

COHEN (SOL-SOLIS)

An esophageal stethoscope.

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Cohen (S. S.)

Compliments of
Dr. Solomon Solis-Cohen,
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PHILADELPHIA.

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**AN ESOPHAGEAL STETHOSCOPE: WITH
REMARKS ON INTRA-THORACIC
AUSCULTATION.¹**

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THE instrument that I have here is a modification of one suggested by Sir Benjamin Ward Richardson. In the course of that observer's examination of a case of suspected stricture of the esophagus, in which no obstruction was shown by the "water-gurgle" test, and he had concluded to pass the stomach-tube, it occurred to him that, perhaps, if he attached the terminal of his double stethoscope to the stomach-tube he might notice the presence of friction as the tube passed over the stricture, or the absence of friction and of stricture; in this particular case he found no friction and determined that there was no stricture. It then occurred to him that in many cases it might be useful to employ a similar apparatus in listening to the sounds of the heart and possible murmurs in the vessels, as in cases of aneurism, unmodified by transmission through the chest-walls, and that possibly he might be able to hear the sounds of the lungs in the same manner. He also thought that certain sounds generated in the stomach might give information as to the manner in which the gastric functions were being carried on; while the sounds of the abdominal aorta could be heard through the stomach,

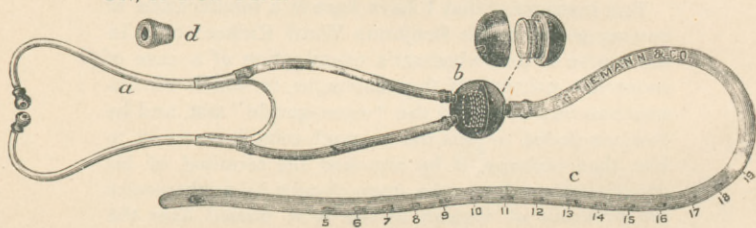
¹ Presented to the College of Physicians of Philadelphia, November 1, 1893.



presented by the author

unmodified by the pressure that on external auscultation is so often a cause of doubt in interpreting the causation of murmurs.

In attempting to repeat Dr. Richardson's observations, I found that there was occasional danger of the regurgitation of fluid through the tube into the ear-pieces. To obviate this objection I have introduced between the stomach-tube and the ear-tube a rubber capsule containing a diaphragm of gold-beater's skin, which serves as a barrier and as a resonator. The capsule can be readily taken apart and cleansed, and new diaphragms can be inserted when needed. I exhibit the improved instrument, as skilfully made for me by Messrs. Tiemann & Co., of New York.



Esophageal Stethoscope.

a. Metallic conducting-tubes of "Albion" stethoscope. *b.* Capsule with diaphragm. *c.* Esophageal tube with indented scale. *d.* Soft rubber caps for ear-pieces.

The esophageal tube is of soft rubber, No. 27 of the French scale, having a lateral eye near the blunt tip. On the same side as the eye, beginning five inches therefrom and extending up to a distance of nineteen inches, is a series of indentations, one inch apart, which show how far the eye of the instrument is from the patient's teeth. By experiments made outside of the body I have found that the sound heard is transmitted from within a radius of an inch and a half or two inches from the opening in the tube, the sound being most distinct when the eye is

in close apposition to the source of sound. I have used the instrument to listen to the sounds of the heart only, not wishing to risk the passage of the tube in cases of thoracic aneurism and not being able to hear through it the lung-sounds.

The most striking difference between the sounds of the heart as heard in the ordinary way and the same sounds as heard through this instrument is the almost uniform quality of the first and second sounds—that is, the sharpness of the second sound, as heard by the ordinary method, is wanting in auscultation by this method. The rhythm is of course the same; the second sound is the shorter, and the pause is easily appreciated. It is possible to separate the two sounds and hear the first sound alone, or the second sound alone, or to hear both. At a distance of from eight to nine inches from the teeth, only the second sound is heard; at ten or eleven inches, both sounds are clearly heard; and at thirteen or fourteen inches only the first sound with, perhaps, an ill-defined second sound. I have not satisfied myself as to my ability to differentiate between the aortic and pulmonary sounds by varying the position of the eye of the tube.

My largest number of observations have been made on persons with healthy hearts, who were under treatment for stomach-troubles, and thus accustomed to passage of the esophageal tube; but I have been able to use the instrument on other patients, with and without cardiac disease; among them two cases in which by the ordinary method of examination I had diagnosticated the existence of mitral obstruction. In one of these two cases mitral obstruction alone was diagnosticated by the ordinary methods of physical examination; and in the other, mitral obstruction and regurgitation. In both cases I failed in each of two examinations to hear the obstructive murmur through the esophageal stethoscope. The regurgitant murmur was heard distinctly, but I could not make out that any

part of it was presystolic. I do not know whether there is an acoustic reason for this, or whether it was due to lack of skill with the instrument. I have no doubt of the correctness of the diagnosis.

I have also used the method in one case in which there was doubt as to the coexistence of aortic diastolic and aortic systolic murmurs, but the apparent murmur of regurgitation was not heard through the esophageal stethoscope, whilst the systolic murmur was heard distinctly, and a good closure-sound was heard. This, I think, warranted affirmation of arterial roughening rather than valvular lesion.

While speaking of the use of the tube to clear up the doubt in cases of suspected aneurism, Sir B. W. Richardson remarks that the good sense of the physician must determine whether or not in given instances the method is dangerous and not to be used.

As to the importance of intra-thoracic auscultation, I cannot as yet speak positively. I do not know how far it will be applicable in cases of doubtful diagnosis—in others it is not needed—or what its exact limitations are. I consider it, however, one of the methods that we may usefully employ among others in making exact observations, and for this reason I have brought the subject before the College for discussion, in the hope that other Fellows may be led to study it.

It is only right to say that two other communications on the subject of intra-thoracic auscultation, one by a German observer, the other by two English observers, have appeared since Dr. Richardson's publication, and apparently as independent studies. Their conclusions are not cited here, as the subject still requires individual and unbiased work.

