In January, 1895, she noticed a swelling in the left groin, growing at first slowly, and then rapidly. Her general health was now giving way. She had much difficulty in sitting down from pain in the back, which was much increased when rising from a chair; no pain when seated. During this time she had had no treatment.

She came to my out-patients in April, 1895, complaining of a large swelling, occupying the position of a psoas abscess. There was no spinal angularity, no pain over the lumbar region, and no abnormality about the hip-joint. She further complained of losing weight, of pain of a gnawing, aching character over the left buttock, close to the spine. This was increased on pressure of the ilia together or apart. The swelling in the thigh did not alter its shape or position on flexion of the leg; it had no impulse on coughing, but had a tense, deep sense of fluctuation. The circumference of the leg was 2 inches greater than that of its fellow. Patient walked slightly lame, with short steps. On point pressure over the sacro-iliac joint she complained of sickening pain. She could not lie on the affected side. Urine healthy; all other organs healthy. The patient had a tuberculous aspect, and was pale and haggard. The risks of an operation were explained to her, and also the probable termination of the disease if left alone. She consented to an operation, was taken in to Rotherham Hospital, and kept at rest for fourteen days.

OPERATION

On May 1st, 1896, chloroform was administered, and the abscess in the front of the thigh was opened first, and about a pint of thin pus was evacuated. The sac was very thick, and separated the muscles of the thigh deeply. The patient was then turned on the right side with her left leg flexed on the abdomen, and supported on a pillow. The incision was made, according to Mr. Golding-Bird's directions, as follows: The line of the joint as stated above is found by drawing a line from a point 3 inches behind the anterior superior iliac spine to the posterior inferior spine. A point on this line $\frac{1}{2}$ inch from the posterior inferior spine marks the centre of the joint. A horse-shoe-shaped incision about 2 inches wide, having this point as a centre and having its convexity downwards, was made, and the flap turned up and stitched or pinned to the skin above. The muscles were divided down to the periosteum and held well away.

After freely clearing the surface over the joint I saw that it looked spotty and greyish in tint. I had intended to trephine, but on pressing a chisel on this surface I found it so rotten that chiselling was commenced at once. The whole of the joint was removed right through into the pelvis, and soft bone was also found and followed up over the surface of the sacrum between the foramina; two fingers could easily be entered at this stage. The bone was well curetted for fear of any spot being overlooked. The cavity was well washed out with hot water, and afterwards filled with an emulsion of sulphur. A large drainage tube was inserted, and the flap stitched round the tube. The abscess cavity in front was now again dealt with; a long tube was passed up into the pelvis from the opening in the thigh, and a syringe of zinc chloride solution (1 in 20) was injected, the abscess cavity itself being freely irrigated with the same solution. A dressing of double cyanide gauze was applied, a long side splint put on, and the patient was sent back to bed.

AFTER-HISTORY.

Considerable pain followed in the evening, but no rise of temperature. The dressing was changed three or four times during the next 18 hours. Much retching and faintness followed that night and the following morning, and there was a temporary collapse early in the morning, but that was met by a brandy and milk enema.

Forty-eight hours after the operation the sacral wound was irrigated with corrosive sublimate solution (1 in 2,000). The sulphur emulsion caused considerable sloughing of tissue, and I should not use it in a future case.

There is little more to say except that during recovery there were occasional rises of temperature, never excessive except once, when it reached 104.4° . It was relieved by quinine. The temperature was never over 100° after July 5th, only once above 99° after July 22nd, and was practically normal after August 9th. Creolin (1 in 60) was used for irrigating after June 6th.

The patient was allowed up on a spinal carriage on July 24th, and on crutches with a Thomas's splint applied on August 13th; the crutches were thrown away on September 10th. The weight of the patient increased at about the rate of 1 lb. a week during convalescence. The sinus which remained was injected with iodoform emulsion once a week, and once or twice wiped with chloride of zinc solution. It remained open until March 7th, 1896, when it closed. No dead

bone was discharged, although the probe passed on to the surface of doubtful bone.

When last seen on October 31st, 1896, the patient was perfectly well. She had had no ill-health since the operation, and walked so well that it would be difficult to detect that she had ever had any disease of the joint.

COMMENTS.

Six years ago a similar case came under my care, and I must acknowledge that, although I dealt with the psoas abscess, I could not discover its origin to my satisfaction. However, the case left for home, but ultimately ended in hospital, with extension of disease to the other joint. She died from prolonged suppuration.

A necropsy I made in 1879 on a man aged 27 is interesting. He had psoas and gluteal abscesses, caseous material in both sacro-iliac joints, and one caseous spot in the spinal canal between the dura mater and the arachnoid in its tubular contraction about opposite the second sacral vertebra. In the lungs were scattered tubercles, the liver and spleen were lardaceous, there were spots of ragged ulceration in the intestines, and the mesenteric glands were caseating, as was also the prostate. The kidneys were in various parts caseating, cystic, and lardaceous.

I cannot conclude without thanking Dr. Reid, the house surgeon, for his constant and valuable attention to the case; to his care I think much of the success was due.

THE ARTIFICIAL FEEDING OF CHILDREN.

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It is only in recent years, since economy has come to be at once the test and aim of civilisation, that waste of child life has excited much interest. Now the problem of infant mortality is one desirable to be faced, and it is being faced, if one can judge from the activity displayed in every country in this branch of research.

It cannot be claimed that we have attained even a reasonable degree of success in dealing with infants if the death-rate can be taken as a guide. In the BRITISH MEDICAL JOURNAL of January 25th are the returns from sixty-five English towns, from which it appears that, of all children born, 19 per cent. die within the first year of life. The Registrar-General's return for the first quarter of 1896 shows the infant mortality for thirty-two provincial towns to have been 15.5 per cent., which is very close to that of the second quarter, and may be regarded as fairly constant. In Paris, the death-rate is the same; in Berlin, 26; in Austria, 25; in Russia, 26; and in Munich, 32 per 100 births. In America, mortality statistics fall under local control and are fragmentary. One reads, for example, "In Baltimore 39 per cent. of the deaths last year occurred in children under 5 years of age, and in Chicago the rate was rather higher." If such things occur in fairly-civilised countries, the conditions elsewhere must be much worse, as we know they are.

Now it is manifestly impossible to isolate the mortality due to improper feeding, but anyone who has to do with the care of infants will appreciate its full significance. The profoundness of this appreciation is revealed in the earnestness of the attempts to procure some efficient substitute for the natural food of the child; but all experience in the use of this or that food is fallacious, since personal interest and professional zeal do so modify the other conditions of the child's existence. Indeed it is probable that too much stress is being laid upon the nature of the food and not enough upon the necessity for general maternal care.

Much admirable work is being done upon the sterilisation of milk and upon the bacteria infesting the intestine, but the results have not yet had their full clinical realisation since the domestic kitchen cannot be transformed into a bacteriological laboratory.

The more recent discussion on this subject in the JOURNAL was commenced on December 7th, 1895, in a "fragment" by Sir William Priestley, in which he refers to the work of Budin and Chavane in Paris. He there says: "Sir Dyce

Duckworth, who has just returned from America, tells me that a 'system is gradually making way there in which medical men habitually write prescriptions expressing the exact amount of casein of cream and of sugar which milk is to contain in accordance with the age and condition of the infant. This is bringing the science of feeding children to very exact proportions, but entails great trouble and possibly expense.'

In the JOURNAL, September 12th, 1896, a writer refers to the same process, doubtfully, "as one that might be followed with great advantage in certain cases." The references by these writers are to the Walker-Gordon laboratories for supplying and modifying milk, which first came into operation in New York three years ago. It seems, therefore, to be worth while giving some slight account of this method for the artificial feeding of infants which promised much, and whose promise is being largely fulfilled; and from which it may appear that it is now "generally available" and need not be "reserved for special cases," as Sir William Priestley suggests.

It will be remembered from Sir Russell Reynolds's pleasing relation, how Liston, when he was about to perform the first operation in England under an anæsthetic, referred to the chloroform as a "Yankee dodge for making men insensible." So the milk supply is not to be discredited because it arises from the same fruitful source.

Much work, all laborious and part mere repetition, has been done upon milk, and the results depend largely upon the impurity of the material, which is not milk but a culture medium. For example, the sanitary authorities of Berlin recognise the excrement of cattle as a normal constituent of milk. Numerous observers have detected in milk such pathogenic bacteria as the tubercle bacillus, the bacillus of typhoid, cholera, scarlet fever, and diphtheria, to say nothing of the rich flora of non-pathogenic bacteria; yet one should not think of such a decoction as milk any more than he would use for his sustenance the infected bouillon of a laboratory. The question is disposed of by saying that one can find in milk the bacteria which have been placed in it.

The next matter to be clear about is that boiled milk is not milk within the meaning of the term, and that sterilised milk is boiled milk. It is no part of my present purpose to discuss the method of MM. Budin and Chavane, excepting to say it is not clear what the method really is. That is admirably done by Dr. Cantley in the BRITISH MEDICAL JOURNAL of January 18th, 1896, though even he has to admit that, like a great many others, he does not "quite understand." It is a fact, which Sir William Priestley thinks is "not generally known," that it requires a higher temperature to boil milk than water—by which one means that the vapour tension of milk overcomes the atmospheric pressure at a higher temperature than water, due to the presence of fat in the milk. To imagine, however, that such milk is not "boiled" is merely to imagine it. When a temperature above 167° F. is applied to milk, then the changes incident to boiling commence. The fat globules are broken up and the fat is liberated, the lactalbumin is coagulated, and changes occur in the milk, sugar, and casein. A substance is created differing materially from the original milk, even though it is a sterile substance.

In the BRITISH MEDICAL JOURNAL of September 12th, 1896, Dr. H. Johnstone Campbell points out the disadvantage of this substance in comparison with milk, and Leeds and Davis did the same thing in 1891. On the other hand, Heubner claims clinical experience in favour of the boiled milk, and Hammarsten and Wroblewski hold that the difficulty arises in the essential difference between the casein of the cows' milk and that of the human. Bendix, too, concludes that sterilised milk and pasteurised milk are of equal nitrogenous and fat values, and that both are equally well digested and assimilated. In regard to this array, the following observations are to be made: Boiled milk is better than very impure raw milk; the children used by Bendix were healthy, 2 years old, were under observation only a few days, and were fed upon a mixed diet; lastly, a child fed upon boiled milk will develop scurvy.

Pasteurisation of milk leaves it essentially unchanged. The pathogenic bacteria are destroyed, but, as Koplik has shown, it does not destroy the bacterium lactis, the potato bacillus, and many other micro-organisms which chance to be present.

If accompanied by refrigeration, however, it delays their activity and the formation of by-products, which, in Flügge's opinion, are so harmful. The sum of the matter, then, is that no amount of scientific hugger-mugger will create good milk out of bad.

The Walker-Gordon laboratories have three ends in view: (1) To produce good milk; (2) to keep it good by consistent cleanliness and by pasteurisation; (3) to modify the constituent elements in accordance with the demands of any given child.

Realising fully that bad milk can by no chance be converted into good milk, their first care is for the source of the milk. The cows are properly selected and bred for this purpose alone. They are tested individually with tuberculin. The herd farm and dairy are under the supervision of a veterinary surgeon and of a bacteriologist. The cleanliness exercised approaches asepsis in its rigidity. The cows and their attendants are daily cleansed and groomed; the milk is received into glass pails, aerated and cooled to 44° F., and in two hours is in the laboratory.

Three courses are now open: A portion is issued in its normal condition; a portion is pasteurised at 167° F. for twenty minutes. This does not render it absolutely sterile, though more nearly so than when received from the animal, for it is pretty well understood that neither human milk nor cows' milk is free from bacteria even in the gland.

The next object of the laboratory is to modify so much of the milk as is required for the needs of the individual child, according to age, constitution, and health. Once in the laboratory, this milk is rendered alkaline, and the cream separated in a centrifugal machine. This yields the following standard materials as a basis of work:

—	Fat.	Sugar.	Albuminoids.
Cream	16.00	4.00	3.60
Separated milk	0.13	4.40	4.00

If it is desired to increase the sugar, milk sugar filtered with distilled water is used, and with these materials the prescriptions are filled as directed. If a child is ordered 24 ounces a day in eight feedings, then 3 ounces are put into each of eight feeding bottles and stopped with cotton-wool. These are placed in a basket of eight compartments, and pasteurised at 167° F. for twenty minutes. The baskets, with name and address attached, are placed in waggons having zinc receptacles and delivered at the patrons' houses in much the same way as ordinary milk. As a result, the child receives the proper combination of the elements of breast milk; it receives a fluid free from foreign matter, alkaline, warm, and reasonably sterile, and in amounts proportionate to its age.

The following is the form of prescription used:

	Per cent.	Remarks.
Fat		Number of feedings
Milk sugar		Amount at each feeding
Mineral matter		Infant's age
Total solids		Infant's weight
Water		
	100.00	Alkalinity per cent.
		Heat at ° F.

Ordered' or

Date, 189 Signature,

The proportion of each constituent to be used is another matter. That depends on the needs of the case, but the table below shows the average percentages in modified milk prescriptions employed by 207 physicians for the treatment of 846 sick infants during July, August, and September.

The ages varied from one week to two years. None of these cases were in hospitals or sanatoriums, but many of them were the children of the city poor.

Time of Treatment.	Fat.	Milk Sugar.	Proteids.
First week	2.40	5.75	0.90
Second week	2.50	5.75	0.95
Third week	2.60	6.00	1.00
Fourth week	2.75	6.00	1.20
Fifth week	3.00	6.20	1.30
Sixth week	3.10	6.30	1.30
Lowest initial percentages..	2.00	5.00	0.45
Highest	4.00	7.00	1.00

This system has only recently come into general use, though for three years it has been going through the experimental stage, and it is too soon to draw any wide conclusions. It may be said, however, that it is now used in every American city, and there is a remarkable unanimity in the testimony to its value; and the process is so well established that the same methods of exactness are employed which prevail in any manufacturing concern.

Statistics pretending to show the value of any clinical method are notoriously untrustworthy, yet this much may be said: the use of this modified milk has proved to be the surest way of reducing infant mortality, which is known to American physicians at least; and men who have to do with children bring to their work a new zeal born of experience and knowledge.

This milk supply is a purely commercial transaction, as much so as a chemist's business, and no one now contends that a physician can carry on the operations of a manufacturing druggist. The cost is about 30 cents. per day per child, the same amount of raw milk being about 10 cents. On the other hand, the funeral expenses in public institutions of each child is about three dollars, and there are other considerations as well which make its use a matter of economy. The cities of New York and Boston have contracted for a supply of this milk to be delivered gratuitously during the summer in the poor quarters, so convinced are the authorities of its utility.

Lastly, the process meets with the approval of those who bear children. It is spreading to the smaller towns, and the venture is an unqualified commercial success.

A CASE OF ACUTE SPREADING GANGRENE TREATED WITH ANTISTREPTOCOCCUS SERUM.

By ERNEST A. T. STEELE, L.R.C.P.LOND., M.R.C.S.ENG.,
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J. H., female, aged 1½ year, was admitted to the Day Nursery and Hospital for Sick Children, Plaistow, on June 22nd, 1896, with the following history:

On June 2nd she burnt herself on the calf of the left leg with a red-hot poker. The burn was dressed with linseed oil by her mother, but would not heal, and the child's health became impaired; she became pale and languid, and refused food.

On June 18th she was sick, and her mother noticed a red spot on the centre of the forehead, and at the same time a small abscess formed on the left lower eyelid. By the next day the spot on the forehead was "as large as a shilling," and had turned black in the centre, and the child was very feverish. An offensive discharge from the left nostril was noticed.

On June 22nd, when admitted there was a gangrenous patch on the forehead as large as a five-shilling piece. Around the edges of the patch the skin was inflamed and undermined, the gangrene extending more rapidly in the subcutaneous cellular tissue than in the skin. The centre was in a condition of moist gangrene, and crepitated when touched, owing to gas in the tissues. The accompanying photograph, which was taken on the following day, gives a good idea of the appearance of the child, and the extent of the disease.

The child's general condition was very bad. The temperature was 101.8°, the pulse 120. Her mother said she had had a shivering fit before admission. Her skin was hot and dry, and of a sallow colour, and she was very drowsy and irritable.

The edge of the left lower eyelid was ulcerating, and covered with grey sloughing granulations. There was considerable offensive sero-purulent discharge from both nostrils.

On the left leg where she burnt herself was an ulcer 1½ inch long by 1 inch broad, its surface covered with grey sloughs, and in places were cup-shaped depressions where the ulceration was extending into the deeper tissues.

Under an anæsthetic the edges of the gangrenous area on the forehead were clipped away with scissors to expose the whole extent of the mischief, and then every particle of unhealthy tissue was clipped away until a healthy raw surface was reached. Pressure was applied to stop bleeding, and the surface mopped repeatedly with nitric acid. The ulcers on the eyelid and leg were scraped with Volkmann's spoon, and treated with the acid.

On the evening of the same day the temperature had dropped to 97.4°, but on June 23rd reached 101.8° again, and the gangrene had recommenced on the upper edge of the forehead wound. An anæsthetic was again given, and the clipping and cauterising process repeated.

On the next two days there was no return of the gangrene, but the temperature remained elevated. On June 26th the ulcers on the leg and eyelid began to slough, and were again scraped and cauterised with pure carbolic acid. The next day the child's condition was about the same, but on June 28th she was much worse; the left side of the forehead wound was becoming gangrenous, and a portion of the base under the nitric acid eschar was affected. The eyelid and leg were also sloughing, and her general condition was very bad. She was sick. The temperature was 102.8°; and the pulse 130, weak and irregular. She refused nourishment. An injection of 5 c.cm. antistreptococcus serum was given, and brandy and liq. strychnina given internally. No further local treatment was adopted.

On June 29th the morning temperature was 100.8°, and the change in the appearance of the wounds and ulcers was very marked: the gangrene had ceased to spread in the forehead, and the phagedænic process in the ulcers had stopped. In the evening the temperature rose to 103.2°, and a further injection of 5 c.cm. of serum was given.

From this date the child's progress was steadily towards recovery, although on July 4th suppuration took place in the right elbow joint. This was incised on July 7th, and the joint drained. The eyelid and leg healed rapidly, and the discharge from the nose ceased. On the separation of the eschar on the forehead a large surface of bone was laid bare, but this has now granulated over. She is now quite well.