

composed of an external membrane, derived from the cuticle which lines the meatus; an internal layer, which is continuous with that of the cavity beyond it; and a middle layer, which consists of radiating muscular fibres, proceeding from the circumference towards the centre, where they are inserted into the extremity of a minute bony process (H,) presently to be described.* This muscular structure appears designed to vary the degree of tension of the ear-drum, and thus adapt the rate of its vibrations to those communicated to it by the air. There is, also, a slender muscle, situated internally, which, by acting on this delicate process of bone, as on a lever, puts the whole membrane on the stretch, and enables its radiating fibres to effect the nicer adjustments required for tuning, as it may be called, this part of the organ.†

Immediately behind the membrane of the ear-drum, there is a hollow space (r,) called the *cavity of the tympanum*, of an irregular shape, scooped out of the most solid part of the temporal bone, which is here of great density and hardness. This cavity is always filled with air; but it would obviously defeat the purpose of the organ if the air were confined in this space; because unless it were allowed occasionally to expand or contract, it could not long remain in equilibrium with the pressure exerted by the atmosphere on the external surface of the ear-drum; a pressure which, as is well known, is subject to great variations, indicated by the rise and fall of the barometer. These variations would expose the membrane of the ear-drum to great inequalities of pressure at its outer and inner surfaces, and endanger its being forced, according to the state of the weather, either outwards or inwards, which would completely interfere with the delicacy of its vibrations. Nature has guarded against

* In many quadrupeds their insertion into this process is at some distance from the centre of the membrane. These muscular fibres are delineated in Fig. 45, vol. i. p. 105.

† Home, Lectures, &c., iii. 268.