

this contamination from culture media these precautions may prove unnecessary. On the other hand, in the case of all those organisms which we have shown to be characterized by their ability in the living state to elaborate toxic derivatives from the media of artificial growth, these precautions cannot be neglected.

In conclusion, although it is premature to indicate the practical lines of direct immunity research opened up by these experiments, it is impossible to ignore the suggestions they offer as to the meaning of sensitization and the superiority of living vaccines over dead, as well as to the necessity for re-examination of the whole scheme of vaccine-therapy. And in the meanwhile, if they do no more than press home the necessity for fresh investigations into the true source and character of the natural antigens of disease they will faithfully have served their purpose.

NOTE.—Since this paper was placed in type two articles on experimental fever have appeared in a German periodical by Thiele and Embleton which might seem at first sight to affect some of the conclusions reached in this communication.⁹ In the articles referred to, the authors—as so many have done before them—have fallen victims to the very fallacies which Dr. Penfold and I have already exposed in the English journals.¹⁰ One of the fundamental errors, for example, in all study of experimental fever produced by injection is the assumption that water which is innocent of demonstrable infection at the time of injection must also be innocent of pyrogen, and that water collected direct from the condenser of a distilling apparatus in daily use and then filtered is necessarily pure water. In consequence, therefore, of failure to recognize this source of error these workers in many of their experiments unwittingly used impure water, as is clearly shown in their own protocols. This accident is alone sufficient to invalidate all the experiments and deductions based thereon, though there are other fallacies of almost equal importance which I have fully described elsewhere.

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- ⁸ Hort: Normal and Immune Serum-Therapy, *BRITISH MEDICAL JOURNAL*, November, 1911.
- ⁹ *Zeitschrift für Immunitätsforschung*, 1913.
- ¹⁰ The Relation of Salvarsan Fever to other Forms of Injection Fever. *Proc. Roy. Soc. Med.*, 1912, vol. v (Path. Sect.), p. 137. Chart.

APYREXIAL TYPHOID.

BY

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APYREXIAL typhoid, although known to exist, is of excessively rare occurrence, and may therefore readily pass unrecognized, particularly in the absence of an epidemic of the disease. Cases of this type have been described by Gerhardt and Dreschfeld, and of these brief mention is made by the latter in Allbutt's *System of Medicine*.

In typhoid fever we know that, in patients of over 40 years of age, the temperature curve is lower and less characteristic, but although cardiac, pulmonary, and renal complications are more common, splenic enlargement and rose rash are frequently absent. For these reasons, therefore, the diagnosis may be rendered more difficult. The case recorded below will serve to illustrate these points.

The patient was a woman aged 60, who had resided in the same house for more than thirty years, and during that period had never required medical assistance for more than minor ailments. A careful investigation into her previous history precluded all possibility of any previous attack of typhoid fever.

The present illness commenced in the first few days of September, with the usual feelings of malaise, and with gradually increasing diarrhoea. She took to her bed on September 8th.

When first seen, on September 10th, the patient was in an exhausted condition, with a dry, furred tongue and subnormal temperature. The outstanding feature of the case at the time was the exceedingly profuse diarrhoea, which persisted in spite of all the usual remedies. On September 12th (two days later) the patient began to wander, and sank into a semi-comatose state, in which she remained for the ensuing fourteen days. During this period the intestinal symptoms were unchanged, there was a moderate distension of the abdomen, but no spots or enlarged spleen were present then or later. Widal's reaction on September 16th was positive in every dilution. From the onset of the attack until September 25th (that is, the fourth week of the disease), when complete consciousness returned, the mouth and surface temperatures were invariably subnormal, and the rectal temperature, taken twice daily, never exceeded 99.4°. From September 26th to October 4th the mouth and rectal temperatures each reached their maximum of 99.6° and 100.4° respectively, after which they dropped again.

During the fourth week a further specimen of serum was obtained for the purpose of comparative agglutination reactions to *B. typhosus* and other allied organisms, with the following results:

- B. typhosus* agglutinated up to 1 in 2,000.
- B. paratyphosus B* agglutinated up to 1 in 200.
- B. paratyphosus A* agglutinated very slightly.
- B. enteritidis* (Gaertner) agglutinated not at all.

The patient ultimately made a good recovery, and without serious complications.

An investigation of the water-supply of the (isolated) dwelling revealed a privy in close proximity to the well, which constituted the sole supply of drinking water on the premises. This water, on examination by the county authority, proved to be contaminated with sewage.

In the light of all the bacteriological findings, I think there can be very little doubt that in this case there existed a true typhoid infection.

A SIMPLE AND RAPID METHOD FOR THE ADMINISTRATION OF SUBCUTANEOUS SALINES.

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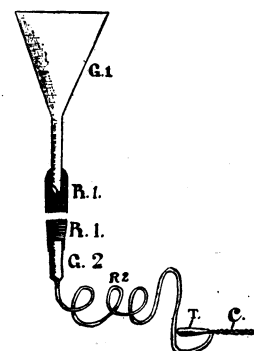
THE administration of saline solution by the method of subcutaneous injection has many points in its favour and should by no means become obsolete. There is no method to equal it when the absorption of a large quantity of fluid is required.

In numerous cases of late years I have made use of an apparatus which, from its convenience and simplicity, has served to replace more cumbersome methods.

The only requisites are (1) a large silver cannula from a Southey's tube apparatus; (2) Southey's rubber tubing; (3) a small piece of glass tubing, narrow at one end to fit this tubing, and larger at the other (for this an ordinary clean fountain-pen filler does very well); (4) a large glass funnel connected to the glass tube by rubber. The various parts are joined together and the whole is sterilized by boiling.

The mode of introduction deserves special notice, for it differs considerably from the usual method. The anterior axillary fold is grasped firmly and drawn outwards. The trocar with its cannula is then passed into the skin in a direction vertical to the chest wall and is pushed steadily through the axillary fold so that its point emerges within the axilla. The trocar is then withdrawn and the cannula is pressed onwards into the axilla until its shoulder rests flush with the skin.

The fluid as it emerges from this cannula spirts in all directions and is poured out into three distinct plains, separated anatomically into watertight compartments by the deep fascial layers. Into the most superficial of these



G1, Glass funnel. R1, Large bore rubber tubing. G2, Glass tube. R2, Southey's rubber tubing. T, Trocar. C, Cannula.