to more peritonitis stopped until healing has occurred, after which the loop may be reposited.

Summary. A new method for diminishing peritonitis from leakage after resection or perforation of exteriorizable bowel is presented. It is based on the observation that it is safe to reposit within the peritoneal cavity, bowel which has been exteriorized for several weeks, and on the proposition that peritonitis from leakage cannot occur if the leak (actual or potential) is walled off outside the peritoneal cavity.

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A Variable in the Sensitivity to Bone-Conducted Sounds.*

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It is well known that the perceptive apparatus essential to hearing is located in the internal ear which is filled with liquid. It is also known that air vibrations are not effectively conducted into liquid directly on account of the impedance differences in the two media. Weber proposed that the middle ear apparatus had the function of a resistance matching transformer which drove, as it were, the air vibrations into the liquid and in this manner conferred great sensitivity in the reactions of the perceptive apparatus to air-conducted sounds. He believed that the tremble in the innermost ossicle, the stapes, located in the oval window, produced a mass shifting in the labyrinth liquid which could come about only through compensation motions at the second window in the internal ear, the round window. This mass shifting of the liquid is thought to result in transverse vibrations of the membranous partition between the two windows and these transverse vibrations, it is thought, in turn constitute the physical activation essential to audition. Curiously enough, the interpretation is founded on two assumptions which are physical impossibilities and the described displacements, which form the basis for all theories of hearing, have never been experimentally demonstrated.

It was known in the sixteenth century that the internal ear also

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reacted to bone-conducted vibrations and that these bone vibrations passed into the internal ear directly through the investing bony wall. Inasmuch as the bone vibrations are heard qualitatively, the same as air vibrations, it followed that the mechanical reactions in the internal ear to both sound sources were similar and a correlation was effected in the following manner: The bone vibrations produced expansions or contractions in the investing wall, which resulted in pulsating pressure changes in the enclosed liquid. The pressure changes would tend to force both windows in and out synchronously but would not produce the described mass shifting in the liquid if both were equally movable. Accordingly it was assumed that one window was more fixed than the other and this obviously would produce the required differential pressures and the mechanics for hearing bone-conducted sounds would be the same as for air-conducted sounds. If, now, one window became definitely fixed, then the compensations at the second window would be exaggerated and a greater than normal sensitivity to bone-conducted sounds should result. This condition is called a prolonged bone conduction or an increased bone sensitivity. This explanation appeared to fit the evidence in cases of otosclerosis where the stapes is definitely fixed by a bony ankylosis.

Pohlman and Kranz devised an electro-magnetic receiver which made possible the quantitative testing of the acuity for hearing bone-conducted sounds. They made the observation that in cases in which the oval window was fixed there was no evidence of the increased bone conduction and that the phenomenon was dependent on the masking effect of adventitious noises on the normal hearing individual but not on the deafened individual. In other words, the experimental evidence opposed the accepted explanation.

The English physicist Wheatstone made an important observation on the sensitivity to bone-conducted sounds. He found that when the stem of a vibrating fork was placed in contact with the top of the head, the sound was heard as if it were located in the head. However, when one external ear canal was blocked with the finger or the canal filled with water, the sound was heard in that ear. Pohlman and Kranz reported their experiments employing a bone telephone as a source and under test conditions. They found that the phenomenon was real and that the increased bone sensitivity under both the conditions of blocking the canal and filling with water was similar and limited to the lower frequency range. This observation has been repeatedly confirmed, seemingly quite independently.

Quite recently von Bekesy has proposed another explanation which

seems to account not only for the increased bone sensitivity but also for the frequency limitations. He states that when a bone receiver is applied to the forehead the skull tends to vibrate as a whole to low frequencies. The lower jaw, however, is not integral with the remainder of the bones of the head but is separated from it by 2 movable articulations. As a result the lower jaw tends to lag behind the vibrations of the skull as a whole due to its own inertia. This produces a counterthrust at the region of the ear canal which results in air vibrations, which are more effectively conducted to the internal ear when the external auditory canal is occluded. This explanation, while seemingly obvious, presents a number of objections which need not be discussed here.

Fortunately it is possible to test the validity of von Bekesy's explanation. If lack of integration of the lower jaw with the remainder of the skull is indirectly responsible for the effect, then integration of the mandible with the remainder of the head should suppress both the increased bone sensitivity and its frequency limitations. Tests on cases with the bone receiver applied to the forehead with the teeth separated and with the teeth clenched, however, showed no significant change in the phenomenon.

A second test was made in the following manner: Two bone receivers were connected in series with an audiometer. These receivers were so arranged that they could be made to react in the same or in opposite phase. The two receivers were applied to the upper and the lower teeth respectively, with the bite open. In phase, all lag in the mandible, assumed by von Bekesy, should completely disappear and the phenomenon should be suppressed. With the receivers in opposite phase, the assumed lag in the mandible should be exaggerated and not only should the enhanced bone sensitivity show an appreciable increase, but the frequency limitations in the phenomenon should be definitely altered. There is no need to reproduce audiograms because no significant changes in the increased bone sensitivity due to blocking the canal could be detected under either condition. The von Bekesy explanation is accordingly not confirmed.

It is curious that with all of the directed research on audition, the classical observation made by Wheatstone in 1827 has as yet received no adequate explanation. It may be well to emphasize that no explanation, no matter how adequate it may appear to be, is acceptable until it has been definitely confirmed by experimental methods.