TREATMENT OF SEPTIC WOUNDS BY CONTINUOUS OXYGENATION OR IRRIGATION.

BY

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I HAVE recently treated a severely lacerated and septic wound about the knee in a child by continuous oxygenation under pressure. I had a rubber bag constructed open at both ends and provided with sleeves at the ends and with a valve through which the oxygen can be introduced.

The bag was slipped over the leg like a stocking and the two ends were rendered gas-tight by firm bandaging or the application of a Martin's rubber bandage, Mead's plaster, or rubber tape. Oxygen was introduced from a cylinder up to the pressure of 3 to 4 lb. which the rubber easily stands; with ordinary bandages the bag will remain inflated with oxygen for about twelve hours, with rubber bandages for longer.

The wound rapidly cleaned and the granulation tissue assumed a most healthy appearance in a shorter time than one would have expected.

a, Simple rubber sleeve;
b, sleeve with section of air
pad; c, entrance tube; d, exit
to vessel under bed.

The child always asked for the "football" in preference to the dressing, as it was more comfortable.

The discharge collects at the bottom of the bag and can be either drawn off by a drain tube, or the bag can easily be removed, boiled, replaced, and refilled within a short time and without pain.

This method, apart from keeping the wound in an atmosphere of oxygen,

keeps the wound protected and saves the patient the pain of removing and replacing the dressings, to say nothing of the saving in dressings themselves, which, when soaked in discharge and in close contact with a limb, must be most uncomfortable.

The wound must, of course, be opened up to its uttermost recesses, sloughs and dead tissues cut away, and large perforated drain tubes inserted so that the oxygen can get to the growing layer of anaërobies. On a large scale oxygen under pressure could be supplied to each bed by small pipes.

This bag, with slight additions, can also be used for continuous or intermittent saline or antiseptic irrigation; by adding a fairly large sized rubber exit tube at the bottom of the bag, connexion can be made to a vessel under the bed, and when it is in position on the limb saline may be run in from a large elevated vessel, the rate of entrance and exit being regulated by nipping the tubes more or less with clips.

This is the simplest form of rubber bag, but the following improvements, although not necessary, may be added:

1. Make the sleeves large enough to slip easily over the wound, and place inside the sleeves a distensible air ring with an air valve.
2. Cover the bag with a linen, canvas, or string net.
3. Make a wound inspection slit in the upper part of the bag which can be made watertight with a clip.
4. Or the bag itself could be made of a waterproof canvas with air-pad sleeves.

Bags of different sizes and shapes are made for different parts of the body.

Advantages.

1. We apply the correct percentage of saline solution to the wound, which can easily be flushed and cleansed at any time, thus removing the dead and toxic lymph and leucocytes without removing the bag.
2. The pain of repeated dressings is obviated.
3. The saving in dressings is enormous.
4. There is no pressure on the limb or soiling of sheets as in the ordinary saline bath.
5. There is no "pus poultice," and the patient is comfortable in all positions: he can move the limb with bag and bath attached.

6. It can be used under an interrupted splint in a compound fracture of a limb.

Continuous irrigation is now the accepted treatment for septic wounds, and the bag treatment allows this to be carried out in the simplest manner and without annoyance to the patient or nurse.

Lieutenant-Colonel Norris, at the offices of the Commonwealth of Australia, 68, Victoria Street, London, S.W., will answer any communications as to the supply of the bag.

SANDFLY FEVER AND BACTERIOLOGY: VACCINE TREATMENT.

BY

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CAPTAIN I.M.S.

WITH regard to the articles in the JOURNAL of July 31st concerning sandfly fever, perhaps the following observations which I had the opportunity of making last year in Rangoon may be of interest. Unfortunately, being on active service, I have not access to the notes I made on the cases at the time, but the interest of the cases to me was such that I can speak fairly accurately from memory.

In March, last year, I was in charge of the 79th Carnatic Infantry during their transfer from Bombay to Rangoon. The outbreak began on board ship and continued with increasing severity for some eight weeks, after which it gradually subsided; altogether some 180 cases occurred.

The first case was observed when the ship had left Bombay two days, and as no cases had occurred previously in Bombay, the incubation period, for this particular case, can reasonably be fixed at two days, or less.

The clinical picture presented by the cases was of the usual type, some conforming to the description of "sandfly fever," as given in Colonel Sir Leonard Rogers's book, and some to the description of dengue. The majority of the cases, however, were intermediate in type, and such I cannot pretend to differentiate.

In 35 cases I undertook blood cultures, and in 5 of these a bacillus was obtained identical in every particular with that described by Colonel Rogers in his book. I believe he succeeded in isolating it in 6 out of 110 cases (I speak from memory). The clinical picture in these cases was of the intermediate type.

The bacillus was a difficult one to work with owing to its tendency to auto-agglutination; nevertheless, a goat was immunized by repeated injections with the bacillus until its serum agglutinated in 1 in 800 approximately. With this a sensitized vaccine was prepared and tried in some 20 cases. The results were interesting, but no conclusions can, of course, be drawn from so small a number. In several cases the temperature came down by crisis immediately after the vaccine; in one case it came down in two "steps," each immediately following an injection. In some cases the vaccine had apparently no effect; these were mostly the earlier cases in which smaller doses were given. In no case were there any untoward effects, and in several the patients asked for another dose, as they said it relieved the symptoms. The dose finally decided upon was one of $2,500 \times 10^6$, repeated the next day if necessary.

The complement deviation test was tried in 4 cases with serum taken from patients suffering from the disease at different stages. The goat's serum was used as a known serum, and a watery extract of the bacillus as antigen; the result was a definite negative in each case. I do not, however, consider that this absolutely negatives the possibility of the bacillus being a causative agent in one type of the fever, as the duration of the fever was so short that one would not expect a patient to raise a high degree of immunity to the bacillus.

Injection of the bacillus into rabbits and a monkey were also without result. Here again these animals were old inhabitants of Rangoon, and may well have become immune, whereas the sepoys were all new arrivals.

I do not believe the bacillus to have been a contamination, partly because I have faith in my own technique, and partly because no growth appeared in those cultures which were positive until the second or in one case the third day of incubation.

I also undertook a series of differential blood counts, in some of these cases, from blood smears taken daily during

Illness and convalescence. The results were of no particular importance; during the fever there was usually a leucopenia with a relative decrease of polymorphs and increase of lymphocytes and mononuclears; during convalescence there was in some cases, but by no means in all, an eosinophilia. One patient in particular I remember, who had only two days' fever, and whose eosinophilia rose from normal on the first day to 22 per cent. on the fifth. I should mention that in every case malaria was excluded, and in every case of eosinophilia the faeces were examined microscopically.

With regard to the transmission of the disease, I noticed that *Culex fatigans* was the most obvious biting insect about the barracks at the beginning of the epidemic, but that later on *Stegomyia* predominated. Sandflies were present throughout the period, but were never obvious.

Another interesting point about the epidemic was the fact that the first two British officers to be attacked were the only two who did not use mosquito nets, they were both attacked within four days of landing in Rangoon. All the other British officers were attacked later, and one when examined on the first day of illness, showed no less than 42 mosquito bites on the knees, the result of working in "shorts" in the office the night before.

This suggested the possibility of examining mosquitos fed on patients at different stages of the disease; accordingly cultures were taken from the contents of the stomachs of mosquitos (all *Culex fatigans*) fed in this way. I would not have believed it possible to obtain pure cultures in this way, nevertheless in 18 out of 23 cases a pure culture of a bacillus was obtained giving nearly all the reactions of Colonel Rogers's bacillus, but differing from it in its greater motility and smaller tendency to filamentous forms. It was not agglutinated by the serum of the goat mentioned above. I mention this bacillus only as a point of interest.

With regard to the nature of the epidemic itself I am not in a position to judge, as I had not previously seen either dengue or sandfly fever; I take it that the epidemic was a mixed one.

AN ADAPTABLE EYE SHADE FOR MICROSCOPIC USE.

By PROFESSOR S. G. SHATTOCK, F.R.C.S.

My excuse for drawing attention to this device is the advantage (with which I have long been impressed) to be derived from cutting off the access of direct light to the eye above the ocular.

In working in a darkened room with a hooded lamp, the drawback mentioned does not, of course, arise. But when daylight is used the admission of light to the eye above the ocular is a distinct hindrance to the study of fine detail. The difference can be at once brought home by temporarily shading the eye with the hand so as to improvise a dark chamber above the ocular. The ability to see more minute details with an eye shade, and a consciousness of diminished strain, will become so apparent that, once used, I feel sure the device will be afterwards invariably resorted to for any prolonged microscopic study.

Mr. Swift, who makes it to my design, tells me that binocular microscopes were occasionally fitted with shades, but these (as in the case of field glasses) were fixed adjuncts. As the use of binoculars for histological purposes became obsolete, the advantage of the shade appears to have been lost sight of. In some form it seems to be well worth reviving.

The draw-tube of all microscopes at the present time is

Fig. 1.—A diagrammatic section (natural size) showing the shade in situ, as kept in position between the flat, upper edge of the draw-tube A, and the rim of the top of the ocular. The form of the upper opening of the shade is indicated by the dotted line.

made of a standard inside diameter, known as No. 1—namely, 23.3 mm.; and this is the size adopted for the aperture in the floor of the shade through which the ocular drops; but the aperture is made also of a larger size to correspond with standard No. 2—namely, 26 mm.—and it can, of course, be cut so as to take an ocular of any other dimension.

It is hardly necessary to add that the shade can be used for either eye by rotating it so that the higher part corresponds with the outer, receding margin of the orbit. Its cost in black matt brass is 3s. 6d.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE ANTITOXIC POWER OF HYPOCHLOROUS ACID.

For some time past experiments have been carried out with a strongly antiseptic liquid consisting of hypochlorous acid and calcium biborate, in order to determine its antitoxic power. The best proportions to use are not yet definitely fixed, but will be given in a fuller account to be published later.

The harmlessness of the liquid in question for guinea-pigs and rabbits is shown in the following table:

TABLE I.

Guinea-pigs.	Quantity of Liquid Injected Subcutaneously.	Effect.
1	1 c.cm.	Slight inflammation at the place of inoculation.
2	2 c.cm.	
3	3 c.cm.	
4	4 c.cm.	
Rabbits.	Quantity of Liquid Injected in Ear Vein.	None.
1	1 c.cm. + 4 c.cm. salt sol. 8 %	
2	1 c.cm. + 1 c.cm.	
3	1 c.cm.	
4	4 c.cm.	
5	5 c.cm.	
6	8 c.cm.	
7	10 c.cm.	

The antitoxic effect of the above-mentioned liquid on diphtheria toxin is demonstrated in Tables II and III.

Neutralization of Diphtheria Toxin in Vitro.

TABLE II.

Guinea-pigs.	Mixture of Toxin and Antitoxic Liquid Injected Subcutaneously.	Result.
1	4 L.D. of toxin + 1 c.cm. of antitoxic liquid	Animals remain healthy.
2	4 L.D. „ + 1 c.cm. „ „	
3	4 L.D. „ + 1 c.cm. „ „	

Three guinea-pigs inoculated with the same quantities of toxin died after less than forty-eight hours.

Neutralization of Diphtheria Toxin in Vivo.

The antitoxic liquid was injected five minutes after the toxin had been inoculated; further doses were given after twenty-four hours and forty-eight hours. Both toxin and antitoxic substance were given subcutaneously on different sides of the body.

TABLE III.

Guinea-pigs.	Quantity of Toxin Inoculated.	Quantity of Antitoxic Liquid Inoculated—			Results.
		After 5 Min.	After 24 Hours.	After 48 Hours.	
1	4 L.D.	1 c.cm.	1 c.cm.	1 c.cm.	Animals remain healthy.
2	4 L.D.	1.5	1.5	1.5	
3	4 L.D.	2	2	2	
4	4 L.D.	2.5	2.5	2.5	
5	4 L.D.	1	1	1	
6	4 L.D.	1	1	1	
7	4 L.D.	1	1	1	
8	4 L.D.	1	1	1	
9	4 L.D.	1	1	1	+ 5 days. Healthy.
10	4 L.D.	1	1	1	

Guinea-pigs inoculated with 4 L.D. of toxin died after less than sixty hours.