the heat production. Normal temperature would, therefore, depend on the function of a central neural mechanism, probably the vestibular nuclear apparatus, responsible for normal muscular tonus and for normal heat production.

4130

Experimental Paratyphoid Intoxication in Man.

GAIL M. DACK, WILLIAM E. CARY AND PAUL H. HARMON.

From the Department of Hygiene and Bacteriology, University of Chicago.

In a number of food poisoning outbreaks competent bacterial examination has failed to reveal the presence of any living microorganisms. It has been inferred especially by Savage and White[1] that many of the outbreaks were due to poisonous thermostabile growth products of *B. aertrycke* or *B. enteritidis*. Animal experimentation along this line has not met with uniform success since most workers have been unable to reproduce symptoms of paratyphoid intoxication by feeding the sterile products of *B. aertrycke* or *B. enteritidis* to animals.

In our experiments 24 people, ranging in ages from 20 to 40 were fed heat killed cultures or filtrates of *B. aertrycke* and *B. enteritidis*. Nine strains were used, 5 of *B. aertrycke* and 4 of *B. enteritidis*. The date of isolation and colony morphology of these strains are as follows:

Strain No.*	Year	Colony Morphology†	Strain No.*	Year	Colony Morphology†
E 520	1888	R, I, S	Ae388	1922	S
Ae522	1892	R	Ae391	1922	S
Ae518	1898	R	Ae411	1923(Apr.)	S
E 396	1921	I, R	E 438	1924(Dec.)	S, I
E 397	1921(Oct.)	I, R			

* Ae prefix refers to *B. aertrycke*. E prefix refers to *B. enteritidis*.
† R=rough, I=intermediate, S=smooth. Arranged in order of predominance.

The cultures were grown in beef heart medium containing 1% of dextrose. They were incubated at 37° C. for periods varying from 2 hours to 20 days. After incubation the supernatant fluid from each culture was divided and half was filtered through a Mandler filter and the remaining half was boiled for 20 minutes. Before feeding both the heat killed cultures and filtrates were tested for sterility. Rabbits were given intravenous injections of the heat

[1] Medical Research Council, Special Report Series, numbers 91 and 92, London, 1925. Published by his Majesty's Stationery Office.

killed cultures and filtrates in amounts ranging from 0.5 to 2.0 cc. All of the animals showed symptoms of dyspnea and many showed prostration and death. The filtrates from the 6 hour cultures were much more toxic than those from older cultures.

Human subjects were fed amounts varying from 20 cc. to 340 cc. of heat killed cultures or filtrates. No symptoms developed in any instance. In order to obtain a freshly isolated strain we injected 2 cc. of a veal infusion broth culture of Ae411 into the gall bladder of a *Macacus rhesus* monkey. The animal died after 8 days and the organism was recovered from the gall bladder. This strain was grown in beef heart dextrose medium for 10 days. One hundred cc. of the culture, after boiling for 20 minutes, was then fed to a human subject. No symptoms developed in this individual. Fecal examinations for members of the paratyphoid group of organisms were made on all of our subjects and in no case were we able to isolate paratyphoid organisms. Twenty of the 24 human subjects had been previously vaccinated for typhoid; the remaining 4 had never been vaccinated. Macroscopic agglutination tests were made, using the serum of the human subjects against the homologus organisms which they were fed. These tests were made before feeding and 10 days after feeding. In no case were the agglutination titres increased after feeding.

Conclusions: Heat killed dextrose beef heart cultures and filtrates of 5 strains of *B. aertrycke* and 4 strains of *B. enteritidis* when fed to adults on an empty stomach failed to produce symptoms of paratyphoid intoxication. No agglutinins for the homologous strains were present in the serum of these subjects 10 days after feeding.

4131

A Peculiar Reaction (Allergic?) to Scarlet Fever Streptococcus Toxin.

MARTIN FROBISHER, JR.

From the Department of Pathology and Bacteriology, the Johns Hopkins University.

During the winter of 1925-26 studies on scarlet fever toxin necessitated the frequent intracutaneous injection of various toxic filtrates. The author served as a subject for these tests and until December 9th, 1927, always gave a typical Dick reaction. On this date, however, and on every subsequent test he gave the peculiar, two-phase reaction which is described below. On this occasion there