have quoted on the disadvantages frequently attending the administration of mercurial medicines in diseases of the biliary organs, and on the number of circumstances in which their use may be dispensed with, leave no pretence for drawing a distinction on these points between different climates. Dr Saunders, whose experience in this branch of practice in England was very extensive, whilst he conceived that mercury can be used with more safety in warm than in cold countries, at the same time expressly says (*Observations on the Hepatitis of India*, p. 44), "The abuse of mercury, even in India, has been admitted by the writers of that country, and we have daily opportunities of observing the number of persons who return from India to Europe, with debilitated constitutions from the use of mercury, considered as so necessary to check the liver-diseases of that continent. Many recover their strength in their passage home ; others arrive in a mere convalescent state, and require the aid of medicine and diet perfectly to restore their health. One very common effect of the excess of mercury is mental derangement, both in India and Europe." "Although," says Dr Lind (*Lond. Med. Journ.* viii. 47), "the universal practice in the East Indies of curing hepatitis by mercury sufficiently proves its power of checking inflammation, yet it is at times attended with several inconveniences, such as bringing on a violent mercurial diarrhoea, by the medicine being thrown in hastily, which must always be done, otherwise, in this disease, suppuration would soon come on ; and in some cases the salivation runs so high as to be truly troublesome. In one instance of chronic hepatitis, I saw a mercurial hæmoptoe brought on by a long use of mercury ; and constantly the patients are so much debilitated by taking mercury, that it is a considerable time before they perfectly recover their former strength in a warm climate. When the hepatitis has been induced by a remittent fever, or diseases accompanied with putrescency, the use of mercury is always at-

tended with the worst consequences." (See Cases of Mercurial Erethism related by Dr Conwell, Treatise, p. 410.)

NITRO-MURIATIC ACID.

619. To those who participate in the opinion we have ventured to express, that mercury, from its frequently injurious operation on the economy, even when very cautiously administered, should not be used when the same results can be obtained by other means, and who are, at the same time, impressed with the belief that the affections of the biliary organs require for their treatment remedial agents of a specific character, it cannot but be gratifying to find in how high estimation the employment of what has been called the Nitro-Muriatic Acid,* internally and externally, is held by Indian practitioners in the treatment of these diseases; and how closely the effects of this remedy are conceived to correspond with those of a salutary character obtained from mercury itself.

620. The use of nitro-muriatic acid as a substitute for, or as an adjuvant to mercury, in the treatment of affections of the biliary organs and other complaints, originated with Dr Helenus Scott, who printed a paper on the subject in India in 1796. At first, he administered the remedy internally; and although he had reason to be satisfied with the general effects derived from its internal use, yet this was attended with considerable inconvenience. He found, however, that a bath of this acid, sufficiently diluted with water, produced equally agreeable results. Subsequently he ascertained that the mere sponging the skin with nitro-muriatic acid, sufficiently diluted, gives rise to the very same effects as bathing, and is more easily applied. Dr Scott has explained very fully the progress of his observations relative to this remedy, the mode of administering it, and its beneficial effects, in a paper published by him in the 8th vol. of the Medico-Chirurgical Transactions, to which we beg to refer our readers. In a postscript, Dr S. mentions that seven-

* *I. e.* a mixture of nitric and muriatic acid, attended with mutual decomposition, of which water, chlorine, and nitrous acid are the results.

ral of his friends had become convinced with him that the very same effects arise from a diluted solution of chlorine in water, as are produced by the nitro-muriatic acid; an opinion since adopted and illustrated by Mr Wallace of Dublin, in his work on the Medical Powers of Chlorine, particularly in Diseases of the Liver.

621. One of the first authors who supported the character of the nitro-muriatic acid as a substitute for mercury, was the present distinguished Director-General of the Army Medical Department. In his account of the diseases of the 88th regiment, &c. Sir James M'Grigor mentions that in the treatment of dysentery and hepatitis, the nitric acid was tried in about 200 cases, and in general with great success. "One fact," says Sir James, "we are clear and decided in, that the injury to the constitution is infinitely less from the acid than from the mercurial ointment, and that men are not half the time convalescent from the first that they are from the last remedy." In his Medical Sketches of the expedition from Egypt to India, published in 1804, Sir James again alludes to the use of nitric acid as a practice from which, on a large scale, for the six previous years, he had observed the best effects, and as one likely to get into general use in India.

622. These anticipations seem to have been, in a great degree, realized. Mr Annesley concludes his observations on the treatment of active inflammations of the liver, with the following statement:—"There are very few remedies which are more deserving of notice than the nitro-muriatic acid wash, and the internal use of nitric acid, in cases of acute hepatitis, after active depletions and mercury have been used. They promote the return of strength, and the healthy establishment of the biliary secretion; and if de-obstruent laxatives, with suitable regimen, be prescribed and adhered to during their use, they remove obstructions, and promote a free circulation in the vessels of the liver. As a restorative of the energies of the system after mercurial courses, they have generally proved beneficial in our practice, particularly when conjoined with the cautious exhibition of gentle tonics, with light but nutritious

diet, and suitable regimen." And, again, the same author says, "We have experienced the most decided advantage from this medicine in all functional disorders of the liver. In the more chronic forms of disease of this viscus, more particularly such as are connected with enlargement of its structure, and a morbid state of the biliary and intestinal secretions, we consider it one of the most valuable remedies we possess."

623. In 1817 a trial was made, under the immediate inspection of Dr Helenus Scott, at the York Hospital, Chelsea, of the effects of the nitro-muriatic acid baths on patients labouring both under hepatic and under syphilitic complaints. From the report upon this trial, which was drawn up by Staff-Surgeon Macleod, and which has never, so far as we are aware, been published, we shall take the liberty to make a few extracts.

624. Our first extract relates to the manner of administering the nitro-muriatic acid bath. "In conducting these experiments," says Dr Macleod, "we have uniformly used an acid composed of two parts of nitric and three of muriatic acid, each being diluted with an equal quantity of water previous to their being mixed together, which was done by pouring them into a bottle properly graduated. Of this mixture we used from one to four ounces to a gallon of water, and of a temperature of from 90° to 100° Fahr. The mixture thus prepared is poured into a narrow wooden tub, so constructed as to enable the patient to sit down in it with his legs at full length. It is capable of holding from twelve to fourteen gallons, and of such a height that the whole of the lower part of the body, as high as the loins, is covered, and exposed to the influence of the acid liquor in the manner which creates the smallest consumption of the acids. The patient is directed to remain in it from a quarter to half an hour every evening, or even longer, if no sense of lassitude or faintness is caused by it. In most cases, the upper part of the body may be washed or spunged with the acid liquor, and it will be of advantage to cover the patient with a sheet or cloth, so as to preserve the bath of nearly uniform

temperature during the time of immersion. At each time of using the bath, four gallons of the acid liquor are poured out, and an equal quantity of boiling water, with a proportionate quantity of fresh acid, is added, in order to bring it to the proper temperature. By this plan, a fourth part of the whole is daily lost; but we apprehend a diminution of the powers of the remedy, from exposing the acid already mixed to the action of heat, and no better means have been yet devised to obviate this risk of deterioration than that which we pursued.

“ In cases in which the whole bath was thought to be too powerful, the pediluvium was preferred. The vessels used for this purpose were long narrow earthen jars, by which only the feet and legs, as high as the knees, were exposed to the action of the remedy. These, like the wooden baths, are constructed on the principle of exposing as much of the surface of the body, with as small a consumption of the acid as possible. In one case warm spunging only was employed, in consequence of the patient being covered with irritable sores; and in another case the mere washing of the feet and hands was found fully sufficient to induce the specific effects of the remedy.”

625. Our next extracts bear reference to the sensible effects which the bath seemed to induce on the several functions of the economy. “ It is chiefly on the natural functions,” Dr Macleod observes, “ that the nitro-muriatic acid exerts the peculiar influence it possesses. In the greater number of cases under our observation, it caused a particular taste in the mouth, which some of the patients termed a bitter taste, while others compared it to that of copper. This, on examination, was found to be attended with a redness and swelling of the gums, followed by an increased discharge from the salivary glands, but without any ulceration or fœtor similar to that which takes place under mercurial influence. This increased flow of saliva, although one of the most constant effects, is not always present; for in some cases the remedy has altogether failed in producing any effects on the mouth. But it was not remarked that its salutary influence was less in these cases than in

the others, and it does not from this appear that this effect is at all a measure of the power which it is capable of exerting on the system.

“ The acids seem to exert their principal influence in producing a change in the secretions of the liver and intestines ; and when the bowels are not excessively torpid, they hardly fail to render them more regular. In many cases the bath causes actual purging, attended with severe griping, and a sensation of heat and scalding about the anus while the stools are passing, which are in general of a very dark colour, and extremely fœtid.

“ The most salutary, and what has been remarked as a very general result of the action of the nitro-muriatic acid bath is its effect in increasing the powers of the digestive organs, and, in consequence, improving the general health of the patients. There has been hardly a case under trial in which this effect was not remarked in some stage of its progress ; and, in general, the appetite, a few days after commencing it, became equal to that of a person in health using his accustomed exercise.”

626. Our last extracts have reference to the influence which this remedy appeared to exercise over the different forms of hepatic disease in which it was employed.

“ In chronic hepatitis without organic derangement, as abscess, tubercles, &c., all the patients,” it is stated, “ appear to have received more or less benefit. In some of them, the pain in the hepatic region has entirely disappeared, in others a sense of weight remains, and sometimes, on sudden motion, a feeling as if the parts were stretched ; and in all, even where a certain degree of uneasiness and pain is still present, the general health has improved, and the countenance has lost the dusky sallowness so characteristic of hepatic derangement. It may also be observed that the amendment began very soon after the bowels were affected by the remedy ; and an improvement in the appetite was one of its most early and most constant effects.

“ In cases where the substance of the liver has been destroyed by ulceration, and considerable quantities of matter

formed, little benefit could be expected from any treatment, and the acid baths have not been more successful than the means usually employed. In all the instances of this description under treatment, the local pain remains with little change, but the general health has notwithstanding improved in a very marked degree.

“ Two cases of chronic hepatitis, with effusion into the cavity of the abdomen, both got well in a short time under the use of the bath without any other remedy. In neither,” it is candidly stated, “ was the effusion very considerable, or very perceptible.”

“ The bath was tried in three cases of chronic hepatitis, complicated with dysentery. Two of these were perfectly cured of the hepatic and dysenteric complaints. The third died of the progress of the hepatic affection, but for a considerable time previous to his death the dysentery was much relieved; so that altogether,” Dr Macleod considers “ the remedy produced in this class of cases the most salutary effects.”

“ From a consideration of the facts that have been stated,” concludes Dr Macleod, “ it will appear that our experience of the nitro-muriatic acid bath will lead to the inference that it is in morbid action of the liver, and in diseases depending on disordered action only without disorganization of structure, that we must expect the greatest benefit from the employment of this remedy.”

627. In perusing these and similar statements relative to the physiological and therapeutical phenomena which manifested themselves during the use of the nitro-muriatic acid, we are naturally led to ask ourselves what portion of these phenomena was actually produced by the agency of this medicine; what portion was produced by the agency of other powers, the operation of which was not attended to, or not sufficiently appreciated; and what portion may fairly be ascribed to the desistance from measures of treatment of a less innocuous character, which the trial of this remedy insured. As it does not, however, appear that the employment of the acids is productive of any injurious consequences to the economy, the de-

termination of these questions is of considerably less practical importance than that of those respecting the claims of mercury to be considered as the source of those various, and as we have seen, somewhat incongruous, effects which are ascribed to it.

TARAXACUM.

628. As a remedy which has enjoyed considerable reputation in the treatment of the chronic affections of the biliary organs, we may here mention *Taraxacum*, of which it may at least be said, that if it has not been the cause of all the good which has been ascribed to it, its employment is not attended with the same risks as that of some more active substances. Boerhaave entertained a very favourable opinion of its services in the removal of biliary calculi. Dr Pemberton states (p. 42-3, and note), that he has seen the most decided advantage from its use in the treatment of chronic hepatitis, both in incipient scirrhus (induration) of the liver, and also in several chronic derangements of the stomach. In such cases he recommends a pint of the infusion to be taken daily, in divided doses,—the infusion being made by adding a quart of boiling water to ten fresh plants, root and leaf, and straining off the liquor as soon as it is cold. “The decoction or extract of taraxacum,” says Dr O’Brien, “requires to be given in the dose of at least half a drachm three times a-day. In one case, where this remedy was exhibited, the patient received so much relief that he thought himself cured, but the disease subsequently returned. The effect of this remedy was to impart a general warmth to the stomach, and to keep the bowels in a regular state, without relaxing them.” (Dub. Med. Trans. i. 364.)

629. But here it is requisite that we should bring the consideration of the treatment of the diseases of the Biliary Organs to a conclusion. For the omission of several remedies, the utility of which, in some of these diseases, has many attesters and believers, we shall excuse ourselves in the following words of Dr Coe, which, if they may appear obsolete as respects some of the illustrations given of the principles they are intended to enforce, are not, it must be allowed,

obsolete as respects the principles themselves. "We should have a large and wild field to wander in," says that philosophic physician, "if we were to take particular notice of all those medicines which, for one reason or another, or from prejudice and whim, without any reason at all, have been recommended, and handed down by traditional writers, one after another, as remedies in icteric cases in general; or even of all which are mentioned by Hoffmann and Bianchi, under the cure of biliary calculi. It is not at all strange that the vulgar should be amused with the greatest trifles under the name of remedies; that they should believe that almost any thing of a yellow colour must be good in a jaundice, even a tench outwardly applied, because it is a yellow fish; that a jaundice may be cured by a little powder of goose-dung, or of earth-worms, and the like; or by swallowing nine lice for six mornings successively; or by tricks played with the patient's urine, &c. But that such things should be at all credited by grave and celebrated physicians, so lately as in the last (*i. e.* the 17th) century, and that these learned men should report such sorts of cures, and labour at the etiology of them, seems very surprising. Can we wonder at any charms, or ridiculous pranks played by the vulgar, after reading such things recorded by learned men, as curing the jaundice *per transplantationem*, which was to be done by the patient's pissing upon an ant-heap, or of the *cura sympathetica*, by giving to a hungry dog cake, made of the recent urine of the patient and wheat-meal? Or can we forbear astonishment to find the late famous Hoffmann, so few years ago, advising the powder of the elk's hoof and of a young hare cut out of the dam's belly, as remedies against the convulsions occasioned by these biliary calculi? Can we fail to be amazed that so great a practitioner could, upon any authority, be brought to imagine that one single dose of half a drachm of curcuma could ease the most violent pain, and expel calculi from the biliary duct and quite out of the body, within two hours? Should he not rather have concluded that the stones were actually passing the duct when that dose was given, and that some of them had passed it long before,

either by the efforts of nature, or by the help of the other remedies that had been used; and that the pain ceased, not from the virtue of the medicine, but because all the stones had by that time passed the duct, as they would doubtless have done if it had never been taken? The vulgar are apt to call every recovery a cure, and to impute it to the last thing taken as a medicine, especially if it was of their own prescribing, whether it has any virtue or not; and to overlook all the means used before, though they perhaps have been operating gradually, and have at length produced the effect which that last thing unjustly obtains the credit of. But surely a physician should judge better, and be very cautious of ascribing effects to inadequate causes, and much more to improbable and absurd ones."

THE UNIVERSITY OF CHICAGO
PHYSICS DEPARTMENT

REPORT OF THE
COMMISSIONERS OF THE
SOUTH AFRICAN
RAILWAYS
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APPENDIX.

In submitting the following Tables to the consideration of the profession, we proceed on the principle so well stated by Sir John Pringle, in reference to certain calculations introduced by him into his work on the Diseases of the Army. "The data are perhaps too few to deduce certain consequences from them, but, as I found no other which I could depend upon, I was obliged to make the best use of these, which, at least, will serve for a specimen of what may be done in this way upon further experience." From the zeal with which statistical knowledge of every kind is at present cultivated, we cannot but hope that more ample data for the illustration of several of the points to which these Tables relate, as well as of other analogous topics, will ere long be collected.

The four following Tables exhibit the Weight of the Liver in persons who died of different diseases and in different climates.

TABLE I.

Shews the Weight of the Liver in 132 persons who died in the Royal Infirmary of Edinburgh, whose bodies were examined, after death, by Dr John Reid, Pathological Clerk.

Weight.		Died in consequence of		Total.	
		Acute Diseases.	Chronic Diseases.		
lb. oz.	lb. oz.				
From 7,,0	to 6,,8	1	2	3 or 1 in 44. cases.	
6,,8	6,,0	...	3	3	... 44. ...
6,,0	5,,8	...	...	0	... ..
5,,8	5,,0	3	1	4	... 33. ...
5,,0	4,,8	2	5	7	... 19. ...
4,,8	4,,0	4	6	10	... 13.2 ...
4,,0	3,,8	14	7	21	... 6.3 ...
3,,8	3,,0	18	4	22	... 6. ...
3,,0	2,,8	16	14	30	... 4.4 ...
2,,8	2,,0	8	6	14	... 9.4 ...
2,,0	1,,8	3	2	5	... 26.4 ...
1,,8	1,,0	5	4	9	... 14.6 ...
1,,0	0,,10	4	...	4	... 33. ...
		78	54	132	... ..

TABLE II.

Shews the Weight of the Liver in the same persons, according to different periods of Life.

Period of Life.	Died in consequence of				TOTAL DISEASES.	
	ACUTE DISEASES.		CHRONIC DISEASES.		No.	Average Weight.
	No.	Average Weight.	No.	Average Weight.		
Years.		lb. oz.		lb. oz.		lb. oz.
From 70 to 60	4	2 14	...	...	4	2 14
60 ... 50	8	3 1	5	3 4	13	3 2
50 ... 40	16	3 6	7	3 13	23	3 8
40 ... 30	15	3 9	15	3 4	30	3 9
30 ... 20	15	3 10	18	3 13	33	3 12
20 ... 10	10	2 13	9	3 3	19	3 0
10 ... 1	10	1 1	...	...	10	1 1
	78	3 1	54	3 8	132	3 4

TABLE III.

Compiled from manuscript materials collected by Mr Marshall, while he was Staff-Surgeon at Kandy, shews the Weight of the Liver in 176 Soldiers of various races, dying in Ceylon; namely, Europeans 140, Indians 14, Malays 15, and Africans 7.

Weight.		Died in consequence of											Total.			
		Endem. Fever.	Dysentery.				Dysentery and Liver Diseases.			Other Diseases.						
			European.	European.	Indian.	Malay.	African.	European.	Indian.	Malay.	European.	Indian.		African.	Malay.	
From	lb. oz. 10,,0 to 6,,8	1	...	...	...	...	...	...	...	...	...	...	...	...	...	Cases. 1 or 1 in 176
...	6,,8 ... 6,,0	1	...	...	...	...	1	...	...	1	...	...	...	...	...	3 ... 1 ... 58
...	6,,0 ... 5,,8	1	2	...	...	...	...	...	...	...	...	...	...	...	...	3 ... 1 ... 58
...	5,,8 ... 5,,0	9	3	...	...	1	...	...	...	...	...	...	...	...	...	13 ... 1 ... 13
...	5,,0 ... 4,,8	26	12	...	...	1	3	...	...	1	...	...	...	...	...	43 ... 1 ... 4
...	4,,8 ... 4,,0	16	13	...	2	...	...	...	...	1	1	1	...	...	...	34 ... 1 ... 5
...	4,,0 ... 3,,8	14	15	1	...	...	1	...	3	1	1	1	1	...	...	38 ... 1 ... 4
...	3,,8 ... 3,,0	2	3	1	3	1	2	1	...	1	...	1	2	...	...	17 ... 1 ... 10
...	3,,0 ... 2,,8	1	3	1	1	1	1	...	...	1	1	1	1	...	...	12 ... 1 ... 14
...	2,,8 ... 2,,0	...	2	3	2	...	1	1	...	...	1	...	...	...	...	10 ... 1 ... 17
...	2,,0 ... 0,,0	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2 ... 1 ... 88
		71	53	8	8	3	10	2	3	6	4	4	4	...	...	176

TABLE IV.

Shews the Mean Weight of the Liver in the same persons.

Race.	Endemic Fever.		Dysentery.		Dysentery and Liver Disease.		All other Diseases.		Total.	
	No.	Average Weight.	No.	Average Weight.	No.	Average Weight.	No.	Average Weight.	No.	Average Weight.
European,	71	lb. oz. 4 10	53	lb. oz. 4 2	10	lb. oz. 4 2	6	lb. oz. 4 1	140	lb. oz. 4 6
Indian, .	...	...	8	2 8	2	2 12	4	3 4	14	2 12
Malay, .	...	...	8	3 3	3	3 12	4	3 7	15	3 6
African,	...	...	3	3 11	...	...	4	3 7	7	3 8

TABLE V.

Shewing the number of Admissions into Hospital, and Deaths by diseases of the Biliary Organs among the British Troops serving in the under-mentioned Stations. (Compiled from the Statistical Reports on the Sickness, &c. of the British Army.

	Period of observation.	Mean Strength.	Acute Hepatitis.			Chronic Hepatitis.			Jaundice.			Total Hepatitis and Jaundice.						
			Admitted into Hospital.	Died.	Proportion of deaths to admissions.	Admitted into Hospital.	Died.	Proportion of deaths to admissions.	Admitted into Hospital.	Died.	Proportion of deaths to admissions.	Admitted.	Ratio per 1000 of mean strength.	Died.	Admissions.	Deaths.	Ratio to admissions and deaths from all diseases.	
HOME STATION,	7½	44,611	117	6	1 in 19½	121	11	1 in 11	99	2	1 in 49½	337	19	1 in 17½	8	.4	1 in 123	1 in 33
MEDITERRANEAN,	19	60,260	331	7	1 in 47	257	11	1 in 23	171	4	1 in 43	759	22	1 in 34½	13	4.	1 in 76	1 in 58
	20	40,826	411	19	1 in 22	198	23	1 in 9	248	5	1 in 49	857	47	1 in 18	21	1.1	1 in 54	1 in 14
	20	70,293	600	24	1 in 25	344	31	1 in 11	224	3	1 in 81	1168	58	1 in 20	17	.8	1 in 72	1 in 29
	20	11,721	85	4	1 in 21	58	2	1 in 29	25	...	0 in 25	168	6	1 in 28	14	.5	1 in 91	1 in 56
NORTH AMERICA,	20	44,120	165	3	1 in 55	99	2	1 in 49½	120	5	1 in 24	384	10	1 in 38½	9	.2	1 in 94	1 in 64
	20	61,066	186	5	1 in 37	94	5	1 in 19	208	2	1 in 104	488	12	1 in 40½	8	.2	1 in 137	1 in 81
AFRICA,	18	1,843	9	3	1 in 3	137	8	1 in 17	4	...	0 in 4	150	11	1 in 14	82	6.	1 in 35	1 in 80
	6	5,908	102	10	1 in 10	63	14	1 in 4½	6	...	0 in 6	171	24	1 in 7	29	4.	1 in 25	1 in 6
	19	22,714	270	10	1 in 27	153	15	1 in 10	73	...	0 in 73	496	25	1 in 20	22	1.1	1 in 45	1 in 12
	19	30,515	1988	96	1 in 20½	469	23	1 in 20½	51	3	1 in 17	2508	122	1 in 20½	82	4.	1 in 15	1 in 6
WEST INDIES,	20	86,661	903	79	1 in 11	902	76	1 in 12	141	6	1 in 23	1946	161	1 in 12	22	1.8	1 in 84	1 in 42
	20	51,567	336	27	1 in 12	109	20	1 in 5½	94	4	1 in 23	539	51	1 in 11	10	1.	1 in 173	1 in 122
	20	535	4	1	1 in 4	...	...	...	1	...	0 in 1	5	1	1 in 5	9.3	1.8	1 in 153	1 in 107
	15	320	...	...	...	2	...	0 in 12	...	...	...	2	...	0 in 2	6.2	...	1 in 193	0 in 33
	16	33,536	1747	144	1 in 19	...	...	...	25	...	0 in 25	1772	144	1 in 12	53	4.3	...	...
	5	38,136	1892	119	1 in 16	440	52	1 in 8½	80	3	1 in 27	2412	174	1 in 14	63	4.6	...	...
	5	17,612	742	43	1 in 17	305	17	1 in 18	37	2	1 in 18½	1084	62	1 in 17½	62	3.5	...	...
	5	31,627	2795	154	1 in 18	509	35	1 in 14½	68	1	1 in 68	3372	190	1 in 17½	106	6.	...	...
EAST INDIES,	12	127,925	...	...	...	...	...	...	...	...	...	14,875	720	1 in 20½	116	5.62	...	...

* As respects these Stations, no distinction is made between Acute and Chronic Hepatitis.

TABLE VI.

Comparative View of the Mortality among White and Black Troops from Diseases of the Biliary Organs.

	Period of observation.	STRENGTH.		Ratio of Deaths from these Diseases, per 1000 of Mean Strength.	
		White Troops.	Black Troops.	White Troops.	Black Troops.
	Years.				
British Guiana,	20	17,689	3,300	1.	.3
Trinidad,	20	6,197	8,309	1.1	.8
Tobago,	20	3,402	2,101	2.	1.
Grenada,	20	6,267	1,899	4.5	1.
St Vincent's,	20	7,432	1,075	1.6	...
Barbadoes,	20	23,936	8,921	1.4	.9
St Lucia,	20	4,814	6,606	1.	.9
Dominica,	20	4,723	2,454	1.7	1.6
Antigua and Montserrat,	20	8,062	3,562	2.8	1.7
St Kitt's, Nevis, and } Tortola, }	20	5,800	1,426	2.2	.7
Jamaica,	30	51,567	5,729	1.	.4
Bahamas,	20	535	7,102	1.8	.1
Honduras,	15	320	4,356	...	.8
Western Africa,	18	4,843	7,581	6.	1.1
Cape of Good Hope, . . .	19 & 13	22,714	4,136	1.1	.5 Hottentots.
Mauritius,	19 & 12	30,315	1,395	4.	5.7
Madras,	12	127,925	769,872	5.62	.11 Natives.

TABLE VII.

Shewing the Number of Seizures (admissions) and Deaths by Inflammation of the Liver, occurring in seven years (1830 to 1836) in three Squadrons of the Royal Navy. Compiled from the Statistical Reports on the Health of the Navy.

Stations.	Total number of Cases.	Total Invalided.	Total Deaths.	Ratio attacked, per 1000 of Mean Strength.	Ratio Invalided, per 1000 of Mean Strength.	Ratio died, per 1000 of Mean Strength.
S. American Squadron, } W. Indian and } N. American Squadron, }	282	37 or 1 in 7.23 cases.	7 or 1 in 40.2 cases.	16.4	2.1	.4
Mediterranean } & Peninsular } Commands, }	353	94 or 1 in 3.71 cases.	5 or 1 in 70.3 cases.	15.	4.	.2
	403	25 or 1 in 16.3 cases.	12 or 1 in 33.7 cases.	7.2	.5	.2

TABLE VIII.

Shewing the results of the cases of Hepatitis, Liver Disease, and Jaundice, treated in the Hamburgh Hospital in 1824 and 1825.

Diseases.	Admissions.			Recoveries.			Deaths.			Remained.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Hepatitis, .	12	4	16	8	2	10	2	...	2	2	2	4
Liver Disease,	21	4	25	9	2	11	9	2	11	3	...	3
Jaundice, .	15	4	19	11	4	15	3	...	3	1	...	1
Total, .	48	12	60	28	8	36	14	2	16	6	2	8

TABLE IX.

Shewing Mortality occasioned by Diseases of the Biliary Organs, in the Royal Infirmary of Glasgow, during the years 1829, 1830, and 1831 (three years), and among the Patients treated at their own houses by the District-Surgeons of that City, from 1st August 1827 to 1st February 1832 (four and a half years).

		Cases.	Deaths.	Ratio of Deaths to Cases.	Ratio of Deaths to those from all Diseases.
Hepatitis,	Infirmary, ..	68	11	1 in $6\frac{2}{11}$	1 in $63\frac{2}{11}$
	District Surgeons,	341	15	1 in $22\frac{1}{2}$	1 in $57\frac{1}{2}$
	Both,	409	26	1 in $15\frac{1}{2}$	1 in $59\frac{2}{3}$
Jaundice,	Infirmary, ..	12	1	1 in 12	1 in 702
	District Surgeons,	46	2	1 in 23	1 in 427
	Both,	58	3	1 in $19\frac{1}{3}$	1 in $518\frac{2}{3}$
Hepatitis and Jaundice,	Both,	467	29	1 in $16\frac{3}{29}$	1 in $53\frac{1}{2}$

TABLE X.

Shewing the Admissions into Hospitals, and Deaths by Diseases of the Biliary Organs among the Troops serving in Scotland from 1816 to 1822 inclusive: their aggregate Mean Strength being 20,825. From Mr Marshall's Observations on the State of Health of the Troops in North Britain, &c.

	Admissions.	Deaths.	Proportion of Deaths to Admissions.	Ratio per 1000 of Mean Strength.		Ratio of Deaths to Deaths from all Diseases.
				Admissions.	Deaths.	
Acute Hepatitis,	47	5	1 in 17.4	2.2	.02	1 in 46
Chronic, &c., .	40			1.9		
Icterus,	38	...	0 in 38.	1.8	...	
Total,	125	5	1 in 25	6	.02	

TABLE XI.

Shewing the Admissions and Deaths, by Diseases of the Biliary Organs, in the Regimental Hospitals of the British Army in the Peninsula, from 21st Dec. 1811 to 20th June 1814. Compiled from Sir James Macgrigor's Sketch of the Medical History of the British Army in the Peninsula, &c. (Med. Chir. Trans. vi.)

Disease.	Admitted.	Died.	Ratio of Deaths to Admissions.	Ratio of Deaths to Deaths from all Diseases.
Hepatitis,	290	23	1 in 12.6	1 in 167
Icterus,	...	2	...	1 in 1920.5

TABLE XII.

Shewing the Deaths, by Diseases of the Biliary Organs, occurring in all the Hospitals, General and Regimental, of the British Army in the Peninsula, excluding French Prisoners, but including extra Patients, years 1812, 1813, and 1814.

Diseases.	Deaths.	Ratio of Deaths to Deaths from all Diseases.
Hepatitis, .	36	1 in 471.3
Icterus, . .	6	1 in 2828

The two following Tables, compiled from the Appendices to the First and Second Annual Reports of the Registrar-General, shew the actual and relative Mortality occasioned by Diseases of the Biliary Organs, in England and Wales.

TABLE XIII.

Of 148,701 Deaths registered from 1st July to 31st December 1837, (75,159 being of Males, and 73,542 of Females), 1909 were caused by diseases of the Biliary Organs; viz.—

	Males.	Females.	Total.	Deaths from all Diseases.
Hepatitis, . . .	91	92	183 or 1 in 812	
Jaundice, . . .	211	194	405 — 367	
Liver Disease, . .	716	605	1321 — 112	
Total,	1018 or 1 in 73	891 or 1 in 82	1909 or 1 in 77	
Deaths from all Diseases.				

TABLE XIV.

Of 342,529 Deaths registered in 1838 (175,044 of Males, and 167,485 of Females), 3880 were caused by Diseases of the Biliary Organs; viz.—

	Males.	Females.	Total.	Deaths from all Diseases.
Hepatitis, . . .	242	207	449 or 1 in 762	
Jaundice, . . .	405	436	841 — 407	
Liver Disease, . .	1432	1158	2590 — 132	
Total,	2079 or 1 in 84	1801 or 1 in 92	3880 or 1 in 88	
Deaths from all Diseases.				

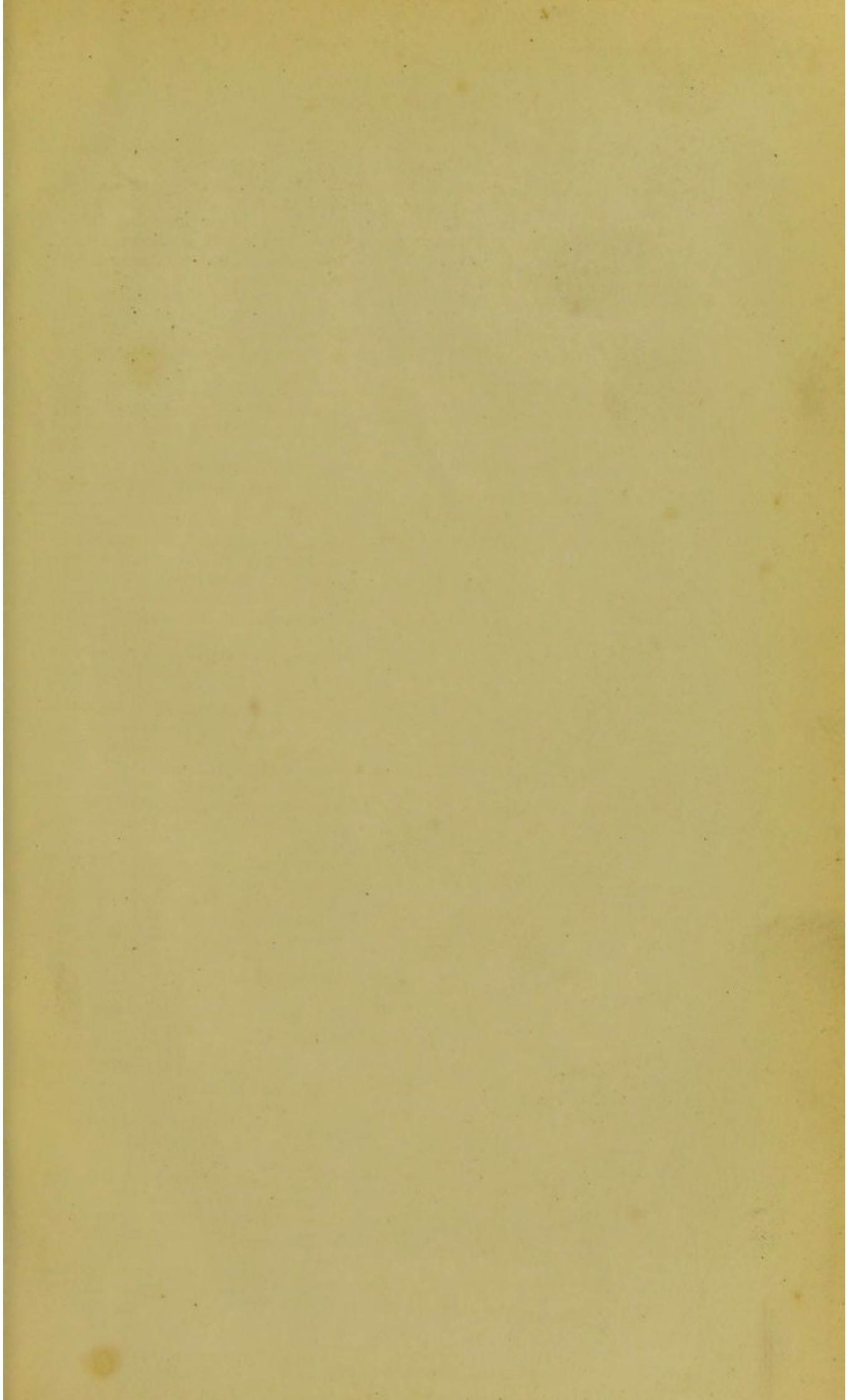
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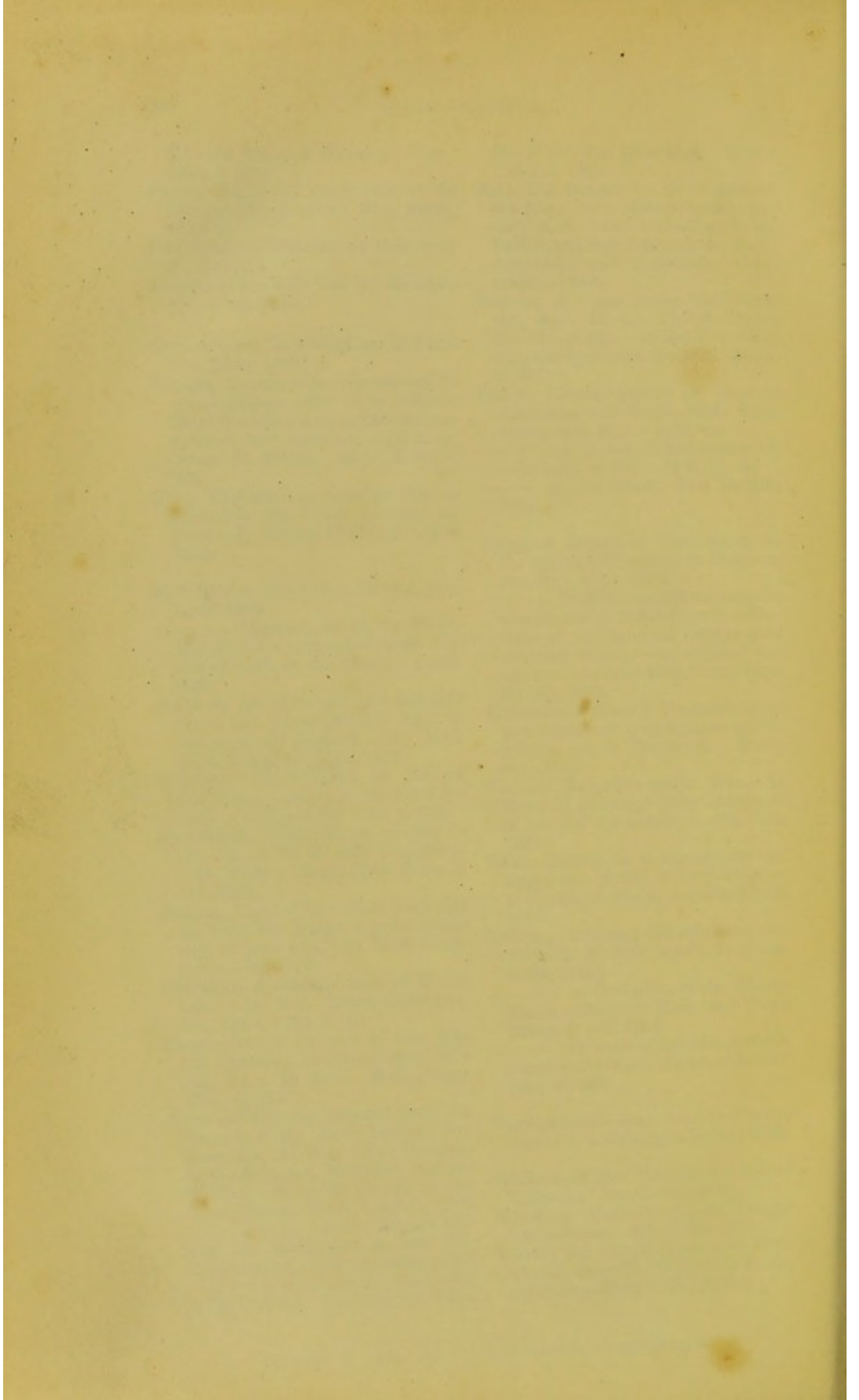
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