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A FOREIGN BODY IN THE ESOPHAGUS DETECTED AND LOCATED BY THE RÖNTGEN RAYS.

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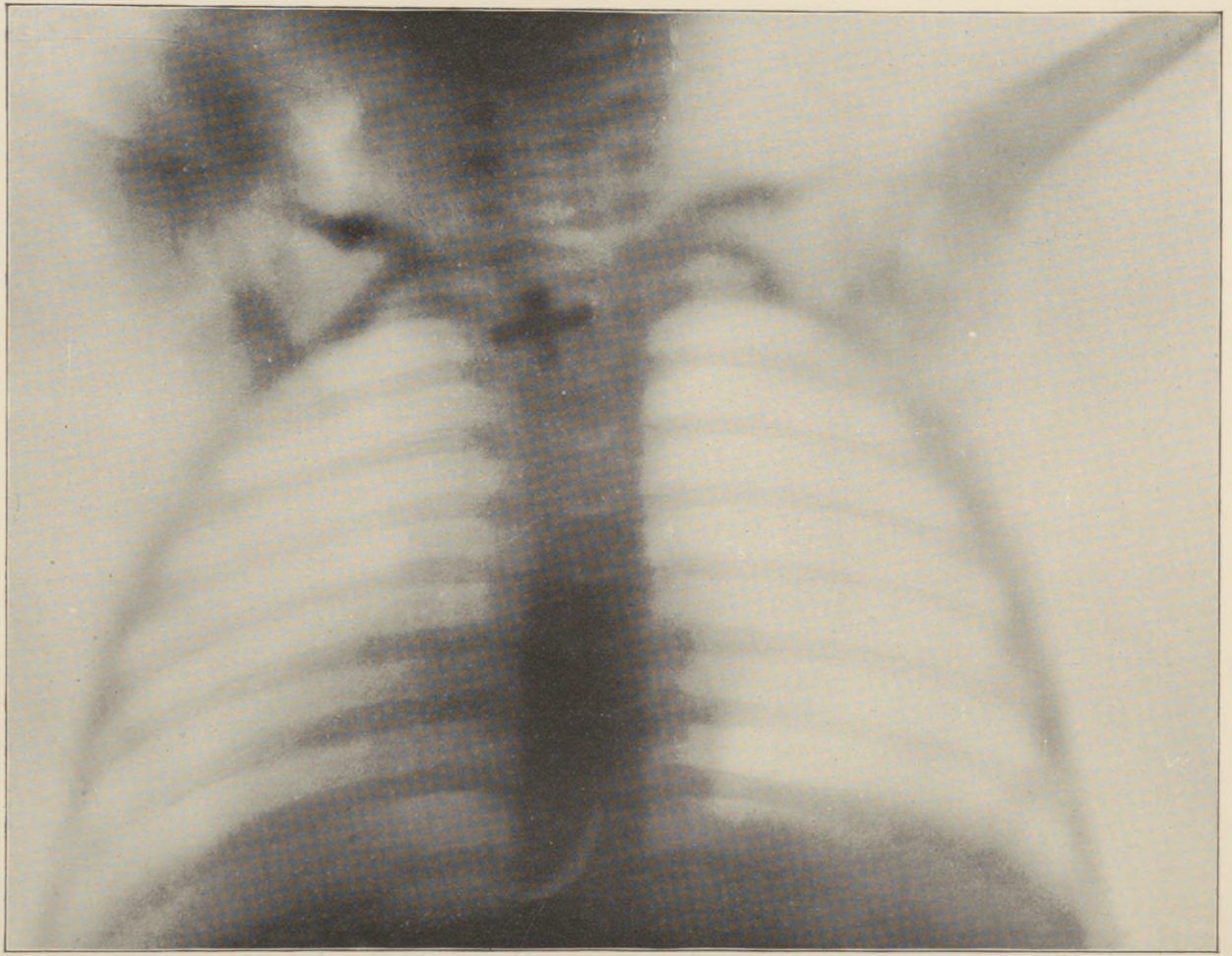
FIG. 2.



Skiagraph of a "jack-stone" which had been impacted in the esophagus just above the left bronchus for twelve days.

FIG. 1.

"Jack-stone," exact size.

A FOREIGN BODY IN THE ESOPHAGUS DETECTED AND LOCATED BY THE RÖNTGEN RAYS.

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In Poulet's classical work on "Foreign Bodies in Surgical Practice" he states that the section on the esophagus is based on a study of more than one thousand cases of foreign bodies impacted in that canal. He enumerates nearly one hundred different articles, but, possibly because it is of more modern origin, the list does not include the metal plaything known as a "jack-stone," which in size and shape seems peculiarly adapted to become an intruder difficult of dislodgement (Fig. 1).

On May 12, 1896, Annie ——, a patient of Dr. Taubel's, aged 2 years and 5 months, began to complain of pain in swallowing and to reject food. Milk and water were taken reluctantly, but solids and semisolids were obstinately refused, or if swallowed were vomited after a few minutes. No positive explanation of these symptoms was known, but it was found that one of a set of "jack-stones" with which the child had been playing was missing. Various forms of treatment were employed for twelve days, and on Friday, May 22, the child was brought to me at the University Hospital. She was in fairly good condition, but had a temperature of 100° to 101° F., a pulse of 130, and was beginning to show the effect of semi-starvation. I at once made arrangements to have a skiagraph of the thoracic region taken by Professor Goodspeed. This was done on May 23. The exposure was for three minutes. The child's arms were held up. The plate was fastened to her back. The result (as will be evident by reference to Fig. 2) was most satisfactory. The "jack-stone" could be seen a little to the left of the middle line, apparently on a level with the space between the second and third dorsal spines,—*i.e.*, a little above the bifurcation of the trachea. Its peculiar shape and its absolute opacity to the rays made it a very striking and easily identified object in the picture.

The diagnosis being thus assured, the child was prepared for operation on the following morning, May 24, by thorough disinfection of both the neck and the upper abdomen. At the operation I had the kind assistance of Drs. Penrose, Wood, Leonard, and Frazier.

For reasons which will presently be stated, after a preliminary attempt to reach the body with various forms of esophageal forceps had failed, it was determined to do a gastrotomy. The abdomen was

opened in the middle line above the umbilicus, the stomach drawn out, the general peritoneal cavity excluded by pads, and an incision made through the stomach wall a little to the right of the splenic end and about midway between the upper and lower borders. A finger introduced soon found the cardiac orifice; a slender flexible esophageal explorer carrying a stout silk thread three feet in length was then pushed downward through the pharynx, and with some difficulty was made to pass the obstruction and enter the stomach. One end of the thread was then hooked out of the wound and the instrument was withdrawn, leaving the other end hanging out of the mouth.

Pledgets of gauze of various shapes and sizes were then firmly knotted to the thread and were drawn upward or downward, most of them being firmly arrested at the point of obstruction, some of them passing through between the bars or spokes of the "jack-stone," but leaving it unmoved. In a few minutes, however, a piece of gauze brought the latter with it into the stomach, from which it was readily extracted. A continuous catgut suture of the mucous membrane and a continuous silk Lembert suture through the peritoneal and muscular coats, inverting the wound, completed the operation, which, including the final closure of the abdominal section, occupied a little less than half an hour.

The child is making a rapid and uncomplicated recovery. She got no food for twenty-four hours; then half-ounce enemata of peptonized milk were begun, and a little later beef peptonoids by the mouth, soon followed by albuminized water and peptonized milk in twenty-drop doses.

There is not much to add to this brief account of a case which acquires especial interest from probably having been the first in which the skiagraph has been used in this particular manner. I may, however, call attention to its advantages: (1) In diagnosis, (2) in locating the foreign body, (3) in selecting the form of treatment.

(1) The diagnosis in these cases has hitherto necessarily been made on the history, the subjective symptoms, and the recognition of the foreign body upon instrumental exploration. The history in large classes of patients is either altogether lacking or is untrustworthy. It is obvious that in very young children and in intoxicated persons it cannot usually be obtained; and that in lunatics and hysterical patients it is apt to be unreliable or positively misleading. But outside of these examples there are on record many curious instances of reasonable doubt as to the history of such cases. Anxious parents and nurses have often convinced themselves and the medical attendant that some article which has disappeared must have been swallowed by a child; mischievous children have pretended to have symptoms

resulting from the presence in the throat or stomach of a foreign body, which they have described in much detail, but which did not exist; even very intelligent patients have found themselves in circumstances which strongly suggested an accident of this character, but which neither proved nor disproved it.

Two months ago the head-master of a large preparatory school, a teetotaler, called to see me in a state of some mental perturbation. He wore habitually a plate carrying three artificial teeth. He was in the habit of removing it at night and putting it in a glass of water. The previous night he had been very tired and sleepy and had gone to bed without doing this. He thought he remembered that just before going to sleep he had removed the plate and had reached over the side of the bed and laid the plate gently on the floor. In the morning, however, there was nothing to be seen of it. No one else had been in the room. The plate could not be found and has never since been seen. It was probably carried away by a mouse or rat. An examination of the pharynx showed no sign whatever of the passage of so large a body. It was interesting, however, to note that although he is an exceptionally well-balanced and intelligent man he was beginning to have a few subjective symptoms which were undoubtedly the result of auto-suggestion. A positive assurance as to the probabilities of the case completely dispelled them. In a hysterical person they would doubtless have become intensified and, finally, very misleading. In any case it would have been most satisfactory to look at a skiagraph that demonstrated the absence of the denture from the digestive tract.

Instrumental exploration, of course, adds greatly to the information derived from the history and the subjective symptoms. It shows obstruction more or less accurately, but, as a rule, does only that, and conveys no information as to the character of the obstructing body. A metallic ring or clink might be obtained by some of the ingenious electrical explorers that have been devised, but, as yet, they are both complicated and uncertain. Previously unsuspected cicatricial contraction sometimes develops obstructive symptoms with unusual suddenness, and, if the case had an uncertain history, might lead to error. Abscess in the esophageal region has been wrongly attributed to a non-existent foreign body. On the other hand, cases have been treated for pulmonary phthisis, for croup, for catarrh, for asthma, etc.,[1] the symptoms being due to foreign bodies which remained unnoticed.

Within the last few years Buttenberg has reported a case of death in an insane patient from an unnoticed piece of porcelain, Le-

[1] Poulet, op. cit.

Dentu, from a pin, Williams, from a piece of bone, and many others have been recorded in which, as in these, the skiagraph would have given evidence otherwise unobtainable.

In the matter of diagnosis, therefore, it is obvious that when the intruding body has sufficient density to cast a definite shadow there will be many cases in which the mere proof of its presence will be of great value.

(2) The exact location of a foreign body can be determined more precisely by this method than by the most careful measurements with flexible instruments. The latter may bend or curve within the esophagus and thus give the impression of greater penetration and of a lower level of obstruction than actually exists. On the other hand, esophageal spasm or inflammatory swelling may stop a bougie or other explorer some inches above the position of the foreign body. Wallace, of Edinburgh, has recorded an interesting case in which so large a body as a denture of six artificial teeth could be discovered and located only after repeated negative results from the use of the ordinary esophageal olivary bougie and of the "coin catcher." A low esophagotomy proved a failure, and gastrotomy was finally required.

Moreover, repeated and thorough exploration, especially if combined with attempts at either extraction through the mouth or propulsion towards the stomach, is not without danger, and in a case of long standing like this one should be employed only with great care. Instances of fatal perforation of the esophagus during exploration have been sufficiently frequent to make this point one of practical importance.

By comparison with the ribs and the vertebræ the precise level of the foreign body, the relation to the bronchi, the great blood-vessels, and other important structures may be most accurately determined by the skiagraph, and both the dangers and the uncertainties of ordinary exploration may be avoided.

(3) As to the choice of method, it was, of course, apparent in this case that if extraction by forceps was not promptly and easily accomplished, the jack-stone would have to be removed either by means of an esophagotomy or a gastrotomy. Propulsion of an irregular body of that sort, which had been impacted for twelve days, was scarcely to be thought of. At first sight of the skiagraph, esophagotomy was suggested by the proximity of the jack-stone to the upper level of the sternum, but an examination of the short fat neck of the little patient showed that if the body were at all fixed it would be most difficult to dislodge it through the largest wound that could safely be made. Terrier long ago excluded from the cases to which

esophagotomy was applicable, all those in which the foreign bodies were situated in the thoracic portion of the canal, and as a matter of fact this is still a good working rule.

If it is of recent introduction and of regular shape, the foreign body in the thoracic esophagus, though inaccessible from the mouth, may be reached by forceps through an esophageal opening and extracted. But if it has occupied that portion of the canal for any length of time, and particularly if it is of distinctly irregular shape and of some size, offering an opportunity for firm impaction, it seems far better to make the original effort through the stomach, so as definitely to dispense as much as possible with instrumentation in the already inflamed and probably ulcerated esophagus.

The peculiar shape of the foreign body in this case facilitated the passage of the flexible explorer from the pharynx to the stomach. Even if the esophagus were completely filled, however, it would be safer and easier to dislodge the intruder by alternate pressure upward through the cardiac orifice and downward through the pharynx, than to trust to either extraction or propulsion through a wound in the neck.

It was made evident by the skiagraph that the jack-stone had passed the narrowing of the esophagus opposite the cricoid cartilage, and had been arrested above the level of the transverse aorta and left bronchus, each of which sometimes grooves the esophagus slightly at the point of contact. It was therefore peculiarly dangerous to attempt with any force to push it downward, as perforation of either of those structures would have been a possible, perhaps after twelve days' esophagitis a probable result. Between the position of the foreign body and the lowest opening that could be made in the cervical portion of the esophagus was a considerable interval through which in a neck as short and stout as this one little or nothing could be done with the fingers, and which is crowded with important vessels and nerves in close proximity to the canal itself. I am aware that a few cases of esophagotomy have been done for foreign bodies said to be about on a level with the top of the sternum (Syme, Cheever), but they are very few. In Syme's case the body was a copper coin, which gave rise to no obstruction; in Cheever's it was a brass pin, and a long probang passed without obstruction. In the latter case the operation was done on the third day.

On the whole, as I have said, thanks to the very definite information given by the skiagraph, it was not difficult to decide in favor of gastrotomy. The impossibility of moving the jack-stone in an upward direction by the means employed during the operation made the choice seem fortunate. The propriety of attempting extraction by

forceps, keeping the foreign body in view at the same time with the fluoroscope, had occurred to me, and was discussed at the time of operation, but the procedure was not employed on account of the general condition of the patient, which demanded haste, and also because the probable inflammation and ulceration of the esophagus was thought to be a contra-indication to the prolonged use of instruments in that canal. There will, however, in all likelihood, be many cases seen earlier in which this method will be applicable.

I have been much impressed by the practical importance of the Röntgen ray process in surgery, but in no instance more than in this, where, in a case in which every hour had become valuable and every effort at exploration dangerous, it substituted accuracy and promptness for otherwise unavoidable uncertainty and delay.