in every great town in England, spreading in that town a more general knowledge of the facts about experiments on animals. Finally, as it is the privilege of a new society to be ambitious, and to look far afield for the extension of its work, so the Research Defence Society has been in communication with some of the most eminent American physicians and surgeons, and steps have now been taken to the formation of a Research Defence Society in the United States.

I need not say that I shall be truly glad now, or at any time, to be of service either to you, Gentlemen, or to any of your acquaintance who may care to have the Society's literature, or to be informed on this or that particular point. It was a happy thought in the mind of Professor Starling's committee to found a society which should bring together, in the unity of science and in the cause of truth, so great a body of educated Englishmen and Englishwomen. The name of Lord Cromer, its President, and the long list of the names of its Vice-Presidents, tell what the world really thinks of the science and art of our profession. Of course, the society has not done growing; it is only eight months old; it will have many more members by-and-by. It will never cease to be welcome till the antivivisection societies cease to be able to obtain a hearing. Doubtless, its work will be advanced by the final report of the Royal Commission, which may soon be published; meanwhile it looks back thankfully to the good reception which has been given to it, and to the good work that it has already done.

THE LIMITATIONS OF A PURIN-FREE DIET.*

By ALEXANDER BRYCE, M.D., D.P.H.CAMB.,

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THE advantages to be derived from the adoption of a purin-free diet are sometimes so notable that there is a tendency on the part of an enthusiast to look upon it as a panacea for all the ills that flesh is heir to. Quite recently the evidence in favour of such a diet has been accumulating, and amongst a certain section of the profession it is taken for granted that the fallacies which have been exposed time and again no longer hold any weight, and that the uric acid theory, so called, has been proved to a demonstration. The arguments from the theoretical point of view in favour of such a diet are so plausible and so difficult to refute that one is aptly to advocate its adoption without considering the consequences. For some years now I have been much attracted by its possibilities in the treatment of disease, and in selected cases where the ordinary therapeutic methods had failed, I have had no hesitation in encouraging patients to give it a thorough trial. It is astonishing what a fascination such a theory has for the young and enthusiastic physician in the first flush of his disappointment with both old well-worn remedies and new much vaunted specifics. On the face of it the whole thing seems so absurdly simple that it does not need any elaborate demonstration to prove its truth. The body of your ailing patient is a more or less intricate filter into which for purposes of nutrition have been poured certain solutions of nutriment containing certain poisons which are not completely excreted, and hence accumulate therein, producing well-defined acute or chronic diseases according to the temperament of the patient. To eliminate the disease all that seems necessary is to expunge the poison from the food, and, where this cannot be done, to select foods which contain no poison, and you go forward with the simple and at first not easily shaken faith that disease in such circumstances is really an impossibility.

Even when, after much patient research—as I have undertaken—you prove without the shadow of a doubt that the bulk of the purins and xanthins ingested are as a rule easily excreted within forty-eight hours, you do not lose faith, and you look round upon the countless examples of healthy men and women who have lived to a good old age and have triumphed over all the dangers of the foods against which Haig issues his diatribes as having become in some unaccountable way possessed of the true elixir vitae. After a few years' careful observa-

tion, however, you are not quite so sanguine as to the universal cure-all, and I propose in this short paper to give a record of some cases in which the results have not been so favourable as some recently reported.

GROUP I.—Headaches.

This group comprises headaches of a periodical nature, sometimes accompanied by sickness, at other times not, but always of the character so generally ascribed to the condition known as uric-acidaemia. All of these cases occurred in ladies who refused to adopt a rigorous purin-free diet, but as a compromise agreed to give up tea, coffee, and cocoa. In the six cases I have noted the results were remarkable, as, after a preliminary exacerbation of the headache, it disappeared never to return. The following is a typical case:

Mrs. J., aged 38, engaged in much religious work, involving, doubtless, the drinking of much tea, suffered from severe headaches of the migraine type, compelling confinement to the house for the whole day. For a week after the exclusion of tea from her dietary she had a severe and continuous headache, and thereafter complete freedom. After abstaining from tea for eighteen months she again, about four years ago, began to take it in smaller quantities, much diluted with water, without a return of the headache.

I am of opinion that the great majority of such headaches in women are due to caffeine poisoning, and for a long time are kept at bay by an extra dose of the poison, so that it becomes quite a common thing for the sufferer to fly to another cup of tea in order to obtain relief, with disastrous results in the long run.

Tea, coffee, and cocoa are nerve poisons, cardiac poisons, and cerebral excitants, and the headache is sufficiently explained by the toxic factor, without having recourse to the statement that xanthins are analogous to purins, and hence are converted into uric acid, or one of its congeners, and as such accumulate in the body. Whenever the dose of the poison is reduced to the amount the body can tolerate the bad effects cease. Probably the temporary relief obtained by a cup of tea is due to the fact that caffeine quickly acts as a diuretic, and leads to an increased excretion of the nitrogenous elements, especially of urea and the fatigue products generally. This is only possible with moderate doses, because it has been experimentally demonstrated that the greater the quantity of caffeine absorbed the less in proportion is it metabolized, and hence the total urinary purin is proportionately diminished. This cumulative action sufficiently explains the toxic effect of large quantities of tea and coffee.

GROUP II.—Epilepsy.

In this malady, in my experience, a purin-free dietary offers the best chance of a cure, and two of my cases after years of suffering have quite got rid of their attacks. In neither case, however, was the diet absolutely purin free although the rules laid down by Haig otherwise were carefully followed—namely, (1) that a minimum of fluid be taken, (2) that the bowels be kept extremely well open; and I added a third instruction, to avoid all salt in the food, replacing it in the bread used by a small quantity of sodium bromide. A third case:

Miss S., aged 24, has now been under treatment for four years without having had a single attack, as compared with one every three months before that; the only purin-containing food allowed is 6 oz. of some kind of animal food once daily.

This case, as well as the three I am about to mention, have had each day for the first two years of their treatment 10 minims of tincture of digitalis and 20 grains of sodium bromide. These three cases, on a limited purin-free diet, had not a single bad symptom during their course of treatment, differing markedly from the next three, on a purin-free diet.

1. Mrs. S., aged 37, had attacks of epilepsy every month for several years. Seven years ago I put her on an entirely purin-free diet, with rapid improvement. After the first six months of less frequent and less severe attacks, she had a long spell in which no attack occurred, although she was much afflicted with muscular rheumatism, and at the end of three years had a sharp attack of pneumonia. For a long time after her recovery she complained bitterly of muscular rheumatism, and was extremely weak and always tired. After this time the epilepsy began gradually to return, and now attacks occur about once in three months. The patient is, however, satisfied, and adheres to the diet, as she says she is not so ill after the attacks as when on a mixed diet, and, indeed, she and her husband and family have become fond of the rigorous diet.

* A paper read before the Birmingham Branch of the British Medical Association.

2. Miss T., aged 25, had had from twenty to thirty attacks of epilepsy a year ever since she was 7 years of age. She had been for thirteen years under the treatment of a well-known nerve specialist in England, and one year in Germany, with no good results. Four years ago I put her on a diet similar to that of Miss S., with the satisfactory result of reducing the attacks of epilepsy to five in six months. Being anxious to get a better result if possible she was early persuaded to adopt a purin-free diet, and for nine months had no attack at all. At the same time she had serious anaemia—for which I was compelled to administer iron—and felt very weakly. For six months more she kept free of attacks, and then they gradually returned, and now are as bad as ever. In the circumstances I do not blame the patient for having returned in the last few months to an ordinary diet.

3. Miss Y., aged 23, has had attacks of epilepsy at infrequent intervals since she was 13. Four years ago she came under my care, and was put at once on a purin-free diet, with the result that for just two years she has had only one attack, and that a very slight one. Unfortunately, however, she has also suffered from anaemia, almost constant nasal catarrh, rheumatism, indigestion, and amenorrhoea. She ceased taking the medicine at the end of two years, but still continues the diet, and although she has had no further attack of epilepsy, she remains in a condition of physical disability, with the symptoms above mentioned, but considers the freedom from epilepsy cheaply purchased by the substitution of the other maladies.

In common with all my other patients on a purin-free diet, these three have felt the cold severely. Two of them, however, are so convinced of the value of the diet in their malady, that they insist on persevering with it for a longer period, and as I am quite certain of at least the temporary value of such a mode of dieting in most chronic maladies, I have encouraged them in this desire, although from experience I expect a recurrence of their trouble in perhaps a less aggravated form. This great reluctance to give up a fleshless diet after it has been persevered in for months or years, is a feature of most cases. Many of them seem to think there is a special virtue in carrying out such a regimen, and although they do not quite look upon themselves as martyrs in a good cause, they have a sense of importance which is almost religious in its fervour, and which is much intensified when they lose all taste for animal food. This the vegetarian takes to be an absolutely certain proof that his is the only natural diet, forgetting that it is quite possible to find people who have in a similar manner lost all taste for fruits and nuts. It is a notable fact that after having been on a purin-free diet for a lengthened period, a return to mixed diet is often followed by bad results, due to inability to digest the food, and other causes, but not necessarily due to the purins. Purins in the form of meat juices and gravies are strong peptogenic agents, being the greatest stimulants to the digestive powers which we know, but, like all stimulants, in excessive quantities they are apt to exhaust the functions to which in small quantities they are valuable adjuncts. Each food has its own special peptogen or digestive stimulant, which acts best when the stomach is for a short time accustomed to its stimulus, but when deprived of it for some time, it does not at once respond to its peptogenic properties. This I believe to be the explanation of the bad results of resuming a mixed diet after a temporary deprivation.

I am sure that quantity of food has much to do with the attacks of epilepsy, as it is a common thing for such patients to remark that when they are increasing in weight they are about to have an attack, and they are almost invariably correct. The only certain fact we know in the pathology of epilepsy is the instability and proneness of the cortical cells to discharge their energy; and increased blood supply is a highly probable factor in this irregular discharge of nervous energy. Purins in the blood may act in this manner, but it is much more likely that they stimulate the appetite, especially for nitrogenous foods, which are the chief source of nerve energy, and thus precipitate an attack. Total deprivation of purins seems so to disorder the digestions of those once accustomed to them that toxæmia is produced, and this of itself is apt to set up convulsions. Where, however, a good digestion, not spoiled by years of bromide administration, exists, a purin-free diet, specially in recent cases, will be found most valuable, and even in confirmed cases of the same type will diminish the frequency or severity of the attacks. In the average case, however, a diet without free purins but only those contained in a small quantity of the accustomed animal food will be found more suitable.

GROUP III.—Asthma.

I have put a considerable number of cases of asthma on a purin-free diet, with the almost constant result of a temporary—sometimes prolonged—improvement, and after a few months a more or less severe relapse. A typical case is—

Mrs. D. had asthma of the most severe character till she was 33 years of age, at which time she weighed about 6 st., although 5 ft. 10 in. in height. She then adopted a rigid purin-free diet, and for two years had no attack at all, during which time she gained 2 st., and could ride a bicycle and walk many miles at a stretch. Thereafter she gradually became subject to her asthmatic attacks again, began to lose strength and weight, although she persisted in her dietary until a more than usually severe attack almost put a term to her existence. I persuaded her to add 6 oz. of animal food to her daily diet, with a speedy return to physical vigour. Her asthmatic paroxysms are not so severe as before the adoption of the purin-free diet, and it is notable that they are in inverse proportion to the number of open-air holidays she takes.

Mr. D., aged 48, small shopkeeper, for over twenty years was only one month a year in his shop, the other eleven months being spent in his bed or bedroom. Nearly five years ago I put him on the purin-free diet, with the remarkable result that these periods were reversed, and he spent eleven months a year in the prosecution of his daily work. After two years, however, his asthmatic attacks began to recur, and he became weakly and unable to resist the cold. He was loth to desist from the diet, but soon saw the necessity of doing so, and adding small quantities of fish and chicken to his daily menu. On this diet he is still able to attend to his work for ten months a year.

Miss H., aged 28, suffered from asthma for twenty years, and found no benefit at all by adopting the purin-free diet. Shortly after abandoning it she displayed signs of osteo-arthritis, and about the same time became a votary of a well-known so-called cure for asthma. As the osteo-arthritis became worse the asthma became better, and she is quite satisfied that the apparatus she uses is the agency of amelioration.

Miss R., aged 28, is an interesting case. She has had asthma as long as she can remember. Five years ago she removed to a bracing suburb, and for eighteen months the asthma disappeared—not an uncommon occurrence; then it slowly returned, and she was persuaded to adopt the purin-free diet. The result was at first a distinct and decided improvement, with great relief; but although she ate well, she gradually began to lose flesh and became anaemic, lost her appetite, and finally, after six months, was compelled to take to a diet including fish, poultry, bacon, eggs. Her anaemia soon disappeared, her physical energy returned, and her asthma is at least no worse than before the experiment.

Miss F. S., aged 20, has had asthma for many years, and for eighteen months after adopting a purin-free diet had complete freedom. Then the attacks recurred, although less frequently, and, thinking she could be no worse, she added a little animal food to her dietary. This, however, made the attacks much worse, and she is now again on a purin-free diet, with comparative freedom from asthma. It is quite possible that the youth of this lady is in her favour, and for this reason she may find salvation in a purin-free diet.

It will thus be seen that my experience of the purin-free diet in asthma is very similar to that in epilepsy, and that an initial improvement was almost invariably obtained, but after a fairly definite period a recrudescence took place. I can hardly resist the conclusion that the explanation of the improvement from the diet is somewhat on a par with that due to a change of climate, and probably both are brought about by metabolic stimulation. When the metabolism flags toxic products reappear, and lead to a return of the malady. The cause of asthma is probably varied, but is closely bound up with the pneumogastric nerve, and it is hardly to be wondered that change of air and change of diet should both bring temporary amelioration of the condition.

GROUP IV.—Neurasthenia.

I have notes of two cases of this condition.

Mrs. A., aged 48, whose constant complaint for nearly twenty years of pain in some part of her body, without obvious cause, suggested a trial of the purin-free diet. It suited her admirably; she had no indigestion, and gained considerable weight, but after eighteen months she was no better of her neurasthenia, and gave it up.

Mr. B. adhered to it for nine months, till anaemia, serious gastric atony, and great loss of weight frightened him. He was so ill that he was compelled to undergo an ordinary rest cure, with the result that strength, weight, and colour were regained, and the phobias, pains and aches disappeared.

A third case with a similar history to the last was that of an American teacher interested in diet, who whilst perfectly well adopted the purin-free diet, with the result that he broke down and had to take six months' holiday and a very liberal diet before he recovered.

GROUP V.—*Variable.*

Of isolated cases the most remarkable are the following:

Miss C., aged 27, for nine months had attacks of cyclic hæmatemesis. Every fifteen or sixteen days a violent vomiting of venous blood occurred, upon which no amount of medication or attention to the laws laid down by three eminent physicians made the slightest impression. As a last resource I persuaded her to try the purin-free diet, the result being a brilliant cure. At the end of a year, however, she was thinner, weaker, anaemic, and tired of life, and had the greatest difficulty in compelling herself to eat anything at all. The addition of 6 or 7 oz. of animal food to her diet soon caused an improvement in her health, but with increased appetite and indulgence the attacks returned with less frequency. She is now quite well so long as she adheres to the smallest possible amount of a mixed diet.

Miss W., aged 30, suffered from some peculiar form of ulcerative skin disease from childhood. All sorts of medical and spa treatments were tried without effect, and when she started the purin-free diet she had a large number of active ulcerative patches, besides being covered with the scars of old ones. In five months after adopting the diet she was quite free from active disease on the skin, and only regretted that there was no chance of eradicating the scars. At the end of twenty-two months—that is, seventeen months of freedom—another ulcerative patch appeared, and since then a good many more have broken out. She, however, adheres to the diet, because she has come to like it.

Miss G., aged 32, had muscular pains and slight swellings in the joints occasionally. At the end of eighteen months on the diet she could report little betterment as to these discomforts, but had lost weight, become anaemic, and was quite tired of life. Nine weeks after adding a moderate amount of animal food she had recovered her usual strength and weight.

C. S. and R. W., whilst on the diet, developed glycosuria, which soon disappeared on cutting down the starchy food.

In two cases, Mr. C. and Mr. D., who adopted the diet, extraordinary increase of the sexual appetite was noticed; in the case of the latter amounting almost to satyriasis.

Mr. W.'s case is remarkable, not only from the fact that he is one of the few who has persevered in the diet, but also because, on a diet of uncooked fruits and nuts, he has rid himself of the most annoying indigestion, phobias, and irritable weakness, despite the concomitant of inveterate constipation, which is quite a common feature amongst vegetarians, and especially those who live on uncooked foods. Cooking his food was quite sufficient in this case to cure the constipation, much to his surprise.

With such a record of cases I have not been able to escape the conclusion that whilst the purin-free diet is an admirable method of treatment in chronic disease, it is not suited as a dietary for ordinary purposes of nutrition in everyday life. The cases admirably illustrate the old adage that "every man is a law unto himself," and demonstrate the fact that most of them were extremely susceptible to the action of excess of purins in the diet, that when these were cut off completely freedom was obtained from their particular malady, but that when malnutrition arose their troubles returned with the old force. When they cautiously adopted a diet containing their old proteid forms of food, with a minimum of purins, then they regained their health and strength, and because they were capable of dealing with all the purins they ingested, kept free or comparatively free from their malady. It is not necessary to suggest that this was due to an excess of uric acid in the blood or tissues, but simply that for some reason or other, probably toxic, they were unable to deal with these particular foods.

With this experience to guide me, I am now in the habit in all chronic cases of disease in which the ordinary methods of treatment have yielded no good result, of cutting off all xanthin-containing and purin-containing articles of diet which are at the same time non-nutritious, and this includes tea, coffee, cocoa, meat soups, beef teas, and gravies. The first three contain methyl-purins, which, although they add no uric acid to the excretions, increase very largely the total urinary purin content. Nothing is lost by this means, because it has been proved that purins yield no potential energy and exert no influence on the circulation or nervous system, although they may temporarily remove feelings of fatigue, and because of their peptogenic effect slightly aid digestion. But they undoubtedly throw a great deal of extra work upon the organs of excretion and thus cause a loss of energy, and by increasing the complexity of the digestive processes are liable to form toxins. I am strongly of opinion that when all these food accessories have been expunged, or nearly so, from the diet list, very little harm can result from the other purin-containing elements; and as these are chiefly proteids to which our digestion and tissues are accustomed, their deprivation is not lightly to be recommended—a fact

which has been abundantly demonstrated in the series of cases I have just detailed. The conclusion of the whole matter would appear to be that the man who lives on simple diet in a moderate way is perfectly well able to deal with all the purins with which he is likely to meet. Octogenarians of all classes always declare that they owe their long life to the use of a simple, moderate diet, not depriving themselves of any ingredients, but using all cautiously, and indulging in hard work, many of them in the open air. Professor Walker Hall, in his admirable book on *Purin Bodies*, to which I am indebted for many of my facts, declares that the human kidney destroys more uric acid than the liver, and the muscles more than either—a striking commentary in favour of exercise, and a corroboration of the belief that the man who lives and works with his muscles in the open air can within reason eat any food he thinks fit. Even here, however, the excessive consumption of tea and meat soups and beer may occasion much of the muscular rheumatism which is such a common feature of the working man's life; and Mendel has shown that alcohol taken at a meal delays the excretion of the purins. Purins are bodies of a highly complex chemical composition, and in excess form unusual combinations in the body which may act as irritants. Too little account is taken of the endogenous purins, or those which are due to the daily wear and tear or metabolic activity of the cell constituents. They are the expression of that amount of protoplasmic activity necessary for the maintenance of cell function. Metabolism, as is pointed out by Dr. Hutchison, is not a hard-and-fast process proceeding along rigid lines to a definite conclusion, but a process as varied as temperament, and marching in different individuals by different ways to diverse results. It is clearly proven that exogenous purins—that is, those which exist in the food, both in a free and a bound condition—are excreted, the former very rapidly, and 50 per cent. of the latter in forty-eight hours. The other 50 per cent. is excreted as urea or bodies intermediate between uric acid and urea. Endogenous purins are said to be excreted in the same manner and the same time, but clearly there can be no definite information derivable on such a point. May they not be the cause of most of the trouble associated with uric acid? It is an interesting fact that most uric acid appears in the urine when the body is freshest—namely, in the morning hours and after a holiday, and no doubt this is due to improved metabolic capacity. If, as we are informed by Haig, all the retained uric acid stored up in the tissues from the digestion of exogenous purins is expelled in—at the outside—twenty-four months when the patient is on a purin-free diet, then it is obvious that the trouble in many of the cases just detailed, if it were due to uric acid at all, must have been caused by endogenous uric acid. This would prove that uric acid was not the cause of deficient metabolism, but the result. In most of the cases there was undoubted lessened oxidation of the blood and tissues, becoming increasingly evident the longer the purin-free diet was persisted in, and it was a notable fact that, without exception, they became much more susceptible to the influence of external cold. There is no clear evidence that it was the diminution of purins *per se* that was the cause of any improvement in their condition, and I am inclined to think that, in addition, the following factors contributed to any good result obtained:

1. Diminished amount of food.

2. Diminished amount of proteid.

3. Greater attention to mastication and other laws of health previously ignored.

Doubtless personal idiosyncrasy has much to do with the matter, as in other things, and it is a fact that exogenous purins are badly metabolized by gouty patients. But this is not the whole truth, for it has recently been proved that white meats like chicken and fish contain more purins than red meats, and yet the gouty man appears to suffer no bad results, or fewer bad results, from the former than the latter; the reason, I believe, is that he can digest them much better than the larger-fibred red meats.

The pathology of gout is not nearly so simple as the purin-free advocate maintains, and it is quite certain that it originates in different ways in different subjects. It may have a renal origin, or a metabolic origin, although in all cases there is a deficient purin metabolism, the purin bases being in excess in the gouty man's blood, so that

while the endogenous uric acid content of the blood is raised, the total result is a diminished uric acid output. But perverted function of one or more organs of the body has much to do with the origin of gout, and it is conceivable that a blood charged with highly complex chemical substances like purins or with toxic products of mal-assimilation may, on physico-chemical grounds alone, render it difficult for the cells to get rid of their own waste products. The gouty man may inherit a perverted function of one or more of his organs, and thus his intolerance for purins may be explained. But there is no doubt that in cases not frankly gouty we can find the same intolerance as is instanced in most of those I have mentioned, and one can hardly escape the conclusion that in them cell-metabolism is at fault, and is rendered worse by the cells being bathed in blood already full of the very products which are endeavouring to escape from them—the outcome being a low endogenous uric acid output. Another factor in the situation is the existence of ferments. Burian talks of xantho-oxidase for oxidizing xanthin into uric acid, and the uricolytic ferment (an oxidase discovered at Johns Hopkins Hospital) is supposed to be capable of decomposing uric acid into urea and other acid products of nitrogenous metabolism, but a good deal of this information is still too much in the realm of theory to help us greatly.

Of more importance, perhaps, in connexion with my series of cases is the fact that while many with powerful digestions and food assimilation can obtain their full allowance of nutriment from a fleshless diet, the average man in this country cannot, and it is worthy of note that carbohydrate foods induce a greater amount of purin in the faeces than flesh foods, no doubt because they break down a greater number of cells in the intestinal mucous membrane because of the difficulty in their digestion and absorption. May not this be the cause of the rheumatism so common in patients on a fleshless and tealess diet? It certainly is worth bearing in mind as a possible explanation of muscular rheumatism in all who are constipated, whether vegetarians or not, for if there be such a thing as auto-intoxication, then the endogenous purins may be absorbed.

In any research into the action of purins, the following considerations must always be borne in mind:

1. Personal idiosyncrasy has much to do with the diverse results reported, and in my opinion this is ultimately bound up with the metabolic activity of the cells, and especially the ability of the cells of the mucous membrane to withstand the onslaught of irritants such as purin compounds.
2. Small quantities of purin are almost invariably well borne, and only in isolated cases are larger doses not tolerated.
3. The ability to tolerate purins is markedly influenced by disease—for example, neurasthenia, so-called, and kidney ailments where the integrity of the cells of the convoluted tubules is doubtful, yet a man in perfect health with a so-called gouty tendency may tolerate them badly because they act as irritants to the mucous membrane of the hepatic ducts, and produce hepatic insufficiency.

It is suggested that one or more national institutions should be established by the United States Government for the isolation of lepers and placed under the management of the Marine Hospital Service. It is proposed that one should be established in the Gulf States and another near the northern boundaries of the United States. At present, as we learn from the *Maryland Medical Journal*, "the manner in which the States treat the sporadic cases which arise within their confines would be intensely ludicrous were it not so grave. When a leper is found, immediately a most ridiculous panic seizes those in his vicinity. He is refused admission to hospitals; an effort is made to convey him by stealth to another State; the States through which he must pass to reach his natural domicile refuse him passage; being unable to get rid of him, the authorities finally isolate him, it may be, in some hut in the woods, where he draws out his miserable existence till death relieves him from his sufferings. Such doings would seem almost a disgrace to a heathen country. There are leper colonies in the Southern Gulf States, yet the intervening States positively refuse to allow the leper to be carried to them, though making absolutely no provision themselves for such a contingency." In these circumstances it would certainly appear to be the duty of the American Government to make proper provision for the care of the lepers within its dominion.

A CASE OF TROPICAL ABSCESS OF THE LIVER RAPIDLY CURED BY MEANS OF THE FLEXIBLE SHEATHED TROCAR.

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In a paper contributed to the recent Sheffield meeting of the British Medical Association I pointed out the extreme difficulty in preventing post-operative sepsis in the open method of treating amoebic abscesses of the liver, at least 80 per cent. of which are sterile when first incised. I further suggested that, in the treatment of these protozoal produced suppurations, the indication is to combine aseptic drainage with repeated quinine irrigation to kill the causative amoebae, and described a flexible-sheathed trocar devised by me for this purpose. Although I had waited in vain for over a year for a suitable opportunity of testing this method before writing on it, yet, by a curious coincidence, at the very moment when Sir Havelock Charles was condemning it as a pretty instrument invented by a pathologist, it was, as a matter of fact, proving its practical value in as striking a manner as could well be conceived, as will be seen from the following case. I am very greatly indebted to Captain J. G. Murray, I.M.S., both for giving the method a trial and generously allowing me to make use of his notes, which are here recorded.

A European male, aged 24, was admitted to the General Hospital under Dr. Murray on July 25th with the following history: He had suffered from dysentery on and off since December last, but during the past month had had only loose stools without blood or mucus. Recently he had had fever in the evenings, night sweats, with pain and tenderness over the liver. At the site of the pain there was very distinct swelling about the size of the palm of the hand between the seventh and tenth ribs in the mid-axillary line, with tenderness and deep fluctuation. The liver dullness extended from the fifth space to 1 in. below the costal margin; x rays showed the diaphragm to move badly on the right side, but no shadow was present. The lungs and other organs were normal.

Operation.

On July 27th Captain Murray aspirated through the ninth space in the mid-axillary line, and withdrew 10 oz. of typical, thick, reddish liver-abscess pus, which only partially emptied the cavity. Rogers's flexible sheathed cannula was then inserted by the side as the aspirating cannula, and the latter withdrawn. A long rubber tube attached to the end of the flexible cannula was carried to the bottom of a bottle containing carbolic lotion and a superficial dressing applied round the base of the instrument. The pus was sent to me for examination, and proved to be sterile. No amoebae were found; this is usual with aspirated pus.

Progress.

July 28th. A small quantity of pus has drained into the bottle. Aspiration was applied to the cannula, and a little very thick pus was withdrawn. An attempt was made to pass some quinine solution in through a funnel, but it did not run well. The patient has been comfortable, and has recovered well from the slight shock of the operation.

July 29th. A little matter has drained from the tube. On applying aspiration a few drachms of thick pus were removed. The cavity was then irrigated through the silver Y tube with bihydrochlorate of quinine solution, 5 grains to the ounce, which had been sterilized by boiling, a glass syringe being used for the injection.

July 30th. A little shreddy pus has drained into the bottle, but less than at first. The patient was attended to by the writer, and a few drops of thick pus were removed by aspiration and the cavity irrigated by quinine solution as before. It has contracted so much that it would only hold a little over ½ oz. of fluid at a time without causing pain. He has slight evening rise of temperature still (as shown in the chart), but is quite easy and feels much better.

July 31st. He complained for the first time of the cannula hurting him slightly. The discharge is much less and distinctly thinner than before the quinine injections. Very little matter is obtained by aspiration and irrigation.

August 1st. Some shreddy discharge in the bottle. Irrigation continued.

August 2nd. Still a little discharge. Temperature now quite normal.

August 4th. Discharge much less and thinner than before. No fever.

August 5th. Hardly any discharge, the carbolic lotion in the bottle showing only a haziness. No pus obtained by aspiration, and only a little shreddy material by quinine irrigation.