

A METHOD OF MAKING X-RAY OBSERVATIONS ON HOLLOW ORGANS.

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The method involved is best illustrated by the following experiment :

A piece of furnace chain was drawn through a stomach tube until the eye was reached. Thus the rubber, which is itself partially impermeable to the X-rays, was reinforced by the metal chain which is completely impermeable. The tube was then swallowed by a subject and observations were made by means of the X-rays and fluorescent screen. The subject was about 5 feet 8 inches in height and weighed 170 pounds. The stomach was normal and contained a few ounces of fluid. Looking through the body transversely the chain could be very distinctly seen in the pharynx, and in the œsophagus to a point a little below the clavicle. As the tube was pushed in and withdrawn its point could be easily followed. In the neck each link of the chain was very distinct.

The Crooke's tube was then lowered to a point in a level with the stomach, and the subject turned so that he faced it. The stomach tube and chain were then seen by placing the screen at the inferior angle of the left scapula. The individual links of the chain could not now be distinguished, but the shadow was distinct. On pushing the tube into the stomach its point could be seen to emerge from the right side of the shadow of the vertebræ. It then glided smoothly downward and forward, and ultimately the lower part of the tube rested upon the greater curvature of the stomach in an almost horizontal position. The tube rose and fell with each movement of the diaphragm. By means of a heavy piece of wire placed upon the skin of the abdomen the course of the tube could be marked upon the surface. The lowest point of the stomach was found to be two and a half inches below the tip of the ensiform cartilage.

The experiment furnishes an accurate method of marking the lower border of the stomach. By gradually filling the stomach through the tube its surface marking could be determined for any degree of distension. The possibility of watching the tip of the tube as it glides along the surface of the stomach suggests a method of observing irregularities of the organ due to congenital conditions, constrictions, tumours within or without the organ, etc. The extent of movement of the tube furnishes a means of determining the extent of the rise and fall of the diaphragm under different conditions. The facility with which the chain and tube are observed in the pharynx, and a large portion of the œsophagus should prove useful. Dilatations of the œsophagus could be examined by noting the various directions in which the point of the tube could be made to travel. In a case such as that of Luochka's, in which the dilatation had a circumference of 30 c.m., this would manifestly be very easy.

The course of the œsophagus is often altered by conditions such as aneurism, new growths, tubercular deposits, utro-pharyngeal and retro-œsophageal abscesses, etc. These would not as a rule be shown by the X-rays, but by watching the alterations in the course of the chain, their location could be determined, and in some cases their extent could be ascertained.

This experiment is but one application of a general principle. The rectum, colon, urethra, bladder, vagina, uterus, nose and all cavities accessible from the