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ELECTRIC ILLUMINATION OF THE STOMACH.

BY JULIUS FRIEDENWALD, A. B., M. D.,

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and Surgeons, Baltimore; Visiting Physician  
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City Hospital Dispensary.



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## ELECTRIC ILLUMINATION OF THE STOMACH.<sup>1</sup>

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In 1867, Milliot<sup>2</sup> invented an instrument to illuminate the stomachs of dead human bodies and of animals. Trouvé,<sup>3</sup> in 1869, constructed his poly-scope, through which he obtained a view of the stomach; this has been used on animals to demonstrate the process of digestion.

In 1883, Mikulicz<sup>4</sup> used a similar apparatus, the gastroscope, on the human being. This consists of a metal tube through which the interior of the stomach can be viewed. He was thus able to diagnose pyloric cancers by the peculiar smooth appearance of the gastric walls. The introduction of the apparatus, however, was attended with such

difficulty that it could never be used for practical purposes.

Einhorn,<sup>5</sup> in 1889, published the first report of his instrument, the diaphane, by means of which he could transilluminate the walls of the stomach.

The apparatus of Einhorn consists of a soft rubber tube having an Edison lamp fastened at one end enclosed in a glass cap; within the rubber tube are wires connecting the lamp with a storage battery; at the other end of the rubber tube is an interrupter. Einhorn's directions are to have the patient, who is in a fasting condition, drink one to two glasses of water and then to insert the apparatus, lubricated with glycerin. The patient is examined in a dark room,

<sup>1</sup> Demonstration before the Clinical Society of Maryland, January 5, 1894.

standing; the stomach appears as an illuminated reddish zone on the abdominal wall. From the use of the apparatus Einhorn derived the following conclusions:

1. We are enabled to recognize quickly a dilatation of the stomach.

2. The condition called gastroptosis can with certainty be pointed out.

3. One is enabled to perceive tumors or thickenings of the front wall of the stomach by their lack of transparency.

We distinguish variations in the size, the location and also in the intensity of the illumination.

In cases of dilatation the lower part of the illuminated area (lower zone) is of a very bright red color and reaches below the umbilicus, often to the symphysis pubis; it passes over into a less intense zone above the umbilicus.

Since Einhorn's first publication, Heryng and Reichmann<sup>6</sup> have transilluminated the stomach and also the colon with a special apparatus of their own construction.

This instrument contains, in addition to the Einhorn diaphane, a coil in which water circulates; which keeps the lamp cool. These investigators recommend the introduction of large quantities of water into the stomach—one to one and one-half liters, instead of the small quantities, one to two glasses, as recommended by Einhorn.

Numerous other investigators have demonstrated and reported the special advantages, in certain cases, of the diaphane. Among these are Parise,<sup>7</sup> Renvers,<sup>8</sup> Boas,<sup>9</sup> Ewald<sup>10</sup> and Einhorn,<sup>11</sup> Stewart<sup>12</sup> and Solis-Cohen,<sup>13</sup> in this country.

Kuttner and Jacobson,<sup>14</sup> working under Ewald's direction, were the first to

make a systematic study of gastro-diaphany upon a large number of cases and to verify their results by post-mortem examination.

Their results agree in general with those obtained by Einhorn. Their clearest pictures were obtained when the stomach contained a large quantity of water—*i. e.*, one liter. They lay stress on the respiratory movements of the illuminated zone (in inspiration descent, in expiration ascent) in those cases in which the stomach is in direct apposition with the diaphragm.

In gastroptosis (dislocation of the stomach downward) there is no respiratory movement of the luminous zone, while in dilatation this change is very manifest.

My best results have likewise been obtained when the stomach was filled with water and my observations confirm the above statement concerning the changes in position of luminous zone during inspiration and expiration.

The instrument is introduced after moistening with a little water; the use of glycerin and other lubricants is unnecessary.

2. Milliot, Paris, 1867.

3. Trouvé, see New York Med. Journal, May 28, 1892.

4. Mikulicz, Ueber einen geheilen Fall von Magenresektion nebst Bemerkungen ueber ein gastroscopisches Symptom des Magencarcinoma.

5. Einhorn, New Yorker Medicin. Monatschrift, November, 1888; also Berliner Clinis. Wochenschrift, 1892, No. 51; also American Medical Journal, Dec. 3, 1892.

6. Heryng und Reichmann, Ueber electricische Magen und Darmdurch enchtung Therap. Monatsh. Marz, 1893.

7. Pariser Berliner Med. Gesellschaft, July 6, 1892.

8. Renvers, Verein fuer Innere Medicin, Berlin, April 4, 1892.

9. Boas, Specielle Diagnostik und Therap. der Magenkr., Leipzig, 1893, pages 86, 87, 105.

10. Ewald, Klinik der Verdauungskrank II, 3rd Ed., 1893, page 91.

11. Einhorn, on Gastrodiaphany, Medical Journal, Dec. 3, 1892, and The Journal, July 8, 1893.

12. Stewart, A Resumé of Some Modern Methods of Diagnosis, Medical News, Feb. 18, 1893, page 170.

13. Solis-Cohen, College of Physicians and Surgeons, Phila., New York Med. Journal, Dec. 16, 1893, p. 744.

14. Kuttner and Jacobson, Ueber die Electric. Durchleuchtung des Magens und deren diagnostischen Verwerthbarkeit, Berl. Klinisch Wochenschrift, Sept. 25 and Oct. 2, No. 39 and 40, 1893.

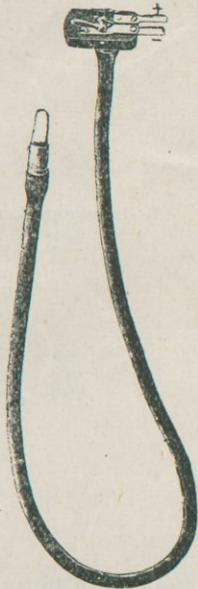


Fig. 1.—The Gastrodiaphane.

Stomach in  
Normal Position.

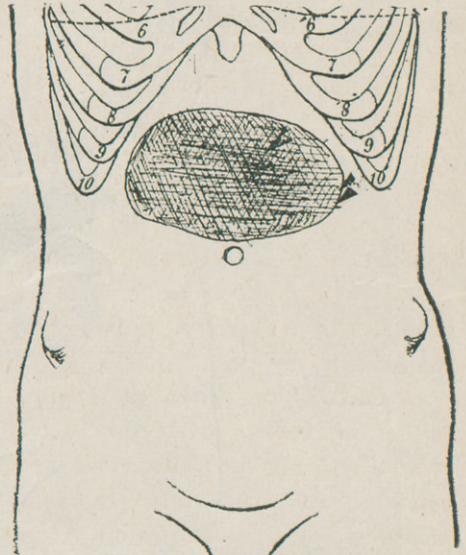
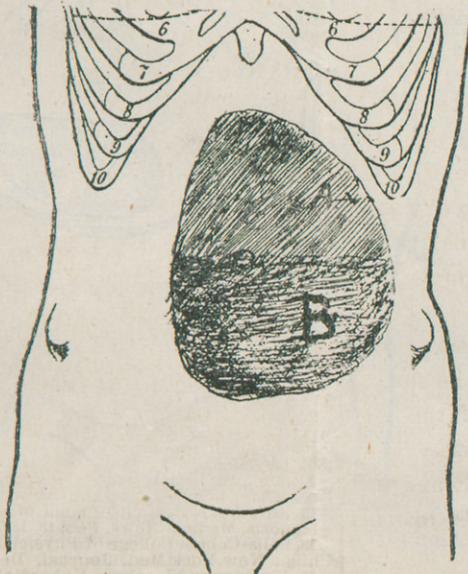


Fig. 2.—Case J. T.



A—Contain'g Air.

B—Containing Water.

Fig. 3.—Case J. S., Dilatation of the Stomach.

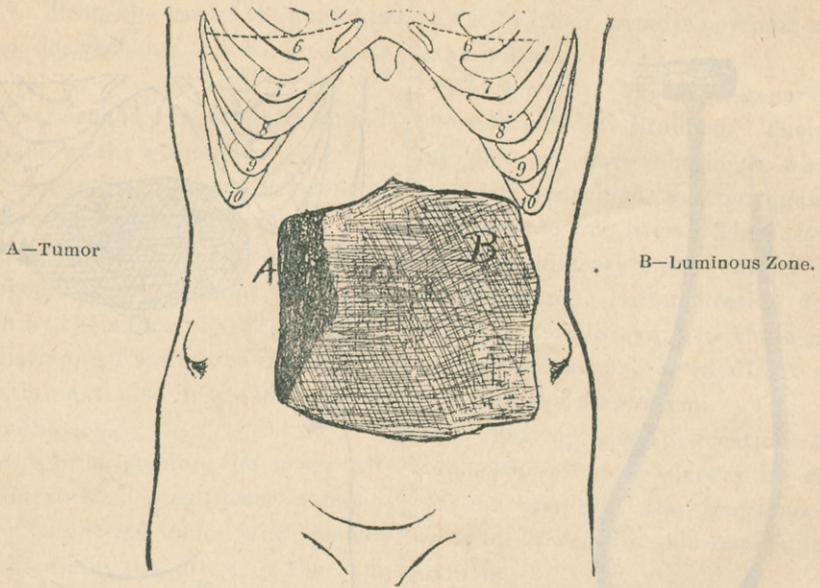


Fig. 4.—Tumor of Pylorus. (From Kuttner and Jacobson, Berlin Klin. Wochenschrift, No. 4, 1893, p. 970.)

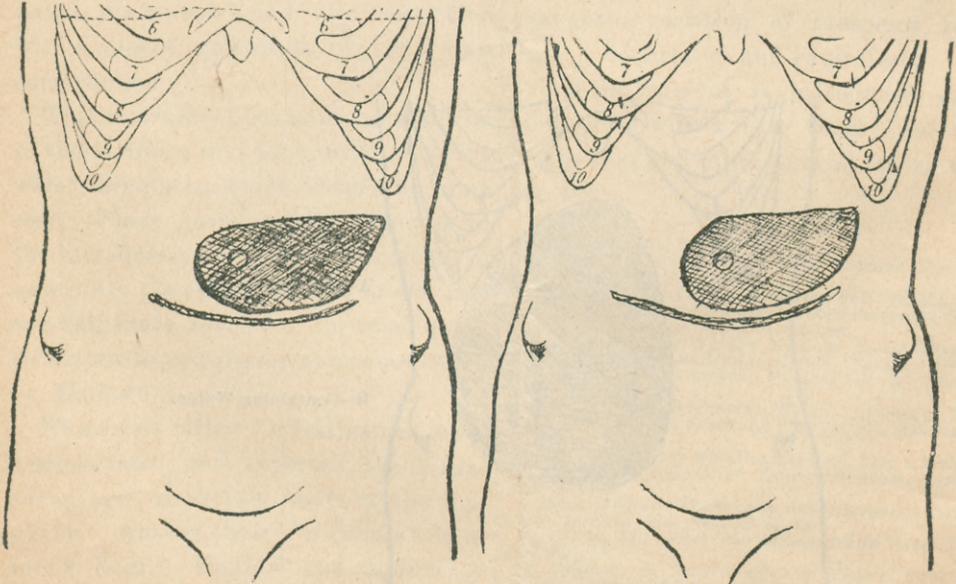


Fig. 5.—Gastroptosis (Deep Inspiration).  
Case Miss A. (Downward Dislocation  
of Stomach).

Fig. 6.—Gastroptosis (Deep Expiration).  
Miss A. (Downward Dislocation  
of Stomach).



