of the membrane (the only thing acted on by the un­dulating air) to another chamber of moſt Angular conſtruction, where the auditory nerve is greatly expanded. They conceive, therefore, that the organ called the *drum* does not act as a drum, but in ſome other way. In­deed it ſeems bad logic to ſuppoſe that it acts as a drum merely by producing a noiſe. This is in no reſpect dif­ferent from the noiſe produced out of the ear; and if it is to be heard as a noiſe, we muſt have another ear by which it may be heard, and this ear muſt be another s*uch* drum ; and this muſt have another, and ſo on ſor ever. It is like the inaccurate notion that vision is the contemplation of the picture on the retina. Theſe anatomiſts attended therefore to the ſtructure. Here they obſerved a prodigious unfolding of the auditory nerve of the ear, which is curiouſly diſtributed through every part of this cavity, lining its sides, hung acroſs it like a curtain, and sending off fibres in every direction, ſo as to leave hardly a point of it unoccupied. They thought the machinery contained in the drum peculiarly fitted for producing undulations of the air contained in this labyrinth, and that by theſe agitations of the air the contiguous fibres of the auditory nerve are impelled, and that thus we get the ſenſation of sound.

The cavity intervening between the external air and this inner chamber appeared to theſe anatomiſts to have no other uſe than to allow a very free motion to the *ſlapes* or little piſton that is employed to agitate the air in the labyrinth. This piſton condenſes on a very ſmall ſurface the impulſe which it receives from a much lar­ger ſurface, ſtrained by the malleus on the entry of the tympanum, on purpoſe to receive the gentle agitations of the external air in the outer canal. This membra­nous ſurface could not be agitated, unleſs completely detached from every thing round it ; therefore all ani­mals which have this mechaniſm have it in a cavity containing only air. But they held, that nature had even taken precautions to prevent this cavity from act­ing as a drum, by making it of ſueh an irregular ram­bling form ; for it is by no means a cavity of a ſymme­trical ſhape, like a vessel, but rather reſembles the ram­bling holes and blebs which are often ſeen in a piece of bread, ſcattered through the ſubſtance of the cranium, and communicating with each other by ſmall passages. The whole of theſe cavernulæ are lined with a ſoftiſh membrane, which ſtill farther unfits this cavity for pro­ducing sound. This reaſoning is ſpecious, but not very conclusive. We might even assert, that this anfractuous form, with narrow passages, is well fitted for producing noiſe. If we place the ear cloſe to the ſmall hole in the side of a military drum, we ſhall hear the ſmalleſt tap of the drumſtick like a violent blow. The lining of the cavernulæ is nervous, and may therefore be ſtrongly affected in the numerous narrow paſtages between the cells.

While theſe ſpeculations were going on with reſpect to the ear of the breathing animals, obſervations were occasionally made on other animals, ſuch as reptiles, ſerpents, and fiſhes, which give undoubted indications of hearing ; and many very familiar facts were obſerved or recollected, where sounds are communicated through or by means of solid bodies, or by water ; therefore, without inquiring how or by what kind of mechaniſm it is brought about, it became a very general belief among phyſiologiſts, that all fiſhes, and perhaps all

animals hear, and that water in particular is a vehicle of sound. In 1767 or 1768 the writer of this article, at the ſuggeſtion of the late professor of aſtronomy in the univerſity of Glaſgow, made an experiment in a lake in that neighbourhood, by striking a large hand-bell under water, and heard it very diſtinctly and ſtrongly when his head was plunged in the water at the diſtance of more than 1200 feet. Many experiments are mention­ed by Kircher and others on the communication of sound through solid bodies, ſuch as mails, yards, and other long beams of dry fir, with ſimilar reſults. Dr Monro has publiſhed a particular account of very cu­rious experiments on the propagation of sound through water in his Dissertation on the Phyſiology of Fillies ; ſo that it now appears that air is by no means the only vehicle of sound.

In 1760 Cotunni publiſhed his important diſcovery, that the labyrinth or inmoſt cavity of the ear in animals is completely filled with water. This, after ſome conteſt, has been completely demonſtrated (ſee in parti­cular Meckel Junior *de Labyrinthi Auris Contentis,* Argentor, 1777), and it ſeems now to be admitted by all.

This being the caſe, our notions of the immediate cauſe of sound muſt undergo a great revolution, and **a** new reſearch muſt be made into the way in which the nerve is affected : for it is not enough that we ſubstitute the undulations of water for thoſe of air in the labyrinth. The well informed mechanician will ſee at once, that the vivacity of the agitations of the nerve will be greatly increaſed by this ſubſtitution ; for if wa­ter be perfectly elaſtic through the whole extent of the undulatory agitation which it receives, its effect will be greater in proportion to its speciſic gravity: and this is confirmed by an experiment very eaſily made. Immerſe a table-bell in water contained in a large thin glaſs veſſel. Strike it with a hammer. The sound will be heard as if the bell had been immediately ſtruck on the ſides of the vessel. The filling of the labyrinth of the ear with water is therefore an additional mark of the wiſdom of the Great Artist. But this is not enough for informing us concerning the ultimate mechanical event in the proceſs of hearing. The manner in which the nerve is expoſed to theſe undulations muſt be totally different from what was formerly imagined. The fila­ments and membranes, which have been deſcribed by former anatomiſts, muſt have been found by them in a ſtate quite unlike to their ſituation and condition in the living animal. Accordingly the moſt eminent anato­miſts of Europe ſeem at preſent in great uncertainty as to the ſtate of the nerve, and are keenly occupied in obſervations to this purpoſe. The deſcriptions given by Monro, Scarpa, Camper, Comparetti, and others, are full of moſt curious diſcoveries, which make almoſt a to­tal change in our notions of this ſubject, and will, we hope, be productive of moſt valuable information.

Scarpa has diſcovered that the solid cavity called the *labyrinth* contains a threefold expanſion of the auditory nerve. One part of it, the cochlea, contains it in a fibrillous ſtate, ramified in a moſt ſymmetrical manner through the whole of the *zona mollis* of the *lamina ſpiralis,* where it anaſtomoſes with another production of it diffuſed over the general lining of that cavity. An­other department of the nerve; alſo in a fibrous ſtate, is ſpread over the external ſurface of a membranaceous