cultivated outside the body. (4) The active substance present in 24 hour filtrates withstands boiling and does not rapidly deteriorate when kept at icebox temperature. (5) Reinjection at a site previously used for a reaction frequently reveals an alteration of the tissue response characterized by shorter latent period and earlier disappearance of the reaction. This alteration in the response is in some cases at least non-specific. (6) Some individuals react more strongly to filtrates, others to constituents of the bacterial cell.

227 (2459)

Observations of the nutritional effect of subcutaneous oil injections.

By B. SCHICK, MARGARET E. FRIES, JEROME KOHN, PHILIP COHEN.

[*From the Children's Clinic of Mount Sinai Hospital, New York City.*]

Experiments with subcutaneous oil injections have been frequently tried. The first clinical observations were published in 1869. Extensive animal experiments were carried out by Leube in 1895 and by Mills in Lusk's laboratory in 1911. Both considered oil injections were of practical value. Others have repeated this work using fat and oil for injections with varying degree of success. Winternitz was, for instance, unable to obtain good results.

We resorted to this method of treatment in a very serious case of Hirschsprung's disease (child 11 years of age). Following the total extirpation of the colon and sigmoid the child either refused or vomited most of his food. He also had loose stools. His condition was desperate, his weight having fallen from 63 to 47 pounds, a loss of 16 pounds.

The first two days we injected 50 cc. of sterile cotton seed oil. The child gained in weight, but after stopping the injections the weight remained stationary. For the following seven days we increased the amount of oil to 100 cc. per day. The general condition and appetite improved to such an extent that he took food by mouth better than before. His weight likewise increased.

Again the injections were discontinued, with the same effect upon his gaining, namely, almost no rise. We therefore decided to continue the oil injections for fifteen days more. Simultaneously the weight rose. As the child was eating well and his state of nutrition was much improved, we have discontinued the oil injections.

Apparently the greater part of the oil was absorbed, but there are a few areas of swelling undoubtedly due to the oil. Over a period of forty-one days thirty injections of oil were given. The total amount was 2250 gm., equal to 20,475 calories or 500 calories per day (750 nem). The child's weight rose from 47 to 58½ pounds, a gain of 11½ pounds.

In consequence of the good result obtained in this case, we tried subcutaneous injections of cottonseed and olive oil in fifteen infants and children suffering from chronic nutritional disturbances. These had a lowered tolerance for food given by mouth, but they seemed to utilize the oil given subcutaneously, as was demonstrated by gain in weight. 10 to 20 cc. were given daily or every other day to younger infants, while 20 to 30 and even 50 to 100 cc. were injected in older children.

The oil was absorbed more rapidly in the atrophic children than in those enjoying better nutrition.* It seems that the first injections of oil were better absorbed than the later ones. The best place for injections is probably the abdominal wall.

That the oil was absorbed at least to a certain extent was proven by fat determinations of the blood and autopsy examination in the case that died.

Work is now being undertaken on children and adults to determine whether such treatment with injection of oil is of real practical value and if so, which cases will respond best to this treatment. We will report later on our observations on the rate and ways of resorption of subcutaneous or intraperitoneal injected oil and fat, the effect on metabolism, the formation of lipolytic ferments, the effect on the blood picture, immune bodies lymphatic systems, etc.

* As some children may be sensitive against cottonseed, olive oil can be used.