Clinical and other Notes.

A MODIFICATION OF THE "HORROCKS BOX."

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This apparatus, which was originally designed for the Service water cart, has been extensively used in India for estimating the amount of bleaching powder to be added to much larger quantities of water, such as water works, large tanks, etc.

The very frequent complaints of chlorinous taste led to the following investigations, which were carried out to ascertain if Horrocks' method were sufficiently accurate and suitable for the testing of these larger bodies of water.

Horrocks' method differs from that of Sims Woodhead, in that the bleaching powder is measured by bulk, instead of being weighed.

It was to this step of the process that attention was first directed.

Fifty weighings from the same tin of bleaching powder were made to determine the weight of a scoopful of powder, and these showed very varying results, the minimum being 1.293 grammes, and the maximum being 2.298 grammes.

The amount of bleaching powder necessary to show free chlorine after half an hour was determined by the Sims Woodhead method as well as by Horrocks' method on untreated canal water, with a bleaching powder containing 32.9 per cent of available chlorine.

The dose of powder, as ascertained by the Sims Woodhead method, was 9.0 pounds bleaching powder per million gallons, which equals 0.29 chlorine p.p.m.

By the Horrocks method, the minimum dose, as measured with the scoopful weighing 1.293 grammes, was equivalent to 25.8 pounds bleach per million gallons (0.894 p.p.m.), while the scoop which held the maximum, i.e., 2.298 grammes, gave the result of 45.8 pounds bleach per million gallons, or 1.506 p.p.m.

This shows that the scoopful varies so much that the dose of bleach will range from twenty-five to forty-five pounds per million gallons, whereas the correct dose as determined by the more accurate Sims Woodhead method was only nine pounds.

This discrepancy in the results is quite sufficient to account for the chlorinous taste so frequently the subject of complaints, and the excess bleach used is the cause of unnecessary expenditure.

A simple calculation will show that the wastage of bleach in a water works delivering one million gallons daily, would amount to over £300
The Horrocks apparatus also suffers from the additional disadvantage that it will not estimate a dosage of less than one part per million. While this gives a margin of safety with the water cart on active service conditions, it has been found that very many of the waters available in cantonments do not require so large a dose.

If one p.p.m. be added to these waters, complaints of taste are liable to arise, and waste of bleach occurs.

The following modifications of Horrocks' method were investigated:

(a) The bleaching powder was weighed, instead of being measured by volume; (b) further dilutions of the bleaching powder were made from the original mixture as made in the black cup of the Horrocks box.

The bleach was weighed on the ordinary dispenser's scales, using the Imperial equivalent of two grammes, which the scoop is reputed to hold. This was taken as thirty-one grains, as the dispensers' scales cannot weigh fractions of a grain.

The bleach was then mixed with ten ounces of water, instead of the amount held in the black cup filled to the white line, as is done in the original method.

It may be mentioned that the black cup, when filled to the brim, instead of to the white mark, holds, on an average, ten ounces.

The solution of bleach made in this ten ounces of water is discarded with the exception of two ounces. These two ounces are now diluted with water, distilled if available, to ten ounces.

It will be seen that the solution of bleach is now one-fifth of its original strength, and therefore contains one-fifth of the weight of a scoopful, i.e., 6.2 grains.

The remainder of the test is now carried out with the six white cups, to which the usual 1, 2, 3, 4, 5 and 6 drops of the diluted solution of bleach are added with a pipette as in the original method, as also the starch and iodide indicator.

The first white cup will now contain a dilution of 0.2 part per million of available chlorine, instead of 1 p.p.m. as in the original test, and the succeeding cups will now contain 0.4, 0.6, 0.8, 1.0, and 1.2 p.p.m. respectively.

These theoretical dilutions were checked, using a bleaching powder containing thirty-three per cent of available chlorine, and a comparison of the results of estimating the dilution actually present with those predicted was made.

The first white cup was found to contain 0.198 p.p.m., which is a negligible difference from the theoretical 0.2 p.p.m.

A further check was made with a bleaching powder containing twenty-nine per cent available chlorine and a comparison of the results arrived at by this modified method and by that of Sims Woodhead was made with an untreated canal water.
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This water required 0.46 p.p.m. of chlorine to produce a blue colour with starch and iodide after standing half an hour as tested by the Sims Woodhead method.

The modified method test was preceded by an estimation of the chlorine in the first white cup.

This was found to be 0.164 p.p.m. as the chlorine content of the bleach used was lower than that used in the previous experiment.

It was then found that the blue colour of the starch and iodide was given in the third white cup, thus showing that 0.164 multiplied by 3, i.e., 0.492 p.p.m., were necessary to produce the blue coloration.

It will be seen that this modification is much more accurate than the original method, which varied in its results from 0.849 to 1.506 p.p.m., whereas the quantity shown by the Sims Woodhead method was 0.29.

In the modification the cup that should, theoretically, have contained 0.2 p.p.m. actually showed 0.198, a negligible difference, while in the second experiment the Sims Woodhead figure was 0.46 as against 0.492 of the modification—again a very small variation.

The modified method was then tried in the field. In the course of a water reconnaissance some fifty wells were tested, firstly with the original method, and secondly with the modification.

It was found that only four of the wells examined required the full 1 p.p.m., as shown by the original method, and that certain of the wells required as little as 0.2 p.p.m. to produce a lasting blue colour.

In conclusion, the suggested modification only differs from the original in the first two stages in two respects: (a) That thirty-one grains of bleaching powder are weighed out instead of taking the volume of a scoopful; (b) that instead of mixing the bleach with the amount of water contained in the black cup, it is mixed with ten ounces of water. Eight ounces of the mixture are then discarded, and the remaining two ounces are then diluted with water, preferably distilled, to ten ounces, and this dilute solution is then dropped into the white cups as in the original instructions; (c) the result is then that multiples of 6.2 grains of bleaching powder are required for each 110 gallons of water to be treated.

For a large supply the figures can be converted into pounds much more easily than the reputed contents of a scoop can be, as there is no necessity to convert two grammes to imperial measure as a first step.

For a small supply 31 grains can be mixed with 10 ounces of water and 2 ounces of this mixture will be required for 110 gallons when the blue colour is given in the first white cup, 4 ounces of the mixture if the colour does not appear till the second white cup, and so forth.

Or, if it is preferred, the appropriate multiple of 6.2 grains of bleach may be weighed out.

It is not suggested that this modification should be applied to Horrocks' test for use in the field; but it is submitted that it is a very useful method for use in cantonments where there is no laboratory, as it is more accurate,
can be performed by anyone, and will avoid the chronic over-dosing with chlorine that gives rise to so many complaints, and it would lead to a very considerable economy in the use and cost of bleaching powder.

The experiments were made in the Poona Water Works Laboratory, by the kind permission of Dr. Baretto, the Director.

I am greatly indebted to him and his assistants for their help and advice.

[The difference of more than one gramme in the weighings of a scoopful of bleaching powder is probably due to the state of the powder and not to any defect in the test.

Major Stanley Elliott has made many weighings at the Royal Army Medical College, and writes that “using the same spoon and the same powder, and measuring the powder in the correct manner, the weights should not vary more than 0·2 or 0·3 grammes. The volumes of the spoons as made for the Horrocks Box are very constant, and variations are due to the packing of the powder in the spoon.”

Stabilized bleaching powder or “Tropical Bleaching Powder,” which is now generally used with the test, is invariably a dry, finely ground powder, and Major Elliott considers that “measurement with the scoop, provided the piled material is not pressed into the scoop, and is cut off level, should be sufficiently accurate for all practical purposes.”

The test does not indicate parts per million of chlorine unless the chloride of lime contains about thirty per cent of available chlorine. The important point is that the test indicates—without any weighings which are usually impracticable with units on active service—the amount of any specimen of chloride of lime which must be added to any particular water in the cart so as to obtain a slight excess of free chlorine lasting half an hour.

It is quite unnecessary to add an excess of chlorine when working with a comparatively pure water, one-quarter or one-half a scoopful of chloride of lime is usually sufficient, and the test can be easily carried out with these amounts.—Ed.]

TWO CASES OF TROPICAL TYPHUS AND OTHER FEVERS.

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In view of Major Biggam’s article on tropical typhus in the Journal of August, 1932, notes on the following cases of fever taken at the time in Karachi and Quetta are of interest.

From April 12 to 15, 1928, a party of five Gunner officers went on a pig-sticking expedition from Hyderabad Sind to the neighbourhood of the Munsher Lake.