

## NOTE ON SOME CASES OF FOOD-POISONING.

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THE cases which form the subject of the following note occurred in the district of Dr Chas. Jackson, M.O.H., of Fulham, and I am greatly indebted to him for so kindly furnishing me with their histories and with samples of the patients' serum.

There were in all four cases, the patients being a man (*A*), his wife (*B*), baby (aged four months) (*C*), and grandmother (*D*). On Saturday, September 15th, 1902, *A* bought three rabbits, one of which he gave to his grandmother, who cooked it and ate it the next day without any ill effects. The other two rabbits were stewed on the Sunday and partaken of by *A* and *B* for dinner and supper without any untoward results. What was left over from Sunday was warmed up on the Monday for dinner and supper, *D* being present at the latter meal. On this occasion *C* had a small quantity of the gravy. The wife (*B*) was seized with diarrhoea and vomiting the same evening, and the others early the following morning. In the cases of *A*, *B*, and *D*, the symptoms were severe but passed off under treatment. The baby's illness, beginning with diarrhoea and vomiting, passed into collapse and finally into coma, which after three days' duration ended in death on the seventh day of the attack. A post-mortem examination was made four days after death. The materials sent to me for examination consisted of a piece of the infant's spleen (Sept. 26) and a portion of the hind-limb of a rabbit (Sept. 21). The surface of the latter was black and charred, and I understood that it was picked out of the ashpan underneath the fire, where it had been thrown after supper.

The method of examination was the same in each instance. A portion of the tissue from the inside of the specimen was removed, put into a tube of bile salt glucose broth (every precaution being taken to avoid accidental contamination), and placed at 37° C. After 24 hours'

incubation, surface cultivations were made from the glucose broth on to bile salt neutral-red lactose agar plates which were incubated at 37° C. From these plates pure cultures were obtained and a further examination showed that in both cases the same organism had been isolated. It was an actively motile bacillus, non-sporing, non-liquefying, and Gram negative. It produced non-characteristic grey-white growths on agar and gelatin. Milk became slightly acid at first but this soon gave place to distinct alkalinity. It fermented

Glucose,	Mannite,	Dextrin,
Mannose,	Dulcit <sup>1</sup> ,	
Maltose,	Sorbit,	
Arabinose,		
Raffinose <sup>2</sup> ,		

with the formation of acid and gas.

It had no action on

Lactose,	Adonit,	Inulin.
Cane sugar,	Erythrit,	

The cultural reactions thus corresponded in every particular with those of the *B. enteritidis* (Gaertner) group. Both bacilli were found to be pathogenic for guinea-pigs when injected subcutaneously. A monkey was fed (by a tube) with a 24 hour broth culture of the "rabbit

<sup>1</sup> *Dulcit*. This reaction is very valuable indeed. Its great importance as a differentiating characteristic was first pointed out by me at a laboratory meeting of the Pathological Society of London held on February 3rd, 1903.

<sup>2</sup> *Raffinose*. These bacilli, just like all the members of the *B. enteritidis* Gaertner group, fermented raffinose with the production of acid always, and often also of a small amount of gas. But there seems some doubt as to the nature of this reaction.

L. Telesmin (*Centralbl. f. Bakteriol. Abt. II., Bd. XII. 205—216, 1904*) states that Kahlbaum's raffinose, after having been heated to 100° C., reduces Fehling's solution, and that on hydrolysis it yields glucose, galactose and fructose. In view of this statement a medium was made up composed of peptone 2% and gelatin 10% in tap-water, the whole being rendered slightly alkaline to litmus. Kahlbaum's raffinose was dissolved in cold distilled water and the solution sterilised by filtration through a porcelain filter. Enough of this raffinose solution was added to the gelatin to make the amount of raffinose equal to 1%. Neutral-red was then added as an indicator. The tubes were incubated to ascertain whether any contamination had occurred. As they were found to be sterile inoculations were made with about 15 different members of the group and all produced acid as evidenced by the change of colour of the neutral-red, a control tube remaining unchanged.

Messrs Merck, however, have informed me that there is no method of ascertaining whether a sample of raffinose is quite free from traces of fructose, etc. It would seem, therefore, that one cannot place much reliance upon this reaction.

bacillus" mixed with a similar culture of the "child's bacillus." It developed diarrhoea and died during the third night. Cultures were made in bile salt glucose broth from the heart blood, spleen, a mesenteric gland and faeces. No growth was obtained from the heart blood or spleen, but from the faeces and gland was isolated a bacillus corresponding in all cultural reactions with the bacilli used for feeding. Specimens of the patients' blood were obtained and tested as below :

## 1st examination.

	Dilution	Time	<i>B. typhosus</i>	<i>B. enteritidis</i> of Gaertner	Bacillus from rabbit
Blood of A	1/50	1 hour	+ +	+	0
„ B	1/50	2½ hours	+ +	0	0
„ D	1/50	2½ „	+ +	0	0

## 2nd examination.

Blood obtained 23 days after beginning of attack.

	Dilution	Time	<i>B. typhosus</i>	<i>B. enteritidis</i> of Gaertner	Bacillus from rabbit	Bacillus from child
Blood of A	1/50	2½ hours	+ +	0	0	+
„ B	1/50	2½ „	+ +	0	0	+
„ D	1/50	2½ „	+ +	+	+	+

A had had enteric fever four years previously.

+ + = good sized clumps but fair number of motile bacilli in field.

+ = only small clumps: many motile bacilli in field.

Two rabbits were then immunised, one with the bacillus isolated from the piece of rabbit and the other with the bacillus obtained from the child's spleen. The serum of these rabbits was tested with the results shown in the following table. The dilutions of serum used were 1/20, 1/100, 1/500, 1/1000, 1/5000, 1/10000; the time limit was two hours, and the cultures were 24 hour growths in bouillon. The hanging

	Rabbit bacillus serum	Child bacillus serum
Bacillus from rabbit	1/1000	1/1000
„ „ child	1/1000	1/1000
<i>B. paratyphoid</i> A (Schottmüller)	<1/20	1/20
„ B ( „ )	1/1000	1/1000
<i>B. L.</i> (Hume) <sup>1</sup>	1/1000	1/1000
<i>B. Aertrycke</i>	1/1000	1/1000
<i>B. "Gl."</i> <sup>2</sup>	1/500	1/1000
<i>B. psittacosis</i> (Nocard)	1/500	1/1000
<i>B. enteritidis</i> (Gaertner)	1/20	<1/20
<i>B. icteroides</i> (Sanarelli)	<1/20	1/20
<i>B. Danysz</i>	<1/20	1/20

<sup>1</sup> *Bacillus L.* (Hume) differs from the rest in that it ferments adonit with the production of acid and gas.

<sup>2</sup> *Bacillus "Gl."* was isolated from the heart-blood of a guinea-pig which died after inoculation with the *Bacillus mallei*.

drop method was employed and observations were made with a 1/2 inch objective and  $\times 8$  eyepiece under dark background illumination. The results record the limit of dilution with which agglutination occurred as tested against a control. As soon as the mixture of serum and culture gave appearances similar to the control the result was noted as negative and the preceding dilution was entered as the limit of agglutination.

These agglutination reactions make it clear that the two bacilli isolated during these experiments are closely related to *B. Aertrycke* (van Ermengem) and *B. paratyphoid* "B" (Schottmüller) and are different from either *B. enteritidis* (Gaertner) or *B. paratyphoid* "A" (Schottmüller). They also show that the bacillus isolated from the heart-blood of a guinea-pig dead of glanders is, as far as it has been tested, identical with *B. psittacosis* (Nocard).

#### CONCLUSION.

The bacillus isolated from the piece of rabbit is identical with the bacillus obtained from the child's spleen and both belong to that group of organisms which has been most frequently associated with cases of food-poisoning. The attacks were caused by this bacillus as is shown by the effect of feeding a monkey with pure cultures. In about 60 hours these bacilli had passed out of the intestine and penetrated as far as the mesenteric glands but had not reached the general circulation.

The fact that all the cases occurred within an hour or two of each other and that the Monday's supper was the only meal at which the baby tasted the rabbit suggests that when purchased the rabbit was quite fit for human consumption, and contamination must have taken place in the consumer's house.