LVIII. NOTE ON THE *MENINGOCOCCUS* AS A SOURCE OF GROWTH FACTOR FOR *STREPTOTHRIX CORALLINUS*.

BY JEAN ORR-EWING AND VERA READER.

From the Departments of Biochemistry and Pathology, Oxford.

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THE findings reported below have been demonstrated at the British Association meeting, 1926, and at a meeting of the Biochemical Society, June 1927. They seem to be of sufficient interest to be briefly summarised, as one of us (J. O.-E.) is unable at present to continue the work.

In the course of an endeavour to ascertain whether vitamin B₁ was essential to the growth of the haemophilic group of micro-organisms, it was discovered that a strain of *Meningococcus* type 1 (National collection of Type cultures, Strain Littledale, No. 668) would grow readily upon a meat extract medium which had been completely freed from the *S. corallinus* growth factor by repeated charcoal extractions. Since the *S. corallinus* has been found to react to a vitamin B₁ concentration of 2×10^{-6} pigeon dose [Reader, 1928], we are convinced that the vitamin B₁ factor, if present at all, was reduced below this value. The final test of the ability to grow in the absence of the vitamin lies in the production of growth in a carefully purified synthetic medium. We have been unable to find such a medium capable of supporting growth, and were unaware at the time of the work of Hosoya and Kuroya [1923].

On retesting the meat extract (vitamin B₁-free) medium after the growth of the *Meningococcus*, it was found to be capable of supporting good growth of *S. corallinus*.

EXPERIMENTAL.

Ordinary meat extract made from 500 g. of lean veal per litre of tap-water was extracted three times with 2 g. charcoal (norite) per 100 cc. To the filtered extract were added 0.4 % Na₂HPO₄ and sufficient 4 % NaOH solution to bring to p_H 7.2. The fluid was then tubed and autoclaved for ten minutes at one and a half atmospheres pressure. The *Meningococcus* was subcultured three times on this medium and five tubes were finally inoculated for use in the *Streptothrix* test [Reader and Orr-Ewing, 1928]. After six days' growth, the tubes were steamed and the contents added to synthetic medium as shown below.

Medium		<i>Streptothrix</i> growth	
Broth cc.	Synthetic medium cc.	Uninoculated medium	Inoculated medium
10	+ 10	Trace	Good = 1/100 pigeon dose
5	+ 15	"	Moderate = 1/400 dose
1	+ 19	"	Poor = 1/4000 dose
0	+ 20	"	—

Similar results have been obtained with the centrifuged culture medium from which the bacteria were as far as possible removed.

It will be seen that the degree of *S. corallinus* growth falls off more quickly than is warranted by the dilution of the medium. The result is therefore of the anomalous type [see Reader and Orr-Ewing, 1928], and for this reason we do not claim to have demonstrated that the *Meningococcus* is able to synthesise vitamin B₁. The results are necessarily expressed in terms of pigeon doses, because this is our only measure of the degree of *S. corallinus* growth. An attempt has been made to test this point by extracting a large volume of the medium after the growth of the organism, but the concentrate was found to be too toxic for use in a pigeon test.

DISCUSSION.

Numerous cases have been reported of the ability of the more hardy organisms such as *B. coli* and *Sarcina lutea* to produce growth stimulators for the delicate organisms such as *Meningococcus*, *Streptococcus haemolyticus*, *Pneumococcus* and *Gonococcus* [Ainley Walker, 1922; Hosoya and Kuroya, 1923]. This case is of some interest as an example of the reverse process. The bearing of this work upon the results of the Japanese workers is discussed in the following paper.

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