OUTBREAK OF FOOD POISONING IN AN INSTITUTION

BY

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In spite of the number of outbreaks of food poisoning well recorded I feel that it would be of use to the profession if these outbreaks were more often described. Much attention has been given to the problems of food poisoning in several countries, in this country particularly, by W. G. Savage and P. Bruce White, and their *Food Poisoning, A Study of 100 Recent Outbreaks* (Special Report Series No. 92, Medical Research Council) should be in the possession of every medical officer of health. The outbreak to be described occurred at a mental hospital with 763 inmates.

Onset of the Outbreak

On September 23, 1936, I was informed by the medical superintendent that several patients were ill, one desperately so, with vomiting or diarrhoea or both, and that food poisoning was suspected. Fifteen patients were found to be ill, and the clinical picture was severe headache, vomiting, diarrhoea, muscular pains, and temperatures varying from 100° to 103° F. The vomit was greenish and the diarrhoea a pale brown loose stool. Muscular pains were complained of chiefly in the legs. The onset of similar symptoms in so many people distributed on the male and female sides of the institution, which are fairly isolated from each other, with more of the staff affected, strongly suggested that infected food was the causal factor.

The dietary was inspected and the foods suspected were breakfast sausage, canned mutton, and possibly milk. The milk was supplied from the institution's farm and had been taken in all the wards and the hospital block. Some wards and the hospital block had no persons ill with the same symptoms as described above, so milk was not further considered. The breakfast sausage had been introduced for breakfast (about 9 a.m.) on September 20, and the canned mutton was used for dinner, at 12.30 p.m. on September 21. The breakfast sausage had been satisfactory, but four of the patients now ill had not partaken of the sausage, and these four patients were in different wards. It was noted that everyone who was ill had taken the canned mutton. There was no sausage left for bacteriological examination.

The mutton was canned in the Argentine, and was supplied in 6 lb. tins. Twenty-seven tins were opened in a larder by the storekeeper at 11 a.m. on September 21 and were taken directly into the kitchen, where they were divided into slabs for further slicing in the wards. The storekeeper noted one blown tin, which he opened after the mutton from the apparently good tins had been delivered to the kitchens. The mutton in this tin was in a state of decomposition, and was destroyed in a furnace. The empty tin was sent for bacteriological examination. The rest of the mutton appeared wholesome, and was eaten without any complaint. It was served untreated.

The Investigation

A few patients assist the kitchen staff, and on inquiry it was established that among the staff or patients in the kitchen none had had any recent suspicious illness. The kitchens were clean, but it was noted that there was a

water-closet in a room opening directly into the kitchen. The temperature of the kitchen was not taken, but the rooms were definitely warm.

Every inmate who became unwell was regarded as suffering from food poisoning, and the number amounted to thirty-one. The shortest incubation period was fifteen hours and the longest seventy-two hours: average period for males, twenty-five hours; for females, thirty-four hours. During convalescence bradycardia was a feature. Two male patients died, one after being ill forty-two hours and the other after between forty-eight and seventy-two hours' illness. An attempt was made by the Welsh Board of Health to discover if any other persons in the country were infected from the same consignment, but without success.

NECROPSIES

Case 1.—A man of 35 years, well developed; the small intestine had a distinct pink colour, but no other macroscopic pathological condition was found.

Case 2.—A man of 59 years. The small intestine showed an abnormal pink colour; the spleen was exceedingly soft and friable. Nothing else abnormal was found.

From both cases portions of small intestine, liver, kidney, and spleen were sent for bacteriological examination to the Ministry of Health Bacteriological Laboratory. The report on the material sent to this laboratory was as follows:

BACTERIOLOGICAL EVIDENCE

Material	Bacteriological Findings
1. Six stools.	<i>B. enteritidis</i> Gaertner in large numbers.
2. One unopened tin of mutton from same consignment.	Negative result.
3. Two tins which had contained mutton.	Negative result.
4. Portion of liver, spleen, kidney, and small intestine from Case 1.	<i>B. enteritidis</i> +
5. Portion of liver, spleen, kidney, and small intestine from Case 2.	<i>B. enteritidis</i> + except in small intestine.

After recovery agglutination tests were carried out at the institution on the remaining twenty-nine suspected patients:

Patients	Positive Agglutination for <i>B. enteritidis</i>
Females (17)	12
Males (12)	9

Agglutination results varied from 1 in 25 to 1 in 500 +. Thus we can say that twenty-three patients almost certainly suffered from a *B. enteritidis* infection. Those who gave no positive agglutination were classified during the acute stages of their illness as "mild cases," and may have been cases which, through extreme caution, were included as probably suffering from food poisoning.

Agglutination tests against *B. enteritidis* were made on all the people who had handled the food, as follows:

Stores—two staff and three patients.
Kitchen—seven staff and twelve patients.
Bakehouse—one staff and three patients.
Farm (milkers)—three staff and eight patients.

The results of these tests showed:

Stores—no positive reactions.
Kitchen—eight positive reactions (six staff and two patients).
Bakehouse—one patient gave a positive result.
Farm—two patients gave positive results.

All these agglutination tests were carried out after ten days had elapsed from the beginning of the outbreak. It is interesting to note that only one member of the kitchen staff gave a negative result, and that particular maid was away the day that the mutton was used. Most admitted eating small portions of the mutton. None apparently were ill. One faecal bacteriological examination was made from each of the above persons, and all gave negative results.

Discussion

The outbreak caused two deaths, and at least twenty-one persons were infected by *B. enteritidis*, yet scientifically the food conveying the infection was not traced. However, there is little doubt that the canned mutton was responsible. The reasons for this belief are:

1. Every inmate taken ill had eaten the mutton.
2. All inmates who had not eaten the mutton were unaffected.
3. Every other article in the dietary was used in the hospital block, and no cases occurred there.
4. All kitchen maids showed a positive agglutination reaction to *B. enteritidis* except one, and she was absent on the day that the mutton was in the kitchen.

It is actually impossible to say what the source of the infection was, but an attempt can be made to deduce it. Savage and Bruce White state that there are three possible primary reservoirs:

1. A habitat outside the animal (including human) body.
2. Infection from a human case—infected sufferer or passive carrier.
3. Infection from an animal source—
 - (a) Specifically infected animal used for food.
 - (b) Sound food infected by a person suffering from a *Salmonella* infection or acting as a carrier of such bacilli.

1. Savage and White maintain that while this source is possible suspected material has always yielded negative results, and in this outbreak I find it difficult to admit the possibility.

2. This source can be discounted fairly certainly, as no illness at all suggestive could be discovered.

3. There was no evidence to show that the mutton could have been infected from an animal source in the institution. The food was traced from the tin to the wards, and it seems certain that it could not have been infected. Thus we are left to consider:

- (a) Was an infected animal used for the food—that is, ante-mortem infection?
- (b) Was the animal originally healthy and the meat infected post mortem?

If (a), then the bacteria survived the "cooking" process, which is unlikely. Moreover, a primary *B. enteritidis* infection of sheep is very rare. Does (b) appear to be a more likely source of the infection? From the number ill and proved to have been suffering from a *B. enteritidis* infection and the number who partook of the canned mutton—that is, twenty-three out of over 700—it is reasonable to suggest that one tin only was infected. Two wards (M2 and F2) supplied thirteen out of the twenty-three cases. The cases at the time of the outbreak were classified as mild, moderate, and fatal. There were nine mild cases, twelve moderate, and two fatal cases. Ward M2 had eight moderate and two fatal cases, and ward F2 showed four moderate cases. Thus it seems that the portion of the can most heavily infected went to ward M2 and the next most heavily infected to ward F2. The average incubation period in ward M2 was twenty hours and in ward F2 thirty-one hours. It is therefore reasonable to say that there was no uniform infection of the meat in the can, as might be expected from an ante-mortem infection, but a grading from one portion to another, as might be expected if one portion was originally infected before sealing of the tin and spread gradually by con-

tinuity of the material. This suggests, therefore, the probability of a post-mortem infection rather than an ante-mortem infection.

Summary

1. An outbreak of gastro-enteritis in which two persons died and twenty-one persons were victims was found to be due to *B. enteritidis*.

2. It is suggested that canned mutton was the food involved.

3. By probability only, and by no scientific proof, it is suggested that the mutton was infected in some manner, and was not taken from an infected animal.

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TREATMENT OF DEPRESSED FRACTURES OF THE MALAR BONE

BY

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A fracture which is becoming common is that in which the malar bone is pushed into the antrum. Sir Harold Gillies informed me that it is becoming particularly common in England, as the almost universal use of safety glass in cars is causing this fracture to replace the former facial cuts in automobile accidents, but even in Australia, where safety glass is only now coming into common use, it is often seen.

In this fracture the orbital, antral, and zygomatic attachments of the malar bone are fractured and the body of the malar bone is pushed partly or wholly into the antrum. The malar bone being strong is rarely comminuted, but not so the lateral wall of the orbit and the infra-orbital margin of the maxilla. If the case be seen soon after the accident the diagnosis is easily made, but even if seen after several hours the depression of the malar bone is rarely masked by the superficial swelling. When there is much swelling an alteration in the shape of the lower edge of the orbit is generally such as to make the presence of this fracture highly probable. The diagnosis in difficult cases is made by x-rays, and especially by one taken vertically of the side of the head from below upwards (Stone's position—Gillies, Kilner, and Stone, 1927), when the prominence of the zygomatic process on the affected side will be absent.

Often the fracture causes loss of sensation over the area of distribution of the infra-orbital nerve. As a rule the antral cavity is filled with blood clot.

Difficulties in Treatment

Treatment by the usual methods is unsatisfactory, the multitude of methods advocated indicating this. The advice generally given is to make an incision under the lip similar to that made in a Caldwell-Luc antrostomy and to open the antrum and elevate the malar bone. The reduction of the fragment is easy by this method, but no facilities are provided for retaining the bone in the correct position, and no allowance is made for drainage of the antrum. Such drainage should be instituted after an antrum full of blood clot has been opened into the buccal cavity, which carries such an infective flora.