Hepatitis and hepatic abscess : their ætiology, diagnosis and treatment / by G. Harrison Younge.

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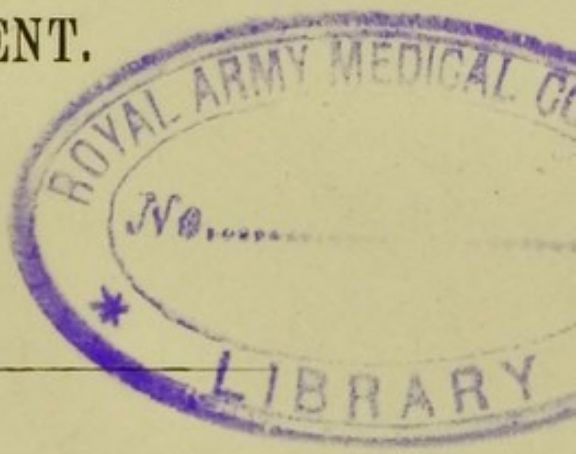

BY

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HEPATITIS AND HEPATIC ABSCESS.

In studying the literature of inflammation and abscess of the liver in the tropics, we cannot but be struck by our want of knowledge of these diseases, more especially with regard to their etiology. For instance it is stated that hepatic abscess may be caused by injury over the right hypochondrium; that it may occur as the result of septic absorption in dysenteric ulceration of the large intestine; and that it is of frequent occurrence in the tropics even when neither of the above conditions are present to account for it. No satisfactory explanation has, however, been given as to why inflammation and abscess of the liver occur more frequently in hot than in cold climates.

Some authorities state that these diseases are caused by long continued heat, while others believe that heat has little or no influence in their causation. Others again maintain that tropical diseases of the liver occur independently of heat and cold, being caused entirely by intemperance in food and drink. "Being occasionally associated with malarial fever, and frequently with dysentery, it is *supposed* that inflammation of the liver may be induced by the same causes as those diseases" (Macpherson). As yet, however, we are unacquainted with the exact cause, or causes, of dysentery. "If pre-existing ulceration of the intestine be rejected as a cause of

hepatic abscess, it is very doubtful whether any other cause can be assigned in its place" (Hilton Fagge.) "Finally, a considerable proportion of cases of hepatic abscess arise under unknown conditions." (Bartholow.)

And yet this subject is one of vast importance, for without definite knowledge as to the etiology of any disease we cannot, with any certainty of success, suggest means for its prevention.

A glance at the returns of the Sanitary Commissioner with the Government of India will show what a great saving, as regards both life and invaliding, might be effected if we could stamp out hepatic diseases amongst the European Army in India. Taking the ten years ending 1879 we find that the annual admission rate for hepatitis was 51·7 per 1,000 of strength; while the disease caused 16 per cent. of the total deaths, and 15·5 per cent. of the total invaliding. The admissions and deaths from hepatic abscess cannot be ascertained as they are not given separately, being apparently included under some general heading.

These and similar considerations led the writer, shortly after his arrival in India, to undertake a series of observations in the hope of discovering why and how residence in a tropical climate influenced the functions of the liver, and these observations were continued with little interruption for a period of five years. The results may be briefly stated as follows :—

During the first year an European spends in India the amount of work done by the liver is enormously increased. So great is the amount of bile passed that the stools are often black, almost resembling tar in appearance. During this time the bowels may be moved three or four times a day, the motions being copious and semi-fluid. In full-blooded persons attacks of biliousness, and of bilious diarrhœa, are frequent. These attacks are often followed by a marked sense of relief

and a feeling of increased vigour. Provided sufficient exercise is taken, and moderation in food and drink observed, this increased secretion continues throughout the first year's residence in India. While the action of the liver remains unimpaired, the health rarely suffers from exposure to the climate, and there is little susceptibility to the action of malaria. During the second and third year's residence, or sooner in intemperate persons and in those who are constitutionally predisposed to hepatic derangements, a marked change takes place. The liver acts in an irregular spasmodic way. After a period of profuse secretion, the hepatic cells appear to become exhausted. When this occurs the secretion is greatly diminished, in some cases almost suppressed.

The condition of an exhausted liver may be aptly compared to that of an eye, which has been overworked in looking at small objects. Under such circumstances the eye becomes irritable and unfit to perform its work. If at this time it is allowed a few days' rest it is quickly restored to health. If, however, the work is persevered with, acute congestion, followed probably by deep-seated mischief, or perhaps by loss of vision, becomes established. Unfortunately in the case of an exhausted liver we cannot insure rest as we could do in the case of an overworked eye. On this account hepatic exhaustion is usually followed by congestion. The two conditions, however, are quite distinct, although often associated.

In a well-marked case of hepatic exhaustion the symptoms are unmistakable. The patient becomes pale and sallow, and has a haggard appearance. The appetite is almost lost. There is often a marked feeling of hunger, accompanied by an indescribable sense of sinking at the epigastrium, but a few mouthfuls of food produce a sense of distention. Flatulence, accompanied by a cold crampy sensation at the pit of the stomach, is

often complained of, especially in the early morning. There is a feeling of uneasiness and distention over the right hypochondrium. The tongue is usually pale and flabby, and indented by the teeth. Shortly after meals there is a feeling of nausea, and this may be followed by vomiting. Morning sickness is often a troublesome symptom. The bowels are usually somewhat relaxed, and the motions are putty-coloured and offensive. There is a constant feeling of languor, which is increased after meals. There may be frequent attacks of vertigo and dimness of vision, and the sleep is heavy and unrefreshing. There are occasional chills, followed by a slight rise of temperature, varying from 1° to 3° Fahr. The head and hands feel hot and dry, and headache is usually present. The urine is hazy, and has a strong, unpleasant odour. It often deposits lithates on standing, and may contain a considerable amount of emulsified fat.

These symptoms, when fully developed, indicate a grave case of hepatic exhaustion. In such cases the condition of the liver quickly reacts on the whole digestive system. The portal circulation becomes obstructed, and this obstruction gives rise to congestion and catarrh of the stomach and intestines. We know that all tissues in a state of exhaustion have more or less completely lost their powers of resisting any injury or strain to which they may be exposed, and the liver does not form any exception to this rule. This diminished power of resistance is a point of great importance, and will be more fully referred to subsequently.

An important question now arises, viz., What are the causes of this excessive action of the liver in tropical climates? Sir Ranald Martin, Dr. Parkes, and most of the older writers, believed that it was due entirely to diminished activity on the part of the lungs. Dr. Parkes pointed out that the amount of oxygen in the air

varied inversely with the temperature. He found that at 80° Fahr. there was 9 per cent. less oxygen in the air than at 32° Fahr. In 1872 Surgeon Rattray, R.N., proved by careful observations that the number of respirations per minute were decreased 18 per cent. in the Tropics. Allowing for the diminished amount of oxygen and the lowered rate of respiration, Dr. De Chaumont calculated that the exhalation of carbonic acid by the lungs was diminished 25 per cent. We know that, next to the lungs, the liver is the chief organ concerned in the excretion of hydro-carbons, and we are therefore justified in concluding that this diminished action of the lungs throws more work on the liver.

The writer's observations, however, have convinced him that by far the most important cause of the increased action of the liver is the blood deterioration, which occurs as the result of prolonged exposure to great atmospheric heat. Dr. Lauder Brunton has proved, experimentally, that exposure to great heat accelerates tissue metabolism, and greatly increases the excretion of urea. More recently Mentzikoff has shown that even a short exposure to great heat causes a marked diminution in the vitality of the red blood corpuscles.

The truth of Mentzikoff's observations must be obvious to every physician who has observed the effects on Europeans of residence in a tropical climate. "Blood-degeneration is initiated in the system of Europeans from the very commencement of tropical residence." (Moore.) It is this blood-degeneration, with the attendant results to be immediately described, which gives rise to the sallow complexion, and profoundly anæmic appearance, seen in all Anglo-Indians towards the end of the hot weather.

For at least six months of the year Anglo-Indians are exposed to a temperature, which varies from 90° to 120° Fahr., in the shade. During the day they are

confined to darkened houses, being unable to take exercise until the cool of the evening. During the night their rest is broken and unrefreshing. While the hot weather lasts they live in what may be compared to a perpetual Turkish bath.

The continued exposure to a high temperature causes at first an increased tissue metabolism; and this is soon followed by diminished vitality, and then by greatly increased destruction of the red blood corpuscles. This increased destruction of blood corpuscles takes place independently of, but is much accelerated by, attacks of malarial fever. Thus, Marchiafava and Celli found that during attacks of ague large numbers of the blood corpuscles were killed outright. While these changes were taking place in the blood they found that the terminal branches of the hepatic artery were blocked up by the dead corpuscles and by their escaped pigments.

In well-marked cases the blocking of the arterioles was followed by commencing atrophy of the hepatic cells. Professor Kelsch has estimated the destruction of blood corpuscles during attacks of malarial fever as amounting to more than one million per cubic centimetre in twenty-four hours. As the result of his observations in India Surgeon R. H. Firth, Army Medical Staff, has calculated that, so great is the destruction of blood corpuscles during attacks of malarial fever, the increased combustion thus generated is sufficient to account for a rise of 2° or 3° Fahr. in the temperature.

Recent researches in physiology have shown that the liver is chiefly, or perhaps wholly, concerned in the removal from the system of effete blood corpuscles. It converts their albuminous elements into urea, and their colouring matter into the pigments of the bile and urine. Thus, in the tropics the liver is called upon to excrete a large amount of hydro-carbons, which would in temperate climates pass off by the lungs; while at the same time it

has to rid the system of the products of excessive blood destruction. It is this combined strain which causes hepatic exhaustion. The recent experiments of Dr. W. Hunter (*Lancet*, vol. ii, 1888) have thrown new light on this subject. By injecting pyrogallic acid, toluylen-diamin, and other substances into the blood he produced rapid destruction of the red corpuscles.

Amongst many other interesting results he found that this was quickly followed by derangement of the hepatic functions; and by an augmented flow of bile, which rapidly became increased in consistence, very viscid, and stagnated in the bile ducts. At the same time the liver and spleen became enlarged. In fact, Dr. W. Hunter had produced experimentally that condition of the liver, which the writer had described as always preceding hepatic exhaustion (*Indian Medical Gazette*, 1887-88).

Even in temperate climates long-continued exposure to artificial heat may cause hepatic exhaustion and abscess of the liver. This is occasionally seen in furnace-men, and others who are exposed to great heat in close ill-ventilated rooms. In the Pathological "Transactions," vol. iv, Dr. George Harley has recorded a case of large abscess of the liver occurring in a young woman, who had never been out of England, "in whom the only exciting cause seemed to be living in a close hot room in a damp situation."

Hepatic exhaustion having been excited other influences soon come into play. The obstruction to the portal circulation gives rise to congestion and catarrh of the stomach and intestines, and these in their turn produce derangement of digestion. Dr. Lauder Brunton has shown that during attacks of dyspepsia ptomaines are abundantly formed in the stomach and intestines; and that these being absorbed, produce a form of toxæmia. Thus, as the result of hepatic exhaustion we have conditions, which eminently favour the development of inflammation of the liver. The vitality of the hepatic

tissues is lowered; the liver is congested; its nutrient vessels are blocked by dead blood corpuscles; the blood within it is impure as it contains the unexcreted elements of the bile, together with ptomaines absorbed from the stomach and intestines; digestion is impaired; and the general health is below par.

Under these circumstances slight influences, which would have little or no effect on a healthy organ, are apt to excite a destructive form of inflammation of the liver. In India, owing to the cachetic condition of most of the European residents, all inflammations tend to assume an asthenic type, and to pass rapidly into suppuration. This tendency to suppuration is even more marked in the liver than in any other organ or tissue.

There is one point in regard to the geographical distribution of inflammation and abscess of the liver which has caused much discussion, viz., their comparative rarity in certain tropical countries, especially Hong Kong and the West Indies. If, however, we carefully study the climate of these regions we will find that it is quite different from that of India. The climate of Hong Kong and the West Indies is insular, and is not, therefore, subject to the great and sudden changes of temperature which occur in India. Instead of the intense heat and scorching winds, which prevail in India for a large part of the year, there are cool and refreshing sea breezes during the day, followed by comparatively cold nights. No exact analysis of the air of Hong Kong and the West Indies appears to have been made; but we are justified in concluding that oxygen and ozone are not lowered, or only to a trifling extent, in these insular climates. In the West Indies, also, malarial diseases are comparatively infrequent, and when they do occur are much less severe than in India. Personal habits have also their influence, and these are by no

means unimportant. Thus, owing to the cool breezes, the men can take much more exercise than in India, and can remain in the open air all day long if they feel so disposed. The water supply also is purer than in India, and the food and cooking are less stimulating.

There still remains to be considered what may be termed the individual predisposing causes of inflammation and abscess of the liver, and the most important of these is intemperance.

Dr. Morehead believed that intemperance did not predispose to inflammation or abscess of the liver, but this opinion is not in accordance with that of other writers on tropical diseases.

Out of 300 cases of abscess of the liver collected by Dr. Waring, 67·5 per cent. occurred in persons of intemperate habits. Professor Maclean states that, although all the invalids from India pass through Netley, cirrhosis of the liver is rarely or never seen amongst them; and from this he argues with justice that intemperate men must be carried off by other diseases, and chiefly by hepatitis and hepatic abscess. Surgeon-General H. H. Massy, Army Medical Staff, believes that intemperance is a powerful predisposing cause of disease of the liver, and he states that in India he has often seen cirrhosis and abscess of the liver co-existing.

Dr. Jules Rochaud has shown that hepatitis and hepatic abscess are comparatively rare in the Indian possessions of France; and he attributes this to the greater moderation, both in food and drink, observed by the French residents.

Taking the six years ending 1876 the total admissions in India for hepatitis were, amongst the men, 58·8 per 1,000, and amongst the women, 19·4 per 1,000 of strength. These figures show that European women, although exposed to the same climatic influences as the

men, are much less liable to hepatitis. I think we may fairly attribute this to their more abstemious habits.

In 258 cases of abscess of the liver collected by Rouis only eight occurred in women; and he ascribes this to the more temperate habits of women, and to the fact of their being less exposed to vicissitudes of weather than men.

The writer found that alcohol, when taken in moderation, had little effect on the secretion of the liver. When taken in any quantity, however, it caused an immediate and marked diminution in the secretion of bile; and this was quickly followed by symptoms of hepatic exhaustion. In cases of a single debauch the effects passed off quickly; usually with a critical discharge of bile, which often caused diarrhœa. If the excess was continued for some time signs of grave derangement of the hepatic functions occurred; and the patient lost appetite, became debilitated, and acquired an unhealthy greenish-sallow complexion. Beer, especially that manufactured in India, was the most injurious of all alcoholic drinks to the liver. Next to it came wines, especially sherry. Brandy and whisky, especially when taken with soda water, had least effect on the amount of bile excreted; while gin appeared to have a decided cholagogue action.

The excessive use of nitrogenous food is another important predisposing cause of diseases of the liver in the tropics. Drs. Parkes and Macnamara found that fatty degeneration of the liver quickly followed the excessive use of animal food in India; and that, when in this condition, the organ was predisposed to inflammation. Some French writers, indeed, have gone the length of maintaining that abscess of the liver is always, except in traumatic cases, the result of "fatty cirrhosis." It has always appeared to the writer that the dieting of European soldiers in India errs in two

very important points, viz., in that the amount of nitrogenous food is excessive during the hot season, and that the principal meal is taken during the intense heat of midday, when the stomach is least able to digest it. It would be almost impossible to alter the former, as any diminution of the meat ration would be strongly resented by the men; but the latter might easily be altered. A light meal might be given at midday, and dinner be issued in the cool of the evening.

In a recent work on "Inflammations of the Liver and their Sequelæ," Dr. George Harley states that "gluttony and intemperance" are the chief causes of hepatitis and hepatic abscess. He has been led to this conclusion by "the fact that the natives of hot climates, whose mode of life is entirely different from that of Europeans, are not one whit more liable to be affected with abscess of the liver than any man residing in Great Britain." When he made this statement Dr. Harley could scarcely have been aware that hepatitis and hepatic abscess caused 6·33 per cent. of the total deaths in the Native Army. "Gluttony and intemperance" undoubtedly increase the liability to inflammation and abscess of the liver; but that they are the only, or even the chief, causes of these diseases cannot for a moment be accepted. They act by increasing the amount of work to be done by the liver; thus intensifying the effects of climate, and hastening the advent of hepatic exhaustion. On the other hand, abstinence will not insure us against diseases of the liver in the tropics.

An interesting point has been noted by Surgeon-General H. H. Massy, Army Medical Staff, viz., that animals, which have been imported into India from a temperate climate, suffer severely from abscess of the liver. Dr. Massy found that about 10 per cent of these imported animals died from hepatic abscess, a

fact which proves that exposure to a tropical climate is alone sufficient to excite the disease.

The writer found that regular and sufficient exercise had a marked effect on the excretion of bile. It diminished the amount of bile in the stools, and rendered its excretion more regular. Hepatic exhaustion, biliousness, and bilious diarrhœa were comparatively rare in persons who took sufficient exercise. Unfortunately European soldiers in India rarely do so during the hot weather. They are compulsorily confined to barracks from 9 a.m. to 4 p.m., and after the latter hour they feel little inclination for exercise. Idleness acts in another way as it increases intemperance. The time that should be spent in exercise is too often passed in the canteen.

The late Dr. Johnson believed that prolonged exposure to the direct heat of the sun was occasionally the exciting cause of inflammation and abscess of the liver, even in persons previously quite healthy. The writer has seen several cases which support this opinion. He has also frequently noticed, as one of the earliest symptoms of an injurious action of the sun, a feeling of weight and tension in the right hypochondrium. In fatal cases of heatstroke the liver is almost invariably found much congested; while in many cases that recover acute congestion, and frequently hepatitis, occur as sequelæ. Schiff has described (Vol. xci, Virchow's Archiv) an hepatic centre just behind the vasomotor area on the floor of the fourth ventricle. Irritation of this centre causes congestion of the liver. Surgeon R. H. Firth, Army Medical Staff, has suggested that, possibly, hepatitis might be caused by abnormal stimulation of Schiff's centre as a result of the direct rays of the sun acting on the nape of the neck. This supposition is supported by the fact that Dr. Pavy was able to excite congestion of the liver and saccharine diabetes by experimental

irritation of the floor of the fourth ventricle. In cases of hepatitis following heat stroke it would be interesting to note whether the urine contained sugar or not. If sugar were present it would strongly support Surgeon Firth's supposition.

I have not been able to find any mention of scurvy as a predisposing cause of hepatitis or hepatic abscess. I am convinced, however, that a scorbutic taint renders the subject of it liable to both. It is not difficult to understand why this should be so, for one of the first pathological results of scurvy is a congested, enlarged, and softened liver. In this state extravasations into the substance of the liver may occur, and these extravasations may form the nuclei of abscesses. It may be thought that a scorbutic taint is uncommon in India; and that, therefore, it cannot materially increase the prevalence of liver diseases. Those, however, who have carefully watched men during the hot weather unfortunately know how frequent it is amongst them in spite of every precaution against it. Even with the greatest care a large proportion of the men will be found more or less scorbutic during the hot weather, for there is no disease more difficult to prevent in a tropical climate.

Of course, it never assumes the severe form seen at sea; but the patient's gums become spongy and readily bleed; and a cachectic condition is developed, which increases the tendency to low inflammatory affections and profuse suppuration.

I believe that chill is always the exciting cause of idiopathic hepatitis; and chill is especially dangerous when it occurs after violent exercise. After a short residence in India, the power of generating heat becomes greatly diminished. On this account changes of temperature, which would scarcely be felt in a temperate climate, become almost painful in the tropics. For the

same reason chills are particularly dangerous, as the system seems to have lost its power of reaction, and cannot rapidly recover from their effects. In the tropics chill mainly attacks the liver because there, as I have tried to show, there is a special predisposition to hepatic diseases. The liver, being the weakest point, usually gives way when any sudden strain is thrown on the system.

In the older works on diseases of the liver, much stress is laid on the connection between dysenteric ulceration of the large intestine and abscess of the liver. Owing principally to the teaching of Sir J. Annesley and Dr. Budd, it was at one time believed that all abscesses of the liver, which were not traumatic in origin, arose from absorption of septic matter from an ulcerated intestine. The length to which this idea was carried may be judged of by the fact that one author referred a large abscess of the liver to "a minute cicatrix in the bowel so small that it might easily have been overlooked." Even in the present day much stress is frequently laid on the connection between dysentery and hepatic abscess. It is, however, of great importance that we should fully recognise the fact that only a very small percentage of cases of abscess of the liver in the tropics is due to dysentery; and that we should fully appreciate the difference in the pathology of dysenteric and tropical abscesses. In the cases of hepatic abscess collected by Dr. Parkes, only 21·74 per cent. of the patients had previously suffered from dysentery. In 300 cases of hepatic abscess recorded by Dr. Waring, only 27 per cent. of the patients had had dysentery. Even these figures, I believe, place the proportion of dysenteric abscesses of the liver too high, for an abscess of the liver may be coincident with an attack of dysentery, and yet the diseases may have no etiological connection with one another. Sir Joseph Fayrer states that "liver abscess

and dysentery are often co-existent, as are liver abscess and remittent fever, and that one may follow closely or precede the other; yet the diseases are independent, though, doubtless, they aggravate each other." Indeed, when we consider that Europeans in India are constantly exposed to the causes of both these diseases, the wonder is that they do not oftener suffer from both at the same time.

It is now universally admitted that there is no tendency to hepatic abscess in the dysentery of temperate climates. The late Dr. Baly stated that, although dysentery was constantly present amongst the inmates of Millbank prison, he never found it complicated with inflammation or abscess of the liver. Dr. Abercrombie, who had a large experience of dysentery in Great Britain, only found the liver affected in one or two chronic cases. During the Crimean war, dysentery was one of the greatest scourges of the British army, yet Dr. Lyons, pathologist to the force, only records one case of abscess of the liver following dysentery. More recently, Niemeyer and Finger, in 311 autopsies on patients who had died of dysentery, did not find a single instance of abscess of the liver.

These, and many similar, facts render it certain that only a very small proportion of the cases of hepatic abscess seen in tropical countries are dysenteric in their origin.

Tropical and dysenteric abscesses of the liver differ entirely in their etiology and pathology. As has been previously stated, when hepatic exhaustion has been established, the terminal branches of the hepatic artery are more or less blocked by dead blood corpuscles. Under these circumstances, the vessels quickly lose their tone, and become dilated. The resulting pressure and impairment of nutrition soon affect the liver cells. The cells at first become œdematous, and then commence

to atrophy along their margins. If a person, whose liver is in this condition, is exposed to a sudden chill, the usual determination of blood takes place to internal organs; and the liver, being the weakest point, gives way. The weakened vessels dilate still further, exudation of leucocytes and liquor sanguinis occurs; and then follow all the other evidences of inflammation.

Why is it, however, that the inflammation is almost always localised? We can no more answer this question than we can explain why it is that the lower lobe of the lung should be so constantly involved in pneumonia. The writer is inclined to think that in hepatic exhaustion the atrophic changes in the cells are more marked at some particular spot than in the rest of the liver. When the general determination of blood occurs this part becomes infiltrated more quickly than the rest of the liver, and then acts as a kind of safety valve to the remainder of the organ. As the inflammation advances, the hepatic cells become opaque and swollen, and the effused leucocytes and liquor sanguinis coagulate, giving rise to the formation of plastic lymph within, and for a short distance round, the inflamed area. In favourable cases the inflammation subsides, and the plastic matter is absorbed. In other cases the inflammation subsides, but the exudation remains unabsorbed.

In the latter, attacks of inflammation recur, and the lymph finally breaks down, and liquefies from the centre. This liquefaction continues until all the lymph, except the outer layer, is converted into pus. The outer layer remains intact, forming a more or less thick sac, which shuts off the pus from the surrounding healthy structures. In some cases the density of the sac gradually increases until the abscess is completely encysted. The first attack of inflammation may, of course, be followed by suppuration; but as a rule it is only after two or more attacks that an abscess is formed.

On the other hand, in dysenteric abscesses, a septic poison is absorbed from the intestines, and is carried to the liver by the venæ portæ. There it gives rise to infective thrombi. At each point where a thrombus forms a true necrosis of the hepatic tissues occurs. The necrosed tissues, which vary in size from a pea to a walnut, rapidly break down and form small abscesses. These may vary in number from three or four to many hundreds. They contain only the *débris* of the dead hepatic tissues mingled with a little lymph and a few leucocytes. Klebs and Birch-Hirschfield have found masses of the micrococcus septicus at the points of infection in the venæ portæ.

In these cases the tissues are so rapidly destroyed that there is not time for the formation of plastic lymph, consequently no lining membrane is formed. If we carefully examine a recent dysenteric abscess we find that the pus is limited only by the liver substance, which for a short distance round the abscess presents a circle of intense congestion. In cases in which the patient has survived for some time, the irritation set up by the purulent matter may cause some effusion of lymph into the hepatic tissues immediately surrounding the abscess, but this never assumes the firm uniform appearance seen in cases of tropical abscess. Another point of great importance is that in abscesses of the liver, which are secondary to dysentery, we will always find the walls of the venæ portæ presenting more or less well-marked evidence of septic inflammation.

Occasionally we find the two forms of hepatic abscess co-existing. When this happens the difference in their morbid anatomy is strikingly seen, as we are able to compare them with one another in the same liver.

We may thus sum up the chief differences between dysenteric and tropical abscesses of the liver. Dysenteric abscesses are the result of purulent phlebitis, excited by

the lodgement of septic thrombi. They are small, usually numerous, and are connected with the branches of the venæ portæ. They are always fatal, and no operative interference is justifiable. Tropical abscesses are large, usually single, and occur in connection with the branches of the hepatic artery. They are due to the breaking down of a comparatively healthy inflammatory effusion, and an early operation is necessary, and is frequently successful.

In his work on "Practice of Medicine," the late Dr. Hilton Fagge states that "In India the current opinion at present would appear to be that dysentery and abscess of the liver are really common results of the same cause. It is supposed that the inflammation extends along the mucous membrane of the alimentary canal to the largest gland that opens into it, just as it does from the urethra to the testes in cases of gonorrhœa." This theory is very ingenious, but it is not now tenable. We have already seen that only a very small proportion of cases of hepatic abscess occur in persons who have had dysentery. Moreover, since the general introduction of the present treatment for dysentery the small intestine is rarely, if ever, found diseased, so that the inflammation could not extend to the liver in the way in which Dr. Fagge supposes. If it were possible for inflammation to extend along the small intestine, it would be as likely to affect the pancreas as the liver; but the former gland is never found affected in dysentery.

There is rarely any difficulty experienced in the diagnosis of hepatitis, as the symptoms are usually well-marked and characteristic; but the case is often far otherwise when an abscess has formed. "The insidious nature of hepatic abscess, and the obscurity which not unfrequently characterises the attendant symptoms, should always be borne in mind. . . . The amount of constitutional disturbance is so small in some instances

as hardly to attract the notice of the patient himself" (Waring). As in other situations, abscesses of the liver have been divided into acute and chronic, and this classification is one of much practical value, and should always be borne in mind. The diagnosis of an acute abscess is comparatively easy, that of a chronic abscess is always difficult, and not infrequently impossible. If careful inquiry is made I believe it will invariably be found that attacks of hepatitis have been preceded by the symptoms of hepatic exhaustion, as already described. After those symptoms have lasted for some time the patient is perhaps exposed to a chill, and this exposure is quickly followed by a sense of pain and tenderness over the liver, which may vary from slight uneasiness to the most exquisite suffering.

In cases in which the pain is at first slight it usually becomes aggravated about the fourth or fifth day. Professor Boyes Smith, of the Army Medical School, lays great stress on the position of the pain in the diagnosis between acute tropical congestion of the liver and acute hepatitis. Dr. Smith states that in acute congestion the pain is referred to a circular spot midway between the ensiform cartilage and umbilicus, and about one inch to the right of the mesial line; while in hepatitis the pain and tenderness are situated along the free edge of the liver. In some rare cases the pain is alone complained of in the right iliac fossa, and the writer has seen two cases of this kind which were at first diagnosed as typhlitis. Frequently the pain is referred to the right shoulder. This has often been dwelt on as an important symptom of hepatitis and hepatic abscess. It is, however, often absent; and further, a similar pain in the shoulder may be present in several other diseases. In 300 cases of abscess of the liver recorded by Waring, pain in the shoulder was only present in 50 per cent. of them.

In some obscure cases, however, it may be the only

symptom present, so that its existence should always put us on our guard. For the first two or three days there is usually some febrile disturbance, but in cases that do well this subsides quickly. In some cases of hepatitis febrile symptoms are entirely absent. In a few there is a high temperature throughout the attack, but these are probably cases of malarial fever complicated with hepatitis, and they usually terminate in suppuration.

During this time the appetite is lost, and the bowels are usually constipated. The tongue is covered with a pale fur on the dorsum, but the tip and edges are red and the papillæ prominent. In appearance it closely resembles the "strawberry tongue" of scarlatina. The urine is scanty and high-coloured, and, according to Dr. Parkes, contains more urea than in any other acute disease.

In hepatitis there is rarely any marked increase in the area of hepatic dulness. In a large proportion of cases the liver dulness is normal. Even when enlargement is present it is much less marked than in acute congestion of the liver. This is due to the fact that in hepatitis the morbid changes are circumscribed, and only involve the terminal branches of the hepatic artery; while in acute congestion the entire liver is affected, and all the portal vessels are engorged. With rest and proper treatment hepatitis usually ends in resolution.

In some cases, however, all treatment fails, and suppuration takes place. When this occurs the symptoms undergo a change. The pain usually subsides, but the patient complains of a feeling of fulness and tension in the right hypochondrium. This subsidence of pain *without any improvement in the other symptoms, and coincident with a rise of temperature*, is almost a certain sign of the formation of an acute hepatic abscess. Too much stress cannot be laid on the temperature as a means

of diagnosis. When pus begins to form it rises, but not to any great height, rarely exceeding 102° or 102·5° Fahr. The peculiarity of the temperature is its great irregularity. As a rule the maximum is reached in the evening, but it sometimes occurs in morning or at mid-day. For a few days the temperature may be intermittent, and then this may be succeeded by a remittent or continued temperature, so that the appearance of the chart is constantly varying. In this respect it differs entirely from the periodicity of malaria, which engrafts itself on most other diseases in India. In some cases of hepatic abscess, however, the temperature is intermittent throughout, but this is very exceptional in acute abscesses. An important sign is that quinine, even in large doses, has no effect on the temperature. Indeed, in many cases the temperature even increases under quinine, and the drug appears to have an injurious effect. The writer, also, has constantly had reason to observe the truth of Professor Maclean's statement that, when congestion of the liver occurs during attacks of malarial fever, quinine loses its effect, and that the congestion must be removed before the fever will yield to the treatment.

As soon as pus begins to form, the appearance of the tongue changes. From the red, rather irritable appearance seen in hepatitis it becomes large and flabby and covered with a thick, grey, muddy looking fur. Dr. Maclean and Sir Joseph Fayrer lay great stress on frequent and persistent vomiting as a symptom of abscess of the liver. They believe that it is rarely absent, and that it is due to irritation of the terminal branches of the pneumogastric nerve. Nausea and vomiting were present in 86·5 per cent. of Waring's cases. The vomited matters usually contain much viscid mucus stained with bile. In the writer's experience nausea and vomiting are never absent in acute abscesses of the liver, but they

are frequently so in chronic abscesses. Diarrhœa is a very common symptom, and the stools usually contain large quantities of dark inspissated bile.

"The decubitus of patients affected with hepatic abscess is often extremely characteristic. To obviate pressure on the swollen and inflamed organ the position assumed is right lateral-dorsal, the body being inclined to the right, the right thigh flexed on the pelvis, the spinal column so curved as to relax the abdominal muscles of the right side. When the pain and tenderness are not great there may be frequent changes of position, but in repose the lateral-dorsal decubitus is assumed. . . . . If pressure interferes with the normal play of the lungs, and dyspnœa is produced on assuming the recumbent posture, the attitude takes this expression also; then the decubitus is lateral, and partly dorsal, but the body is raised to a half upright. There are many exceptions to these rules. Some lie easier on the back, some on the left side, but it is quite certain that much the largest number, when uninfluenced by special circumstances, place themselves as above described." (Bartholow.)

In acute hepatitis passing on to abscess the decubitus is always lateral-dorsal; but in a large proportion of the cases of chronic abscess of the liver there is nothing peculiar in the position assumed by the patient.

A sense of burning of the hands and feet, alternating with a feeling of clamminess, is often complained of. Sir William Aitken describes a reddish mottling of the palms of the hands and soles of the feet as frequently seen in hepatic abscess. Jaundice is rarely, if ever, present; but the face has usually a peculiar muddy parchment-like colour.

When an abscess is situated in the upper thick edge of the liver a frequent dry cough is always present. In these cases, also, the "hepatic compression rhonchus,"

described by Dr. Walshe, is often marked. This is due to the enlarged liver compressing the thin edge of the lung, and so condensing it as to give rise to loss of resonance, increased vocal fremitus, and tubular breathing. It is important that this condition should be borne in mind, as otherwise the physical signs may lead to a diagnosis of primary pneumonia, and thus divert attention from the liver. Rigors are often spoken of as an important symptom of abscess of the liver; but they are very rarely present in acute cases. There may be frequent chills, but these are of little diagnostic value.

When an acute abscess has formed the characters of the urine change completely. In hepatitis it is scanty, high-coloured, and contains a large amount of urea. When pus has formed it becomes pale and abundant, and, according to Dr. Parkes, the amount of urea excreted is greatly diminished. Dr. Parkes' observations appear to prove that the diminution of urea is in direct proportion to the extent of hepatic tissue destroyed.

When an abscess has formed the physical signs undergo a change. The area of hepatic dulness steadily enlarges. The enlargement usually takes place downwards. In some cases the dulness increases both upwards and downwards, and in a small number only upwards.

In the latter cases the pus is, probably, always situated between the opposing surfaces of the liver and diaphragm. When an abscess points upwards the normal outline of hepatic dulness is altered. In a healthy liver the dulness is convex upwards, the highest point being at the mammary line. If an abscess points between the mammary and anterior axillary lines this convexity will be greatly increased, and may extend as high as the nipple. When an abscess points either in front of, or behind, these lines, the outline of dulness becomes horizontal, or if the abscess is large it may even be concave. The

irritation caused by the pus often excites inflammation of the pleura covering the diaphragm. When this occurs, a distinct friction sound is heard, and there may be œgophony over the attachments of the diaphragm. In the diagnosis of these cases great care is necessary to distinguish them from primary diaphragmatic pleurisy.

During the initial stage of hepatitis the respiratory movements on the right side are limited, owing to the pain caused by full inspiration. If, however, the patient is persuaded to take a full breath the liver descends freely. When an abscess has formed, not only are the movements of the right side limited, but the liver does not descend on forced inspiration. As the hepatic dulness increases the right side becomes perceptibly enlarged. When the abscess is in the thin edge of the liver this can easily be felt below the costal arch, and it communicates a sensation of dense elastic resistance to the hand.

When it is situated deeply below the ribs the intercostal spaces bulge, becoming distinctly convex outwards. Percussion over the bulging intercostals gives a sensation of marked resistance to the finger. When examining a patient for enlargement of the side and bulging of the intercostals it is best to do so from a distance, as from the foot of the bed. From this position an enlargement, which would probably escape notice if examined in the ordinary way, will often be detected. Careful measurements are of course necessary to determine the exact degree of enlargement present. In doing this it should not be forgotten that the right side is naturally a little larger than the left. Tension of the right rectus muscle has been described as an important sign of hepatic abscess. It is of little value, however, as it is present in all painful diseases of the liver. Fluctuation is rarely detected in an acute abscess, and then only when the pus has been allowed to burrow extensively. A friction sound may be heard on auscultation over an acute

abscess, but it is not nearly as frequent as in chronic ones. Dr. P. Manson has described an emphysematous crackling as felt and heard over an abscess of the liver, and he attributes it to generation of gas within the abscess cavity, owing to decomposition of its contents. The writer has never detected this sign, and is strongly inclined to doubt its existence.

Chronic hepatic abscess is rarely seen, except in natives or in Europeans whose constitutions are greatly undermined by prolonged residence in a tropical climate. In such subjects the formation of an hepatic abscess gives rise to little constitutional disturbance.

Occasionally a large part, or even the whole, of the liver may be destroyed without giving rise to any symptoms whatever, and the disease may remain unsuspected until sudden death occurs from rupture of the sac of the abscess. The importance of these cases has been especially dwelt on by Sir Ranald Martin and Professor Maclean.

In the majority of cases there are general malaise, with languor and inability for exertion. The appetite fails, and there is a tendency to chronic diarrhœa. There are frequent chills, and in many cases distinct rigors, followed by sweating. A steady, progressive loss of flesh occurs in most cases. One of the most frequent symptoms is a constant dry, hacking cough. The face has a peculiar haggard anxious expression, the complexion is muddy and parchment-like, and the conjunctivæ are often of a greenish-yellow colour. A careful study of the temperature is of great importance in the diagnosis. It rarely exceeds 102° Fahr., and its course is very irregular. The morning temperature may be normal, or even subnormal, or it may exceed that reached in the evening. This constant variation in the temperature should always excite suspicion.

The symptoms of chronic hepatic abscess often closely

resemble those of phthisis, and when there are symptoms which would suggest the latter disease the liver should be carefully examined. In the absence of any physical signs of phthisis, hectic fever and progressive emaciation point strongly to chronic hepatic abscess. Pain is never marked, and is often entirely absent. Usually the most that is complained of is a sense of dragging in the right hypochondrium.

Towards the end chronic dysenteric diarrhœa, due to hectic fever, frequently sets in; and, as pointed out by Morehead, this is probably the reason why abscess of the liver has been so often attributed to dysentery. He thinks it probable that the latter disease has been looked upon as the cause of, instead of being due to, the hepatic mischief.

In chronic abscess of the liver the physical signs are often very obscure. In a few cases the area of hepatic dulness is markedly increased; in the majority the increase is slight, but distinctly perceptible; while in some cases the area of dulness is quite normal. In the earlier stages of the disease the enlargement is irregular, consisting of a bulging of some particular part of the liver, the surface of which is quite smooth to the touch. As the disease extends, and so involves more and more of the liver, the enlargement tends to become uniform.

As a chronic hepatic abscess is most frequently situated in the thick edge of the liver, just below the diaphragm, encroachment on the lungs occurs oftener than in acute abscess. In the former also fluctuation is much oftener obtained than in the latter. Even when the abscess is too deeply situated to give distinct fluctuation there is often a peculiar doughy sensation felt on palpation, which is very suggestive. Bulging of the intercostal spaces is generally present, but there is rarely any perceptible pointing. The respiratory movements are limited on the right side, but not to the same extent

as in cases of acute abscess. The liver is fixed, and does not descend on full inspiration. When a chronic abscess approaches the surface there may be a sudden accession of acute pain, followed by a marked rise of temperature. It is very important that these symptoms should not be mistaken for the onset of acute primary hepatitis. They are due to the development of secondary perihepatitis. The pain is of a stabbing character, and may be accompanied by a friction sound similar to that heard in pleurisy, but situated much lower.

Chronic hepatic abscess frequently causes secondary inflammation of the lower lobe of the right lung, and the case may then be mistaken for one of primary pneumonia. In such cases, however, the symptoms are those of a wasting disease, accompanied by hectic, and on physical examination the breath sounds are not heard as low as they ought to be, the lung being pushed upwards by the enlarged liver. And further, the intercostal spaces corresponding to the upper margin of the liver bulge outwards, a condition which is never seen in primary pneumonia.

The chief diagnostic symptoms of hepatic abscess may be summed up as follows:—When after an attack of acute hepatitis the pain subsides, while the temperature rises and becomes irregular, the hepatic dulness steadily increases, and the liver feels unusually resistant to the touch, the intercostal spaces become convex outwards, the urine changes in appearance, becoming pale and abundant, and the tongue becomes covered with a thick dirty grey fur, an acute abscess of the liver may be diagnosed with certainty. In some cases of acute abscess the only symptom present is an elevated and irregular temperature. If the temperature continues high, and is unaffected by quinine, after the symptoms of hepatitis have subsided it is sufficient to justify a strong suspicion of hepatic abscess.

A chronic abscess of the liver occasionally becomes encysted. When this happens the disease may remain unsuspected for years. In most cases of chronic abscess, however, there are loss of appetite, progressive emaciation, increased temperature with hectic, a dry hacking cough, enlargement of the liver, bulging of the intercostal spaces, and perhaps fluctuation. In tropical climates hepatic abscess should be suspected in all cases of obscure ill-health, and the liver should be carefully and repeatedly examined. In the absence of physical signs of phthisis progressive emaciation and hectic fever are probably due to a chronic abscess of the liver.

Much difference of opinion exists as to the course to be pursued when an abscess of the liver is suspected. I believe that it is our duty to at once explore the liver freely. Many of the older authorities condemn exploration as dangerous and unjustifiable. If, however, the operation is performed antiseptically the risks are almost nil; while the advantages to be derived from an early detection of pus, when it exists, are very great. In making exploratory punctures I use the largest-sized needle of an aspirator in the following way. The needle is placed in a strong solution of carbolic acid (1 in 20). The skin is punctured with a lancet over the point where the greatest tension is felt on palpation. The needle is then taken up, the thumb of the right hand being placed over the thick end while it is still in the lotion. If this is carefully done the needle remains full of carbolic lotion. It is then driven into the liver to the necessary depth, the thumb not being removed from its thick end until this is effected.

As the etiology of inflammation and abscess of the liver has been fully considered, only a few remarks are necessary regarding their preventive treatment. Exposure to great heat being the chief predisposing cause, the only safe preventive is removal to a cooler climate when

the symptoms of hepatic exhaustion show themselves. There is a general and well-founded impression that the climate of the Indian hills is unsuitable for patients who are suffering from any organic disease of the liver. In hepatic exhaustion, however, change to a hill climate will usually at once remove the symptoms. When change to a cooler climate is impossible we can only insist on the absolute necessity of moderation in food and drink, and the importance of taking a sufficient amount of exercise daily. A scorbutic taint should be looked for; and, if present, should be carefully treated.

Sudden changes of temperature, such as occur at the commencement and end of the hot season in India, should be carefully guarded against. The occasional use of the following pill often gives much relief: ℞. Calomel, gr. ij; pulv. ipecac., gr. j; ext. taraxaci, q. s. When this has acted fully on the liver, quinine in gr. ij or gr. iij doses thrice daily, is perhaps the most useful remedy we possess. It appears to act by increasing the powers of resistance, and thereby diminishing the destruction, of the blood corpuscles.

Nitrohydrochloric, taken just before meals with a little angustura bitters, is also a useful remedy.

When hepatitis has supervened a large blister should be applied over the point of greatest tenderness. A blister relieves the pain more quickly than any other form of local application; and at the same time it appears to have a decided effect in checking the exudation of plastic lymph, an action which is greatly to be desired. When diffuse tenderness remains after the blister has risen it is best removed by large linseed poultices applied over the entire hypochondric region. The bowels should be freely opened, the best purgatives being calomel or podophyllin with compound colocynth pill. When the bowels have acted freely from gr. x to gr. xx of powdered ipecacuanha should be given, as first recommended by

Surgeon-General Maclean. In hepatitis this should not be preceded by a dose of opium, as is often recommended, as opium checks the action of ipecacuanha on the liver. The previous application of a blister over the hepatic region usually prevents nausea or vomiting; but if vomiting should occur it usually ceases on the application of a mustard plaster to the epigastrium, or on the administration of a few minims of chloroform suspended in mucilage. A hot bath is also very useful as it re-establishes the action of the skin, which is always checked in hepatitis, and thus lessens the internal congestion. When a hot bath is given great care is necessary to prevent after-chill.

Half the dose of ipecacuanha should be repeated morning and evening for forty-eight hours. If, after that time, the symptoms have not abated we may conclude that ipecacuanha has failed, and we should then adopt some other treatment.

Surgeon-Major Cutcliffe has strongly recommended the following: R. Antimon. tart., gr. j; potass nitrat., ℥ij; to be divided into eight powders, and one to be taken every third hour until the pain is relieved. When acute hepatitis occurs in strong plethoric Europeans this treatment is even more successful than that by ipecacuanha; but it should be avoided in patients who are anæmic and debilitated from long residence in the tropics.

Since 1870, when Surgeon-General W. Stewart, Army Medical Staff, first drew the attention of the profession to the use of chloride of ammonium in hepatitis, this medicine has been much used in India, and with marked success. It acts by increasing the secretions of the skin, bowels, and kidneys; thus purifying the blood, and diminishing the strain on the liver. When the skin is hot and dry Dr. Stewart recommends that diaphoretics should be given before the chloride of ammonium is commenced. As the remedy is non-depressing it is more

suitable to the treatment of asthenic cases than ipecacuanha or Cutcliffe's powders. Care should be taken in the selection of the medicine, as a large amount of the chloride of ammonium supplied in India is quite inert.

When hepatitis occurs in plethoric and intemperate subjects, who suffer from constipation, the ordinary hospital white mixture is very useful. It should be given so as to keep up a free action of the bowels for two or three days, when the symptoms will often subside. This treatment, however, should not be prescribed during the rainy season, or when cholera is prevalent.

When the acute symptoms of hepatitis have subsided tenderness with slight enlargement of the liver may remain for some time. When this happens I have found the following mixture of the greatest use, R. Tinct. iodi, ℥ss; potass iodidi, ℥ss; aquam ad., ℥vj; one ounce to be taken three times a day. In a few cases where there were tenderness and enlargement of the liver with an irregular temperature and night sweating, leading me to strongly suspect the existence of a small abscess, the symptoms entirely disappeared under the use of the above mixture. While the iodine mixture is being taken much benefit will be derived from the application over the hepatic region of a compress wrung out of nitro-hydrochloric acid solution.

In some cases of hepatitis all medicinal treatment fails, and it becomes evident that unless relief is quickly obtained suppuration will ensue. In such cases as these Professor Maclean long ago recommended in his lectures at Netley a form of treatment which he described under the term "preventive aspiration." The operation consists in introducing a medium-sized aspirating needle into the liver at the point where the greatest tension or tenderness is felt on palpation, and drawing off a couple of ounces of blood. In this way blood is removed directly from the inflamed tissues; and immediate, and

often permanent, relief follows. During 1883-84-85, acting on the recommendation of Professor Maclean, Surgeon S. J. Rennie, Army Medical Staff, and the writer adopted this treatment in a considerable number of cases, and found that it was practically free from risk, and gave excellent results. Under the term "hepatic phlebotomy" Dr. George Harley recently recommended puncture in acute congestion of the liver, and claimed the credit of having introduced this treatment. (*British Medical Journal*, vol. ii., 1886.) The only thing that is new in the operation, however, is the name.

In some cases of hepatitis all treatment fails, and suppuration occurs. When this happens we should at once decide on our line of treatment, as delay may be fatal to the patient, and always diminishes his chances of recovery.

Previous to the introduction of antiseptic surgery operations on cases of hepatic abscess were so unsuccessful that Sir R. Martin, Morehead, Maclean, and others strongly condemned interference. They stated that an abscess of the liver should not be opened until distinct pointing, and redness of the skin, showed that it was about to burst of its own accord. And further, that when an abscess tended to open into the lungs or intestines it should be allowed to do so, as these routes were more favourable for its evacuation than externally. Dr. Budd went even further than this. He stated that an abscess of the liver which pointed externally should be allowed to burst, as then slow inflammation caused adhesion between the two layers of the peritoneum, and shut off the peritoneal cavity from contamination; while the pus escaped slowly through a small opening, thus preventing the entrance of air into the abscess cavity.

In 1850 Dr. Malcolmson, of Madras, recommended early operations, as he believed that the gangrene, which so often followed the opening of an hepatic abscess, was

due to the great undermining of the tissues, caused by long pent up pus. Early operations were also practised by Inspectors-General Murray and Cameron, of the Army Medical Staff. In the *Lancet* for 1863 Dr. Cameron described his method of operating. In cases where an abscess was suspected he explored the liver with a small trochar. If pus was found he passed a large trochar and cannula into the abscess, and fully evacuated its contents. The trochar was then withdrawn and the cannula tied in, its orifice being covered with tow. Over this large linseed meal poultices were applied for four or five days. The cannula was then removed, and some simple dressing applied. The wound was allowed to heal gradually, great care being taken to keep the parts clean. Dr. Graves also opened hepatic abscesses, but he preferred to do so gradually with potassæ fusæ.

After the introduction of the aspirator this instrument was extensively used in the treatment of hepatic abscess. Recent experience has, however, shown that aspiration is by no means a successful mode of treatment; and that, moreover, it is attended by very serious risks.

The latest statistics on this subject have been collected by Surgeon-Major A. Tomes, of the Indian Medical Service. (*Indian Medical Gazette*, 1884.) From these it appears that the cases treated by aspiration gave only 24·1 per cent. of recoveries, as against 68·4 per cent. of recoveries after incision and free drainage. Even when recovery follows aspiration it is usually only after the health has been entirely undermined by repeated operations and long-continued suppuration. Nor is this surprising when we consider the anatomical structure and relations of the liver. Its tissues are dense and inelastic, and it is firmly attached to the surrounding parts by its various ligaments. It follows that if we rapidly draw off the contents of an hepatic abscess under

the high pressure of an aspirator the abscess walls cannot collapse. This leads to the establishment of a vacuum, which must be filled in one of two ways. Either air enters through the puncture or blood is effused from the sac of the abscess. In either case the result is unfortunate. In the former fermentation of the contents of the abscess, and probably pyæmia, will follow. In the latter suppuration will be greatly increased, the hepatic tissue breaking down with a rapidity that is astonishing. The writer's experience leads him to believe that aspiration is only applicable to cases of large chronic abscesses. In India we occasionally meet with large chronic abscesses of the liver in persons whose constitutions have been completely undermined by long continued residence in the country. In these cases there is such lowering of the vital powers that any cutting operation, or even complete emptying of the sac of the abscess, would almost inevitably prove fatal. Here occasional *small* aspirations afford the best chance of success. According to the size of the abscess we may at each operation draw off from eight to sixteen ounces of pus. In this way tension is relieved, and as the abscess is only partially emptied, the dangers of air entering, or of hæmorrhage taking place from, the sac are avoided. During each operation antiseptics should be carefully used. The patient's strength should be supported in every way, fluid nourishment and stimulants being freely given. In successful cases the sac of the abscess gradually contracts, and at the same time lymph is effused from its inner surface. When the general health has improved, and the abscess cavity has somewhat contracted, it may usually be cut into and a drainage tube inserted. When this can be done it will greatly facilitate the cure. Even when the above treatment is not ultimately successful it will prolong life, and greatly lessen the patient's suffering.

In acute abscesses of the liver aspiration is rarely,

if ever, successful. Not infrequently it is absolutely injurious, the abscess increasing more quickly after the operation than it would have done had it been allowed to remain untouched. The writer has, therefore, abandoned the use of the aspirator in acute abscesses, and instead adopts the following treatment. As soon as an abscess is diagnosed or suspected the liver is explored in the manner previously described. If pus is found the exploring needle is at once withdrawn, and an incision made along its track down to the liver, all bleeding vessels being at once secured. This having been done a bistoury is passed into the liver along the track of the needle until it enters the cavity of the abscess. During this stage no cutting action is used, the bistoury being simply pushed onwards. The bistoury is then withdrawn, and an ordinary dressing forceps inserted into the abscess. As soon as this has been done the blades are separated about an inch, and the forceps forcibly withdrawn. In this way the opening is enlarged to the required size, and all danger of hæmorrhage is avoided. It is necessary that the opening in the liver should be quite an inch wide, otherwise it will close so rapidly as to render the operation unsuccessful. When the forceps has been withdrawn a drainage tube is inserted, and the abscess cavity syringed out with carbolic lotion (1 in 50). It is best to avoid perchloride of mercury solution, as any retention of it would be dangerous. During every step of the operation the strictest antiseptic precautions should be adopted, as on this depends the whole success of the case. If the first dressings remain sweet they need not be changed for twenty-four hours. Afterwards they will require to be changed morning and evening, and at each dressing the abscess cavity should be syringed out with carbolic lotion (1 in 50).

For this purpose Dr. Bartholow recommends the use

of a watery solution of iodine as preferable to carbolic lotion. Until the discharge from the abscess ceases entirely the greatest care is necessary to prevent accumulation of pus in the sac of the abscess. Such an occurrence will be at once indicated by a rise of temperature.

The time at which the drainage tube may be removed with safety depends entirely on the progress of the case. It should be allowed to remain in until all traces of discharge have ceased for some days. It is not often that the tube causes any discomfort to the patient. When it does so we will usually find that the incision through the skin was made too small in the first instance. When this has been the case the external wound closes rapidly, and the pressure of the tube on the new skin causes great pain. To prevent this occurrence we may adopt Dr. Knowsley Thornton's suggestion to cut out a lozenge-shaped piece of skin before inserting the drainage tube. Some surgeons object to the insertion of a drainage tube between the ribs, as they believe that its pressure may excite necrosis. I have never known this to happen, and I think that the objection is unfounded.

If an abscess forms and can be opened posteriorly the above operation is generally sufficient, as free drainage is easy on account of gravitation. When, however, an abscess is situated, and has to be opened anteriorly, thorough drainage through a single opening is impossible, as the pus would have to ascend against gravity. If, under these circumstances, only one opening is made pus is certain to accumulate in the abscess, and to give rise to hectic fever, or, perhaps, to pyæmia. In these cases a counter-opening is absolutely necessary to insure thorough drainage; and in making this I have found the following method the best and most convenient. As soon as the upper opening has been made in the way already described a long silver probe, curved to the necessary angle, should be passed to the lowest part of the abscess

cavity. The probe should then be pushed downwards and outwards until its point can be felt through one of the intercostal spaces below. The point of the probe should then be exposed by a free incision, and to it should be attached a long perforated drainage tube. The probe should then be drawn upwards carrying the drainage tube with it. In this way the tube is made to enter the lowest part of the abscess cavity, and perfect drainage is insured.

To illustrate the value of a counter-opening I may quote the following case. It is one of considerable interest as it shows in a striking manner the relative value of the different operations.

Sergeant T. P., G.-1, Royal Artillery, a man of splendid physique, aged 28 years, total service nine years, in India four and a half years, was admitted into the Station Hospital, Cawnpore, on May 21st, 1885. Since his arrival in India he had been subject to bilious attacks and dyspepsia; but had never suffered from either dysentery or malarial fever. In 1883 he had a severe attack of acute hepatitis; but apparently recovered completely; and, excepting a few of his usual bilious attacks, enjoyed excellent health up to the date of his present illness. This was caused by prolonged exposure to the sun after he had taken a quantity of alcohol. On admission the temperature was 101·4; and he complained of pain and a sense of dragging over the hepatic region. On physical examination there was considerable tenderness, but only slight enlargement of the liver. The tongue was furred and the bowels constipated. He was ordered a purgative and a blister 2 by 2 over the hepatic region, and also the following mixture every fourth hour: —℞. Ammon. chlorid., gr. xx; potass bicarb., gr. xv; decoct. tarax, ℥j. Nourishment, consisting of milk and beef-tea, was given regularly every third hour.

Up to May 26th there was but little change in the

symptoms. The temperature remained high, but there was a distinct morning remission. On the morning of the 27th the temperature was 103·4. The pain was excruciating, and he could not bear the slightest examination. The tongue was thickly furred ; and there was some diarrhœa, the stools being dark and offensive. The pulse was very weak and intermittent. One ounce of champagne was ordered every third hour, and linseed meal poultices were applied over the hepatic region instead of turpentine fomentations, which had been previously used. On May 29th the hepatic pain was much diminished. The tongue was covered with a thick greyish, muddy-looking fur. There were bilious vomiting and diarrhœa. The hepatic dulness had begun to increase downwards, and on palpation there was a feeling of great tension over the inner and anterior part of the right lobe. It was evident that pus had begun to form rapidly, and the diagnosis was changed to abscess of the liver. I made an exploratory puncture with a large-sized aspirating needle, and drew off three ounces of pus. The needle was passed two inches to the right of the tip of the ensiform cartilage. This was followed by a marked fall of temperature. It soon rose again, however, and the abscess rapidly refilled. On June 14th I aspirated, and drew off sixteen ounces of pus. Four days later the abscess had again refilled. I, therefore, determined to cut down upon it. Chloroform having been administered by Surgeon S. J. Rennie, I commenced the incision at the site of the aspiration puncture, and carried it outwards and downwards for three inches just below, and parallel to, the costal arch. The liver was found firmly adherent to the parietes, and there were no vessels that required to be ligatured. On reaching the liver a bistoury had to be passed downwards for three inches before it entered the abscess, as it was deeply situated on the under surface. Twenty ounces of pus escaped. The

incision through the liver was enlarged with a dressing forceps in the manner already described. A drainage tube was inserted, and the abscess was syringed out with carbolic lotion (1 in 50). Immediately after the operation the temperature became normal, and remained so for several days. Then a constant evening rise, varying from 99·5 to 101, occurred, showing that there was retention of pus in spite of the greatest care in syringing out the abscess cavity. This continued up to July 20th, on which date the wound had almost closed; and all discharge, except slight serous oozing, had ceased. The evening rise of temperature then became more marked. The hepatic dulness and tension began again to increase, and it became evident that the abscess was once more refilling. On July 28th there was distinct bulging of the ninth and tenth intercostal spaces corresponding to the posterior axillary line. I, therefore, made an exploratory puncture with an aspirating needle, passing it between the ninth and tenth ribs in the posterior axillary line. A few drops of fœtid pus escaped.

I at once cut down on the abscess, following the track of the needle. A bistoury was passed, and the opening enlarged with a dressing forceps as previously described. About two and a-half ounces of fœtid pus escaped. A long silver probe, curved to the proper angle, was passed through the lower opening into the abscess cavity, and then onwards through the narrowed track of the old operation until it emerged at the opening in the epigastrium.

The latter was enlarged, and a perforated drainage tube was attached to the upper end of the probe. The probe was then drawn downwards, carrying the tube along with it, until the latter emerged at the lower opening. The abscess was syringed out with carbolic lotion (1 in 50), and both wounds were carefully dressed. The temperature immediately fell to normal. On the morning of

July 29th I found that the drainage tube had become blocked during the night, and that the temperature had risen to 100·2°. On removing the obstruction about an ounce of pus and broken down hepatic tissue escaped.

The drainage tube was then changed in the following way : The upper end of the old tube was slit up for about an inch. One end of the new tube was inserted into the slit end of the old one, and fastened with a piece of silk applied as a clove-hitch. The old tube was then drawn downwards through the lower opening, and the new one left *in situ*. In this way the drainage tube could be changed without the slightest inconvenience to the patient. The temperature did not again rise above normal. For the first four days, as the discharge was very profuse, the abscess was syringed out four times a day, and the tube changed morning and evening. From 1st to 10th August the tube and dressings were changed, and the abscess syringed out, morning and evening. On the latter date the discharge had ceased, and a marked improvement had taken place in the patient. He had gained nearly a stone in weight, the face had quite lost its unhealthy parchmentlike colour, the appetite was good, he was quite cheerful, and was able to sit up for about two hours. I removed the drainage tube, only inserting a small piece in the external wounds to prevent these closing. On August 22nd the latter were removed, and three days later the wounds were firmly closed. Convalescence was rapid, and on September 25th he left the station for six months change to England.

When I heard of him two years afterwards he was in perfect health.

At first sight one might think that incisions into the liver would be attended by considerable risk. Experience, however, shows that such is not the case. Even extensive wounds of the liver produce little constitutional disturbance provided no large blood vessels or bile ducts are

injured. Repair is also very rapid owing to the abundant blood supply. In operating on abscesses of the liver the danger lies rather in too limited, than in too extensive, incisions. Provided an hepatic abscess is opened early, and with due antiseptic precautions, there is little, if any, more risk than attends the opening of a large abscess in any other situation.

Too much stress cannot be laid on the importance of operating early. Every day, indeed every hour, gained increases the chances of success. We should remember that when suppuration has become established in the liver it advances with startling rapidity. On this account we should operate at the very first moment at which an abscess of the liver is detected. When this course is adopted we operate on tissues which have not been undermined, and before the constitution has been damaged by septic absorption. The arguments in favour of early operations in cases of hepatic abscess are very weighty. If the operation is deferred until fluctuation becomes evident, as has often been recommended, a large amount of the liver substance will be destroyed; and this must of necessity prolong the process of cicatrisation, even if it does not render recovery impossible.

Delay in operating a'so exposes the patient to the risks of hectic fever, and may even lead to the development of pyæmia.

If the expectant plan of treatment is adopted the abscess may burst into the pericardium or peritoneum, either of which events would be immediately fatal. Even when an abscess is discharged through the lung, which was formerly regarded as the most favourable route for its evacuation, recovery only takes place after prolonged suppuration, and considerable destruction of the lung-tissue, which will leave the patient's constitution more or less damaged for life.

If, after a single opening has been made into an abscess

of the liver, the temperature rises, and the hepatic tension and dulness increase, we should not hesitate to again place the patient under chloroform and to make a counter-opening in such a position as will ensure perfect drainage.

Great stress has been laid on adhesions between the liver and parietes as necessary to the success of operations in cases of hepatic abscess. Adhesions undoubtedly render the operation easier; but they are by no means essential to its success. Nor do we often meet with an abscess of the liver in which parietal adhesions do not exist. They were absent in only three out of all Morehead's cases.

When they are absent Dr. Howard Marsh proposes to stitch the edges of the incision in the liver to those of the incision in the abdominal walls, so as to prevent the escape of pus into the peritoneal cavity.

Dr. P. Manson has devised and strongly advocated an operation for hepatic abscess, the steps of which are as follows. He passes a full sized trochar and cannula into the abscess, and then withdraws the trochar, leaving the cannula *in situ*. A large drainage tube is then tightly stretched over a stilette, and fastened with a running knot. The stilette and tube are pushed through the cannula into the abscess. When this has been done the cannula is removed, and the running knot opened. The elastic recoil of the tube, as it returns to its original size, tends to carry it still further into the abscess. The tube, having expanded, completely fills the opening made by the trochar. The stilette is then withdrawn, and the tube filled with carbolic lotion. The free end of the tube is placed in a vessel containing carbolic lotion, and the pus is allowed to syphon off.

Theoretically this operation may appear a good one, but practically it lacks every essential of success. The tube, being tightly grasped by the tissues, causes intoler-

able pain. For the same reason the abscess cavity cannot be syringed out, nor can the pus drain away freely.

After recovery from an hepatic abscess sluggishness and enlargement of the liver frequently remain for some time. The nitro-hydrochloric acid bath, as recommended by Sir Ranald Martin, removes these symptoms more quickly than any other form of treatment. Change to Europe is necessary to complete recovery. If possible a visit to one of the German mineral wells should be recommended.