remained unhealed. This led directly inwards for about an inch, and was probably connected with one of the silk ligatures which lay immediately beneath the opening in the abdominal wall. In all other respects the patient was quite well.

The case presents several features of interest. As stated previously no decided opinion was formed prior to operation as to the nature of the disease affecting the bowel. The history was not that of recurring appendicitis, and the size and position of the tumour were opposed to such a diagnosis. This is mentioned because the case had been diagnosed as one of disease of the appendix, and the patient had been sent to hospital for operation on that account. The absence of any history of diarrhoea or hæmorrhage, and the presence of a distinct tumour negatived a diagnosis of ulceration of the bowel, and the disease was of too chronic a nature to be a cancer. The case serves to illustrate the fact that diarrhoea and hæmorrhage do not necessarily occur even when extensive ulceration of the cæcum exists. An interesting case, illustrative of the difficulty of diagnosis in these cases, is reported by Pilliet in the *Progrès Médical* of November, 1894. In that case the tumour was considered by some to be a fibroid, by others an osteoma. When explored by operation it was incised, and found to be the cæcum affected with tubercle. No attempt was made to remove the diseased part. Stricture of the cæcum is very uncommon. Out of a series of 44 cases of stricture of the large intestine Treves only found 4 in the cæcum. Considering the narrowness of the stricture in this case, it is remarkable that there were not more definite signs of obstruction.

There is reason to think that tuberculous disease of the cæcum is more common than is generally believed, and that some of these cases are mistaken for inflammatory conditions of the appendix. A very instructive case of this nature came under my care in hospital a few years ago. Before the patient came into hospital a swelling had formed at the site of the appendix, which was taken to be an appendicular abscess. The abscess had burst spontaneously, and after some time a fæcal fistula formed. When the patient came to hospital there was found to be considerable induration in the neighbourhood of the cæcum, and several fistulæ leading down to the indurated mass. A considerable quantity of pus and some fæcal matter was discharged from these fistulæ, and the pus tended to burrow in various directions. An exploratory operation was undertaken to see whether it was possible to close the communication with the bowel. The fistulæ and sinuses were laid open, but it was found that there was such extensive matting together of the parts that it was impossible to isolate the bowel from the surrounding structures. After a sufficient interval of time had elapsed a second operation was performed. The abdomen was opened and the affected portion of bowel was shut off from the rest of the alimentary canal by short circuiting, the lower end of the ileum being united to the transverse colon. The patient recovered from the operation, which was so far successful that all communication between the alimentary canal and the diseased portion of bowel was completely shut off. The sinuses, however, failed to heal, and pus continued to burrow in various directions in the iliac fossa and loin. The case was taken to be one of tuberculous disease of the intestines, and this opinion was strengthened by the fact that after a time a fresh fæcal fistula formed at the site of the second operation, ulceration of the bowel having taken place at this point.

The possibility of confusing cases of disease of the appendix with cases of tuberculous disease of the bowel itself was pointed out by Mr. Herbert Page a few years ago. Writing in the *Lancet* of July 3rd, 1897, he published a case very similar in many ways to the case under record, but in which the adhesions were too dense to admit of removing the diseased intestine. Cases like Mr. Page's, and the one previously operated on by myself, show that the difficulty of isolating the diseased portion of bowel may prove insuperable, yet the possibility of such a condition being present should not deter the surgeon from exploring the part.

When a reasonable suspicion of tubercle of the cæcum exists an exploratory operation should be undertaken, and should the surgeon's suspicions be confirmed an operation of this nature appears to offer a fair chance of recovery from an otherwise incurable and distressing affection. The earlier the operation is undertaken the greater will be the likelihood of a successful issue.

THE SPONTANEOUS CURE OF HYDATID CYSTS.

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It is well known that hydatid cysts which have undergone degenerative changes resulting in a "spontaneous cure" are not uncommonly found in the *post-mortem* room. An example of this condition occurring in the liver has lately come under my notice, and it, I think, throws some light on the vexed question of the causes leading to the death of the parasite:

The patient, a man aged 63, died from the effects of an enlarged prostate. With the exception of the urinary organs, nothing abnormal was found at the necropsy until the liver was examined. This organ weighed 3 lbs. 15 ozs., and contained two cysts in different stages of degeneration, the position of which is indicated in the accompanying diagram.

Lower surface of the liver; A, is the larger cyst; B, is the smaller cyst; C, gall bladder.

The larger cyst was about the size of an orange, and situated in the right lobe of the liver; its anterior wall did not project beyond the surface of the liver around it, but its posterior wall bulged considerably, causing the cyst to have a tense globular appearance. The cavity of the cyst was completely filled with a uniform grey, putty-like mass. The capsule varied from $\frac{1}{4}$ to $\frac{1}{2}$ inch in thickness, and was composed of dense, fibrous tissue, undergoing in parts calcareous changes, and on its inner surface was a thin, greyish-yellow, shaggy-looking deposit, which could easily be scraped off the fibrous tissue. The capsule in parts was comparatively easily separated from the hepatic tissue in contact with it, and there were no signs of shrinkage. The putty-like mass was composed of granular debris, fatty material, crystals of cholesterine, and a few hooklets. The smaller cyst was situated in the left lobe of the liver. Its capsule presented the same characteristics as the above described. Its contents, however, were in a different stage of degeneration, and the putty-like material was here mixed with a grey, translucent gelatinous substance, crescentic and folded layers of which were arranged in a concentric manner, and alternated with the thicker layers of pultaceous material. The microscopical appearances of this cyst were similar to those of the other, and the grey gelatinous membrane presented the typical laminated character of the hydatid endocyst. Neither cyst contained bile. The liver itself was fibrous, and the microscope showed a general cirrhotic condition of the organ, most marked in the immediate neighbourhood of the cysts.

The chief points in the above cases are:

1. The two cysts were in different stages of degeneration; in the smaller one a quantity of the laminated hydatid membrane was still found, but in the other not a trace of this remained, and indeed nothing to indicate its nature except the presence of a few hooklets, which were only found after repeated examinations.
2. Both cysts were situated in the peripheral parts of the liver and projected considerably beyond its surface.
3. There were no evidences of pus in the contents of either cyst.
4. The capsules of the cysts were globular and tense, and there were no signs of puckering or contraction.

5. Neither contained bile.
6. There was a general fibrotic condition of the liver.

THE CAUSES OF SPONTANEOUS CURE IN HYDATID CYSTS.

Various explanations have been offered as to the causes leading to the death of the hydatid parasite. Opinions seem to vary very much, and some of the explanations advanced are very theoretical and highly improbable. Even from a practical point of view, it is most important that the conditions which may lead to a "spontaneous cure" of hydatid cysts should be thoroughly understood, for some of the methods of treatment advocated in cases of hydatid disease have been based upon theories, and have not infrequently produced serious results. A study of the possible causes of "spontaneous cure" will also, I think, teach us that the only rational treatment for cases of hydatid cyst is removal.

It is necessary to understand in what way the hydatid receives its nourishment. The capsule, usually termed the "ectocyst," is composed of fibrous tissue formed from the tissues of the host, and in contact with its inner surface is the membranous "endocyst" lined by the thin cellular parenchyma from which spring the brood capsules. The ectocyst is supplied by vessels from the hepatic artery and portal vein, and pabulum from these bathes the outer surface of the endocyst, and by imbibition nourishes the parenchyma. A vascular system has not been shown to exist in the hydatid cyst.

The various explanations offered as to the cause of "spontaneous cure" in a hydatid cyst are:

1. Natural death of the parasite.
2. Toxic action of bile from its entrance into the cavity of the cyst.
3. Absorption of hydatid fluid.
4. Inordinate multiplication of the internal brood.
5. Changes in the ectocyst.

It will be seen that the first four explanations or any combination of them are based on the theory that changes in the tumour are secondary to the death of the parasite. The last explanation (namely, changes in the ectocyst) supposes, however, that the death of the parasite is a secondary condition to changes around it.

1. *Natural Death of the Parasite.*—The limits to the growth of a hydatid cyst are unknown. Cases are on record where a hydatid cyst has been present for forty years, and still found in a living condition. Dead cysts, however, have been found at all periods. There are practically no facts which can be adduced to support this theory.

2. *Toxic Action of Bile.*—Bile sometimes enters the cavity of a hydatid cyst, and when present the cyst has frequently been found to have undergone degeneration. On the other hand, bile is often absent in these cases, as, for example, in the case recorded above, and again two dead cysts have been found in a liver, one containing bile and the other not, and in such a case the presence of bile must be a pure coincidence. It is quite easy to understand that among the number of dead hydatid cysts found in the liver, some would probably contain bile, but that fact *per se* proves nothing. Again, dead hydatids are found in other organs such as the lung. A belief in this theory has led to the injection of bile and other medicated substances into the cavity of a hydatid cyst with the object of producing a cure, and suppuration and other bad results have thus been brought about.

3. *Absorption of Fluid.*—According to this view the absorption of fluid occurs, causing the death of the parasite, with subsequent degeneration and shrinkage. This is the explanation which, if one may judge from textbooks, has been widely accepted; and in favour of it is adduced the fact that, after tapping, the cyst sometimes disappears. This, however, does not prove that such a process can occur in the body, as there is no vascular connection between the parasite and its host. If absorption took place we ought to find in most cases some indications of contraction showing that the cyst had at one time been of larger size, but in a large number of recorded cases the degenerated cyst has been found to be tense and globular, and presenting absolutely no signs of contraction. Both the cysts described above showed no signs of ever having been of larger size. The fact that the endocyst has in many cases of "spontaneously cured" hydatids been found folded upon itself has been advanced as a proof that the ecto-

cyst has contracted; this line of reasoning, however, is fallacious, as the folding of the endocyst is as easily explained by supposing that changes in the ectocyst have prevented its further expansion, and that the endocyst, still growing, has of necessity become folded. In their latest stages one might expect that most dead hydatid cysts would be found in a shrunken condition, but it is evident that we must look to an earlier stage of degeneration to find an explanation for the cause of death. The holding of the theory of absorption producing death of the parasite has led to the treatment, once so largely in vogue, of tapping the cyst, a mode of procedure often attended with disappointing results.

4. *The inordinate growth of the internal brood* has been supposed to cause degenerative changes by pressure. There is practically no evidence to support this view—and, indeed, it is surprising what a large amount of pressure can be borne without interfering in any way with the life of the parasites. Again, in the case of hydatids in the lung there is no authentic case of a hydatid smaller than a walnut containing daughter cysts, whereas dead cysts have been found in all stages of development; and, moreover, hydatids in the lung containing numerous daughter cysts are exceptional.

It will thus be seen that the above explanations are very unsatisfactory; they may, possibly, explain some cases, but they certainly do not afford an explanation for the large majority. It is therefore necessary to seek another cause, which is less imaginary and more logical than any of those above mentioned.

5. *Changes in the Ectocyst.*—The ectocyst, sometimes termed the "pseudo-cyst," is the external covering of the hydatid cyst, and is derived from the tissues of the host. According to this theory changes take place in the ectocyst which result in an interference with the supply of pabulum to the parasite leading to its death, and to degenerative changes in the cyst and its contents. This view was strongly supported by Dr. Kelly in 1869, but does not seem to have met with general acceptance. The changes which occur are fibrotic, the increase of fibrous tissue or its condensation causing the vessels of the ectocyst to become occluded, and thus the changes in the cyst are comparable to those occurring in a tuberculous nodule undergoing caseation. The following considerations support this view:

(a) Dead hydatid cysts are most commonly found in the periphery of an organ where the blood supply would be least.

(b) In many cases no puckering or contraction is found which would indicate that the cyst was ever of larger size, and in fact they are often globular and tense.

(c) In hydatids of the lung when the ectocyst is tough and thick the cyst is usually small and undergoing calcareous degeneration.

(d) Graham has noticed that in small degenerated cysts in the lung where the ectocyst is as a rule not very thick, and may be wanting, the lung substance around is indurated.

In my case, though the ectocysts were not very thick, they were densely fibrous, and the liver tissue around showed marked fibrotic changes, and these changes both in and around the ectocyst must have greatly interfered with its vascular supply. The whole organ presented well-marked cirrhotic changes, and those in and around the capsule of the cyst seemed to be simply an exaggeration of this general pathological process.

The toxic action of alcohol has been brought forward as a cause of death of the hydatid; it cannot, I think, be reasonably supposed that a sufficient quantity of alcohol (even supposing it has a poisonous effect on the parasite) could enter the cyst; but it is not impossible that, by producing cirrhosis of the liver, it might in some cases lead indirectly to the death of the parasite.

In conclusion, I may state my belief that in the majority of cases, though probably not in all, the death of the parasite is secondary to changes in and around its capsule, and that these changes are most likely to occur in organs in which fibrous overgrowths are common. It is quite true that this view does not help us in the medical treatment of cases of hydatid disease, but, on the other hand, it offers no encouragement to the various methods of treatment based upon some of the other theories above referred to—methods often followed by poor results; and it points to the removal of the entire cyst contents as being the only rational treatment.