NOTE ON AGGLUTINATION REACTIONS IN THE TYPHOID CARRIER STATE.

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IN any search for enteric carriers the patient with a positive blood-agglutination must be regarded as suspect. Earlier workers were of opinion that the converse of this was true—that a negative agglutination reaction implied that the case was not a carrier. It is true that McCowan and Mann (1925) described a series of nine carriers, of whom two showed a negative agglutination reaction during the clinical attack of typhoid fever, but the subsequent history of the agglutination reactions is not given. Ashby (1931) indicates in his series the prevailing belief that carriers show significant alterations in their agglutination reactions. Although repeatedly controverted in the medical literature by the publication of small groups of cases where the carrier state has been accompanied by negative blood-agglutination reactions, this view dies hard, and was revived during the recent discussions centring around the Croydon typhoid epidemic.

It is in the hope of bringing the facts before those outside bacteriological circles that we append the following observations.

We have been fortunate enough to have under our observation in one hospital a series of 25 enteric carriers, and we hope the tables below, which incorporate our findings, will give further evidence of the fallibility of dependence on blood agglutination reactions in the detection of carriers.

Agglutination tests were performed by the Dreyer technique, using Oxford standard suspensions.

Table I shows 11 cases from which typhoid organisms were isolated at the time of the investigation into the blood agglutinations, but which gave reactions to *B. typhosus* " O " and " H ", which were negative or within normal limits.

Table II shows 14 cases in which there was evidence of typhoid, and which gave serum reactions to *B. typhosus* " O " and " H ", which were of diagnostic significance.

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TABLE I.

	Date of infection.	Typhoid bacilli in fæces.	Agglutination to T. "H" and "O."
Case 1	14.vii.31	+	Normal limits.
,, 2	Not known	+	Negative.
,, 3	15.iv.18	+	,,
,, 4	Not known	+	Normal limits.
,, 5	19.ii.32	+	,,
,, 6	Not known	+	,,
,, 7	,,	+	,,
,, 8	,,	+	Negative.
,, 9	,,	+	,,
,, 10	5.v.10	+	Normal limits.
,, 11	Not known	+	Negative.

TABLE II.

	Date of infection.	Typhoid bacilli in fæces.	Agglutination. T. "H."	Agglutination. T. "O."
Case 12	Not known	+	1/125	Negative.
,, 13	3.vii.33	+	1/50	,,
,, 14	7.v.29	+	1/125	1/50
,, 15	4.ii.32	+	1/125	1/125
,, 16	24.vi.33	+	1/125	Negative.
,, 17	Not known	+	1/125	1/50
,, 18	5.vii.28	+	1/300	1/125
,, 19	Not known	+	1/50	1/50
,, 20	,,	+	1/250	1/125
,, 21	,,	+	1/125	Negative.
,, 22	17.iii.32	+	1/250	1/50
,, 23	Not known	+	1/125	Negative.
,, 24	,,	+	1/125	1/50
,, 25	1.ii.33	+	1/250	1/50

Thus it is seen that in this series 11 out of 25 carriers, i.e., 44%, gave negative blood-agglutination reactions at a time when the organism of typhoid could be recovered from the stools. It must be emphasized that the greater the bacteriological interest shown in the stools the larger the number of carriers that will be detected. In this connection attention may be drawn to the long persistence of the passage of organisms ; one case in the series dates the original infection to 1910.

Browning *et al.* (*Med. Research Council Report*, No. 179) quote a personal communication from Haaland, who obtained 7 negative Widal reactions from

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16 confirmed carriers. Similarly, Küstner and Günzler are reported to have found that of 50 male carriers, 6 fæcal and 14 urinary carriers had negative Widal reactions.

O'Callaghan (1937) found 7 carriers in a population of 1,134; on investigation 6 of these had negative Widals.

Pijper and Crocker have abandoned the Widal reaction in the demonstration of carriers. In their report they mention " three manifest carriers with no ' H ' agglutinins ".

SUMMARY.

1. The existence of the view that the search for enteric carriers can be facilitated by preliminary Widal reactions is remarked upon.

2. The fallacy of this view is pointed out and demonstrated by the results obtained on examination of 25 known carriers from whom specific organisms were recovered during the period of this investigation.

3. Of these cases, 11 out of 25, i.e., 44%, proved to have Widals which were negative or within normal limits.*

4. The persistence of the carrier state is emphasized.

5. References are given to literature describing similar results.

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* Since this paper was written a communication has appeared by Felix (*Lancet*, 1938, ii, p. 738) showing the failure of agglutination reactions in typhoid carriers with the usual " H " and " O " antigens, and claiming a greater incidence of positive reactions with the " Vi " antigen. It is of interest that the present series of cases were also investigated by Felix with the " Vi " antigen, but no greater incidence of positive reactions was reported, the percentage of negative reactions with the " H " and " O " antigens being as above—44% and with the " Vi " antigen 60%.

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