the *typus bovinus*, points to cattle as being a possible source of infection of human beings.

We have now still to investigate to what extent the distribution of tuberculosis in human beings is attributable to infection from the bovine source. Koch estimates the extent of infection by the milk and flesh of tuberculous cattle, and by the butter made of their milk, as being hardly greater than that of hereditary transmission. Of late years observations have been published which show that in some countries the spread of human tuberculosis is entirely independent of the tuberculosis of animals. When in London, Koch called attention to the fact of how often milk and butter containing tubercle bacilli is consumed in large towns and how comparatively rarely intestinal tuberculosis occurs. In Japan milk and products of milk play, according to Kitasato and others, no part in food of the inhabitants and still tuberculosis, and even intestinal tuberculosis, is at least as widely distributed there as in European countries, where the consumption of milk and its products is general. In Greenland, according to Rørdam, feeding infants with cow's milk is entirely out of the question on account of the scarcity of cattle, and yet the Greenlanders, according to Kijler, succumb to tuberculosis in great numbers, particularly in youth. In Germany, von Behring and Biedert did not succeed in establishing by statistics the relative frequency of tuberculosis in cattle and in man; no more was Flügge able to determine the influence of feeding infants with cow's milk on the frequency of consumption.

This also seems to demonstrate that occasionally an infection from the bovine source occurs, but, on the other hand, that the tuberculosis of cattle is not responsible for the extraordinary distribution of consumption. To this it may be objected that the infection from bovine sources would with us be much more frequent if milk were not boiled, as it very generally is before being consumed, and if the inspection of meat were not carried out as stringently as it is. As to this latter, it must, however, be remarked that its great advantage in a sanitary respect lies in a different direction. In any case, the muscle itself, according to general opinion, rarely conveys tubercle bacilli. Also the boiling of milk alone cannot have the influence in question, as milk even to-day is often consumed raw, especially by children over 1 year of age. Butter and cream are nearly always consumed without having been previously heated. Further research alone can give new light in this respect, especially in countries or districts where children are still frequently brought up on unboiled cow's milk.

The recent investigations of Heller and his followers seem to show that intestinal tuberculosis is more frequent in some districts than in others. It would certainly be worth while to look further into the causes of this fact. After what has, however, just been said it would not be right to at once attribute these intestinal infections to cow's milk. Moreover, it would be desirable to search as carefully in the respiratory organs as it is already done in the mesenteric glands for primary tuberculous foci.

Facts ascertained so far by no means speak in favour of the view that the infections with tubercle bacilli derived from cattle are a greater danger for man than a transmission of bacilli from human sources. From the fact that the tubercle bacillus of the *typus bovinus* has always been proved to be the more virulent one for experimental animals, conclusions must not be drawn as to its effect on human beings, and this also in view of the experiments of von Baumgarten and F. Klemperer. Tuberculosis in cattle has existed with us for a long time, and therefore also the transmission of tubercle bacilli from animals to man. For this reason persons to whom tuberculosis was conveyed from bovine sources must have had ample opportunity of transmitting the bovine germs to their fellow-beings. Consequently, tubercle bacilli of the *typus bovinus* ought to have been found also in many cases of consumption which have resulted from an infection from man to man. In all the literature on this subject which has come under my notice, the only case in which an adult consumptive expectorated bacilli of the *typus bovinus* is the one described by Sturmann, and even there the patient was considered as having been infected directly from cattle.

From the experiences gained hitherto, the inference may be drawn that an infection which a human being receives from cattle is not easily transmissible to other human beings, and in most cases, therefore, does not lead to the spread of the disease.

Finally, attention must be called to the fact that in those

cases where tubercle bacilli of the *typus bovinus* have been found in human beings the course of the disease was by no means distinguished by particular malignancy. On the contrary, calcified foci in the mesenteric glands, which were accidentally found in children having succumbed to other diseases, have also supplied highly virulent bacilli of the *typus bovinus*.

In any case, the observations at hand suffice to justify the demand that the measures against transmission of tuberculosis by food should remain in force to the present extent, and yet there is no reason to extend them; on the contrary, Koch's warning should be earnestly taken to heart that through over-estimating the danger impendent from tuberculous cattle, the more important problem should not be neglected—that is, the prevention of the transmission of tuberculosis from man to man. I therefore arrive at the following conclusions:

1. By bacteriological investigation of tuberculous lesions in human beings, cattle and swine, two types of tubercle bacilli can be detected which may provisionally be called *typus humanus* and *typus bovinus*.

2. The widely-spread tuberculosis of cattle is to be traced exclusively to infection with tubercle bacilli of the *typus bovinus*.

3. Swine are susceptible in a high degree to the tubercle bacilli of the *typus bovinus*, in a lesser degree to those of the *typus humanus*.

4. The tuberculosis of human beings chiefly arises from infection with tubercle bacilli of the *typus humanus*, which is transmissible from man to man.

5. Tuberculous lesions in human beings can be produced by tubercle bacilli of the *typus bovinus*.

6. Tubercle bacilli of the *typus bovinus* can be transmitted to human beings by food derived from tuberculous animals, especially by milk of cows affected with tuberculosis of the udder.

7. The part played by infection from bovine sources in spreading tuberculosis in man is small in comparison to the danger threatening from a consumptive human being.

A CASE OF INFLAMED RETROPERITONEAL HERNIA (SO-CALLED DUODENAL):

OPERATION: RECOVERY: DEATH FROM TYPHOID NINE MONTHS LATER.

By R. LAW FORD KNAGGS, M.C. CANTAB.,
Surgeon to the Leeds General Infirmary.

JOHN R., aged 22, was admitted to the Leeds General Infirmary on March 23rd, 1904, unconscious, with a broken right arm and some suspicion of abdominal injury. He was at work on some scaffolding in the morning, when it gave way, and he was precipitated a distance of 45 ft. on to some ashes. He was picked up unconscious and brought to the infirmary, but recovered consciousness before he was removed to the ward. No further ill effects of the concussion were subsequently observed.

The right humerus was fractured about the middle, and in due time united satisfactorily. There were also bruises and scratches on the loins and blood in the urine, but the hæmaturia disappeared after the first twenty-four hours. The pulse was 100; respirations, 24. The other symptoms were abdominal, and proved to be connected with a condition which has led to this paper being written.

It was subsequently ascertained that before the accident he had been ailing for some time, and as the other consequences of his injury need not be further considered the story may be told in the ordinary way.

REPORT OF CASE.

Previous History.

He had scarlet fever a year ago, and before that his health had been good. Afterwards he suffered from frequent pains in the lower part of the abdomen, and these were often associated with slight diarrhoea, which he attributed to cold. These abdominal pains were so frequent that he was rarely quite free from them. The week before the accident, which occurred on a Wednesday between 9 and 10 a.m., he had complained very much of stomach-ache. The diarrhoea had been

very troublesome on the Tuesday, and on that day he did not go to work. He did not feel well on the Wednesday, and went to work rather late, and very shortly after he began the accident occurred. There was no doubt that the accident was the result of the defective scaffolding.

Condition on Admission.

When admitted he was suffering from some degree of shock, but was not collapsed. He had not vomited, and, as

Fig. 1.—Diagrammatic sketch of the arrangement of parts found on opening the abdomen: a, Stomach; b, small intestine; c, transverse colon; d, descending colon; e, sac covered by gastro-colic omentum; f, caecum; g, great omentum; h, opening into sac.

already stated, he had quickly regained consciousness. The abdomen was rigid, and only moved very slightly with respiration. There was no tenderness, but he complained of pain in it below the umbilicus, which was like the pain he had been having with the diarrhoea. The liver dullness was slightly diminished, and there was no abnormal dullness in the splenic region. The note was dull over the intestinal region, more particularly on the left side, and there was a doubtful thrill obtained in the left flank. The pulse, at first 100, soon fell to 84. In the evening the abdominal signs

Fig. 2.—Transverse colon turned up to expose the orifice of the sac in the transverse meso-colon (operation): a, jejunum.

were less marked, there had been no vomiting, and the patient felt better.

The following day, March 24th, at 2 p.m., the pulse, taken hourly, showed a considerable and sustained increase (116 to 120). The abdomen was fuller, rigid, and immovable but was not tender. There was a fluid thrill and shifting dullness in both flanks; a fair amount of urine had been passed. During the examination he vomited—for the first time since admission—about 1½ pints of orange-coloured fluid having a marked intestinal odour. His countenance did not suggest abdominal trouble.

Operation.

An operation was at once decided on. At 4 p.m. ether was administered, and the abdomen was opened by a medium incision below the umbilicus. There was a considerable quantity of fluid present; it was of a brownish colour, slightly muddy and odourless, but strands of dirty-looking lymph came up on the swabs with which it was mopped up from the pelvis.

Fig. 3.—Diagrammatic sketch of the orifice of the sac and its relation (post mortem): a, jejunum; b, pancreas; c, inferior mesenteric vein; d, tributary vein from mesocolon.

The incision was extended above the umbilicus and down to the symphysis to enable a better view of the parts to be obtained. There was nothing abnormal about the colour or vascularity of the exposed intestines. The coils of small bowel were neither distended nor collapsed.

The distended caecum was prominent just to the right of the incision. The transverse colon lay collapsed at the upper part, and above it was a bulging swelling of a dark-red colour, and for a moment taken for the stomach. The ascending colon lay on the right of this swelling, but out of sight and higher up.

The incision was now extended to within an inch of the ensiform cartilage, and the dark-red swelling more freely exposed. On lifting up the upper angle of the incision, the stomach, pale and collapsed and small, was seen far up and at a considerable depth, lying upon the upper anterior surface of the swelling as it sloped backwards towards the posterior abdominal wall. The position of parts is represented in Fig. 1. The tumour was now a very marked object. It was globular in shape but somewhat flattened antero-posteriorly, and its transverse and vertical diameters would each probably measure about 8 in. The stomach lay deeply upon its upper surface, and the transverse colon, with a meso-colon, lay around its lower circumference and slightly upon its anterior surface.

The gastro-colic omentum constituted a thin layer over the cyst-like tumour, which showed, smooth and rounded and of a red-claret colour, through it. The tumour was tympanitic, and fluid, and intestines could be seen and made to move about within the cyst.

The hand could be passed under the lower edge of the swelling below and behind the transverse colon, and towards

the middle line the finger, meeting with no resistance, passed, as subsequently determined, through an orifice into the interior of the tumour. Though the transverse colon had a distinct mesocolon, its lower surface was much broader than the upper, the latter appearing to blend with the coverings of the cyst.

On raising the transverse colon and omentum, and drawing it well upwards, the small intestine could be seen to pass into the cyst on its inferior and posterior surface, and lying upon the posterior abdominal wall.

It was decided to open the cyst upon its prominent anterior surface through the gastro-colic omentum between the stomach and the colon. The abdomen all round was first adequately packed with gauze, then the lesser peritoneal cavity was opened by tearing through the gastro-colic omentum, and, lastly, the cyst wall composed of two layers of peritoneum, namely, the posterior wall of the lesser cavity and the lining membrane of the cyst, incised at its most prominent part. A good deal of odourless fluid escaped, and more was mopped out, and several feet of distended coils of small intestine were exposed. The coils were only slightly congested, and were covered with much yellow lymph, agglutinating them in parts, but the adhesions were easily separable.

The edges of the opening into the hernia being now held by clips, the transverse colon was turned upwards, and traction made upon the bowel emerging from the hernial orifice. The small intestine to the extent of 6 or 8 ft. was easily withdrawn until the commencement of the jejunum was reached. No sign of constriction could be detected, but the bowel withdrawn was markedly distended, somewhat inflamed, and throughout its length had layers of yellow lymph attached to it in longitudinal lines, where it had been deposited in the spaces between contiguous coils. Some of the last coils to be drawn out were more or less completely covered with thick yellow lymph, looking as though they had been plastered over with custard pudding. This lymph was entirely confined to the contents of the sac.

The aperture into the sac was circular and about $3\frac{1}{2}$ in. in diameter. It was situated in the posterior part of the inferior layer of the transverse mesocolon and just to the left of the spine. Its edge was rounded but not indurated. Emerging over the posterior edge of this orifice was the commencement of the jejunum, which as it lay within the sac was attached to the posterior abdominal wall. The impression given was that the hernial protrusion had taken place through the root of the transverse mesocolon and superficial to the duodeno-jejunal flexure.

The operation was concluded as follows: The sac was wiped out through the incision made into it in front. The hernial aperture was then diminished by a continuous silk suture applied on the inside of the sac through the edges of the opening, and in the end closed by sutures attaching it to the jejunum. The sutures through the edges of the ring were only superficial for fear of injuring a large vessel. The edges of the incision through the anterior wall of the sac were then attached to the upper angle of the parietal wound, and the interior of the sac was packed with gauze. The pelvis was drained at the lower angle of the incision and the wound closed.

After-History.

The patient was much collapsed at the close of the operation, and $2\frac{1}{2}$ pints of saline fluid were infused. For some time it was feared he would not rally, but eventually he did. His condition was very critical for three days, but by March 31st he was on the high road to recovery.

Unfortunately, the abdominal wound became infected and broke down, and had to heal by granulation. The cavity of the sac gradually contracted and in due time closed, and the patient was discharged on May 14th quite well.

Between this date and his subsequent readmission he was seen at rare intervals. He maintained that he was very much better since the operation than he had been for a long time before. He had been quite free from pain, and it now appeared that notwithstanding the history obtained soon after admission, he must have had some vague abdominal discomfort for years. He felt so well that he discarded his abdominal belt, with the result that the scar stretched to a width of quite 3 in., and the intestines could be seen mapped out beneath it.

Three weeks before his readmission he came up to complain of severe headache. On November 1st his wife came to say he was very ill, and that his doctor had referred him to the infirmary. He was at once readmitted, when it was evident that he was suffering from typhoid fever. He was transferred

to the care of Dr. Barrs and passed through a very severe attack and then had a relapse, from which he died on December 5th, nearly nine months after the operation.

Necropsy.

There were the usual *post-mortem* evidences of typhoid, and several of the ulcers had penetrated almost to the serous coat of the intestine. But the chief interest, so far as this paper is concerned, lies in the conditions connected with the former hernia.

On opening the body, the site of the aperture in the gastro-colic omentum through which the hernial cavity had been packed was recognized by a radiate arrangement of fibrous tissue lying on the surface of the omentum above the transverse colon. Two rounded bands arose at this spot and diverging, were attached to the anterior abdominal wall. These attachments were separated by the whole width of the diaphanous cicatrix. These two bands were the principal adhesions present between the anterior parietes and the abdominal contents.

There was a very wide omental adhesion attaching the transverse colon to a coil of small intestine below it. This was divided, and the transverse colon and great omentum turned up, whilst the small intestine was removed from a few inches below the commencement of the jejunum. In this way the parts connected with the hernia were thoroughly exposed.

No aperture or trace of an obliterated aperture was present in the transverse mesocolon, but a very remarkable pocket of peritoneum was found at the back of the abdomen immediately to the left of the spine and just below the parietal attachment of the transverse mesocolon. When the mouth of this pocket was expanded and drawn forwards by the separated fingers and thumb of one hand its cavity was sufficiently deep and capacious to have lodged a very large orange. It was quite 3 in. deep, and on its floor at the upper part the pancreas could be recognized behind its peritoneal lining. When first exposed it lay flaccid and collapsed, and was empty except for the first inch or two of the jejunum which emerged over its lower edge (Fig. 3).

In the fold of peritoneum that formed the margin of the mouth of the pocket the inferior mesenteric vein was found. Ascending on the left, it arched round the top, and descended on the right until it disappeared, to pass below the lower edge of the pancreas to join the splenic vein. Just where it began to curve round the upper end it received a considerable tributary from the left hand side of the transverse mesocolon. From this description it will be seen that the pocket was in all probability a remarkably developed fossa of Landzert.

REMARKS.

In placing upon record this remarkable and interesting case of retroperitoneal hernia there is no need to waste time in discussing from what particular fossa the hernial sac originated. It is sufficient to recognize that the orifice of the sac lay to the left of the spine, and was encircled on the left and above by the inferior mesenteric vein in the latter part of its course. It is evident that the vein was a most important factor in producing the conditions which favoured the formation of the hernia, and that in all probability it was some slight peculiarity in development that caused it to exert such an influence.

Mr. Moynihan, in his *Retroperitoneal Hernia*, goes very fully into these points, and to his pages the reader who wishes for further information is referred.

The death of the patient from typhoid some nine months later enabled the impressions formed at the operation to be compared with the conditions present *post-mortem*. It must be admitted that at the first glance they appeared incapable of being reconciled. At the operation the mouth of the sac was apparently unmistakably in the transverse mesocolon. *Post-mortem*, what was no doubt the sac lay on the back of the abdomen, and the transverse mesocolon was quite normal.

However, this difficulty soon disappeared, for it was obvious that, as the hernia had forced its way beneath the transverse mesocolon, and had enlarged to an enormous extent above it, the aperture of the sac had gradually been drawn upwards, and, when the transverse colon was drawn up to expose it, had appeared to be situated in the mesocolon.

This case would no doubt belong to the group called by Mr. Moynihan "left duodenal hernia," but it will be noted that the growth of the hernia was upwards. A somewhat similar arrangement is shown in Fig. 17 in *Retroperitoneal Hernia*, but in that case the lateral deviation to the left is more marked than in the present one, and it is on the lateral deviation that the more simple nomenclature is based.

A point of very considerable interest was the result of the method adopted to obliterate the sac. After suturing the edges of the aperture and packing the whole interior of the collapsed sac with gauze, which was renewed regularly until the cavity shrank and healed up in the usual way, it was natural to suppose that there would be no possibility of a return of the hernia.

My astonishment was extreme when I saw how utterly the proceeding had failed. The silk suture had evidently quickly been shed into the interior of the sac and come away with the discharge and the dressings, allowing the orifice to resume its patency, whilst the only trace of the effects of the packing were some adhesions at the upper part of the pocket, which the pathologist almost unconsciously separated with his finger as he explored its limits and extent.

A CASE OF RETROPERITONEAL FIBROLIPOMA : OPERATION : RECOVERY.

By R. J. JOHNSTONE, M.B., F.R.C.S.,

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IN Mr. Alban Doran's admirable summary of the literature of benign retroperitoneal tumours,¹ comment is made on the scarcity of recorded cases, only 13 records being available for purposes of comparison. This circumstance is, I think, sufficient apology for the publishing of the account which follows.

My patient, M. A., was admitted to the Royal Victoria Hospital on August 27th, 1904. She was married and a 3-para, aged 38, but older looking; her last confinement was eleven years previously. She first noticed the tumour six months before admission; it had increased in size rapidly for three months, and had since remained quiescent. It caused no pain, did not interfere with her appetite, or with her daily work. Menstruation had been always regular from the age of 15, was 4 to 5 weekly in type, lasted as a rule four days, and was copious. The menses came on three days after admission, and the loss, which was fairly profuse, continued for a week. She had typical "facies ovarica," was rather thin and anaemic, but heart, lungs, and kidneys were sound. The abdomen was distended by a tumour reaching from the pelvis to within 2 in. of the ensiform cartilage, rather more prominent below than above the umbilicus. It was roughly globular in shape, irregular on the surface, some of the projections being distinctly firmer than the general mass. There was no true fluctuation, but here and there one got a sense of elasticity, like that given by a small tense cyst. The whole tumour was dull on percussion, a clear note was got above it, and in the left flank. Per vaginam the uterus could be felt fairly normal in position, the pelvis was empty. I diagnosed an ovarian tumour, perhaps a multilocular cyst with almost solid contents, or more probably a fibroma.

On September 10th I opened the abdomen by an incision 3 in. long midway between the pubes and umbilicus. The tumour was greyish-pink in colour and quite solid, the uterus and both ovaries perfectly normal. The incision was rapidly extended up to within two inches of the ensiform cartilage, and the tumour thus fully exposed was found to spring by a broad base from the right flank, its attachment ending below at the right iliac fossa. The front and sides of the tumour were covered by peritoneum, the ascending colon lying on what one might call the left brow of the tumour. The peritoneum was incised along a line parallel to and about 1½ in. to the right of the ascending colon, which was then carefully stripped off the tumour, my assistant making traction to the right on the mass. When this had been done the right ureter and kidney came into view, being apparently embedded in a deep groove on the inner and under aspect of the tumour, which was freed from them, a small piece of the kidney capsule coming away in the process. The tumour then shelled very easily out of its bed in the loin, and was completely separated by dividing the peritoneal reflection along its outer border. Only two leashes of vessels required ligature. The oozing from the large raw surface left was checked by copious douches of hot saline. The cut edges of peritoneum were then sutured, bringing the right colon and kidney into approximately normal position, and the abdominal wound closed.

There was some rise of temperature for the first five days of convalescence (101° F. on two occasions), due probably to absorption from the raw surface. Diarrhoea was present for

the first week, owing, I suppose, to interference with the blood supply of the ascending colon. The patient left hospital four weeks later, much improved in appearance, and with a sound abdominal scar. I saw her again nine months after operation. She had put on flesh, and expressed herself as "never better." Abdominal palpation showed no return of the tumour, and the kidney could be felt in its normal position.

The tumour weighed 20lb. on removal. On section it proved to be a lipoma with small myxomatous areas, and a fair amount of connective tissue, and this diagnosis was confirmed microscopically.

Fig. 1.—Ideal section to show relations of tumour: T., tumour; R.C., right colon; L.C., left colon; S.I., small intestine; R.K., right kidney; L.K., left kidney.

The case requires very little comment. Like most other surgeons who have reported cases of this kind, I had no idea of the true state of affairs until the abdomen was opened. This might be avoided, and a correct diagnosis reached sometimes at least by careful and repeated examination of the relative areas of dullness and resonance; but some cases, I am convinced, would, even after the greatest pains had been taken, be confounded with ovarian tumours. As regards the operation, I was surprised in my own case at the ease with which it was performed, but I have since then assisted Professor Byers in an attempt at the removal of a large retroperitoneal tumour, which turned out to be a myxosarcoma. The growth was so intimately connected with the vessels of the mesosigmoid into which it extended that removal was impossible without endangering the vitality of the gut; and in addition tremendous venous haemorrhage, which could only be checked by plugging with gauze, followed the separation of the upper part of the tumour, which lay to the right of the middle line below the mesenteric attachment. This patient, however, recovered from the operation, and left hospital comparatively well. It is easy to understand, therefore, that the ease and safety of the removal will altogether depend on the relations of the tumour to the viscera, and still more to the vessels of the abdomen. As regards the treatment of the capsule, I am firmly convinced that in a simple case, such as mine, the best practice is not to plug with gauze, but to suture the cut edges, close the abdomen, and rely on firm pressure with a binder to prevent, or at least to check, oozing and the formation of a retroperitoneal haematoma. Even should this form, with aseptic methods there is practically no risk, and every probability of its ultimate absorption, while the patient escapes a lingering convalescence, a troublesome sinus, and the increased chance of a ventral hernia.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, October 22nd, 1904.

PROFESSOR CZERNY has resigned the Chair of Surgery in the University of Heidelberg, which he has held since 1877, in order to devote himself entirely to the duties of Director of the Institute of Cancer Research. He will be succeeded in the Chair of Surgery by Professor Garré, who accepted a "call" to Breslau after the death of Professor von Mikulicz.