again. The results are claimed to be eminently satisfactory but there may be objections to its application to the comparatively sensitive skin of the human subject on account of its irritating qualities which do not obtain in the case of animals.

The method adopted by me, which is a modification of that employed by Grossich, is as follows: Immediately before the animal—*e. g.*, cat or dog—is put into the ether chamber the hair is cut short and the skin shaved dry along the line of the intended incision. Tincture of iodine (U.S.P. 7.5 per cent. in 95 alcohol) is painted on and a little way around the shaved area with a camel hair brush and the anæsthetic is administered. When the animal is fully under (with ether this usually takes ten to fifteen minutes) and placed on the table a second application of the iodine is made a minute or two before the skin is incised, and a third, after the stitches are in, when the operation is finished. No dressing of any kind is applied to the wound but the day following the operation a fourth application of the tincture is made. No further treatment is necessary,

During the last four months many operations have been performed in this laboratory on a variety of animals—rabbits, cats, dogs, sheep, raccoons, opossums, etc., and in every case where the above procedure has been adopted healing has been by first intention and rapid.

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The Diagnosis of Abortive Cases of Poliomyelitis by the Demonstration of Specific Antibodies.

By **JOHN F. ANDERSON** and **WADE H. FROST.**

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The occurrence of abortive cases of poliomyelitis has already been established upon clinical and epidemiological ground. Netter and Levaditi[1] have given the only specific proof of an abortive case of poliomyelitis in a human being by demonstrating, in the serum of such a case, immune bodies capable of neutralizing the

[1] Netter, A., & Levaditi, C., *Compt. Rend. de la Soc. de Biol.*, vol. 68, 1910, pp. 855–857.

virus of poliomyelitis *in vitro*. Their case was a child which suffered a clinically obscure, mild illness about the same time that another child of the same family suffered a frank attack of poliomyelitis.

We have undertaken a similar demonstration in nine suspected abortive cases of poliomyelitis selected from a much larger number observed during an epidemic of acute anterior poliomyelitis in Iowa in the summer of 1910. Special interest is attached to these cases because of the mildness of their symptoms, the frequency of similar cases and their epidemiological relation to cases of frank poliomyelitis.

The sera of these nine cases were tested for immune bodies as follows: One half cubic centimeter of each serum was mixed with an equal volume of a 5 per cent. emulsion (filtered through paper) of fresh spinal cord from a monkey in the acute paralytic stage of poliomyelitis following inoculation with virus (M.G.) kindly furnished by Dr. Simon Flexner, of the Rockefeller Institute. To each mixture was added 0.1 c.c of fresh serum from a normal adult. As controls, we used the serum of a frank case of poliomyelitis and of a normal adult. The mixtures were allowed to stand 1 hour at 27° C. and 20 hours at 15° C. One half cubic centimeter of each mixture was then injected intracerebrally into a monkey (*Macacus rhesus*). The two control monkeys receiving the mixture of normal serum and virus developed typical poliomyelitis on the tenth and twelfth day respectively. Three of the monkeys receiving the serum from suspected abortive cases also developed poliomyelitis.

The monkeys receiving the serum from the other six suspected abortive cases, and from the frank case of poliomyelitis have all remained well (78 days).

We then repeated the test, using the serum of the three suspected abortive cases which had failed to show immune properties in the first experiment; and for controls, using five specimens of normal human serum (three adults and two children). In this series we altered the proportion of serum and virus to the extent that we used a *one per cent.* emulsion of fresh spinal cord, all other conditions remaining the same. In this series poliomyelitis developed in only two of the controls, and in one of the monkeys

receiving the serum of a suspected abortive case of poliomyelitis, indicating presumably a certain degree of germicidal power even in *normal* human serum.

To compare this germicidal property of normal serum with that shown by the sera from the six suspected abortive and two paralytic cases in series 1, we inoculated a third series of monkeys. In this series we tested the three normal sera which had shown neutralizing properties in series 2 using a *5 per cent.* emulsion of virus, thus repeating exactly the conditions of series 1. All three monkeys developed typical poliomyelitis in 10 to 14 days.

The sera of six out of nine (66.7 per cent.) suspected abortive cases of poliomyelitis have shown, when tested against the virus of poliomyelitis, a germicidal property greater than that shown by any one of six normal sera similarly tested. We interpret this as establishing, to a reasonable certainty, the diagnosis of poliomyelitis in these six cases, and strongly confirming the same diagnosis in a larger group of clinically similar cases observed in connection with the above.

Attention is called to the epidemiologic and prophylactic importance of establishing, by close study of such cases, some clinical criteria for their better recognition.

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Pure cultures of parasitic amebas on brain-streaked agar.

By **ANNA W. WILLIAMS.**

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This work was begun with the attempt to obtain cultures of bacteria-free amebas in crushed rabies brains, the idea being either that the amebas might take up the rabies organisms as food or that they might free the rabies organisms from their host cells and thus bring about, in some way, a culture of the latter, as Clegg reports having done with the *B. leprœ.*

Four cultures of amebas were selected for a first trial, 3, presumably parasitic (type, *Entameba coli*), the fourth, a saprophyte (*Ameba lirnax*). Of these four, only one, a culture from a case of