To rightly see the position, more delicate testing than that resorted to by Voit requires to be adopted. The examination of the blood shows that even two hours after the injection it has not recovered its normal condition. There is a further point that the experiments show in a decided manner, and that will therefore have to be considered by physiologists, namely, that notwithstanding that dextrose has been used, what is found in the urine, and, after the lapse of a little time, likewise in the blood, is a product of much lower cupric oxide reducing power. Baisch's¹ results obtained from normal urine stand in accord.

Towards the conclusion of his article Dr. Paton says: "The evidence may therefore be considered as establishing (1) that glucose is formed in the liver; (2) that glucose is used in the tissues, and is not all excreted by the kidneys." That glucose is susceptible of being formed in the liver is a truism with which everyone is familiar. Under a great variety of abnormal conditions abundant evidence is forthcoming showing that sugar escapes from the liver, and its escape is made manifest by its influence upon the blood and the urine. As regards the second proposition, whilst I contend that the entrance of sugar into the circulation is revealed by its influence upon the urine—that the urine, in fact, stands as an indicator of the state of the blood in relation to sugar—it has not been in my mind that all the sugar that may happen to reach the blood is eliminated by the kidney. At page 236 of my *Physiology of the Carbohydrates*, I say, in connection with the consideration of the subcutaneous injection of glucose: "I have referred to the protoplasmic transmutation of sugar into glycogen in the liver. But the transmutative power by no means exclusively belongs to the liver; indeed, I am disposed to think it exists as a general property of the protoplasmic matter of the body."

What we have broadly to deal with is the application of our food supply of carbohydrate matter within the animal system. Under the glycogenic doctrine, everything is centred in the liver. The liver takes the carbohydrate, stores it as glycogen, and then gives it out to pass as sugar into the circulation, to be conveyed to the tissues for oxidation, and thence heat, or some other form of force-production. Such was the doctrine propounded for the disposal of carbohydrate matter within the animal system; and, further, to meet the want of the tissues, if the tangibly evident supply was not afforded by the food, the liver was alleged to form it out of other material, it not being then realised that with animal food we get a certain amount of supply of carbohydrate matter, sufficient, it appears to me, to account for the glycogen found under the circumstances in the organ. What is the alimentary form of diabetes but this passage of the carbohydrate matter of our food into the general circulation as sugar, and do we not, by cutting down the supply of it, protect the system from the sugar invasion, and thereby bring the urine to a natural state?

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NOTE ON THE ETIOLOGY OF TYPHUS FEVER.

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Of late years opportunities for bacteriological examination of cases of exanthematic typhus have become increasingly rare. Existing observations on this subject appear to be mostly due to foreign observers. Thus Hlava¹ described a diplobacillus, and subsequently fungi, a vibrio which he calls *V. proteus ruber*, and several other organisms as occurring in the blood of patients examined during life. Lewaschew² found cocci which he names micrococcus exanthematicus in the spleen pulp. Calmette³ found what he looked upon as a fungus belonging to the ascomycetes or ustilaginæ. Dubieff and Bruhl⁴ found a diplococcus exanthematicus, which they cultivated and looked upon as the cause of the disease. These researches have failed to obtain confirmation at the hands of other observers. I think it desirable, considering the obscurity of the subject, to publish the following account of an unsuccessful attempt lately made by me to

isolate micro-organisms from the blood of a typical case of spotted typhus.

The patient was a young woman, aged 22, who was admitted into the Hardwicke Fever Hospital, Dublin, under the care of my friend Dr. J. B. Coleman, suffering from a typical attack of typhus fever. Course, temperature, and exanthem were in all respects characteristic. Tested by the Gruber-Widal method, the blood serum gave a negative reaction. The skin of the forearm, having been thoroughly disinfected, the sterilised needle of a sterile antitoxin syringe was introduced into one of the large cutaneous veins, and about 20 c.cm. of blood readily obtained. The blood was at once distributed amongst a number of tubes of glycerine agar and faintly alkaline peptone broth. In some of the agar tubes the blood was allowed to flow over the oblique surface of the medium and settle at the bottom. Others of the agar tubes had been previously melted, and cooled to 40° C. These, after addition of the blood, were poured out on sterile Petri dishes. All were put away at 37° C. to incubate. On the following and subsequent days they were carefully examined, but no signs of growth appeared on any of them. In the broth tubes the coagulated blood formed an opaque flocculent mass, partly floating in the surrounding liquid, which was perfectly clear and bright. That the media were capable of supporting bacterial life was proved by subsequently inoculating some of the tubes and plates with *staphylococcus aureus* and *B. typhosus*, both of which grew luxuriantly. At the time of the examination—the eighth day of the fever—the patient's temperature was 103°, and her skin abundantly covered with the characteristic "mulberry rash." Crisis ensued on the fourteenth day, and recovery followed.

This negative result, obtained under very favourable circumstances—for example, the amount of hæmoglobin introduced into the media must have rendered them very favourable to the growth of strictly obligate parasites—leads me to the conclusion that micro-organisms capable of growing on our nutrient media are at any rate not always present in the blood of typhus fever; and confirms the reports of Szwajcer and Bujwid,⁵ Weinschal,⁶ Thoinot and Calmette,⁷ and Curtis and Combemale,⁸ who found the blood of considerable series of typhus cases absolutely sterile. It would seem probable that our present methods of investigation are not capable of solving the question as to the nature of the *materies morbi* in this disease.

I desire, in conclusion, to express my best thanks to Dr. Coleman for his courtesy in allowing me to examine this case, and for his assistance in obtaining the blood.

[Since writing the above note I have had an opportunity of examining another case, that of a young woman under the care of Dr. Murphy at my own hospital, the Mater Misericordiae, suffering from typical spotted typhus. The blood was aseptically obtained in a Gruber-Widal collecting pipette and inseminated on broth, agar, and obliquely solidified human blood serum. All the media are still (after forty-eight hours at 37° C.) quite free from growth of any kind. In this case also, the serum gave an absolutely negative result by the Gruber-Widal method.]

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MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

TWO CASES OF LARYNGEAL SPASM FATAL IN THE FIRST ATTACK OCCURRING IN THE SAME FAMILY.

THE following cases may be of some general interest from the rarity of a fatal termination to this affection, and also from the strange coincidence of two members of a family being carried off within a couple of days of one another with precisely the same symptoms, both having been perfectly well right up to a few minutes of their death.

One afternoon, in obedience to an urgent call, I went to see a child, living close by, who was said to be suffocating, if not already dead. I arrived at the house within two or three minutes of the receipt of the message, but found the child quite dead, death evidently having occurred only a few minutes before.

The child was a boy, 19 months old, and was one of twins, the other twin having died within a month of its birth. According to the mother's account the child was perfectly well, and had been so for months. Just before his death he