NOTES FROM THE CAMPS—SANITARY (SAND AND WATER).

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An outbreak of diarrhoea in two companies of the 16th (S.) Battalion Highland Light Infantry, on December 16, 1914, when ninety men were affected, caused an investigation to be made as to the cause. Complaints as to the quality of the water supply had already been made and the valuable assistance of Dr. R. M. Buchanan, City Bacteriologist, Glasgow, was obtained to examine it. The water was, however, ruled out, as the number of men affected was only a fraction of the whole number using the same water supply. The same process of elimination had to be applied to the food supplies, which are daily inspected and invariably of excellent quality.

In the search for evidence of local contamination it was found that the camp kettles were being scrubbed with sand picked up indiscriminately. Clean sand was provided and orders issued that it only was to be used for scrubbing purposes. Thereafter no further cases occurred.

The ground at Gailes has been used yearly for over two decades for camp purposes; refuse pits have been opened and covered over; much traffic, horse and otherwise, has occurred in the vicinity of the drains, and indiscriminate use of sand meant the use of polluted material.

A bacteriological report on the sand in question is appended and valuable suggestions are made by the bacteriologist. The investigation into the water supply is added, as every year complaints are made as to its colour and turbidity especially in wet weather.

A large, more or less permanent, camp has been erected at Gailes, which may be further extended, the sandy soil and healthy situation, with ample manœuvring ground in the near vicinity, making this one of the most suitable localities for training purposes. It is desirable that an authoritative statement as to the water supply should be put on record.

REPORT OF THE BACTERIOLOGICAL EXAMINATION OF SAND FROM MILITARY CAMP AT GAILES.

December 10, 1914.—I, Sand from heap by sump at main drain.
II, Sand from foundation pit in street between A and B line, 2nd Battalion.

Sample I was collected from a small heap which had been used for cleansing food utensils and which presented a soiled appearance. It was examined the same day to determine the nature and amount of bacterial contamination, if any. Sample II was collected from foundation pit for comparison with sample I.

Sand I.

Bacterial Content.—2,060,000 per gramme in gelatine at room temperature; 95,200 per gramme on agar at 37° C.
Clinical and other Notes

Colon group (lactose, indol). Details: *Bacillus coli* present in 0·01 grm.; *B. neapolitanus* present in 0·01 grm., absent in 0·05 grm.; *B. coscoroba* present in 0·05 grm.; *B. acidi lactici* present in 0·001 grm.; *B. proteus* present in 0·001 grm.

Sand II.

*Bacterial Content.* —21,200 per gramme in gelatine at room temperature; overgrown with colonies of mould (mucus).

Colon group (lactose, indol) absent in 1 grm. Details: *B. coscoroba* present in 0·01 grm.; *B. proteus* present in 1 grm., absent in 0·1 grm.

The results obtained from the examination of sand I serve to show the extent to which sand becomes polluted by its use in the cleansing of food utensils. The nature of the pollution indicates that this practice may become a source of dangerous contamination. The danger would be sufficiently guarded against by the use of clean sand from a sand pit placed in boxes. The requisite amount of sand would be lifted out and the possibility of its use a second time would thus be obviated.

(Signed) R. M. Buchanan.

Glasgow Public Health Laboratory,
January 25, 1915.


First Sampling.

November 30, 1914.—Water supplied to Gailes Camp from Irvine Waterworks.

The sample had been collected at least forty-eight hours previous to examination.

*Physical Characters.* —The sample contained a deposit of peaty material and filamentous fungi.

*Bacterial Content.* —70,600 per cubic centimetre on gelatine at room temperature; 28,900 per cubic centimetre on agar at 37° C. Coliform bacilli present in 1 c.c., absent in 0·1 c.c.

The excessive bacterial content was no doubt largely attributable to the interval (forty-eight hours) between the collection and examination of the sample.

The results were reported on December 2, 1914, as indicative of a water requiring careful supervision, and further samples were requested.

Second Sampling.

December 4, 1914.—(a) Irvine; tap at station. Sample taken at 5·30 p.m. (b) Gailes Camp; water standard in front of Army
Service Corps Store. Sample taken at 4 p.m. (c) Water standard at end of lines at parade ground. Sample taken at 4 p.m.

The samples had been collected at least eighteen hours previous to examination.

Physical Characters.—(a) Fairly clear; no sediment. (b) Slight turbidity; no sediment. (c) Decided turbidity; brownish sediment.

Bacterial Content per cubic centimetre.—On gelatine at room temperature (five days), (a) 612, (b) 670, (c) 721; on agar at 37·5° C. (three days), (a) 470, (b) 360, (c) 490. Bacillus coli group (lactose, indol) present in 1 c.c., absent in 0·1 c.c. Details of colon group: B. neapolitanus present in 1 c.c., absent in 0·1 c.c.

The interval of about eighteen hours between collection and examination of samples (a), (b), and (c) no doubt also contributed largely to their high bacterial content.

The results were reported on December 10, 1914, and on the same date further samples were taken with the view of reducing, as far as possible, this interval of time between the collection of samples and their examination.

Third Sampling.

December 10, 1914.—I. Water tap in Gailes Club House. II. Tap in North Parade Ground at T. and S. huts. III. Tap at kitchen of 2nd Battalion.

The samples (each about 6 oz.) were collected at Gailes Camp about 4 p.m. and subjected to examination within three hours.

I.

Physical Characters.—Clear; no sediment.

Bacterial Content.—68 per cubic centimetre on gelatine at room temperature; 26 per cubic centimetre on agar at 37° C. Colon group (lactose, indol) present in 100 c.c., absent in 10 c.c. Details of colon group: B. neapolitanus present in 100 c.c., absent in 10 c.c.; B. proteus present in 100 c.c., absent in 10 c.c.

II.

Physical Characters.—Slightly turbid; no sediment.

Bacterial Content.—154 per cubic centimetre on gelatine at room temperature; 52 per cubic centimetre on agar at 37° C. Colon group (lactose, indol) present in 100 c.c., absent in 10 c.c. Details of colon group: B. neapolitanus present in 100 c.c., absent in 10 c.c.; B. coscoroba (or B. cloaca) present in 1 c.c.; B. proteus present in 1 c.c.
Clinical and other Notes

III.

Physical Characters.—Clear; no sediment.

Bacterial Content.—152 per cubic centimetre on gelatine at room temperature; 36 per cubic centimetre on agar at 37° C. Colon group (lactose, indol) present in 100 c.c., absent in 10 c.c. Details of colon group: *B. neapolitanus* present in 100 c.c., absent in 10 c.c.; *B. coscoroba* present in 10 c.c., absent in 1 c.c.; *B. proteus* present in 10 c.c., absent in 1 c.c.

The results of this third sampling may be taken as being fairly indicative of the actual condition of the water. Sample I as representing the delivery from a tap in more or less constant use for some considerable time, was taken for the purpose of comparison with II and III.

The bacterial content of the three samples qualitatively is very nearly alike, but quantitatively is about doubled in samples II and III as compared with sample I. Bacilli of the colon group (lactose, indol) are present in 100 c.c. but not in 10 c.c., but the detailed results under this group show the absence of true *B. coli* in 100 c.c.

Conclusions.

Owing to the interval between the collection and examination of the first and second samplings the numerical results have no value beyond indicating (1) the possibility of rapid multiplication of bacteria if the water is allowed to remain for any length of time in the end pipes, and (2) the need for systematic flushing of those standard taps which are not much in use.

The results of the third sampling may be interpreted as indicating a fairly pure upland supply when local conditions and circumstances are fully taken into account. At the same time it must be stated that the total number of bacteria per cubic centimetre and the colon group content are comparatively high and point to some contamination, which although not presenting evidence of a specifically dangerous nature is undesirable, and most probably preventible. It is of a nature that suggests pollution of the reservoir by the intermittent visits of sea birds.

(Signed) R. M. Buchanan.