TROPICAL LIVER ABCESS, ITS CAUSATION, SYMPTOMS, AND TREATMENT BY INJECTION OF EMETINE HYDRO-CHLORIDE, WITH NOTES OF EIGHT CASES OF HEPATITIS, OR LIVER ABCESS SOME OF WHICH HAVE BEEN TREATED BY THIS METHOD.

Donalld H. Macarthur
M.B., Ch.B., Captain,
Royal Army Medical Corps.

M.D. 1913.
CAUSATION

What do we mean by the term Tropical Liver abscess?

There is doubtless a large amount of confusion associated with the expression, but we may take it to mean, the single or multiple large abscesses of the liver, either caused by Dysentry or some other agent, which are especially prevalent in hot climates.

There are very considerable differences of opinion among those best qualified to speak with authority as to the causation of this condition.

The chief questions of controversy are:—
(1)......Are all Tropical Abscesses the direct result of Dysentry?
(2)......If so, is the Amoebic form the only cause, or does the Bacillary also take its part.
(3)......If the Amoebic form only, are the Amoebae the sole factors or do they carry in their substance, Pyogenic organisms which actually determine the suppuration.

The answer to the first question is I think in the negative, in some few cases no possible connexion can be established with Dysentry, Amoebic, or Bacillary.

The following observers admit of a non-dysenteric Tropical Liver abscess;—Krause, Koch, Councilman, Lafleur, Kartulis, Meyer & Childe.

Davidson states that he has seen a considerable number of cases, in which a previous history of Diarrhoea or Dysentry could be positively excluded.
It is probable however that these cases are the exception, and that in most Dysentery is the causal agent.

A study of the death rates from Dysentery and from Liver Abscess in the British Army in India makes it apparent that the two diseases bear a close relationship to each other.

The following table is taken from Albut & Rolleston's System of Medicine:

Table Showing Death Rates per 1,000 from Liver Abscess & from Dysentery in the British Army in India for 1901-1903.

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>Liver Abscess</th>
<th>Dysentery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burmah Coast</td>
<td>2.30</td>
<td>3.70</td>
</tr>
<tr>
<td>Burmah Island</td>
<td>1.35</td>
<td>0.00</td>
</tr>
<tr>
<td>Bengal Grissa</td>
<td>6.55</td>
<td>3.30</td>
</tr>
<tr>
<td>Gangetic Plane (Chota Nagpur)</td>
<td>2.34</td>
<td>0.93</td>
</tr>
<tr>
<td>Upper Sub Himalaya</td>
<td>0.98</td>
<td>1.07</td>
</tr>
<tr>
<td>N.W. Frontier, Indus Valley, N.W. Rajputana</td>
<td>0.38</td>
<td>0.22</td>
</tr>
<tr>
<td>S.E. Rajputana, Central India, Guzerat</td>
<td>1.75</td>
<td>1.17</td>
</tr>
<tr>
<td>Deccan</td>
<td>1.27</td>
<td>0.26</td>
</tr>
<tr>
<td>West Coast</td>
<td>1.06</td>
<td>0.21</td>
</tr>
<tr>
<td>S. India</td>
<td>1.10</td>
<td>0.19</td>
</tr>
<tr>
<td>Hill Stations</td>
<td>1.08</td>
<td>0.66</td>
</tr>
</tbody>
</table>
The following table taken from the same source expresses the percentage of cases of Liver Abscess associated with Dysentery by some of the best known observers:

<table>
<thead>
<tr>
<th>Observer</th>
<th>Country</th>
<th>No of Cases</th>
<th>Percentage of Cases associated with Dysentery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Annesley</td>
<td>India</td>
<td>29</td>
<td>72.3</td>
</tr>
<tr>
<td>2. Waring</td>
<td>-&quot;-</td>
<td>204</td>
<td>72.2</td>
</tr>
<tr>
<td>3. Sanitary</td>
<td>Commis.</td>
<td>509</td>
<td>53.0</td>
</tr>
<tr>
<td>4. Rogers.</td>
<td>Calcutta</td>
<td>63.</td>
<td>90.48</td>
</tr>
<tr>
<td>5. Sachs.</td>
<td>Egypt</td>
<td>48</td>
<td>41.7</td>
</tr>
<tr>
<td>6. Kartulis</td>
<td>-&quot;-</td>
<td>500</td>
<td>55.6</td>
</tr>
<tr>
<td>7. Zancarol.</td>
<td>-&quot;-</td>
<td>444</td>
<td>59.0</td>
</tr>
<tr>
<td>8. Kelch &amp; Keiner</td>
<td>Algeira</td>
<td>500</td>
<td>85.0</td>
</tr>
<tr>
<td>9. Smith</td>
<td>Seamen's Hospital</td>
<td>45</td>
<td>84.0</td>
</tr>
</tbody>
</table>

Major Rogers’ figures are most striking, they show that in Calcutta, & this is probably true for other parts of India, Liver Abscess is almost entirely associated with Dysentery.

It frequently happens that a patient suffering from Liver Abscess can give no history of a previous attack of Dysentery, but we know that many attacks of Dysentery are slight in nature, so much so in some cases as to be practically disregarded by the patient, & it is probable that it is these unrecognised & therefore untreated attacks, which most often lead to Liver Abscess.
It also frequently happens that at the time of development of the abscess there is no actual Dysentery present, & no Amoebae can be found by microscopic examination of the stools.

The microscopic examination of pus from abscesses has however proved beyond any question of doubt, that in a large majority of cases the causal agent is the same for Tropical Dysentery & Tropical Liver Abscess, that is to say, the Amoeba Histolytica.

To Kartulis the credit for this discovery is due, though Lisch had previously noted the presence, & described the characters of Amoebae in the stools of a patient suffering from Dysentery, and considered that they were the causal agent of that disease.

The following paragraph is quoted from Muir & Ritchies Manual of Bacteriology:

"Microscopic examination of the abscess contents, show chiefly necrosed and granular cells, & debris resulting from their disintegration, whereas ordinary pus corpuscles are scanty & may be practically absent. In such abscesses the amoebae are usually to be found, & not infrequently are the only organisms present, no culture of bacteria being obtainable by the ordinary culture methods."

The truth contained in the above Paragraph has an important bearing on treatment to which I shall refer later.
This statement is also an answer to question No. 3. Pyogenic organisms are rarely found in the pus of liver abcesses, Major Rogers says in only 15% of cases, to this also I shall refer later.

Again the pus found in most cases of liver abscess is quite unlike that formed by Pyogenic organisms.

The pus is usually of the colour of Anchovy Sauce, & it’s smell is inoffensive, it is quite a distinct variety.

Pus is in reality somewhat of a misnomer, it is the result of a liquefying process acting upon the Hepatic tissue.

Amoebae are sometimes found in the pus, but more often in the wall of the abscess cavity, it is well known that one often fails to find them in the first pus which is poured out on the incision of an abscess, but finds them in the pus at a later date perhaps after 48 to 74 hours.

We come to the conclusion therefore that the majority of liver abscesses are associated with Dysentery, & that it is chiefly the Amoebic variety which is responsible for their production although other causes cannot be entirely eliminated.

OTHER FACTORS WHICH CAT AS PREDISPOSING AGENTS

In addition to the direct causative agent, the Amoeba Histolytica, we must also consider other factors which play an indirect but very important part. The most important of which is ALCOHOL.

On this point all modern observers are agreed. Waring noted the habits of 40 patients suffering from liver abscess and found that 65.5% were intemperate.

Liver abscess is not common among the natives of India, & that is doubtless due to a large extent to their temperate habits.
Eight cases of Liver Abscess have come under my care since landing in India two years ago; I have given short notes of these below.

As regards the previous habits in these cases, one was a total abstainer, one was a moderate, & the other six were heavy drinkers, which gives a percentage of 75 heavy drinkers, one of these was a native but he had adopted some of the vices of the West, and is included among the heavy drinkers.

The injurious effects of an excess of alcohol on the liver is a fact all are agreed upon, the devitalised organ readily falls a victim to the attack of the amoebeas.

Over indulgence in food doubtless acts in a similar manner but is of very secondary importance.

GREAT HEAT either alone or associated with chills is another important determining cause, possibly the importance of the heat is partly in the multiplication of the amoebeas outside the body, & the increased source from which infection may be derived.

The cold certainly acts by concocting the liver, & making it less resistant to infection. Old Indian residents often develop Liver Abscess after returning to England, three of my cases did so after coming up from the intense summer heat of the Punjaub Plains to the comparative cool of a hill station 8,000 feet above sea level.

The effect of altitude alone is to diminish the number of cases in proportion to the coolness of the atmospheric temperature.
The following table gives the admission per 1,000 for liver abscess in the British Army in India at various elevations for the three years 1895-1897:

<table>
<thead>
<tr>
<th>ELEVATION</th>
<th>ADMISSIONS PER 1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 100 feet.</td>
<td>2.8</td>
</tr>
<tr>
<td>100 to 500 &quot;</td>
<td>2.4</td>
</tr>
<tr>
<td>500 &quot; 1500 &quot;</td>
<td>1.7</td>
</tr>
<tr>
<td>1500 &quot; 3500 &quot;</td>
<td>2.1</td>
</tr>
<tr>
<td>3500 &quot; 5000 &quot;</td>
<td>1.9</td>
</tr>
<tr>
<td>5000 &quot; 8000 &quot;</td>
<td>1.2</td>
</tr>
<tr>
<td>8000 &quot;13000 &quot;</td>
<td>0.0</td>
</tr>
</tbody>
</table>

If the same troops were constantly either in the hills or in the plains, the figures would probably decrease with increasing altitude in an even more definitely regular manner; one must remember that troops are constantly passing from the hills to the plains & vice versa, & many cases which develop in the hills were probably infected in the plains, the actual onset of the abscess being probably determined in some cases by a sudden change to a colder climate, producing Liver congestion and a lessened resistance.

SEX

It is usually agreed that men are much more liable to Liver Abscess (all my cases occurred in men). Why this should be so it is somewhat difficult to say, it is most probably due to the fact that men are more exposed to infection of Dysentery in camp than women, & also to the fact that they are on the whole more intemperate in their habits.
TRAUMATISM is said sometimes to be a cause but did not apply to any of my cases.

MALARIA What connexion Malaria has with Liver Abscess is not fully understood, but it is reasonable to assume that a disease which causes such intense congestion of the internal organs must act at any rate as a powerful pre-disposing cause.

SYMPTOMS

The mode of onset & symptoms vary greatly in different cases. The onset may be sudden and acute but is more often slow & insidious. In cases 4, 7, & 8 of my series there was a comparatively rapid onset, in each of these cases there was within a few days of the commencement cause pain, fever & obvious evidence of Hepatic enlargement. In all the other cases the onset was slow especially in cases 1 (3 weeks), 5 (1 month), & 6 (3 months).

The most important symptoms are (1) Pain, (2) Localised tenderness, (3) Fever, (4) Hepatic enlargement; there are often also present; (5) Peculiar Facial appearance (6) Leucocytosis, and sometimes (7) the symptoms consequent on the rupture of an abscess into some other part.

PAIN is a very variable symptom, its severity probably depends on the situation of the abscess, if superficial it resembles that of a dry pleurisy, if deep is of a dull character, sometimes there is more a sensation of dragging and fulness than actual pain.

Sometimes it is most acute, in cases 4 & 7 the pain in the Hepatic region was agonising & had to be controlled by
Morphia. In case 1, it was absent throughout the whole course of the illness, & in the other cases was of moderate severity.

Pain radiating to the right shoulder is a very suggestive symptom, and is said to indicate an abscess in the right lobe. A sign which I have found of value is a moderate degree of rigidity in the right Rectus muscle, this sign was present in cases 6, 7 & 8.

(2) LOCALISED TENDERNESS ON PRESSURE is one of the most valuable signs, as it points not only to the existence of an abscess, but to its situation. In a suspected case the available surfaces of the organ should be carefully palpated by the finger tips being pressed into the intercostal spaces, & upon the Epigastric region, the patient being made to take deep inspirations during the process. The position of any specially tender area being most carefully noted.

(3) FEVER like all the other signs of this disease is most variable, depending on the stage to which suppuration has reached, and possibly also on the nature of the suppuration. When present it is usually of a hectic type, accompanied by rigors, but many cases have long periods of apyrexia broken at intervals by a sudden rise & fall of temperature. Cases 1 & 5 illustrate this point though perhaps in case 5 the apyrexia was due to treatment.

Irregular fever is perhaps the most common initial sign of the disease, and may last a considerable time before the case assumes definite localising symptoms. Cases are recorded
but must be rare, where there is no rise of temperature throughout the whole course of the disease, a case is quoted by Pel of a man who developed Liver abscess eleven years after returning from the East, in which case the disease reached its full development without any rise of temperature.

Osler mentions a case where a patient with a Liver abscess which had perforated the lung coughed up pus after his temperature had been normal for weeks.

(4) **ENLARGEMENT OF THE LIVER** must I think be present to a certain extent in all cases, but in some it is so slight as to be unrecognised. In case 1 of my series, repeated & careful percussion by myself & several of my colleagues failed to reveal any enlargement, & the diagnosis was only made by a process of exclusion & the use of an exploring needle.

Most cases of Liver Abscess occur in the right lobe & usually more toward the upper than lower surface. Waring states that 70% occur in this situation. The enlargement is therefore usually found to be in an upward direction and on the right side. There is seldom any marked downward enlargement, case 6 was the only one of my series which showed any definite increase in a downward direction. Sometimes the enlargement can be made out by inspection alone, in cases 7 & 8 there was obvious bulging in the hepatic region, specially so in case 8, where the bulging was apparent from the other side of the ward.

In cases of enlargement the percussion sensation is also altered, one feels as if one was percussing a dense substance than normal Liver tissue.
The fact that the increase is usually in an upward direction is an important point in the differentiation of Liver abscess from other pathological conditions of the organ, such as malignant disease, etc. In many cases the mode of enlargement is very typical, the fulness rises from the mid nipple line in an upward & backward direction, so that at the mid-axillary line it may reach as high as the 5th rib, while behind it may reach as high as the Scapula.

Fluctuation & Oedema only occur in very advanced cases, both were present in case 8.

(5) PECULIAR FACIAL APPEARANCE In some cases the patient's facial appearance is most typical. Osler says in his "Principles & Practice of Medicine":

"There is no internal affection associated with suppuration, which gives, I think, the same hue as certain instances of abscess of the Liver."

The skin has often a sallow, muddy appearance, the face is pale, conjunctivae usually slightly jaundiced, eyes prominent & staring. In cases 1, 2, 5, & 7 the facial appearance was most suggestive of the underlying condition.

DECUBITUS Patient is as a rule unable to lie on either side, but keeps flat on his back.

LEUCOCYTOSIS of the Polymorpho-Nuclear variety is usually present, its absence must not however be relied on as negating abscess. A blood count was not done in all my cases, in some this was due to the difficulty of doing Microscopic
work in a very high temperature. Cases 1 & 7 however showed a marked Polymorpho-Nuclear Leucocytosis, in case 5 no change in the blood count was found.

**SYMPTOMS CONSEQUENT ON RUPTURE.** In a few cases external spontaneous rupture may occur & the patient recover without any special form of treatment.

The usual sites of rupture are the Lung & Pleura, Peritoneum, Stomach & Intestines, the most common being the Lung & Pleura. The symptoms of rupture into the right pleural cavity are sudden pain, followed by dyspnoea, and the signs of Empyema. These signs were present in case 5, but not recognised at the time. When an abscess ruptures into the lung the patient generally coughs up typical chocolate coloured pus, and the diagnosis is obvious. Rupture into the Peritoneum is most dangerous, Peritonitis quickly follows & immediate operation affords the only chance for the patient's life. Rupture into the Stomach is recognised by finding liver pus & possibly Amoebae in the vomit, & the same may be found in the stools in rupture into the intestines.

**DIAGNOSIS**

In differentiating Tropical Liver Abscess from other conditions, a history that the patient has resided in the East & suffered from Dysentery is of course an important point in favour of Liver Abscess.

The diseases which may be confused with it are, Malaria, Hydatid Cysts, Distension of the Gall Bladder, Abscess in the Abdominal Wall, Enteric Fever, Empyema & Abscess of the
Lung, Intermittent Fever associated with Gall Stones, & Tertiary Syphilis of the Liver.

The most common mistake is perhaps a confusion with MALARIA, because Malaria & Liver Abscess are both common in the same geographical areas, and the symptoms are not unlike.

If the fever does not yield to quinine & if no Malarial parasites are found in the blood before the administration of Quinine, Malaria can be definitely excluded.

HYDATID CYST may produce physical signs very similar to those of Liver Abscess, but the two diseases are not likely to occur in the same geographical areas, if there is any doubt between the two, an exploratory puncture will reveal hooklets in the pus in the case of Hydatids.

A DISTENDED GALL BLADDER has a characteristic pear-shaped outline & is mobile, & a history of Biliary Colic may be present.

ABCESS IN THE ABDOMINAL WALL is not very likely to be a source of confusion, but Osler notes a case where there was extreme difficulty in differentiating between the two, & it was not until operation that the question was decided in favour of Liver Abscess.

ENTERIC FEVER Many cases of Enteric begin with Pulmonary symptoms, if these symptoms take the form of congestion at the base of the right lung; it is sometimes difficult to be sure that the abnormal dulness found is not due to an upward enlargement of the Liver. I have seen several cases which
eventually proved to be Enteric in which there was a reasonable doubt of the existence of Liver Abscess, & in one case have gone as far as exploring the Liver.

Liver Abscess & Enteric occur to a large extent in the same geographical areas. The temperature charts in typical cases are quite unlike, but in both diseases there are wide divergencies from the normal, & in practice confusion often does arise. An early differentiation is most important, both with regard to treatment & the prevention of infection, if the case proves to be Enteric.

Enteric & Para-Typhoid should therefore always be excluded in doubtful cases.

In the Army in India a widal reaction alone is of little value as 85% of British Troops in India have been inoculated & their blood therefore shows a positive reaction in varying degrees. A widal reaction which varies in intensity from time to time is of course of more value. Another objection to the widal reaction is that it will not be present until probably the tenth day of disease, & in these cases early diagnosis is of the utmost importance.

Direct cultivation of the organisms of Enteric & Para-Typhoid from the patients' blood should always be attempted.

Success in this method will only be obtained by making the cultivation early in the disease, the best time being during the first three days, it is practically of no value after a week; after this time cultivation from the stools & urine should be attempted.
FROM EMPYEMA & LUNG ABCESS the diagnosis is made by noting character of the pus withdrawn and the presence or absence of Amoebae, in this connection it must be remembered that an Empyema containing typical Liver pus may be present as a complication of Liver abscess with or without rupture of the diaphragm.

INTERMITTENT FEVER ASSOCIATED WITH GALL STONES

The diagnosis between Liver Abscess and this condition is sometimes very difficult; in many cases of the latter rigors & high fever may occur for a long time without suppuration. The points in favour of Intermittent Fever associated with gall stones, are the entire absence of fever between the attacks in that condition, & the fact that the patients' general nutrition does not suffer, also the length of time which a patient may suffer from that disease.

Another condition which may simulate Liver Abscess is TERTIARY SYPHILIS OF THE LIVER. Captain Davis R.A.M.C., reported a case where the symptoms and physical signs were so suggestive of Liver Abscess, that the Liver was explored, the case eventually being found to be Tertiary Syphilis of the Liver, this case rapidly responded to Anti-syphilitic treatment.

Where a doubt exists of the presence of this condition, the Wassermann blood reaction will of course be most useful in coming to a diagnosis.
The treatment of Tropical Liver Abscess is said by almost all authorities to be Surgical, alternative methods are sometimes mentioned, but usually to be dismissed as worthless and dangerous.

The meaning of the term "Surgical" may be taken to be "Open Operation".

Thus we read in Davidson's account of the disease: -

"When abscess has formed treatment belongs to the domain of Surgery."

In Rose & Carless' Manual of Surgery: -

"Experience proves that the usual law of treating suppuration ought to be strictly observed viz., that the abscess should be opened & drained."

& again in Osler's Practice of Medicine: -

"The death rate has been lowered of late years owing to the greater fearlessness with which Surgeons now attack these cases."

While fully admitting that at the time when these words were written, open operation afforded in most cases the greatest hope of success, my contention now is, that for the majority of cases, especially in hot climates a better method has now been introduced that is to say: "Aspiration, repeated if necessary, & as many times as necessary, & the injection of the Soluble Salts of Emetine.

To Major Rogers of the Indian Medical Service the credit for this discovery is due, a discovery which will I think in tropical stations eventually revolutionise the treatment of this so often fatal disease.
I feel confident that in a few years, open operation, except in a small percentage of cases where there are obvious contra-indications to Aspiration, will be a thing of the past.

Let us consider the advantages & dis-advantages of each method. It is held by many surgeons that treatment by Aspiration is (1) Un-surgical,(2) that it may drain one abscess & leave a second or others un-explored,(3) that it is dangerous and may set suppurative Pleurisy and Peritonitis by the transference of Septic matter to the Pleural or Peritoneal cavity.

As regards the first objection, the object in view is to cure the patient, & if that can be done better by aspiration than open operation this objection fails to the ground; our object is not to perform a surgical procedure but to save our patient's life.

(2) That it may drain one cavity & leave others un-explored. Does not the same objection apply to open operation specially in view of the fact that most abscesses occur in the upper part of the right lobe, and the means of access is therefore usually by the trans-pleural route.

(3) The danger of carrying septic infection to some other parts is, I think, greatly exaggerated. Rogers has shown that in 85% of cases the abscess is sterile as regards pyogenic organisms. With ordinary technique therefore the risk only applies to 15% of cases, and must even in these cases be a very small one. The practice of many surgeons is to explore the Liver first with a needle, and, if pus is found, to perform an open operation, keeping the needle in position and using it as a guide.
or Peritonitis develop? In very few I think. We are justified then in absolutely disregarding the danger of infecting other parts by transference of septic matter from the abscess cavity.

Let us now consider the dangers of open operation, especially in a hot climate.

Many cases of course develop abscess of the liver on their return from the East to England. I am not criticising open operation in such cases, where the operation can be done under the best possible climatic conditions. I am speaking of it as it applies to patients in India & other tropical climates, part of my own experience having been in the Punjaub Plains in the hot weather.

In the first place, open operation usually involves a general anaesthetic, whereas aspiration can easily be done under Eucaine. Ether is of course out of the question. It cannot be used because of the high temperature. Chloroform is of necessity the anaesthetic used. Chloroform is a most unsuitable & dangerous anaesthetic for a patient whose general metabolism is profoundly affected, as must be the case in Liver Abscess.

Secondly a patient with this disease is not a good subject for any severe surgical procedure.

Thirdly, & compared with this objection the two preceding ones are of very minor importance, is the danger of secondary Sepsis.

In a cool climate this does not of course apply, the danger can be reduced to a minimum by strict observance of the
laws of aseptic surgery, but in a tropical country this is not altogether so. I have seen Liver Abscess patients after operation in hospitals in the Punjaub Plains during the hot weather, the average daily temperature about 120° in the shade; in spite of thermantidotes and other contrivances for reducing the temperature indoors, the ward temperature ranged from 100° to 110°. A patient under these conditions specially when his chest is swathed in cotton wool & bandages, perspires profusely every hour of the twenty four, if he did not, Heatstroke would quickly end the scene. He is usually covered with prickly heat. My contention is, that under such adverse conditions no matter how perfect the aseptic technique employed at the operation, and subsequent dressings, it is absolutely impossible in the majority of cases to keep the operation wound free from sepsis; organisms are carried up by the sweat from the deep layers of the skin, they find an excellent culture medium in the discharge from the wound, & the almost inevitable result is that septic infection is added to the already heavy list of factors which militate against the patients' chance of life.

When a previously aseptic abscess becomes infected by pyogenic organisms, the subsequent history of the case is usually one of terrible suffering & discomfort, increasing weakness & finally death.

Let us now consider the alternative treatment.

Aspiration alone has been tried & usually found to be useless. Aspiration & the injection of Quinine into the abscess cavity has been tried by many, but it's results have not met with sufficient success to enable it to displace the
ordinary operation. As early as 1886 Maclean & Chevers advocated the use of Ipecacuanha in the treatment of acute Hepatitis, but their views did not meet with general acceptance & after a brief trial Ipecacuanha gradually fell out of use in the treatment of this disease. During the last few years the great value of this drug in amoebic conditions has again become recognised, chiefly owing to the advocacy of Sir Patrick Manson, & Major Leonard Rogers.

The great objection which is often insuperable to it's use, is the distressing vomiting it so often produces.

Wadde in 1911 showed that Emetine the principle alkaloid of Ipecacuanha, has the power of destroying the Amoeba Histolytica in cultures in high dilutions.

This led Rogers to test it's effect on active amoebae in saline solution. He found that the organism is killed by a 1-10,000 solution and rendered inactive by a solution of 1-100,000, from this he went on to try it's effect on patients suffering from amoebic conditions, and met with brilliant results.

In July 1912 he published a series of three cases where the drug had been used in patients who were unable to take Ipecacuanha by mouth, two of these cases were suffering from severe amoebic Dysentery & the third from acute Hepatitis of amoebic nature, which was thought to be on the verge of abscess formation. All these cases quickly responded to treatment, & there was a speedy recovery in each case.
In August of the same year he published two more cases of acute Hepatitis; in which the same treatment was successful, and another very instructive case of Multiple Liver Abscess, in which, although the case ended fatally, subsequent Post Mortem Examination showed that all the amoebae in the Liver had been killed by the injection of two grains of Emetine, in doses of half a grain; a few broken up and devitalised amoebae only being found. This case leaves no doubt of the tremendous power of emetine as a specific against the organism of amoebic dysentery & Liver Abscess.

In the same article he describes three more cases of amoebic Liver Abscess & one of Splenic Abscess cured by the same method.

In adopting this treatment in cases of Liver Abscess certain points must be remembered. Aspiration & Injection of Emetine is eminently suitable in cases where there are no complications; it is of no use where the abscess is infected by pyogenic organisms. In such cases the pus must be let out in the usual way by operation. Emetine will be found of great value in the after treatment, but pus due to the ordinary organisms of suppuration must be allowed a free escape.

My criticism of the paragraph previously referred to in Rose & Carless' Manual of Surgery is that the pus in 35% of cases is not pus in the ordinary sense of the word & it's treatment is therefore not based on the ordinary rule of surgery.
After aspiration of the contents of an abscess, the Emetine Solution may be injected subcutaneously, but probably better results will be obtained by injecting/diluted with Saline solution, into the abscess cavity, where it will come into direct contact with the amebae.

In case 8 of my own series, I attributed the unexpected success I obtained to the fact that I had adopted this procedure.

-------------------------
SUMMARY
-------------------------

The conclusions to which we have arrived on this subject are:

Tropical Liver Abscess is in the great majority of cases the result of a previous attack of amoebic dysentery, though other causes cannot be entirely eliminated.

Other important predisposing agents are;— Alcohol, Great Heat & Ghana. Malaria cannot be disregarded as a predisposing factor, though its actual connexion has not been fully determined.

It is a disease of very varying signs & symptoms, although Pain, Fever & Hepatic Enlargement are the classical symptoms, any of these may be absent, or present, in a very minor degree. It is often confused with Malaria both on account of the resemblance of the symptoms & because both diseases occur in the same geographical areas to a large extent.

It must be diagnosed from Enteric as early as possible in the interest of others as well as the patient.
Other diseases which sometimes bear a strong likeness to it are Hydatid Cysts, Distended Gall Bladder & Abscess of the Abdominal Wall. We have seen that in all doubtful cases the liver should be explored, if pus is present the diagnosis is confirmed, and of not, but if the liver is in the pre-suppurative stage of Hepatitis benefit will result. It is necessary in exploring to use a large bore needle, and make a very thorough examination, as even when pus is present, it is very easily missed.

As regards treatment, our conclusion is, that however suitable open operation may be in a cool climate, it is a procedure which should be avoided as far as possible in the Tropics because of the difficulty, caused solely by high atmospheric temperature, of preventing the occurrence of secondary septic infection.

We have seen that in Emetine we have a drug which has an enormous power of destroying Amoeba Histolytica, specially when injected directly into the abscess cavity.

Major Rogers' Paper & my own Case No. 8, show that aspiration combined with the administration of Emetine Hydrochloride may be successfully used in the treatment of Liver Abscess, even when the patient's condition seems very serious indeed. My Case No. 7, shows the value of Emetine in warding off actual pus formation in cases of Hepatitis.

There are certain contra-indications to the use of Aspiration & Emetine treatment, these include the presence of Pyogenic organisms in the abscess cavity, & the presence of any complication such as secondary Empyema.

If Aspiration, coupled with Emetine injection as a means of treatment is confined to suitable cases to which these contra-indications do not apply, & where there is a reasonable
supposition that the Amoeba Histolytica is alone responsible for the condition, I am sure the results will be good, & that we shall have fewer cases in our hospitals in the hot weather dying as a result of secondary septic infection following Operative treatment.

HISTORY OF 8 CASES

CASE I: -

Pte. A., 1st Dragoon Guards.

LIVER ABcesso, OPERATION, RECOVERY.

I saw this patient first in January 1910. He was sent into hospital at Ambala by the Medical Officer i/c of the Unit as unfit for duty.

On admission to hospital patient complained of feeling out of sorts & of shortness of breath.

STATE ON ADMISSION: -  Patient was pale & anaemic, & slightly jaundiced. The only fact made out by physical examination was irregular action of the heart. There was no Cardiac Enlargement, no unusual pulsation, murmur or thrill, but the pulse was irregular & intermittent, & there was a re-duplicated second sound. Urine was normal, Tongue furred.

TREATMENT & SUBSEQUENT HISTORY: -  Patient was kept in bed on a moderate diet & observed. For the first three weeks after admission his condition was much the same as above, Temperature normal or Sub-normal, Pulse always irregular. After three
weeks in hospital his temperature went up to 103°, & he had a rigor. Blood examination at this time showed a Polymorphileucocytosis. No Malaria Parasites were found. For a week his temperature continued to fluctuate from 103° to normal, Patient had rigors frequently. Blood culture for Enteric & Paratyphoid was negative. No enlargement of Liver could be made out. As there were no physical signs to guide one, it was decided to explore the liver. Typical Liver pus was found, a portion of rib was excised, & the abscess drained. Patient made a good recovery.

The interesting feature of this case was the absence of any sign pointing to Liver Abscess. Patient had no pain during the whole course of his illness.

This patient had been a total abstainer & had no history of Dysentery.

Ipecacuanha was frequently given after his operation.

CASE II:—

SERGT. K., lst DRAGOON GUARDS.

LIVER ABCESS, OPERATION, DEATH.

This patient was admitted to Station Hospital, Ambala, February 14th 1910.

COMPLAINT:— Patient had been out of sorts for three weeks & had occasional twinges of pain in the right side & right shoulder, he had continued at work, but pain becoming very severe reported sick, & was admitted to hospital.

STATE ON ADMISSION:—

Patient had a muddy ashy complexion, very promin-
ent & staring eyeballs, and was distinctly emaciated.

Temperature 102°, Pulse 120, Respiration 24.

Physical examination revealed considerable upward enlargement of the liver in the right axilla. No downward enlargement could be made out. Other systems were normal; Blood, no change in the total, or different count; No Malaria Parasites.

**TREATMENT & SUBSEQUENT HISTORY:**

Patient was anaesthetised & the liver explored. Pus was found which was of a typical Anchovy Sauce-like colour. A portion of rib was excised, & the abscess drained.

Ipecacuanha was given but could not be tolerated. For the first week after operation patient's condition was much improved, his temperature remained low, & his pain was very much diminished.

A week after operation however, it was noticed that the pus which previously been quite inoffensive was becoming very foul-smelling, it's colour also changed to a dirty yellow.

Patient had a severe rigor on February 23rd, & from that date his condition steadily grew worse.

He died on March 19th.

This patient had been a very heavy drinker. He had had Dysentery in India five years before, the type of which was unknown.
CASE III:

SERGT. W., West Riding Regt.

LIVER ABCESS, OPERATION, RECOVERY.

This patient had no previous history of Dysentery, he was accustomed to drink alcohol in very moderate amounts.

He was admitted to Station Hospital Ambala in May 24th 1912.

COMPLAINT:— Pain & discomfort in the right side of the chest & fever.

STATE ON ADMISSION:— Patient was somewhat emaciated, temperature was hectic in type, ranging from normal in the morning to 102°-103° at night. There was pain on the right side, increased on respiration, acute tenderness on palpation in the mid-axillary line about the level of the 8th rib. There was considerable upward enlargement of the Liver.

TREATMENT:—

The Liver was explored & typical Liver pus found in the right lobe, the cavity was drained in the usual manner.

Patient was subsequently given Ipecacuanha in increasing doses, he tolerated it well & was able to take grains 45, three times a day.

A certain amount of Secondary Sepsis occurred, but in spite of it & the fact that his body was covered with Prickly Heat, he did well. His recovery was doubtless partly due to his moderate habits, & to the excellent way in which he tolerated Ipecacuanha.
CASE IV

GUNNER, K. . ROYAL HORSE ARTILLERY

MULTIPLE LIVER ABSCESSES, OPERATION, DEATH.

This patient was admitted to the Station Hospital Ambala on June 14th 1912.

COMPLAINT:— Very severe pain in right side.

HISTORY:— Patient had been out of sorts for a few days previously, but the acute symptoms developed with great rapidity. Patient had been a very heavy drinker. He had had Dysentery in South Africa in 1900.

STATE OF ADMISSION:— His face was flushed & anxious looking. There was very severe pain on the right side, over the Liver region which was increased by respiration. Tongue was very foul. Pulse 120, Respiration 24, Temperature 101°-104°.

Patient had occasional attacks of shortness of breath, & was only able to lie on his back. There was slight upward enlargement of the Liver.

TREATMENT:— It was necessary to inject Morphia to relieve the pain. Calomel was given & Ipecacuanha, but the latter was not tolerated. On the evening of the second day, his state became very much worse, dyspnoea became intense, & the pain agonising.

Operation was decided upon, the patient was anaesthetised & an exploring needle inserted. Pus was not discovered till after about half a dozen attempts. A portion of rib was excised & the abscess drained.

Patient died the following day.
POST MORTEM APPEARANCES:—

The Liver was found to be the seat of nine abscesses. The pus was of a dirty yellow colour. The organ was only slightly enlarged. No bowel lesion was discovered.

An instructive point in connexion with this case is that although the Liver was riddled with abscesses pus was not withdrawn by the exploring needle till after several attempts.

This is an indication for always using a very large needle, the one used in this case was quite up to the average size.

CASE V:—

PTE.E. .1ST CONNAUGHT RANGERS.

LIVER ABCESS, OPERATION, DEATH.

This patient was admitted to Station Hospital Dalhousie on July 3rd 1912.

COMPLAINT:— Pain in right side specially on taking a long breath.

STATE ON ADMISSION:— Patient's complexion was sallow, & muddy conjunctivae were slightly jaundiced, Eyeballs staring & prominent. He had severe pain in the right side over the Liver region, & this pain was greatly increased by respiration.

Temperature was normal, Pulse 120, Respiration 20.

Patient was somewhat emaciated. Careful percussion elicited no hepatic enlargement. Heart, Lungs & Urine were normal. Blood count no change, blood negative to Paratyphoid & Enteric. No Malaria Parasites found.
PREVIOUS HISTORY:— Patient had had a bad attack of dysentery whilst on service in South Africa in 1900, Type unknown. He had been a heavy drinker for some years.

ONSET OF PRESENT ATTACK:—

This was very insidious, patient stated that he had felt out of sorts for some weeks, but had been able to perform his duties, he had occasionally had attacks of pain in the right side.

SUBSEQUENT HISTORY & TREATMENT:—

Although the signs were somewhat indefinite, a provisional diagnosis of Hepatitis was made, patient was put on Ipecacuanha grains XV, three times a day, the dose being gradually increased to Grains XXX. Patient did not tolerate it well, and after a week it was discontinued.

During the first week in hospital patient's temperature was hectic in type, swinging from normal in the morning to 102° at night, & he had occasional rigors. After this time his temperature subsided & continued practically normal for the next four or five weeks, during which time he appeared in fair health, & was allowed up. About August 4th however the temperature took on a hectic type again, and his general condition became worse.

He had sweats, rigors, & a return of the pain in his side.

No liver enlargement could be made out. Ipecacuanha was again tried, but had to be stopped owing to the distressing vomiting which it caused. This state continued for about a fortnight, temperature hectic, rigors, sweats, etc.

On the night of August 18th Patient had a sudden attack of agonising pain in the right side and became breathless. I saw him a few hours afterwards, & noticed a considerable upward
extension of the Liver dulness on the right side.

A needle was inserted in the 9th interspace in the Scapula line, & pus withdrawn. The pus was of the typical Anchovy sauce colour which one associates with Liver Abscess.

In consultation with two of my colleagues we came to the conclusion that I had tapped a Liver abscess, & decided to treat it by aspiration, & an attempt at Ipecacuanha administration.

Aspiration was performed & twenty ounces of pus withdrawn. After this patient appeared much better but did not tolerate Ipecacuanha. On August 25th the dulness which had subsided after aspiration was again present, & Dyspnoea became marked.

Open operation was decided upon. Parts of three ribs were excised & the following condition became apparent.

A rupture of the Diaphragm communicated with an abscess cavity about an inch in diameter, situated in the upper part of the right lobe of the liver. A secondary Empyema had resulted, and the right lung was absolutely collapsed.

After the operation patient's condition improved for a few days, but soon began to get worse. Emetine, which by this time I had read of in Major Rogers' Paper was injected & Vaccines from the pus given but with no benefit, & patient died on October 20th after a lingering & painful illness.

CONCLUSIONS:— The original diagnosis, Hepatitis, was doubtless a correct one, as was the treatment first adopted, though perhaps we should have made a more determined attempt to continue it.

Two mistakes were made in this case which I fear cost the patient his life. The first was the Liver was not explored...
in the early stages. An old Indian Practitioner once gave me this advice "In all cases of fever for which you cannot find a cause in the country Exclude Liver abscess" & if I had attempted to do so in this case the result might have been different. The fact that I could find no enlargement of the Liver in this case, prevented me from doing so, & it was a mistake which I have often regretted since.

The second mistake was that when the acute & sudden attack of pain occurred on August 16th followed by marked dyspnoea, one should have at once thought of involvement of the Pleural Cavity and instead of being content with Aspiration an open operation should have been done at once, if this had been done a week would have been saved, and the lung might have expanded again, instead of becoming a mere mass of fibrous tissue as it did.

As I have stated before, while fully convinced that open operation is not as a rule the best treatment for an un-complicated case, & that one is not dealing with a secondary Empyema as well. Looking back on this case one comes to the conclusion that had I known of Emetine at the time, this patient might have recovered, the pus withdrawn was quite free from Pyogenic organisms, and the abscess was a small one. The Ipecacuanha used at first was obviously effective in so far as it went, & it was unfortunate that the patient could not tolerate it longer. If one had used Emetine daily from the first & continued it twice or three times a week for some time after the temperature had become normal, the abscess might never have formed at all, & if it had done so could have been evacuated by Aspiration without subjecting the patient to the increased dangers of open operation.
MULTIPLE LIVER ABSCESSES, MISTAKEN DIAGNOSIS, DEATH

Mr. A..., Civil Engineer, admitted to Station Hospital Dagshai, Simla Hills, September 1911.

COMPLAINT: Severe pain below the right costal margin, & irregular fever.

HISTORY: Patient had been ill for 3 months with indefinite abdominal pains, dyspepsia & irregular fever. He was a heavy drinker but had no history of dysentery.

The day before admission the pain had suddenly become localised to a spot about an inch below the right costal margin; in the mammary line. His doctor, who had been attending him for some time, regarded the case as one of rupture of a D uodenal Ulcer & sent him to Station Hospital, Dagshai for operation.

STATE ON ADMISSION: Patient's general condition was fairly good. Pulse 114, Respiration 22, Temperature 100.8. On examination of the abdomen, the right rectus muscle was found to be rigid, a very tender point was found below the costal margin, there was some dulness in the right flank & an area of dulness over the tender spot.

It was thought that a Duodenal Ulcer had ruptured into the lesser sack, thus giving rise to no very acute symptoms. A laparotomy was performed, but nothing found except that the liver was very large. The patient died three days later.

POST MORTEM APPEARANCES: The liver was very greatly enlarged, chiefly in a downward direction. On section, three small abscesses were found containing dirty yellow pus. No amoebae were found in the pus. No bowel lesion was found.
CASE II;

Corporal D...., 1st Connaught Rangers.

HEPATITIS, EMETINE INJECTIONS, RECOVERY.

Patient was admitted to Hospital at Dalhousie on October 13th 1912.

COMPLAINT; - Severe pain over the region of the Liver & Slight cough.

ONSET OF ATTACK; - was very acute, symptoms developed in 24 hours.

STATE ON ADMISSION TO HOSPITAL; - Patient had severe pain, increased on pressure over the 10th intercostal space in the right mid-axillary line, the region which he indicated was very definite. Pain was also felt in the right shoulder.

Pulse was 98. Respiration 19, Temperature 102.4, patient had severe rigors.

PHYSICAL EXAMINATION; - There was slight but very definite rigidity of the right side of the abdomen. The lower margin of Liver dulness was at the normal situation, but the upper margin was at a higher level than usual, extending upwards in a dome shaped manner in the axilla. Lungs were normal, Heart & Urine normal. Blood showed a marked Polymorph Leucocytosis. No Malaria Parasites.

PREVIOUS HISTORY; - Patient had been a very heavy drinker, he stated that he had passed blood in his motions a couple of years previously, but his documents showed no admission to hospital.

TREATMENT & SUBSEQUENT HISTORY; - Patient was put to bed on a milk diet, Calomel & Mist Alba freely given. This produced a watery motion but there was no suggestion of dysentery & no Amoebae were found in the stools. Having recently read Major
Rogers' Paper on the use of Emetine in conditions due to Amoebae, I thought that this was most probably a suitable case as it appeared to be in the pre-suppurative of Liver abscess, & decided to treat the case by injections of Emetine Hydro-chloride. Emetine Grains 1/3 was injected hypodermically on October 13th, & this was repeated on the next three days. On the second day of patient's stay in hospital it was noticed that the Hepatic area, chiefly over the right lower costal margin, was distinctly bulged. This area was very tender on pressure.

For the first week the temperature of the patient ranged from 100' to 102' but from the third day in hospital his general condition became much better, his pain diminished in intensity and the rigors ceased.

On October 21st temperature began to rise again, & Emetine grains 1/3 was given. For the next four days temperature continued above normal, & Emetine was given daily.

During this period patient felt quite comfortable & had no pain or tenderness. On October 26th temperature was normal, & continued to be so throughout the rest of his stay in hospital.

Emetine was given every second day until November 3rd when it was discontinued.

The swelling in the Liver region & increased dulness lasted for a considerable time after the acute symptoms had disappeared, & it was not until six weeks after admission that the liver resumed the normal limits.

CONCLUSIONS: I think that this was a typical case of Hepatitis which without treatment would have gone on to suppuration.

During the first ten days I was more than once on the
point of exploring the liver as the rigors & Leucocyctosis were most suggestive of pus formation. Patient remained in hospital for some time longer, during which time he gained a stone weight.

CASE 8 ;

A NATIVE CARPENTER
LIVER ABSCESS, ASPIRATION, INJECTION OF EMETINE, RECOVERY.

This patient was admitted to a native hospital of which I was in charge at Dalhousie on October 1912.

COMPLAINT ;— Pain in right side & Fever.

STATE ON ADMISSION ;— There was obvious bulging of the liver on the right side, this bulging was quite apparent on looking at the patient from the opposite side of the Ward.

Liver dulness extended as high as the 4th rib in the mid-axillary line. There was no downward enlargement. There was fluctuation, oedema & great tenderness on pressure over the most prominent part of the swelling.

TREATMENT ;— An aspirating needle was inserted & twelve ounces of Typical Liver pus were withdrawn. Emetine Gr. 1/3 was injected & repeated daily for three days. Patient did not vomit. Patient was very much relieved & temperature remained low for several days. On the fifth day however it was noticed that pus was again accumulating & a small quantity, between 2 & 3 ounces was withdrawn. On this occasion a grain of Emetine diluted in two oz. of Saline solution was left in the abscess cavity.
Emetine injections were continued for three days after which time, as the hospital had to be closed for the Winter, I recommended the patient to go to Ambala to continue treatment at a native hospital there; he refused to do so & said that he would return to his village & die there.

He therefore left Dalhousie & I heard nothing further of him until the beginning of January, when I found out on making inquiries that he had made a complete recovery, without any further treatment, & he is now pursuing his occupation as a carpenter.

CONCLUSIONS ;-

I did not consider this a suitable case for aspiration as, on account of the fact that the pus was almost through the skin, I thought there was almost certainly some secondary infection.

I had no alternative however as I knew that the patient would not go to another hospital on the closure of the one of which I was in charge.

Patient was a heavy drinker & I did not expect him to live long after leaving hospital. I think the Emetine injected into the abscess must have had a very effective result in destroying the organisms there & producing a cure.
REFERENCES.

2. ditto Page 581.
3. ditto Page 587.
4. ditto Page 591.
5. ditto Page 594.
6. ditto Page 600.
7. ditto Page 605.
8. ditto Page 581.
10. ditto Page 576.
11. ditto Page 530.
12. ditto Page 531.
13. ditto Page 532.
15. ditto Page 908.
17. ditto Page 912.