

**EXPERIMENTAL RESEARCH  
INTO THE SURGERY OF  
THE RESPIRATORY SYSTEM**

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Experimental Research into the Surgery of the Respiratory System by George W. Crile

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**GEORGE W. CRILE**

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BY

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SYSTEM

INTRODUCTION

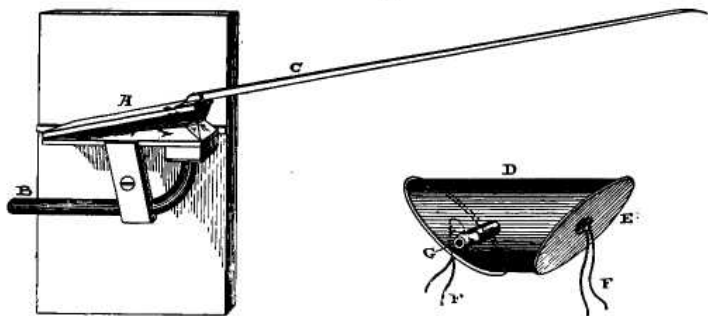
FROM clinical observations it is apparent that there are a number of phenomena attending operations and injuries of the thorax and the respiratory tract which are not sufficiently well understood for ready application in surgery. Instead of taking up the subject in a general way, it was thought best to divide it into parts, and to make a research on each subject separately. From the nature of the subjects, some parts overlap others. It has been only within recent years that opportunities have been general for experimental work on that part of physiology which relates so directly to surgery. It has been the aim in this work to dwell upon the subjects of most practical importance, and to elucidate, as far as possible, the practical bearings of the several questions under consideration. It is not intended to be exhaustive on all the subjects taken up, nor have all the data accumulated in the experiments been recorded in the protocols, as this would involve unnecessary detail. It was originally intended to make the research both clinical and experimental, but the experimental side grew so large as to

make it seem advisable to keep the clinical in the background. It was also intended to present a bibliography of the literature on the various subjects, and the greater part of this has been collected, but will not, at the present time, be added. The experiments have been performed with great care, with the sole desire to arrive at the truth, without reference to previous notions or theories. The research has extended over two years, and was carried out in the physiological laboratory of the Cleveland College of Physicians and Surgeons. In all the experiments dogs were used as subjects, and taken unselected as they were supplied by the laboratory servant. I cannot sufficiently acknowledge my indebtedness to my associate, Dr. W. E. Lower, who rendered most valuable assistance throughout the research, and whose name deserves to appear on the title-page.

#### METHODS OF RESEARCH AND NOTATION

The animals were all reduced to full surgical anæsthesia before the experiments were begun, and were killed before recovery from the same. In the greater number of experiments ether was employed, and anæsthesia was produced by the following method: A hood was constructed so as to accommodate the animal's entire head; it was made of strong cloth, conical in shape, and into its apex was thrust a piece of cotton-wool. Saturating this piece of cotton-wool with the anæsthetic, and holding the hood closely over the head of the animal, reduction to surgical anæsthesia was made with but little difficulty. After the completion of anæsthesia the trachea was exposed and a breathing canula inserted. To the

free end of this canula a strong rubber tubing was attached, and to the end of this tubing was fastened a funnel, which was placed over a piece of cotton-wool saturated with the anæsthetic. By this method anæsthesia



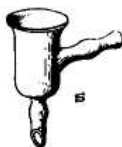
1. Instrument for recording respiration.

2. Receiving respiratory tambour.

was easily maintained and no impediment offered to free respiration, thereby making it possible to carry on the



3. T, clamp for temporarily closing vessels.



4. S, glass canula for connecting the blood-vessels with the manometer.



5. R, seeker.

experiments with a minimum of respiratory error. The respirations were recorded by means of a tambour with