Dr. Robert H. Craig (Montreal) performs the submucous resection in two stages when a general anæsthetic is indicated. He makes the original incision and liberates the muco-perichondrium and periosteum under cocaine (adrenalin) anæsthesia. The patient is then placed in a recumbent posture, ether is administered, and a post-nasal tampon is inserted. A mouth gag is applied and a suture put in the tongue for traction purposes. The nasal packing, which has been saturated with 1 : 4000 adrenalin solution, is removed from both nostrils. The deflected cartilage and bone can be removed carefully and deliberately. Since adopting this method of operating in two stages (when it is desirable to administer a general anæsthetic) Craig has had no difficulty in controlling hæmorrhage, which caused considerable trouble and loss of time in many of these cases.

Dr. Wendell C. Phillips thought the end-results depended in large measure upon the technique and the skill of the operator. His best results had been obtained with the patient in the recumbent position on the operating table, with the head-rest high. The discomfort to the patient is thus obviated, the liability to fainting is lessened, and the manipulation on the part of the operator is much more easily accomplished. He had never had reason to do the operation under a general anæsthetic. In atrophic rhinitis, according to Wright, the operation should never be performed.

Dr. Cobb, in reply, said that he had never seen perforation occur subsequent to the operation. He believed that a small perforation may have occurred in the mucous membrane with laceration of the periosteum, and that the later increased size was due to the shrinking of the mucous membrane edges until they reached the firm support of the periosteum below.

(*To be continued.*)

AUSTRIAN OTOLOGICAL SOCIETY.

April 25, 1910; *Monats. f. Ohren., year* 44, *No.* 5.

v. Hammerschlag *in the Chair.*

Abstract of the Proceedings.

The Artificial Tympanic Membrane and its Mode of Action.

By R. Bárány.

Bárány commenced by stating that his remarks must only be taken as a preliminary communication on investigations in respect of which he had as yet been unable to formulate definite conclusions, but the notice of Beyer's paper on "The Significance of the Membrane of the Round Window" in the programme of the German Otological meeting had made him feel that he should publish his

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present views on a subject which for a long while had been engaging his attention.

The unreliability and inaccuracy of patients' reports render research in this direction so unsatisfactory that he had found it necessary to elaborate a more exact method, which however was only applicable to cases in which the tympanum was completely covered with epithelium and the tube closed.

It is carried out by running a drop of mercury into the ear, when it is found that the hearing is improved if it occludes the niche of the round window. One must not regard the membrane itself as being covered with mercury, for the air in the niche is intercepted between the two. The amount of mercury is of no importance so long as the niche is completely occluded and the oval window left free, but if both windows be simultaneously covered the hearing then becomes worse. Bárány had not been able to carry out an analogous experiment on the oval window, as this entailed laying the patient down and then bending the head downwards, thus introducing so many difficulties as to make the test uncertain and valueless.

By moving the head so that the mercury also is moved from the round niche and comparing the perception for the notes of various tuning-forks in the two positions the improvement in the hearing can be noted. This apparently varies with different tones, but in one case all the forks used were heard better. Accurate data on these points he was, however, as yet unable to furnish. He had also tested the bone-conduction, but would at present confine himself to stating that air- and bone-conduction are in no way opposed to each other, and that an improvement in air-conduction must not be thought to necessarily mean a shortening of bone-conduction or *vice versâ*; this latter point he had been able to determine by means of tests which he had adopted with mercury and liquid vaseline in cases where the tympanic membrane was normal. These tests showed that at the moment when this application reached and covered the membrane a maximal lengthening of the bone-conduction took place for the tuning-fork "*e*," maximal because the note was really heard until the perception by air was lost. And at this moment the air-conduction is either normal or only very slightly reduced.

By means of the same tests with liquid vaseline and mercury he had acquired further important data towards the solution of the problem of the manner in which the artificial tympanic membrane acts. Thus, when the tympanic membrane is covered with oil the

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first thing noticed will be that the perception for the higher notes is depreciated and the range for whispers rapidly decreased. The same agency enabled him also to assert that the action of the mercury membrane depended on the obstruction of the path of the sound waves *viâ* the air to the round window. But why should this obstruction bring about an improvement in the hearing? Over this he had puzzled a long while until he had happened on the work of Mach and Kessel in 1874, where it was stated that by means of the stroboscope they had inspected the stapes and round window under the influence of sound and noted that when the stapes moved inwards the round window was pushed outwards and *vice versâ*.

Now in cases where the membranes of both the oval and round windows are unobstructed sound-waves will affect each equally and cause each to move inwards. It is obvious that here a derangement will arise, and that some power of the perception will be lost. If, however, the membrane of the round window be protected from the direct influence of the sound-waves without its power of mobility being impaired, then it will be readily able to move outwards when the inward movement of the membrane of the oval window takes place. This protection of the round window can, of course, be produced by other means than mercury alone, by pledget of wool or by oil for instance, but not with so much accuracy. When one has convinced oneself of the validity of this experiment one may then apply it for diagnostic purposes in order to determine if an artificial tympanic membrane would be efficacious, always remembering that great care must be taken not to do more than occlude the round window, as if the oval window is also occluded a depreciation of the hearing will be produced. Experiments with wool show that most probably occlusion of the oval window alone reacts in the same way in most cases; sometimes, however, considerable differences obtain, but an attempt to enter into an explanation of these phenomena would lead one too far into the domain of hypothesis.

H. Frey remarked that Bárány's communication agreed with the results of experiments which he himself had undertaken, prompted by an article of Fruitiger's on a test which comprised occluding the round window or its niche with a small pledget of wool, and by which an improvement in hearing was found to occur. He had also found that it was the deeper tones which were affected the most. He had been in the habit of stating in his courses that any improvement in hearing which followed the use of an artificial tympanic membrane depended on the fact that the round window was free. He had not yet published the results of his observations.

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Prof. GOMPERZ said that he had communicated the results of som research on the round and oval windows in 1899, but that contrary t Bárány he had obtained more improvement in the hearing by treating th oval window. His best results followed the insertion of a plug betwee the remains of the incus, malleus or tympanic membrane, and the foo plate of the stapes, which thus enabled sound-waves to be conducted t the labyrinth, as in the normal ear obtained *vid* the chain of ossicles. I the round window were occluded at the same time his results were n affected thereby in any way worth mentioning. These observations, com bined with the fact that he had been able to detect only an advantageou influence on the hearing from the simultaneous occlusion of both window compelled him to regard the ingenious theories which Bárány ha advanced as not applicable. In 1902 he had also published articles o his investigations into the subject of artificial membranes.

G. ALEXANDER remarked that of course one must pre-suppose a intact cochlea in the consideration of this question, otherwise no artificia aid could improve a power of hearing which did not exist, whilst if thi faculty were present it was difficult to say why the hearing could not b improved. As regards the artificial membrane, he did not think it wa certain that by the application of a pledget to the promontory the vaselin oil would necessarily run into the round niche, he thought it would hav run into the meatus. He had seen cases where scar-tissue had forme over the round niche, in which, after the cicatrix had been cut through the hearing had improved. It seemed to him that vascular influence were also brought into play in this connection. It was easy to understan why the artificial membrane reacted best when applied to the round niche as in that position it served to enlarge the promontory under whic directly lay the organ of Corti, and thus the ligamentum spirale might b affected and the hearing improved. He did not believe that even th smallest particle of mercury finds its way into the niche of the round window. If one lays a whole temporal bone in some fluid the greatest care must be taken in order to bring the fluid in relation with this part as a kind of meniscus is formed there. The action of the mercury is due to its relation with, and enlargement of, the promontory at its thinnest portion, viz. between the stapes and the window round.

E. RUTTIN recalled a case which supported Bárány's view, in which scar-tissue involved both the round and oval windows. After a partial division of the scar over the oval window the hearing was only very slightly improved, but when the round window had been laid free a very marked improvement occurred.

V. HAMMERSCHLAG had been in the habit for several years of adopting a method to aid the hearing in cases where an artificial membrane was inapplicable because the medium-sized or large defect was not situated at the periphery. This consisted in placing the head on one side, instilling a couple of drops of liquid vaseline, and then blowing them into the ear. By this means the fluid was driven into the tympanic cavity and there acted as an artificial drumhead. Its action was usually maintained for some while, probably because the fluid was retained in this position for some considerable time by capillary action.

BÁRÁNY, in reply to Frey, stated that he had, of course, tested the bone-conduction, but had not yet been able to formulate any definite conclusions thereon. In answer to Alexander, he said it was quite easy to assert that by applying liquid vaseline to the promontory the round window was also occluded. Of course no fluid would actually reach the membrane itself, and it was on this very point that the solution of his

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theory rested. With Alexander's suggestion that the enlargement of the surface of the promontory by mercury was accountable for the improved hearing he was in complete disaccord. He had experimented as to the conductivity of mercury for high tones, and had found that 1 mm. of mercury sufficed to completely arrest the passage of high tones through a glass tube. Prof. Gomperz's method of applying a swab soaked in liquid vaseline to the niche did not ever afford a certain closure of the niche, and it was for this reason that he (Bárány) had employed mercury, by which means one was able repeatedly to demonstrate the action of an artificial membrane. He would prefer not to make any definite statement as to the lowering of the lower tone limit as the number of the cases he had tested had been too small. With the blowing in of liquid vaseline, as described by Hammerschlag, a drop had evidently covered the round niche and thus formed an artificial membrane. In conclusion, he would like to allude to a case, the explanation of which had only just occurred to him. It related to a patient on whom the radical operation had been performed, and in whom there was yet a small granulating focus over the promontory. If boric powder were blown in an improvement in the hearing took place, not, however, at once, but after some five minutes. This application must have produced sufficient reaction to promote a secretion, which then occluded the round niche, and it was at this moment when the hearing was affected. He could accomplish the same result in this patient with liquid vaseline.

ALEX. R. TWEEDIE (*trans.*).

INTERNATIONAL CONGRESS OF MEDICINE AT BUDAPEST.

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SECTION OF OTOLOGY (AND INTERNATIONAL CONGRESS OF OTOLOGY).

(*Continued from p.* 417.)

THE INDICATIONS FOR, AND THE OPERATIVE TREATMENT OF, SECONDARY SUPPURATIVE LABYRINTHITIS.

BY Dr. SCHMIEGELOW (Copenhagen).

Forty-two cases were reported, ten of circumscribed labyrinthitis, partial or serous, all of which were cured by opening and evacuating the contents of the middle ear. The remaining thirty-two were cases of diffuse suppuration of the labyrinth. The indications for operation on the labyrinth do not solely depend upon the functional examination, but also upon the progress of the malady and upon the direct examination of the outer wall of the labyrinth after the radical operation. The treatment of secondary labyrinthitis consists partly in effective prophylaxis and partly in the surgical

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