

of a culture of this organism will not protect mice against a minimal lethal dose of *B. oedematiens* toxin, or *Vibrion septique* toxin or against infection with these organisms.

Two other strains exactly similar to this have been recovered from two out of four tubes of catgut from a batch used in the hospital at the time this infection developed.

*Summary.* An anaerobic bacillus has been cultured from the lesion in a fatal human operative wound infection and from catgut. It is pathogenic in small doses for eight different species of laboratory animals. It produces a lesion in these animals resembling somewhat the lesions produced by *B. oedematiens* and *Vibrion septique*. It differs from these organisms strikingly in certain of its cultural characteristics. Serologically it has been demonstrated to be distinct from both of these. As far as we know it does not correspond to any other pathogenic anaerobe heretofore described. The name proposed for this new species is *Clostridium oedematoides*.

This is a preliminary report.

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#### General and Local Heat Developed in Living Animal Body by Passage of High Frequency Currents.

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The present wide use of clinical diathermy has led us to a study of the deep heat produced in tissues by the passage of alternating currents of high frequency. Most of our experiments have been made on dogs anesthetized by the intravenous injection of barbital sodium. The deep temperature was measured by means of specially prepared thermocouples soldered to the tips of Luer needles which could be inserted into the body cavities. These thermocouples, which were of copper and constantan, were connected with a galvanometer through a constant temperature junction obtained by a thermos bottle thermostat as described by Clark.<sup>1</sup>

The high frequency current was passed through the body by placing the electrodes usually on the sides of the shaved thorax. Great care was taken to have the electrodes parallel to each other and the thermocouple needles at right angles to the electrical field. This is very important, otherwise there is a concentration of current at the

needle point which results in false readings. This source of error was excluded in all experiments. In some instances the temperature was measured by mercury thermometers as well. The current strength usually employed was between 1200 and 1500 milliamperes, with a concentration not greater than 100 milliamperes per square inch of electrode surface. Under these conditions no damage to the skin resulted.

The passage of such a current through a dog's thorax results in a general elevation of body temperature (rectal), with an equivalent rise of temperature in the lung. This is shown in Fig. 1. In this figure it is likewise shown that with the passage of the current the lung at first gradually warms more than the rectum, but later cools below the rectal temperature until the current strength is increased, when it again crosses the rectal temperature.

Fig. 2 shows the effect of sudden death on the temperature recorded by a mercury thermometer placed in a dog's abdomen between electrodes. The sudden precipitous rise indicates that the cooling mechanism at work during life has suddenly ceased to operate.

That this cooling mechanism might be related to surface temperature is brought out in Fig. 3. But that it is far more likely depen-

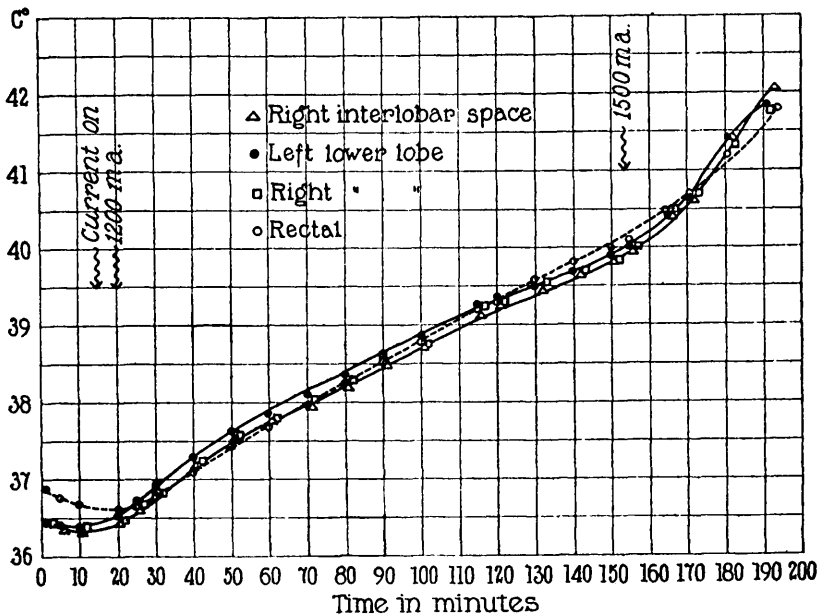


FIG. 1.

Temperature recorded by thermocouples in lungs and thermometer in rectum, of anaesthetized dog, subjected to high frequency current.

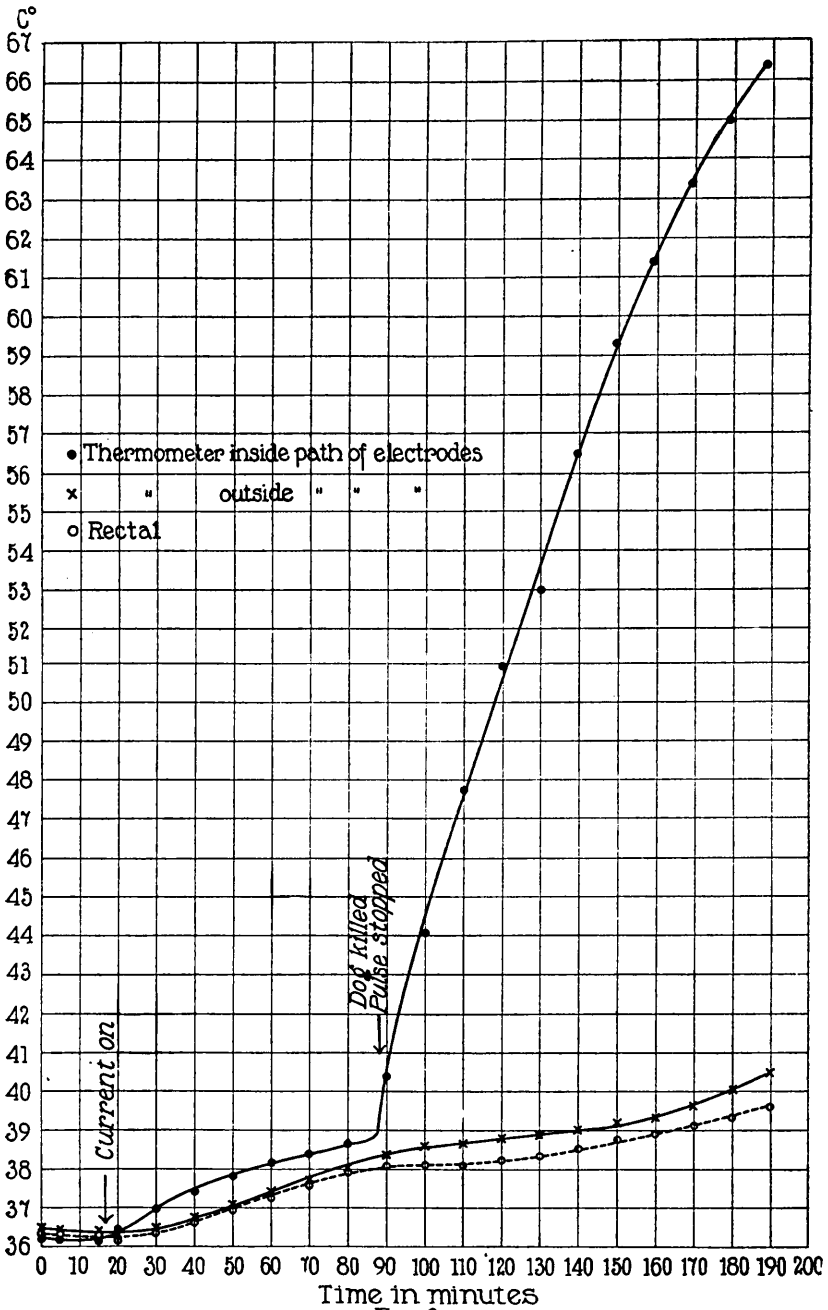


FIG. 2.

Effect of death on heat recorded by thermometer, placed in abdomen between the electrodes.

dent upon normal local circulation is shown, we believe, clearly in Fig. 4 and Fig. 5.

In the experiment summarized in Fig. 4, the left branch of the pulmonary artery was surrounded by a pneumatic cuff, as described by Moore and Binger,<sup>2</sup> in such a manner that the circulation through the artery could be obstructed or released at will while the animal was breathing with closed thorax. Obstruction to the circulation in the left lung was immediately followed by a local rise in temperature, which fell promptly when circulation was again reestablished. Subsequent sudden death of the animal resulted in a still more precipitous rise of temperatures in both lungs. That this added rise is due to the cessation of the bronchial circulation is indicated in Fig. 5, where the "death curve" was obtained in one lung as soon as its root was ligated. A control experiment showed that ligation of the bronchus alone, without the vessels, had no such effect.

This work represents a preliminary report on a critical study of diathermy. It has led to some interesting observations on heat distribution. At present experiments are being made on temperature measurement of the circulating blood at various points in the animal body.

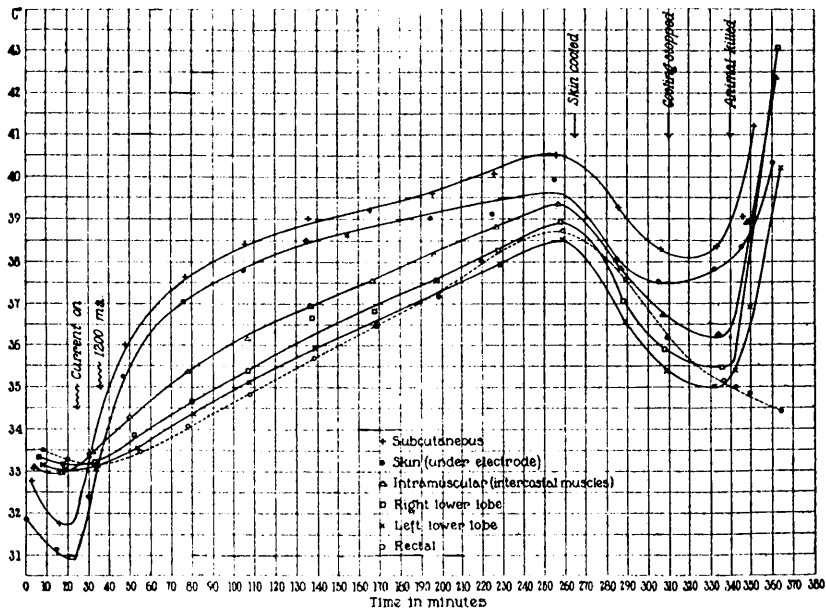


FIG. 3.

Effect of cooling the skin, during passage of high frequency current, on temperature recorded by thermocouples placed at various points.

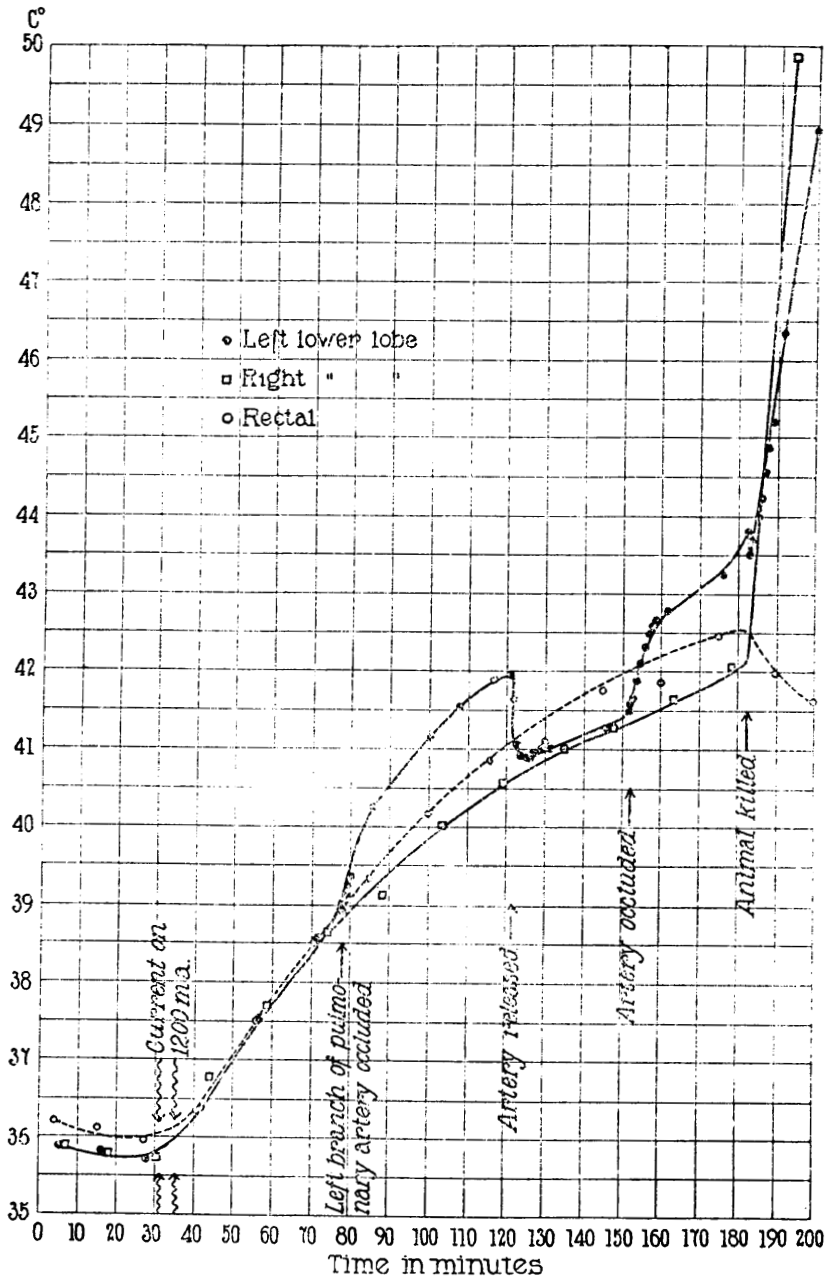


FIG. 4.

Comparison of heat developed in right and left lungs and rectum, with effect of clamping and releasing artery to the left lung.

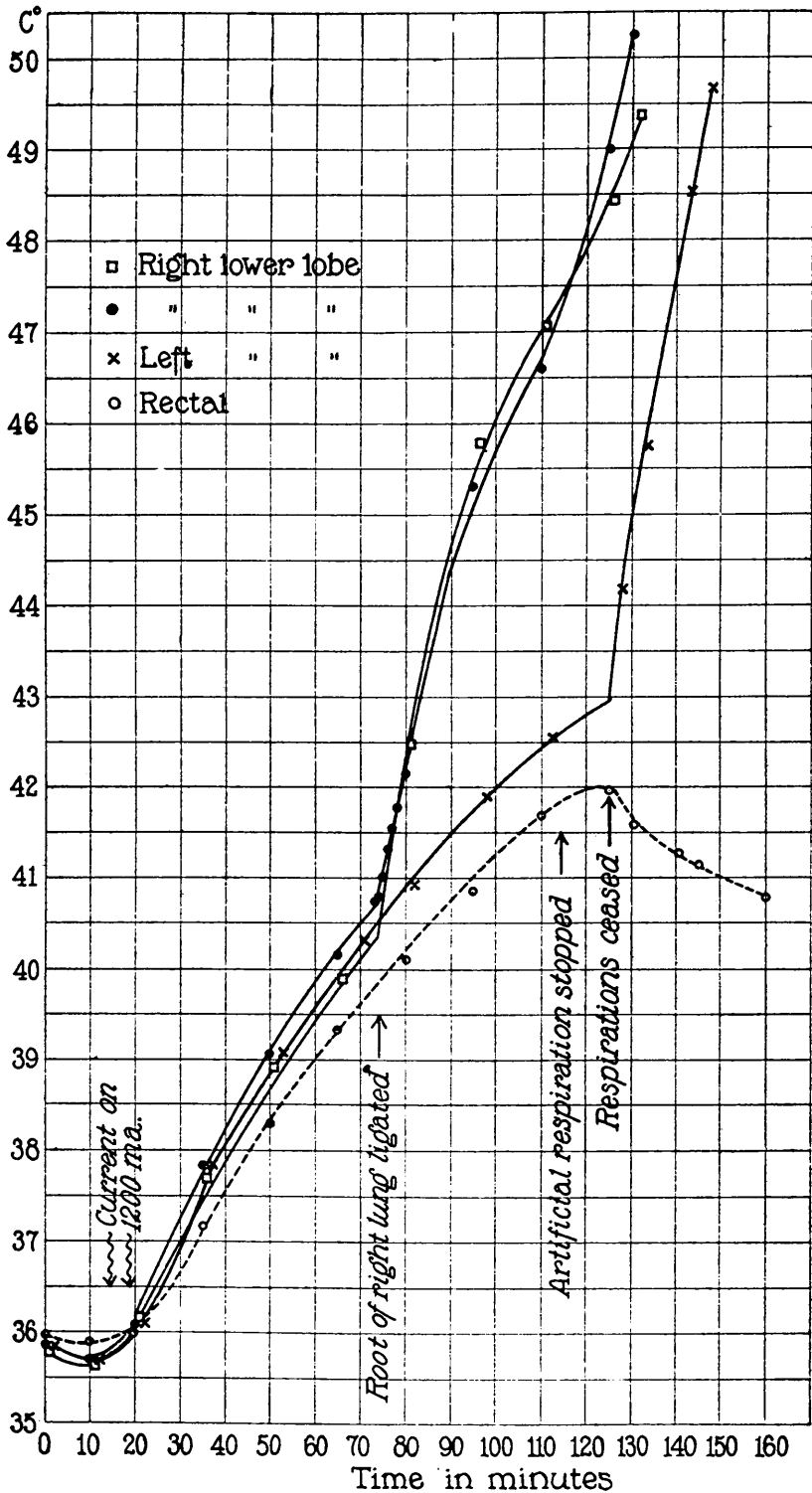


FIG. 5.

Comparison of heat developed in right and left lungs and rectum. Effect of ligating the root of the right lung, and effect of sudden death.

These and other experiments indicate that the efficiency of the local circulation determines whether the heat produced by the passage of high frequency currents through the living animal will remain localized or be disseminated uniformly throughout the body.

This is a preliminary report.

<sup>1</sup> Clark, Harry, *J. Exp. Med.*, 1922, xxxv, 385.

<sup>2</sup> Moore, Richmond L., and Binger, Carl A. L., *J. Exp. Med.*, 1927, xlv, 655.

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### Observations Upon Certain Isolated Loops in Intestinal Obstruction.

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In previous experiments<sup>1</sup> loops of intestine were doubly occluded and the continuity of the intestinal tract was re-established by anastomosis between the proximal and distal ends. (Fig. 1. a.) At the same time, nothing was done to interfere with the mesenteric circulation of these blind intestinal loops. A fatality occurred if the loop subsequently twisted so as to occlude the mesenteric circulation, or if the loop distended sufficiently to interfere with the circulation of the vasa recta through intra-enteric pressure. If the above factors did not obtain, the animal, in each case, made an uneventful recovery.

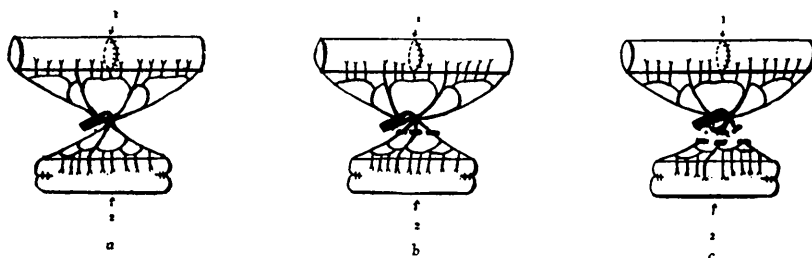


FIG. 1.

a No deliberate interference to mesenteric circulation.

b Mesenteric circulation ligated.

c Mesenteric circulation ligated and cut.

1 Reconstruction of canal.

2 Isolated loop.

Black oblong = deliberate interference to mesenteric circulation.