FOOD UTENSIL BACTERIOLOGY

BY

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Modern conditions compel many people to have meals in communal feeding-places, and much work has been done on outbreaks of enteritis following the consumption of meals contaminated by infected "food-handlers." Not so much attention has been given to the possibility of transfer of similar and other infections by food utensils.

To ascertain the general hygienic condition of the "messing equipment" in daily use by the public a survey was made in 25 kitchens. These included A.A. and R.A.C. approved hotels, restaurants of multiple stores, works and school canteens, day nursery kitchens, teashops, snack-bars, and a civic restaurant. Visits were made between 12.30 and 1.30 p.m., so that conditions were observed at the peak hour when they were at their worst. The visits were not pre-announced, so that no special cleaning could be done. The kitchens were situated in a residential area of about 60,000 inhabitants—a London dormitory town where the food inspection was maintained at a very high level.

Samples of washing-up water in actual use were taken and swabs of spoons, cups, forks, glasses, and plates which had been used, washed, and were stacked ready for re-circulation. The swabs were moistened in nutrient broth, and for cups an area of 2 sq. in. (12.9 sq. cm.) to the left of the handle was rubbed over on the assumption that this area was most likely to contain organisms. For glasses the rims and inner and outer surfaces to a depth of 1/2 in. (1.25 cm.) were covered, and for forks the free ends of the prongs for a depth of 1 in. (2.5 cm.).

Organisms Isolated from Utensils

Spoons.—Out of 164 examined, 8 grew a coagulase-positive *Staphylococcus aureus*, 2 a Group B haemolytic streptococcus, 1 a *Bact. dysenteriae sonnei*, 1 a paracolon bacillus, 2 *Bact. faecalis alkaligenes*, and 27 yielded coliform bacilli.

Cups.—Out of 121 examined 9 grew a coagulase-positive *Staph. aureus*, four haemolytic streptococci (2 Group C, 1 Group B, and 1 Group G), 2 paracolon bacilli, 2 *Bact. faecalis alkaligenes*, and 30 yielded coliform bacilli.

Forks.—Out of 219 examined 8 yielded a coagulase-positive *Staph. aureus*, 2 haemolytic streptococci (1 Group A, 1 Group G), 2 paracolon bacilli; 1 *Bact. faecalis alkaligenes*, 1 *Proteus* bacilli, and 43 yielded coliform bacilli.

Plates.—Out of 53 examined 6 grew a coagulase-positive *Staph. aureus*, 2 haemolytic streptococci (1 Group B and 1 Group G), 2 *Bact. faecalis alkaligenes*, 1 *Proteus* bacilli, 3 *Pseudomonas pyocyanea*, and 23 yielded coliform bacilli.

Glasses.—Out of 58 examined 3 grew a coagulase-positive *Staph. aureus*, 4 haemolytic streptococci (2 Group B and 2 Group G), 1 *Bact. faecalis alkaligenes*, 1 Morgan's bacilli, and 10 yielded coliform bacilli.

All these organisms except the coliform bacilli are possible pathogens and have been cited as causes of disease. The widespread occurrence of coliform bacilli would suggest a real possibility of contamination by intestinal pathogens. No attempt was made to classify these coliform bacilli, as high counts of the dish-washing waters grown at 37° C. suggested that the majority were of animal origin. Faecal streptococci, *Streptococcus viridans*, and *Staph.*

albus were also grown from 588 of the utensils examined, only 27 yielded no growth of any kind. These organisms, although not pathogenic in themselves, are an indication of the degree of possibility of infection from mouth and bowel organisms.

Dish-washing Waters

Thirty-eight samples of dish-washing water were examined; 19 had counts of more than 1,000,000 organisms per ml. at 37° C. and 9 had counts of more than 1,000,000 organisms per ml. at 22° C. Twenty of the 38 had considerably more organisms growing at 37° C. than at 22° C.—the approximate proportion being 120:1—suggesting the presence of a much higher number of organisms of animal than of soil or dust origin. As the average crude sewage in this country contains approximately 1,000,000 to 5,000,000 organisms per ml. at 37° C. (Topley and Wilson, 1946), it is seen that the majority of the dishes are being washed in water that bacteriologically is equivalent to sewage.

Twenty-three of the 38 waters had more than 1,800 coliform bacilli present per 100 ml. The Ministry of Health standard for a potable water varies according to the origin, but is ideally no coliform bacilli in 100 ml., and waters are "satisfactory" only if they have not more than 2 coliform organisms per 100 ml. Hence, these waters used for washing utensils, most of which are to be placed in the mouth, would appear to be entirely unfit for such a purpose.

Owing to the difficulty of obtaining soaps and soda 11 of the 38 waters contained no detergent. In others soda had been generally added, but in varying proportions—a handful or so being thrown in at random. That the addition of soda is of value is shown by the following:

With pH range 7–10 67% waters had bacterial counts greater than 1,000,000 organisms per ml.

Over pH 10 only 35% waters had bacterial counts greater than 1,000,000 organisms per ml.

With pH range 7–10 67% waters had coliform bacilli greater than 1,800 per 100 ml.

Over pH 10 only 47% waters had coliform bacilli greater than 1,800 per 100 ml.

The temperatures of the waters were found to be exceptionally low: the average was 40° C.—the maximum being 50° C. and the minimum 30° C. These temperatures would of course be too low to have any destructive or inhibitory effect on any organisms.

Among the organisms isolated from these waters were *Streptococcus viridans*, faecal streptococci, *Staph. albus* and *aureus* (coagulase-positive), coliform bacilli, paracolon bacilli (8 times), *Bact. faecalis alkaligenes* (12 times), *Proteus* bacilli (once), *Pseudomonas pyocyanea* (8 times), and aerobic sporing bacilli (14 times).

Drying Cloths

In most cases, owing to the shortage of towels and the impossibility of a quick laundry service, cloths were used till wet, and then dried and re-used. Many were washed at night and sent to the laundry weekly. Seventeen of the 36 examined yielded only faecal streptococci, *Staph. albus*, *Str. viridans*, and aerobic sporing bacilli. From the others one or more of the following were grown: coliform bacilli, paracolon bacilli, coagulase-positive *Staph. aureus*, and *Bact. faecalis alkaligenes*. On the whole the cloths did not seem too unsatisfactory.

The cleanest utensils came from a multiple store where a washing machine, with soda, was used and where there was no hand-drying of cups, plates, and glasses. These were placed in a drying oven with a temperature of

approximately 82° C., their length of stay varying from a few minutes to half an hour according to the demand for them. This temperature was high enough to kill many of the more delicate organisms, and indeed 10 out of the 20 swabs were sterile. This compares very favourably with the other 24 kitchens, where only 17 sterile results were obtained from among 595 swabs.

Though this investigation was not concerned with the bacteriological examination of the "food-handlers" in the kitchens, advantage was taken of the visit to inspect the sanitary arrangements and washing facilities provided for them. In most cases these were unsatisfactory. In 14 places no washing facilities were available either within or immediately adjacent to the sanitary convenience, and hands had to be washed, if indeed they were washed at all, in the same kitchen sink as the crockery and cutlery. This provides a sure path of infection by intestinal pathogens.

Conclusion

It would seem from this brief survey that in communal feeding-centres the cleaning of eating utensils is very unsatisfactory, and that pathogenic organisms are likely to be spread among the users of different articles. The lack of modern equipment such as washing machines, the difficulty of obtaining soap and washing powders, and the scarcity of drying towels renders very difficult the important and necessary task of feeding people in a hygienic manner. The finding of dysentery bacilli on the cutlery in one out of only 25 kitchens is rather disquieting, and may suggest the origin of the sporadic case of "diarrhoea"; and the finding of pathogenic streptococci 14 times and of pathogenic staphylococci 36 times may help to explain the high incidence of septic mouth lesions so common in the last few years. The prevalent method of washing and drying infected crockery and cutlery appears to do little in the way of destroying their pathogens.

Very great interest was shown by the proprietors of the premises visited, and every help was given to facilitate the investigation. Results were keenly awaited, and they were eager to know what measures could be adopted to remedy defects. It would seem that public health propaganda for improvement in kitchen hygiene, together with suggestions as to the methods to be followed, would be welcomed, especially if accompanied by bacteriological evidence showing its necessity.

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REFERENCE

Topley and Wilson (1946). *Principles of Bacteriology and Immunology*, 3rd ed., p 1584.

For the 1946-7 academic year 248 graduates and others of like status from overseas have been awarded British Council scholarships, which enable them to take a wide range of postgraduate courses of study in this country. The scholarships are normally for one year, but extensions are granted in suitable cases. In addition the British Council has helped to place many students who have come under the auspices of overseas authorities or privately. The Council during the year established a students' welfare department to deal with the reception and non-academic welfare of scholarship holders, and to help them to gain a general knowledge of British life and institutions. To this end vacation courses, which enable those residing in London to visit the provinces and vice versa, as well as term-time talks, discussions, shows of documentary films, and other events are arranged. These facilities are available also to students sponsored by the Colonial Office, the Indian and Sudan Governments, and to other overseas students. The year's British Council scholarship holders have come from some fifty Empire and foreign countries, and include 36 taking medical subjects.

THE SURGICAL TREATMENT OF CHRONIC FRONTAL SINUSITIS

BY

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In my experience few complaints produce so much disability or suffering as chronic infection of the frontal sinus. In a great number of instances this suffering appears to be unnecessary, and I am therefore impelled to record my suggestions as to how unsatisfactory results may be avoided.

In the first place it is necessary not to exaggerate the incidence of frontal sinusitis, and to avoid operating under a mistaken diagnosis. The prominent symptom of frontal headache is attributable in many instances to neuralgia of various types or to migraine, but with no cause in the frontal sinus. The incidence of sinus headaches may, according to Proetz (1943), be no more than 5%; but when there is such a cause the case is difficult to cure. It is not my intention to enter into a discussion on the differential diagnosis of frontal headaches, but rather to suggest means of relief when the cause has been established.

Two Important Points

First, it is necessary to eliminate all contributory factors in the nasal fossae; this advice may seem obvious, but in a large number of unsuccessful cases referred to me this elementary detail has been overlooked. The treatment referred to is the care of infection in the maxillary and ethmoidal cells, the straightening of a high deviation of the septum, and the removal of an enlarged and obstructing middle turbinal body. Several patients I have seen have been submitted to more than one external operation, while the septum has been so twisted as to make the nasal fossa on the affected side quite inadequate for ventilation and drainage.

The second recommendation concerns direct treatment of the infected frontal sinus after all preliminary measures have been taken to provide a satisfactory outlet to the fronto-nasal duct, as outlined above. I do not believe that internal operations on the frontal sinus are satisfactory; evidence is afforded by a number of patients so treated who have subsequently come under my care and have required an external operation for their cure.

The most skilled operator in this region that I have seen was Dr. Max Halle, of Berlin, but even though I admired his dexterity in creating a free passage into the frontal sinus, the difficulty of clearing all infected ethmoidal cells by the intranasal route, together with the tendency of the exposed bony canal to reclose, has prejudiced me against this and other similar methods.

One comes, therefore, to the final determination that in cases with chronic infection of the frontal sinus associated with the usual symptoms of headache, difficulty in concentration, depression, and so on, the correct treatment is an operation by the external route. It remains then to decide what method is desirable.

Method

Attempts at obliteration of the frontal sinus are, in my experience, usually unnecessary, generally disfiguring, and often ineffective. I have had to operate on several patients who had elsewhere been submitted to attempted obliteration of the sinus. The anatomical structure is such that unless a new and permanently enlarged fronto-nasal duct is created an inefficiently drained recess will be left in the lower part of the sinus, with continual suppuration and the continuance of the symptoms which the operation is intended to relieve.