

hearing on the right side up to  $110^{\circ}$ , from destruction of the tympanum, an instant gain down to  $60^{\circ}$ , a gain of  $50^{\circ}$  on the audiometric scale.

In this preliminary report I have omitted many subjects of interest, but I hope I have related enough to show that the world of science in general, and the world of medicine in particular, is under a deep debt of gratitude to Professor Hughes for his simple and beautiful instrument, which I have christened the audimeter, or less correctly but more euphoniously, the audiometer.

V. "Note on the Invention of a Method for making the Movements of the Pulse Audible by the Telephone. The Sphygmophone." By BENJAMIN WARD RICHARDSON, M.D., LL.D., F.R.S. Received May 14, 1879.

While experimenting with the audiometer, it occurred to me that I might get a secondary or telephonic sound from the movements of the pulse at the wrist. I have effected this in a very simple manner, by adding a microphone to a POND'S sphygmograph. I mount on a slip of talc, glass, wood, or ebonite a plate of metal or gas carbon. I place the slip in the sphygmograph as if about to take a tracing of the pulse. I connect one terminal from a Leclanché's cell to the metal or carbon, and the second terminal from the cell to a terminal of the telephone. Then I connect the other terminal of the telephone with the metal rod of the sphygmograph. The instrument is now ready for use. It is placed on the pulse, in the ordinary way, and is adjusted, with the writing needle thrown back, until a good pulsating movement of the needle is secured. When the movement is in full action, the needle is thrown over to touch the platinum plate, which it traverses with each pulse-movement, and completes the connexion between the telephone and the battery. The needle, in passing over the metal or carbon plate, causes a distinct series of sounds from the telephone, which correspond with the movements of the pulse. When all is neatly adjusted, the sounds heard are three in number, one long sound and two short, corresponding to the systolic push, the arterial recoil, and the valvular check. The sounds are singular, as resembling the two words, "bother it." The sounds can be made very loud by increasing the battery power.

This little instrument is not so good a recorder of the pulse as the sphygmograph, but it may be made very useful in class, for illustrating to a large number of students, at one time, the movements of the natural pulse, and the variations which occur in disease. I call the invention the sphygmophone.