

which had been normal in November, 1893, was now 97·4° F., the pulse had changed from 78 to 65, the skin was paler, drier, and less active, and the patient's whole appearance was indescribably different. If I may be allowed the comparison, she seemed to have merged her former personality into that of a more placid, apathetic, and slightly larger twin sister. As the patient could not be persuaded to continue the fresh sheep's thyroid gland, first prescribed, however prepared, the five-grain tablets already mentioned, of which a fresh supply had arrived, were prescribed. At first three tablets daily were given, cautiously increased to six, which dose it has not been necessary to increase. The effect was satisfactory from the very first, and the patient now (Dec. 10th, 1894) declares herself—and, indeed, appears in all respects—to be perfectly well. She is taking three tablets daily at present, and will remain under careful observation in future. I would add that either the fresh sheep's thyroid or the five-grain tablets have proved so satisfactory in every case thus far that I have not found it necessary to try later and perhaps more elegant preparations. Our present Italian Custom laws also render the importation of pharmaceutical novelties vexatious and difficult.

In June, 1892, a Swiss woman forty-four years of age consulted me. Her history, as noted down at the time, is as follows. She had married young and had borne several children, but the relation had proved a very unhappy one. Until 1888, however, she had enjoyed robust health. At that time she suffered from a great mental shock, succeeded by grievous family complications, which had continued to distress her ever since. In 1889 menstruation became irregular and after a twelvemonth finally ceased. Shortly after the shock mentioned she began to suffer from palpitation, breathlessness, swelling of the neck, prominence of the eyes, great nervousness, and insomnia. These symptoms continued for some months after the final menstruation (May, 1890), but gradually disappeared. She had never submitted to regular systematic treatment, but had taken medicine for hysteria from time to time. She had remarked that both before and after the climacteric all the symptoms were invariably aggravated for the first four or five days of the regular monthly time. Since then she had gradually lost control of her voice, which was sometimes fairly strong and clear, at other times muffled and indistinct, but always losing force. What chiefly distressed her, however, was inhibition of brain power and a sense of overpowering fatigue and melancholy. She slept fairly well, but was never refreshed thereby. There was lack of appetite, but digestion, although sluggish, was fairly good, and the bowels were always constipated. She suffered very much from the cold, and was invariably worse in cold weather. No organic lesions were discovered. The skin was pale, dry, and harsh; the hair was unusually thick, long, and lustrous, but latterly it had been falling out. She complained that the hands and feet were swollen at times, but this I did not observe. The tissue about the eyes was slightly swollen and the cheeks were pale. Her facial expression was notably anxious. The treatment prescribed consisted in attention to diet, regulation of the bowels, and the administration of hypophosphites of iron, strychnine, and quinine with arsenic. This treatment was continued, with intermissions, in Switzerland, where she spent the summer. She was distinctly better when I saw her again in the following November. During the winter, however, in spite of treatment, all her symptoms became aggravated, and in June, 1893, she was distinctly worse than the year before, when I first saw her. Her appearance did not suggest myxœdema, and I could not satisfy myself that atrophy of the thyroid was present, but it was decided to make a cautious trial of the same tablets of compressed dry thyroid gland powder. At first three were given daily, being then increased one at a time to six tablets daily. The effect was simply amazing, and after a few weeks the patient expressed herself, and, indeed, seemed to be, perfectly well. One or two tablets daily have been taken since, and she remains in good health.

Florence.

## AN OCCURRENCE OF MILK INFECTION.

BY JAMES NIVEN, M.A., M.B. CANTAB.,

MEDICAL OFFICER OF HEALTH, MANCHESTER.

ON Nov. 7th, 1894, Dr. Henry Ashby sent me a note in reference to a number of cases of illness which had occurred in Victoria-park, Manchester, some of them having come under his professional observation. The symptoms he described were diarrhoea, sickness, and abdominal pain. Those attacked were all supplied by one milk dealer, and he was of opinion that circumstances pointed to the milk as being the cause of the attacks. On that day and the following day I called at a few houses in Victoria-park, the addresses of which I had received from Dr. Ashby, and inquired into the circumstances under which their illnesses had occurred. All the families visited had received their milk from one dealer, and, so far as I was able subsequently to ascertain, all the families attacked in a similar manner at that time received the same supply, and other individuals not so supplied were found to have partaken of that milk. The chief points which I ascertained in the preliminary inquiry were that the attacks in the great majority of instances occurred on the night of Nov. 5th and in the early part of Nov. 6th. As a rule the persons attacked had partaken of unboiled milk. The milk supplied on the morning of Nov. 5th first produced the symptoms. It did not seem to make much difference in the result whether a small amount of milk in tea or coffee, or a large amount, was used. One woman was positive that all milk brought into the house was boiled, and in a number of instances the milk had been warmed. One occurrence of illness after the use of boiled milk is, however, scarcely sufficient to found a conclusion upon, as an oversight might have been made. Thus, at the first house I went to I was told that the children attacked always had their milk boiled, except on that particular morning. In the second house four persons escaped. One had had boiled milk, two others never used it, and the fourth only took a little in tea. The three attacked had had unboiled milk. In a third house ten were attacked and three escaped. Two of these did not have milk at all. Those attacked all took milk freely. At a fourth house a girl who came to clean the steps received a glass of milk, and was subsequently ill with the same symptoms as those attacked in the household. At another house, not in Victoria-park, five members of the family were taken ill—one on the night of Nov. 4th, one on the night of the 5th, and three others on the 7th. This household was the only one in the street supplied by the milk dealer whose milk was concerned. A considerable time elapsed—at least eight or nine hours—between taking the incriminated milk and the occurrence of symptoms of illness.

The conclusion drawn from these preliminary visits was that the phenomenon was probably one of bacterial growth in the body—i.e., of infection—from the use of this particular milk-supply. On Nov. 8th I obtained a sample of the milk supplied on Monday evening from a patient of Dr. Ashby, and took it to Professor Delépine, who very kindly undertook to make plate cultivations from it and otherwise to examine it bacteriologically. This milk had an unpleasant odour. Another sample of the milk supplied on Wednesday, Nov. 7th, which I obtained on a visit to Victoria-park on Nov. 8th, also had a disagreeable odour, which I seemed to recognise at the time but could not locate. On subsequently learning what had happened at the farm I seemed to recollect the odour as resembling that of "sweet pus." On Nov. 8th I also saw Dr. Waddell, of Rusholme, who had visited a large number of cases. On the previous day he called at the farmhouse from which the incriminated milk came, but beyond general insanitary conditions he ascertained nothing, and he was assured that there was nothing the matter with any of the cows. He informed me that the farmer had two supplies, one from his farm and another from Derbyshire, and that those attacked in Victoria-park had received their milk only from the farm, this special supply being retained for their use. Those who were supplied with the Derbyshire milk had escaped.

On Nov. 9th I called at the farm along with Mr. King, the veterinary surgeon of the Corporation. Mr. King made a careful examination of the cows, and found nothing in their condition which suggested that any of them could have

**FOOTBALL CASUALTY.**—During a recent match a Notts Forest left wing forward sustained an injury, which on medical examination was found to be a muscular adhesion in the vicinity of the sciatic nerve, and he will probably not recover the full use of one leg for some time.

produced milk so toxic as that sent out from this farm. I asked the farmer a good many questions, interrogating him closely about the health of the cows and the health of the milkers, and of those who had to do with the milk otherwise. He informed us that a milkman had recently left him. We discovered nothing in reference to either man or cow. I also inspected the farm premises along with Mr. Martin, medical officer of health for Gorton, in whose district the farm is, and his Inspector. Close to the farmhouse is a tip of midden-privy refuse belonging to the Gorton Local Board, which Mr. Martin informed us might contain 40,000 tons of material of that kind. The farm is bordered on two sides by streams which meet below, one coming from this tip, and very foul, the other comparatively clear, but also contaminated with sewage and with matter from a tripe-boiling place. The water used to wash the pails was tepid. Mr. Martin took the temperature of this water, which was 92° F. As was subsequently ascertained by Inspector Lord, the water used in cleansing the milk pails was kept in a foul cistern. The cows also drank from a pool in the yard which received drainage from the cowshed midden. The storage of the milk overnight was such as to expose it to warmth and contamination from the cowshed. It is needless to multiply particulars. The conditions were thoroughly insanitary and were such as to lend point to the bacteriological report of Professor Delépine on Nov. 12th, which is as follows :—

The Owens College, Manchester, Nov. 12th, 1894.  
REPORT ON A SAMPLE OF MILK RECEIVED FROM DR. NIVEN ON  
NOVEMBER 8TH.

The milk was coagulated, the coagula being pure white and opaque. The smell was sour, and reaction strongly acid. Microscopical examination revealed fat globules in part confluent; there was no cell visible, and no extraneous matter, with the exception of micro-organisms distributed uniformly through and between the coagula. These bacteria were mostly short, plump bacilli, and large coils of variable size, here and there forming chains (streptococci). Abundant growth was obtained in milk and bouillon, both aerobically and anaerobically at the temperature of the body, the growth being accompanied by the production of gases having a very offensive smell. Abundant growths are also obtained on agar at 37° C., and on gelatine at 21° C. By plate cultivations various organisms were separated, two of which were more abundant than the others. These were a streptococcus with large segment, and a microbe having the characters of the bacillus coli communis. (These organisms are under investigation.) A virulent form of the bacillus coli communis has been found associated with severe gastro-enteritis. It is probable that, by accident, some contaminated water found its way into some of the vessels used for collecting or distributing the milk. Two tame young rats and two guinea-pigs were given large doses of the milk (varying in amount from one-tenth to half of the weight of the animal) without any unpleasant effect. The animals showed no dislike to it, and in one case a second dose was taken as readily as the first. It is therefore evident that the illness produced by the milk was not the result of a simple poisoning.

SHERIDAN DELÉPINE.

Nevertheless, there seemed something unexplained, and in any case it was desirable to ascertain more about the extent of the mischief done. I had already, on Nov. 7th, sent an inspector to the farm for a list of the customers supplied with milk from the cows on the farm. He brought me back a few names of people who had not been ill. On visiting the farm on Nov. 9th I insisted on having a complete list of the customers—those supplied in the morning being discriminated from those supplied in the evening. Such a list was subsequently sent, but I may say that I put no great value on any statements made with regard to the exact allocation of the milks respectively from the farm and from the supplemental supply in Derbyshire. In any case no distinction in the number of attacks is observed between those said to have been supplied respectively in the morning and in the evening. So far as it goes this would seem to exclude the fouling of one particular pail or of one particular supply as the cause of the disease. The list of customers was divided on Nov. 12th among the respective district inspectors, who made an inquiry into the occurrences in the different families on the list. It was possible from the same list to ascertain approximately the names of the medical men who attended the families attacked, and a letter was sent requesting them to be kind enough to give a brief account of their cases. The account thus obtained has not been completed, but showed conclusively, if further proof were necessary, the dependence of the illness on a particular milk-supply. It is intended to publish the accounts given by different medical men, of course without names and addresses. On Nov. 15th Inspector Lord found the milkman who had left the farm, who informed him that a cow had been removed about Nov. 2nd. He also visited the farm in Derbyshire from which the supplemental milk-supply came, and on Nov. 17th he proceeded to trace the cow which had

been removed. On Nov. 19th the farmer came and stated that on Nov. 6th his attention was called to a cow with "gargil"—i.e., inflamed udder—the milk of which had been at that time, and was also on Nov. 7th, mixed with the milk of the other twelve cows on the farm. This cow was removed from the farm on Nov. 8th, and on Nov. 10th was slaughtered and sold for food.

"Gargil" or "garget," I am informed, is an acute inflammation of the udder, which often leads to extensive sloughing. In an article in the *Medical News* for Aug. 8th, 1891, Dr. Tower, of Milwaukee, gives a drawing of the microscopic appearances of a sample of milk from such an udder, showing streptococci and collections of micrococci. I am not aware of any similar outbreaks which have been ascribed to a case of gargil.

Altogether, 160 cases of illness have come to my knowledge in forty-seven families, but none of them were fatal. In forty-nine families amongst those given in the list of consumers no illness was experienced. It is probable, however, that many of these had not partaken of the milk. The total yield of the cows was given to me by the farmer on Nov. 9th as seven gallons at one milking—i.e., 112 pints in the day. Now a number of the households were very large and this would not have sufficed for them. Moreover, at the same visit I was assured that the families in Victoria-park were exclusively supplied with milk from the farm. These nearly all suffered from the use of the milk, and therefore I consider it likely that a number of the other families had other milk.

In endeavouring to form a judgment as to what was the element in the milk producing the mischief one had to consider the nature of the occurrence. The great majority of the illnesses began on the night of Nov. 5th and early on Nov. 6th. Evidently something new was imported into the situation. It is true that there was plenty of material round the farm to cause disease, and the abundant presence of bacterium coli commune in the sample examined by Professor Delépine was quite in accord with the conditions to which the milk had been subjected on the farm. But, then, it had been for years subjected to similar conditions, and nothing had taken place. Moreover, with so many members of the family suffering from diarrhoea it is possible that some contamination might have occurred in the house where the milk was obtained. The teats of the cows were far from clean at my visit, and the bacterium coli commune might have entered in that way, or it might have been introduced by contaminated water, and, as I have mentioned, the water with which the pails were washed could not be regarded as other than contaminated. But it is felt that there was something altogether new, and probably arising from something fresh imported into the situation, and that this something was probably disease in man or cow. Hence our persistence of inquiry. As it turned out, one out of thirteen cows was acutely ill, and the period of its acutest illness covered the period of the outburst. The farmer says that he became aware of the illness of the cow on Nov. 6th, and it may be assumed that it had begun to be ill a day or two before then. It does not go for much, but he himself felt it necessary to remove the cow. The weight of probability is, I think, otherwise, greatly in favour of this cow having been the origin of the outbreak. We have thought it advisable to investigate this subject further. Mr. King has undertaken to get some udders from cows suffering from "gargil," and Professor Delépine has undertaken to investigate the bacteriology and pathology of milk from them. A detailed account of a number of the cases has been sent me by the medical men in attendance. It shows the time of attack, and, when ascertained, how much milk was used. Taken along with Professor Delépine's report it appears to point to bacterial growth as against the action of toxines. I have not been able to find an account of any outbreak similar to the above, although it seems likely that such must have taken place. An interesting account is, however, given by Professor Gaffky<sup>1</sup> of an illness characterised by rigor, diarrhoea, and fever (up to 105·8° F.), with very severe general symptoms, and followed by prolonged convalescence, occurring on the same day in the assistant, chemist, and servant at the Institute at Giessen, in consequence of partaking of milk. The source of the infection was found in a cow suffering from hæmorrhagic enteritis. The same bacilli, short, very motile, and pathogenic for mice and guinea-pigs, were found in the dejecta of the cow and of the patients.

<sup>1</sup> Deutsche Medicinische Wochenschrift, vol. xviii., No. 14, 1892; see also Schmidt's Jahrbuch.

They were, however, absent from the milk. It is inferred that the milk of the cow must have become contaminated with dejecta. A matter of some consequence in the Manchester outbreak is the strong belief entertained at one household affected that the milk used had always been boiled. In other families this seemed to have prevented the illness. But there is no doubt whatever that the bacteria concerned in the outbreak were capable of resisting tolerably high temperatures, since, in some instances, the milk, the use of which had been followed by attacks, was warmed, and in other cases mixed with hot tea or coffee. Professor Flügge<sup>2</sup> discusses the effect of heat on the sterilisation of milk. He finds that the anaerobic bacteria which are to be found in almost every milk do in part resist boiling for a period of an hour and a half. "Of much more consequence, however, are the peptonising bacteria, which are frequently present in enormous quantities, grow best at a high temperature, possess a dangerous tenacity of life, not altering the milk perceptibly for a considerable time, though gradually imparting to it a bitter taste. Amongst the twelve species encountered were three which were found on several occasions in the ordinary milk of commerce, and which appear to have a special importance, inasmuch as their pure culture in milk evoked severe toxic effects in different experimental animals, and in young dogs especially produced violent diarrhoea, often leading to death. The spores of these peptonising bacteria stand heating in water or steam up to 105° C. for two, and in part even up to six, hours; the ordinary heating up to 100° for about three-quarters of an hour does not destroy them." Professor Flügge concludes that the ordinary process of sterilising milk by boiling is insufficient. In spite of that, a very large proportion of the infectious germs present in milk will be destroyed by boiling, sufficient to prevent many of them from reproducing disease. But it would certainly seem that we cannot afford to neglect other precautions in the conservation of milk, even if we do have it boiled before use.

In the course of this inquiry several questions of general moment have risen. If we are to assume that the infection in this case was due to disease in the cow, yet how far was this disease ascribable to the insanitary conditions to which the cows were subjected? In order to elucidate this question I inquired into the previous history of cows on the farm, and was informed that there had been no disease among the cows for seven years. Seven years ago nine cows were said to have died one after another of a disease characterised by rapid onset, weakness, and staggering. The exact nature of this disease, apparently, no attempt was made to clear up. Several of the cows at our visit had a temperature of 101° F. and one had a temperature of 102°. In regard to this one Mr. King was inclined to think that it was tuberculous. I can scarcely believe that animals placed under such conditions as existed on this farm would escape disease for seven years.

Then, again, how far are such conditions limited to individual farms and how far are they general? From my previous experience of dairy farms in a neighbouring district I should say that they are far below any standard of sanitation which should be tolerated; and from what I have heard of the keeping of cows in and around Manchester the whole trade must require investigation and amendment. But it would scarcely be possible to establish a high standard in one district and allow surrounding districts to retain their old conditions. To obtain the maximum of advantage from an improvement in the method of dairy farming this must be made general. For that purpose I would venture to suggest that a uniform code should be applied to all cowsheds, both in and outside our large towns, and that this should not be too stringent in regard to the size of existing cowsheds. Also that veterinary surgeons, at an adequate salary, should be appointed to districts to make periodical examinations of the farm premises and of the stock. They would be required at once to report any insanitary conditions on the farms, or any disease in the cows, to the sanitary authority in whose district the farm or cowshed lay, so that adequate measures of prevention might at once be taken. I cannot help thinking that many such occurrences as the above must take place, though on a more limited scale, and that a large amount of bad health, especially in infants, must be produced by an impure milk supply. It is the more necessary to exert ourselves in

improving the state of the farms and the conditions of milk storage, if, as Flügge's results indicate, boiling affords an insufficient protection against impurities in milk. The directions in which amendment are most urgently called for are these:—

1. The removal from the milk-supply of all milk from diseased cows, or from cows in an abnormal condition, and the prompt removal from the cowshed of diseased cows.
2. The supply of pure drinking water to the cows.
3. Cleanliness about the farm. The teats and udders of the cows should be carefully cleaned before milking, and milked with washed hands. They are, as a rule, merely stripped, often with dirty hands.
4. Adequate space, lighting, and ventilation should be provided.
5. The milk pails and vessels should be scalded after each milk round and carefully cleansed.
6. The milk should be stored on the farm in a dry, well ventilated, and clean place.
7. When retailed in shops it should be protected from dust.
8. It should be sterilised before distribution if possible.

## ABDOMINAL SECTION DURING PREGNANCY.

By JAMES MURPHY, M.D. DURH.,  
SURGEON TO THE SUNDERLAND INFIRMARY.

DURING the year 1893 I had occasion to perform abdominal section on four patients who were pregnant. Their histories, briefly, were as follows.

CASE 1.—The patient, a lady aged twenty-two years, the mother of one child aged eighteen months, was sent by Dr. Norie. She was quite well up to two days before my seeing her, when she was suddenly taken with intense abdominal pain and tenderness, severe prostration, and constant vomiting. She had not menstruated for three months and believed herself to be pregnant. On vaginal examination the uterus was found to be enlarged and pushed forwards by a hard mass in Douglas's pouch. It looked very like a case of extra-uterine gestation after rupture, but there was no hæmorrhage from the uterus, and extra-uterine gestation is very rare with patients who have recently been pregnant. She was at once (Feb. 10th) removed to the Sunderland Infirmary and her abdomen opened immediately after her arrival, when she was found to be three months pregnant. The tumour in Douglas's pouch was a parovarian cyst, being quite black owing to a twisted pedicle. The tumour was removed and the abdomen washed out and closed. The case was perfectly aseptic throughout, and the patient was attended in her confinement on Sept. 4th by Mr. Stobo of Southwick, who informs me that she had an easy labour and gave birth to a boy. Both mother and child did well.

CASE 2.—A young lady thirty-two years of age was sent into the Sunderland Nursing Institute under my care by Dr. Beveridge of Hendon, to have an ovarian tumour removed, she being about six months pregnant. The operation was performed on April 20th, at 12 noon. The tumour proved to be a solid round-celled sarcoma weighing about two pounds, with somewhat numerous adhesions. The labour pains commenced twenty-four hours after the operation; they were slight for the first few hours, but towards 10 P.M. they became very much worse, and the patient soon gave birth to a boy, who lived for about twelve hours. The convalescence was uneventful, and the patient left the institute in three weeks, her highest temperature being 99.5° F.

CASE 3.—The patient, a woman twenty-two years of age, was sent to the Sunderland Infirmary by Dr. Houseman of Houghton-le-Spring. She was two months pregnant, and on the left side of her uterus there was apparently an adherent ovary in which she felt considerable pain. I did not consider there was any occasion to open the abdomen until Oct. 23rd, when to my surprise she became very collapsed, and fluid appeared in the abdomen. I at once put her under chloroform, and on cutting down to the peritoneum discovered that this fluid was blood. Opening the peritoneum by a small incision I removed about twenty ounces of blood and washed out the abdomen with boracic acid lotion. The uterus was enlarged, both tubes and ovaries were healthy, and from the

<sup>2</sup> In an article in the *Zeitschrift für Hygiene und Infections-Krankheiten*, vol. xvii., No. 2, p. 272, 1894, quoted in *Schmidt's Jahrbuch*.