OBSERVATIONS WITH LACTIC ACID BACTERIA.

By R. W. ALLEN, M.D., B.S.LOND.,

LATE GULL STUDENT IN PATHOLOGY, GUY'S HOSPITAL.

IN view of the considerable vogue at present enjoyed by "curdled milk" products, the following considerations are not devoid of interest.

First in regard to the preparation of curdled milk by means of the various lactic acid bacillary cultures at present on the market. About the beginning of this year I conducted an investigation upon milk collected from several of the best known dairies in London. Should the milk it is proposed to curdle be contaminated bacteriologically, the possibility of this contamination being enormously increased by the needful six to twelve hours' incubation, despite the presence of the added lactic acid bacilli, cannot be ignored. It therefore became necessary to determine what preliminary sterilization methods should be taken with such milk as is ordinarily supplied by some of the better-class dairies before subjecting it to the lactic fermentation. I came to the conclusion that raising the temperature to the boiling point and allowing it then to fall to 40° C. was quite inadequate. Several samples of milk so treated and then incubated for eight to ten hours were found to be simply swarming with sporing and non-sporing organisms, including the *Streptococcus pyogenes longus*. It was found that the temperature should be maintained near the boiling point for almost an hour to ensure reasonable sterility, and I accordingly advised Mr. W. H. Martindale to this effect when he was placing his Trilactine product upon the market, and such a caution is therefore printed upon his boxes. Despite this warning I had a sample of milk sent me lately which had been treated for ten hours with this preparation at 37° C. without the production of the perfect curd which is usually obtained. I suggested that perhaps the tablets had been overheated in the manufacture, but examination of some of the same as had been employed dispelled this idea. Upon examining the half-curdled lumpy product I had received it was found to be swarming with bacteria, both staining and failing to stain by Gram's method, and among these *Streptococcus longus* was especially prominent. Inquiry revealed that the temperature of the milk had merely been raised to 100° C. and then allowed to fall. Had the patient for whose use the milk was designed swallowed such a bacterial culture the effect might well have been disastrous, and too strong a warning can hardly be given to ensure the future prevention of inadequate preliminary sterilization of the milk.

The second observation was made upon a patient who had suffered from typhoid fever and dysentery in South Africa. Intestinal digestion was subsequently attended by much discomfort, and food passed through the small intestine at an abnormal rate. Test meals showed that the stomach was acting quite normally; regurgitation of bile, however, occasionally occurred overnight. Examination of the faeces showed little evidence of incomplete digestion, but the bacteria were very numerous.

A large dose of bismuth was given at 9.45 a.m., upon an empty stomach, and screen tracings taken then, at noon, at 1 p.m., and at 5.15 p.m., by Dr. A. C. Jordan, to whom I am indebted for the following report: "The stomach was found to be normal in size, shape, and position. Gastric peristalsis was very active; normal in direction. The antrum pylori filled and emptied itself in the normal manner, showing the pylorus to be normal. After 2½ hours some bismuth had already begun to enter the caecum, that is, in little more than half the usual time. There was still bismuth in the stomach. One hour later (1 p.m.) there was rather more bismuth in the caecum, ascending and transverse colon, almost to the splenic flexure. Hence the intestinal contents were passing through the large intestine at the normal rate. The only abnormality consisted in the unusually rapid rate of progress through the small intestine. The lungs and heart appeared normal, and no other abnormality was to be made out."

In view of the discomfort experienced by the patient, and the bacteriological findings in the faeces, he was given curdled milk for a week. The faeces were then examined bacteriologically. No bacteria were to be seen in smears, and culture plates made with agar and with gelatine from

a whole loopful of the faeces, yielded after three days' incubation colonies varying from four to ten in number, and consisting solely of lactic acid bacteria. The diminution in bacterial contents of the faeces was thus extremely striking.

The third observation was one typical of several.

A case of chronic gleet of seventeen years' standing had been treated with gonococcal vaccine, and with a series of vaccines made from the other organisms present. The condition had thereby been very much improved, cells were almost absent in smears made from the slight discharge still present, and such as were present were of the lymphoid and epithelial varieties. These swarmed with bacteria, chiefly Gram-negative bacilli and Gram-positive cocci, and upon these vaccines had little effect. This I concluded to be due to the fact that they were resident entirely upon the surface of the urethral mucosa, just as are the bacteria upon the intestinal mucosa. I therefore decided to try the effect of instillations of living cultures of lactic acid bacteria. By means of an ordinary syringe an ounce of filtered milk culture was inserted up the urethra night and morning for a week. Upon the day following the first instillation there was slightly increased discharge, which diminished rapidly upon subsequent days, and considerable itching of the urethra. Upon the eighth day smears and cultures were taken and only lactic acid bacteria found; the urethra was thoroughly flushed that morning and evening with weak permanganate solution, and next day smears and cultures again were taken. These proved quite sterile, and after the lapse of two months the urethra is still apparently sterile and no discharge present worthy of mention.

It was found that certain varieties of lactic acid bacilli were more active in this connexion than others, and that the percentage of lactic acid present in the culture medium was of importance. A preparation according to the formula I found most useful is being supplied by Martindale under the name of "Trilactine Special for Injection," and is well worthy of extended trial in such cases where bacteria are resident upon the surface of the mucosa, and not in the glands of Littre and the lacunae.

REMARKS ON A CASE OF TUBERCULOUS PERITONITIS.

By OLIVE ELGOOD, M.S., M.B.LOND.,

MOSELEY, BIRMINGHAM.

THERE appear to me many points of interest in the following case, which does not easily fit into any of the classifications with which the current literature somewhat cursorily deals with this disease, so that although the termination proved disastrous, I think the case worthy of publication.

E. H., aged 27, was first seen by me on September 24th, 1907, with the complaint of dyspareunia and sterility, dating from her marriage two years before.

History.

Up to her visit to me menstruation had been perfectly regular and normal, and the general health always satisfactory; there had been no former illnesses, except, as was revealed by subsequent investigation, a somewhat vague attack of pelvic pain and menstrual disturbance, unaccompanied by fever, occurring after sitting on wet sand at the age of 17.

She was herself one of seven children and her husband one of three, and on both sides there was a complete absence of any tuberculous history.

Condition when First Seen.

There were no physical signs of disease in lungs or abdomen. The hymen was unruptured. Great pain was felt on introducing the finger into the vagina, but nothing abnormal in the wall of the vagina or in the vulva. The uterus was fixed in complete retroversion, and thickening of the whole vaginal vault was felt. I could not define the appendages on either side.

Believing the existing condition to be the effects of an old peritonitis, probably dating from the attack mentioned as occurring ten years earlier, but in any case the origin being obscure and not pointing in any way to tuberculous or any other specific trouble, I prescribed tonics, vaginal douches and plugs, and rest.

After-history.

Two months elapsed before the patient came to see me again, during which time she had developed a persisting, chocolate-stained discharge. She complained of having had four definite menstrual haemorrhages, and spoke also of a pain gradually

increasing in severity for the last two to three weeks, in the lower dorsal region, and of an increasing general lassitude.

On examination of the abdomen I now found an obvious distension due to a fluid tumour (a dilated bladder being excluded) the size of a large cocoanut in the right iliac region. No localized thickenings or masses were to be felt. The uterus was even more densely fixed than before, and an ill-defined mass could be felt in Douglas's pouch, presumably inflamed appendages.

During the next fortnight I had the patient under close observation in bed: the pain in the back became very severe; the collection of fluid, which altered in position with the movements of the patient, rapidly increased in quantity, so that at the close of the fortnight the abdomen was about as large as with a seven to eight months pregnancy; during this period vomiting began. The vomit consisted of clear watery fluid, was unassociated with food, and occurred in attacks lasting for two or three days at a time. It appeared to be controlled by bismuth. The bowels never gave any trouble, and easily answered to gentle laxatives when these were necessary. Loss of weight was rapid, and was obvious to the eye even during so short a time as a fortnight. There was no rise of temperature.

Dr. Stanley Barnes then saw the case with me, and agreed that the condition was probably acute miliary abdominal tuberculosis with effusion, though the rapidity of the course led to a suspicion of malignancy of some organ, possibly the ovary. He also corroborated my opinion that an exploratory laparotomy with removal of the fluid was the course indicated.

Operation.

On December 22nd, 1907, at 9.30 a.m., I explored the abdomen with the assistance of Mr. Hewetson. After removing about 13 pints of clear, straw-coloured fluid, we found the intestines densely studded throughout their whole course with miliary tubercles, and feeling collectively exactly like a sponge. They were collapsed and toneless, and lay together in a heap, but there were no adhesions, and scarcely any appreciable thickening of the parietal peritoneum. The omentum was shrunk, non-adherent, and also thickly studded, and a few isolated patches of recent lymph were lying loose. The whole peritoneum had a reddish appearance as of recent acute inflammation.

Both tubes were dilated to the size of two fingers, felt dense, and were freely movable and non-adherent at the sides of the uterus. The latter was retroverted and held down by fibrous thickening in the cellular tissue of the pelvic floor. There were no obviously enlarged glands. Considering the extent of the disease we thought it useless to attempt to remove the pelvic organs; and, after thoroughly mopping up all the fluid, I simply closed the abdominal wound in the ordinary way.

Post-operative Course.

The temperature rose to 100.6°, and the pulse was 112 during the evening following the operation. The patient passed a very restless night, and complained of much pain in the abdomen and back; she also vomited small quantities of watery fluid persistently. Fearing an increase of exhaustion, I injected ½ grain morphine the following morning. She dozed intermittently after this, but the pulse became very weak at night, and at about 1 a.m. could not be felt at the wrist. The patient was perfectly conscious, but the condition was extremely grave. She, however, recovered from the temporary heart failure after saline transfusions and strychnine injections, and at 10 a.m. the following morning—that is, the second morning after operation—the pulse was 104 and of good quality. Flatus was all this time being freely passed through the rectum, but no stool. Troublesome vomiting persisted, the vomit becoming intensely green. Turpentine enemata and small repeated doses of calomel were given on the third day, but the latter were mostly vomited, and feeding by nutrient injections had to be started. On the fourth day a blood clot and a good deal of altered blood was vomited, there having still been no stool, though flatus was passing fairly freely. Calomel and cascara were given cautiously by the mouth, and on the sixth day a large fluid stool was passed. From this day matters began to mend; the vomiting improved considerably, though it never entirely stopped, and was always accompanied by a good deal of rather suggestive hiccough, but mouth feeding was on the whole well borne, and the general condition seemed to progress favourably. I therefore thought it safe to try tuberculin injections controlled by periodic estimations of the opsonic index.

The accompanying chart shows the effect of these injections on the indices, and indicates the doses of tuberculin used and the dates of the administrations.

The abdominal wound meanwhile healed in due course, but reaccumulation of fluid must immediately have occurred, for on January 7th, the fifteenth day after operation, the abdomen was as completely full as before the operation. There being considerable tension on the newly-healed wound and commencing embarrassment to the action of the heart and lungs, I removed, by puncturing at a point as low as possible on the abdomen, one inch to the side of the original wound, ten pints of perfectly clear fluid similar in all respects to the fluid previously removed, by this means leaving the cavity clear, as far as was possible to say.

The general condition was at this time very fairly good, the pulse had never been beyond 100 since the attack of heart failure, nourishment was being well taken, and vomiting which still persisted slightly was never alarming, and the

bowels were acting freely. The operation itself was well borne, but the next day vomiting began again with renewed vigour. Nutrient enemata were well retained, but no formed stool was passed after the paracentesis, and two days after it no faecal odour could be detected in the bowel wash-outs. A hard mass soon became definitely palpable in the right iliac fossa. Symptoms of obstruction steadily progressed, although the vomiting never at any time became faecal, and from this I gathered that there were at least two definite obstructions, one high up and the other low down, rendering the possibility of relieving the condition by surgical means hopeless. The patient gradually sank, dying of unrelieved obstruction on January 20th.

A, 3000 mg.

B, 2500 mg.

C, 2500 mg.

The following are the points in this case which occur to me as possessing interest:

1. The family history.
2. The method of infection.
3. The extremely rapid course.
4. Connexion of the pelvic condition.
5. The removal of fluid.
6. Treatment by tuberculin.
7. The significance of the heart failure.

First taking the family history and method of infection together, it is difficult at first sight to see in what way infection could have occurred. It is practically certain that the first pathological condition present was pelvic, whatever was the primary cause of this pelvic inflammation.

Contemporary authorities dispute the frequency of infection taking place through the genital tract; thus Dr. Thomas Wilson, in a recently published work, entitled *Pelvic Inflammation in the Female*, states: "The tubercle bacillus rarely gains access to the Fallopian tube and pelvic peritoneum by way of uterus and vagina. The usual routes are by the peritoneum or through the blood stream. . . . From the peritoneal cavity the tubes are frequently secondarily infected. . . ."

This is borne out by my case, since the patient was clear on the fact that marital intercourse had never taken place, nor was there the slightest suspicion of tuberculosis in the husband or his family. It is unlikely, therefore, that infection could have taken place directly through the external genital tract. On the other hand, this affection seems, according to most recent authors, most constantly a secondary infection from some pre-existing focus in other parts. Goodall, in a paper on this subject in the *American Journal of Obstetrics* for 1907, says that in 99 per cent. of cases this is a fact, while in his experience in from 30 to 50 per cent. of these the primary focus is undiscoverable by clinical examination. It is difficult quite to see why this should be, but it was certainly a fact in my case, if there were a primary focus, and I am sorry that no *post-mortem* examination was possible to discover this fact. However, the discussion of the possibility of a primary focus only increases the difficulty of the case and does not help materially. Practically, it appears that the tubercle bacilli gained access to the blood of an individual with no inherited tendency to foster the disease, and found a suitable pabulum, in which to flourish, in some old-standing pelvic

adhésions. Thence it spread all over the abdomen. If this reasoning be correct, the interest lies in the extreme rapidity of the process, the whole course being completed within two months. Evidence of this remarkable acuteness lies in the complete absence of (1) enlarged glands, (2) abdominal adhesions, (3) any areas of caseation.

Passing on to the question of treatment I think one lesson stands out to be learnt from the results of removal of fluid.

The fluid thrown out may possibly be considered in the light of a safeguard designed by Nature as an artificial way of keeping the flaccid intestines floating out of each other's way. A warning of this possibility was given when, after the operation, symptoms of partial obstruction appeared. At the time I thought this due simply to paralysis of the gut, which would be accentuated by the dose of morphine, and the possible effect due to the removal of fluid did not assume the importance which I now give to it. The symptoms all became ameliorated as soon as the fluid had reaccumulated to any appreciable quantity, presumably as soon as the intestines were kept floating. On the other hand, when I carefully drained away all the fluid again by tapping, symptoms of obstruction reappeared, and this time progressed steadily and increasingly, giving evidence of actual kinks and not merely of paralysis. Undoubtedly, it was essential to relieve the tension in the peritoneal cavity, both because of the pressure on the heart and lungs and on the newly healed wound; but if the opportunity arose again I should be careful to remove enough only to relieve the tension, repeating the operation as often as necessary, rather than to entirely drain the cavity.

With regard to the effects of tuberculin, in such an acute case one could hardly expect much benefit from the treatment. As the index chart shows, the patient was constantly inoculating herself, and was possibly dealing, herself, with doses of tuberculin far larger than my own administrations.

It was impossible to say that at the actual moment of injection the blood had not been recharged in the interval that must necessarily have elapsed from the time of drawing the serum for the examination of the index; and though it was certainly unsafe to attempt larger doses for injection, it is doubtful whether such small quantities could be of any value.

One point of interest finally deserves mention, namely, the attack of heart failure which came on from thirty-six to forty hours after the operation. It was too late to be due to anaesthetic shock, and the question of its origin lies between a morphine toxæmia and some obscure circulatory affection directly concerned with the disease under consideration.

With regard to the morphine, opinions of course differ widely upon the propriety of ever giving morphine at all after abdominal operations. Every one will of course agree that it is a drug that should be avoided if possible, but where rest is especially indicated, as it appeared to me to be so in this instance, the benefit gained by it is often considerable, and in any case it seems hardly credible that so small a dose as $\frac{1}{2}$ grain could be responsible for such severe heart failure. Again, the patient's general condition did not suggest morphine toxæmia; the pupils, though small, reacted easily to light, and were certainly not "pin-point," and her mental condition was perfectly clear.

On the other hand, it is very difficult to explain from a circulatory point of view. The heart itself was never dilated, nor did it ever show any sign of disease, so that the cause of failure was unlikely to be purely cardiac, but the possibility of pressure of paralysed and distended guts upon a weakened heart suggests itself, and is perhaps the most probable explanation.

In conclusion, I have to thank Dr. Barnes and Dr. Hewetson for very much help and advice throughout the case, and Dr. Beatrice Webb for kindly estimating the opsonic indices.

A BAZAAR on behalf of the Edinburgh University Women Students' Union was held in Edinburgh during the three days November 19th, 20th, and 21st. The hope was that the sum of £5,000 or more would be procured thereby. Unfortunately, from various causes, some unavoidable, some avoidable, the sum hoped for was not attained. Probably only £1,500 will be available.

A CASE OF ABDOMINAL, PELVIC, AND LABIAL TUMOUR.

By JOHN A. C. MACEWEN, M.B., B.Sc.,
F.F.P.S. GLASG.,

SURGEON TO THE ELDER COTTAGE HOSPITAL, GOVAN; ASSISTANT
SURGEON, GLASGOW ROYAL INFIRMARY; SENIOR ASSISTANT
TO PROFESSOR OF SURGERY, GLASGOW UNIVERSITY.

THE tumour in the case described below was very large; while extraperitoneal, it occupied a great part of the anterior portion of the abdominal cavity, and, further, extended down into the pelvis, in front of the bladder, and thence, through a large opening in the perineum, into the labium, which was greatly distended by it. On account of its size, unusual situation and extent, and physical characteristics, considerable difficulty was experienced in arriving at a definite diagnosis, and, in order to present these difficulties to the reader, the facts are recorded in their chronological order.

History.

A woman aged 49 was admitted to the Elder Hospital at the end of January, 1908, complaining of a swelling between the thighs, which rendered walking difficult. She stated that she first noticed a small swelling on the left thigh, close to Poupert's ligament, and just external to the labium, about nine years ago. This swelling was soft, and easily reducible, and generally disappeared on lying down. It gradually increased in size, occupying the labium more and more as it did so. The growth for many years was very slow, but during the four months prior to admission it had increased fully a third in size. At first it caused no inconvenience, but about four years ago patient began to suffer from a sense of fullness in the vagina, and, later, considerable general discomfort, associated with the difficulty in walking already mentioned. During the last six months micturition had become troublesome, the patient feeling that there was some obstruction to the passage of urine, which necessitated the emptying of the bladder every two hours. No difficulty was experienced with the bowels, which were perfectly regular, a laxative rarely being required. At no time had the patient suffered actual pain, and, apart from the condition complained of, she had always enjoyed excellent health. Menstruation had always been perfectly regular, normal, and painless.

The patient was married and had had nine children born at full term and two miscarriages, the latter occurring the one before and the other after the last full-term child. The labours were all easy, no instruments being required, and the miscarriages likewise caused the patient but little inconvenience. She first noticed the swelling in the groin shortly after the last miscarriage.

Condition on Admission.

The urine was normal, specific gravity 1026; no pus, albumen, or sugar. While of normal height, the patient was exceedingly stout and heavy. The abdomen was rather flaccid and pendulous, particularly in the lateral regions, and appeared to be laden with adipose tissue. The lower limbs were particularly fat, the fat terminating rather abruptly at the ankles, and giving the appearance of oedema. That the swelling was not oedematous was shown by the complete absence of pitting on pressure.

The left labium was enormously distended, forming a covering for a mass which occupied its whole origin from the pubes and perineum, and which extended fully 6 in. down between the thighs, the outer wall being composed of labial tissue, while the inner was partly labial and partly vaginal. The vessels on the surface were much dilated, and the mass was dull to percussion, fairly firm to the touch, and not adherent to the skin, which, however, was not quite freely movable over it.

The impression conveyed by the examination so far was that the mass was a fibro-cellular tumour of the labium, such as is occasionally met with growing to a very large size, so as to extend even as far as the knees. The history given by the patient, however, together with certain facts elicited on further examination, seemed rather to point to a partially incarcerated perineal hernia. When the patient coughed a certain impulse was transmitted to the mass, which, further, was partially reducible. After such partial reduction it was possible to pass the fingers some considerable distance into the pelvis by the side of the vagina. Full reduction of the swelling was impossible, but after the patient had been kept in bed for a few days, it was noticed that the swelling was smaller, softer, and more reducible than before. It was noticed, further, that the partial reduction was sometimes accompanied by a slight gurgling sound, which appeared to increase the probability of bowel constituting the contents. Abdominal palpation did not reveal anything definite, the wall being so bulky as to render accurate palpation very difficult.

First Operation.

It was decided that the swelling, whether tumour or bowel, was not confined to the labium, and it was therefore determined to open the abdomen.

A vertical incision was accordingly made from below the umbilicus to the pubes, and attention was at once arrested by the fact that the abdominal wall, while fat, was not as fat as