

wards dysphagia set in, and gradually increased until swallowing solids became an impossibility.

When first seen by the author she could swallow only small quantities of liquids. Laryngoscopic examination revealed nothing, but with the finger a hard mass was found opposite the lower border of the cricoid cartilage, springing from the posterior and left side of the passage. A very small opening existed on the right side. A piece of the growth was removed, and proved to be epitheliomatous.

Œsophagotomy was performed. As the growth was fairly adherent to, and incorporated with, the walls of the œsophagus, no attempt was made at removal. The walls of the tube were then sutured to the skin, and a larger rubber tube inserted, which was subsequently replaced by a full-sized india-rubber tracheotomy tube. She is now fed entirely through the opening, and is improving greatly in health.

A. B. Kelly.

**Johnston and Holland.**—*Two Cases of a Halfpenny in the Œsophagus. Diagnosis by X Rays.* "Brit. Med. Journ.," Dec. 5, 1896.

Of one of these cases an excellent photograph was obtained, which is reproduced. The patients in either instance were two and a half years of age; and no difficulty was experienced in making out the position of the coin with the aid of a fluorescent screen.

Ernest Waggett.

**Raw.**—*Foreign Body in the Œsophagus. Localization by X Rays.* "Brit. Med. Journ.," Dec. 5, 1896.

A REMARKABLY clear photograph was obtained (reproduced), showing the coin lying opposite the fourth, fifth, and sixth cervical vertebrae. The patient, a restless child of two years, was allowed to fall asleep; and the sensitive plate was then slipped under the pillow on which the head rested. The focus tube was fixed nine inches above the head.

Ernest Waggett.

## E A R .

**Bezold, F.** (Munich).—*Demonstration of a Continuous Range of Tones for the Detection of Defects of Hearing, especially in Deaf Mutes, and its Significance in support of Helmholtz's Theory.* "Zeitschrift für Psychologie und Physiologie der Sinnesorgane," Band 13.

PROF. BEZOLD'S apparatus for the production of pure tones through all the range of audition consists, in the first place, of ten tuning-forks, from B<sub>2</sub> (fifteen vibrations) up to C<sup>3</sup> (one thousand and twenty-four vibrations). This covers the lower half of the scale of audition and they are fitted with movable weights, so that the intermediate notes between each pair of tuning-forks can be produced. For physiological examination, a fork with a tone as low as eleven vibrations is further called into use. He finds that the curve of vibrations obtained from the stem of the tuning-forks is the same as that from the blades, and not, as is sometimes supposed, an octave higher. The upper half of the range—viz., from C<sup>2</sup> upwards—is tested by means of three stopped pipes, with a movable piston, the highest one being the well-known Galton's whistle.

The lower limit of audition in the human ear seems to be eleven vibrations, or even somewhat lower; the upper one about fifty-five thousand; the whole range extending somewhat over twelve octaves.

For the appreciation of this continuous range of tone, Prof. Bezold finds it

necessary that there should be, at the peripheral termination of the acoustic nerve, some mechanical auxiliary apparatus which should possess the property of chromatic stringed instruments, and have an element in it corresponding to each individual tone of the whole scale with which it may enter into sympathetic vibration, and which would communicate a stimulus to the nerve fibre connected with it. He urges our indebtedness to Helmholtz for having demonstrated the necessity for such an apparatus and the probability of its being represented by the cochlea. The best adapted arrangement for this sympathetic vibration is the membrana basilaris of that organ.

He holds, further, that this theory receives support from the results of full functional examination of the human ear, especially in regard to loss of hearing for different tones in the range. Assuming that partial losses of hearing are observed, the question arises as to whether corresponding areas of disease in the course of the lamina spiralis are shown by pathological dissection after death. He holds that experiments made upon animals lead to serious errors, and that in the human subject the loss of the cochlea leads, without exception, to complete deafness in the affected ear. He adds that there have been recorded a number of dissections where the localization of the disease in the cochlea has corresponded with the partial loss of hearing, and to disprove Helmholtz's theory it would be necessary to bring forward a case of destruction of the cochlea in which, during life, a corresponding defect of hearing had been proved not to exist. Such a case has not yet been brought forward. One great difficulty connected with investigation is the impossibility of excluding the hearing of the opposite ear, unless it is at the same time highly defective—even deaf—and this in spite of the greatest care in occluding it. Bezold then comes to the conclusion that we can only test reliably the hearing for the lower half of the tone range in any case of unilateral deafness, as no amount of occlusion will prevent the sound ear from hearing the higher notes of the scale. It is found, after necrosis of the labyrinth, that there is complete deafness for the notes of this lower half.

Given a defect of hearing for a portion of the scale, its cause may arise from changes situated peripherally or centrally to the labyrinth. Disease of the middle ear leads to loss of hearing for the lowest portions of the scale. The same, according to Helmholtz's theory, would arise in the case of disease affecting the uppermost turns of the cochlea. This is, however, to be distinguished from the former condition by the results of the tests for bone conduction. As regards the detection of changes in the auditory nerve on the central side of the labyrinth and its paths of junction with the cerebral cortex, the difficulties are very great, and in most cases it can only be founded upon the detection of simultaneous implication of neighbouring nerve structures. Prof. Bezold is very doubtful whether defects in the cortical centre can give rise to gaps in the range of hearing, as this centre is educated to receive the auditory impression, however complex, as a whole, and not as made up of numerous elements in the tone range; hence a gap in the hearing would indicate that the diseased condition was situated somewhere else, rather than in the cerebral auditory centre. Further, there is little doubt that each ear is connected with both cerebral hemispheres, and therefore, for a gap in the hearing to result from disease of the auditory cortical centre, this disease would not merely require to be bilateral, but further to affect identically symmetrical spots in the cortex of the two sides.

The examination of deaf mutes frequently reveals gaps in the range of audition, there remaining very frequently larger or smaller residua of hearing power, while *post-mortem* examinations show, in the majority of such cases, changes in the labyrinth. The functional examination of such patients is free from the fallacies arising from the difficulty of occluding the sound ear. Prof. Bezold therefore

investigated seventy-nine deaf mutes (that is, one hundred and seventy-eight ears). Of these, forty-eight ears were totally deaf, and one patient was unsuitable for thorough examination. The remaining ones had residua of hearing, and could be classified in the following groups :—

1. Those presenting only an "island" of hearing power, in which the hearing at the upper and lower extremities of the range was lost, leaving an intermediate field of audition extending over not more than two and a-half octaves, and in the worst case including only two semi-tones.
2. Those presenting "holes" or gaps; single in sixteen, double in four.
3. Those presenting loss of hearing for the upper part of the tone range.
4. Those with defects of varying extent, simultaneously at the upper and at the lower extremities of the range.
5. Those with extensive defects confined to the lower tones.
6. Thirty-three ears in which there were only very slight defects at the upper and lower extremities of the range.

From the variety of the deficiencies exhibited in the first five groups, Prof. Bezold concludes that normal perception for the different parts of the tone-range is localized in an area of considerable extent, a view which he considers to be a strong element in favour of Helmholtz's hypothesis. The results of the functional tests in the sixth group would exclude in them any considerable degree of destruction of the labyrinth, or the trunk of the auditory nerve, and the deaf-mutism must in this set of cases be ascribed to changes in the cerebrum itself. The picture of the field of audition in deafness due to cerebral disease would therefore be the one found in the sixth group, namely, slight defects at the two extremities of the scale; whereas partial lesions of the cochlea, and in rare cases, perhaps, of the acoustic nerve trunk, would be indicated by fields of audition showing islands or gaps, as in the first and second groups, and the diminished ranges present in the third, fourth, and fifth groups.

*Dundas Grant.*

**Broca, A.**—*Abcès du Cou consécutifs aux Otites Moyennes Suppurées.* "Arch. Intern. de Lar., Otol., et Rhin.," Nov. and Dec., 1896.

This paper was elicited by that of Hamon du Fougeray on the same subject, and in particular by what that author states with regard to those cases which fall under the heading of "abscess in direct continuity with a focus of osteitis." He would seem to imply that as many as thirty per cent. of acute mastoid cases came into this category. Broca, on the contrary, considers the condition associated with the name of Bezold to be in reality one of great rarity. Out of two hundred mastoid cases, only once has he met with the complication. On the other hand he has met with cases, at first sight examples of mastoiditis of Bezold, which, however, proved to be dependent on disease of portions of the petrous bone other than the mastoid process. He has, therefore, formulated the rule that where a neck abscess is present, that should be opened and explored before the mastoid cells are interfered with. Every case in which pressure on the cervical swelling causes pus to flow from the ear is not a mastoiditis of Bezold, and what is said in this connection upon suppuration due to infection of the jugular vein, and upon glandular suppuration due to disease of the middle ear or of the meatus, is well worth reading in the original.

*Ernest Waggett.*