only reliable one, is careful experience. The hypothesis which he advocates in accounting for the effects of the balsams is that of substitution. He thus reasons: The scarlatiniform eruption described which often occurs on the seventh or eighth day of the treatment is the infallible correlation of the disappearance of the false membranes. This phenomena, so remarkable, readily intelligible by those who comprehend the physiological and pathological affinities which unite the mucous and cutaneous tissue, demonstrates the *modus operandi* of the balsamic treatment. In brief, it is evident that the whole of the recovery is under the influence of the medicines, as it was before under that of the malady: on the other hand, that the cure is accomplished by the way of a general substitution; adding, emphatically: Now this substitution can result only from the antagonism between a morbid exanthema and the medicinal exanthema. Consequently, it is specially requisite to produce the latter. The treatment is illustrated by twenty-six cases. In conclusion, the author refers to Dr. Garreau, Chief Surgeon of the Hospital of Lowal, in confirmation of the efficacy of the treatment in question.

In a subjoined note he calls attention to a remarkable peculiarity, that though the exanthema ordinarily only occur after a prolonged treatment, yet it occasionally appears sooner, after three or four days; nevertheless, whether the treatment be restricted to the shorter period, or the doses be equally prolonged, *it is on the seventh or eighth day that the eruption is always produced.*

ART. V.—*Sound: A Course of Eight Lectures delivered at the Royal Institution of Great Britain.* By JOHN TYNDALL, LL.D., F.R.S.

THESE eight lectures on Sound, intended to interest not only those who possess special scientific culture, but all intelligent persons, have already attained popularity, and are likely to be widely read and respected by medical men of a physiological turn. The author informs us that he has made much use of Helmholtz's work, 'Die Lehre von den Tonempfindungen,' that he has been assisted, in going through the press and otherwise, by English and German friends, and that "one celebrated German friend" had read through all the proof sheets. Thus when it is also borne in mind that the subject is a pet one of so able a man as Dr. Tyndall, it will be perceived that this book must carry with it an unusual weight of authority. Besides, it abounds

with excellent woodcuts, and its style is charming. It will, none doubt less than ourselves, be justly treasured not only as a pleasant, but a safe guide in acoustics.

On the other hand, we regard any statement made in a book so diligently supervised and polished, should it be inaccurate, as particularly detrimental to the spread of correct knowledge, and we therefore think it imperative on us as physiologists to venture to demur to a few statements that fairly fall within our province. At page 75 we read :—

"Dr. Wollaston was expert in closing the Eustachian tube, and leaving the space behind the tympanic membrane occupied by either compressed or rarefied air. He was thus able to cause his deafness to continue for any required time without any effort on his part, always, however, abolishing it by the act of swallowing. A sudden concussion may produce deafness by forcing air either into or out of the drum of the ear. In the summer of 1858 I was on the Fee Alp, in Switzerland, where, jumping from a cliff on to what I supposed to be a deep snowdrift, I came into rude collision with a rock, which the snow barely covered. The sound of the wind, the rush of the glacier torrents, and all the other noises which a sunny day awakes upon the mountains, instantly ceased. I could hardly hear the sound of my guide's voice. This deafness continued for half-an-hour, at the end of which time a suitable act opened the Eustachian tube, and restored, with the quickness of magic, the innumerable murmurs which filled the air around me."

We would ask for a reconsideration of this account. The author has just described the Eustachian tube as keeping itself closed, and only opened by means of muscles in the act of swallowing; but Wollaston never suspected but that it is naturally patent, and that it can only be closed artificially by the swelling of its wall on the diminution of the air-pressure usually there present; to him, unless Dr. Tyndall, which we cannot think, had some other source of information than Wollaston's paper in the 'Philosophical Transactions,' the experiment of retaining compressed air in the drum was unknown. It was only this ignorance of the fact that the tube, when passive, is shut, that led Wollaston to imagine that his powers of exhausting the air in the drum (causing the tubes to more completely collapse) by a forced inspiration with shut nose and mouth excelled those of other people. There is no reason to suppose that he could perform any particular feat in this way. Indeed, Dr. Tyndall's own tubes seem to be at least as well able to keep closed with unequal aerial pressure in the fauces and tympana, for they are related to have so remained for half an hour. But we own to be at a loss to understand his adventure. He expresses no opinion whether the concussion had increased or diminished the

quantity of air in his drums. It must have been easy to have observed which event had happened, and yet it seems that it was only inferred from the effects that one or other had occurred. As the concussion operated perpendicularly to the paths of the two tubes, it would not *directly* tend to knock air either into or out of the drums; and certainly we cannot suppose that one drum was partially emptied and the other over-filled,—what happened to one happened to both. There would be, perhaps, on the sudden arrest of motion through the feet a tendency to send the air in the lungs towards the bottom, and withdraw some from the throat, and thus from the drums. But then the nostrils, if not the mouth, would supply a current of air, and swallowing would not take place at the instant of collision to open the Eustachian tubes—tubes too minute, when fully open, to permit an *instantaneous* escape of much air. In short, it is inconceivable that the quantity of air in the drums could be affected by an accident having far less tendency to lessen the air in the fauces than an ordinary act of inspiration; and an act of swallowing would have been sure to have quickly restored the aerial equilibrium, could such a thing have been. There is a mistake, we are convinced, somewhere, a lapse of memory, the shock on the nerves in scenes too exciting for careful observation, or transient confusion in the sensorium. The remarks are given by Dr. Tyndall in support of Wollaston's view, that a tense membrana tympani is unfitted for hearing low sounds, though it is fitted for hearing high ones as well or better than a slack membrane. However, our author seems to have been deaf to all the mountain sounds, various as they were, some of which may be presumed to be of high tone, and thus gives only a dubious support to Wollaston. We cavil at these statements because the correctness of Wollaston's observations as to the effect of a tense membrane upon the hearing of acute sounds has been disputed, and with sufficient force to render it desirable to have his experiments repeated by dispassionate observers.

Besides, Wollaston's observation of the different ranges of tones that are audible to different individuals, and which, he thought, indicated the different degrees of tension of their tympanic membranes, is now being used to support a theory that (p. 324) there is a lute of 3000 strings in the human ear that is adapted to the hearing of at least so many tones. In individuals the scope of this organ is supposed to differ, and to more properly account for Wollaston's observation. There is no impossibility, or even improbability, in this idea; but we always advise caution in deciding by the aid of such comparisons. The ear is a complex organ, and many of its parts may, if altered, produce similar results as to audition, and those who make such com-

parisons as to individual endowments ought to be very watchful against sources of error. We remember well the sensational announcement, made, some years ago, by a then Scotch professor, of the great proportion of mankind who were hopelessly affected with colour-blindness, and of the urgent necessity there was for ceasing to use coloured lights for railway signals; insomuch that the public was terrified: and yet we have known other persons deeply interested in eye-disease through long years of inquiry unable to meet with a single case of marked colour-blindness.

ART. VI.—*Observations on the Nature and Treatment of Polypus of the Ear.* By EDWARD H. CLARKE, M.D., &c.

THIS pamphlet of Dr. Clarke's is a study of aural polypi chiefly as they presented themselves in a few cases treated by the author. The cases are fully related with an eye to pathology and treatment, and the morbid structures are illustrated by microscopic drawings which are well engraved. It is deduced that polypi may be divided into two varieties, the fibro-plastic and epithelial. The former rarely spring from the tympanum, and rather from the outer than inner half of the meatus, but may be attached to the membrana tympani itself. They grow from the fibrous tissues of the ear, are globular or pyriform, and covered by a kind of pavement epithelium. The latter group grow from the epithelial tissues of the ear, consist of epithelial elements, and are highly vascular. These may be found in any part of the meatus, or may spring from the mucous membrane of the drum. In all of both groups of cases, he infers that otorrhœa preceded the polypus; and he thinks the growths are due to something of the nature of inflammation. In the majority the membrana tympani was perforated to a greater or less degree, or at all events diseased. Both kinds may be successfully extracted, and by persevering after-treatment with caustics and astringents, their return may be obviated. In one instance an epithelial polypus which filled the meatus, obstinately reappeared even after a second removal. At length a swelling showed itself in the mastoid process, on which being opened, a copious discharge of pus resulted, and water injected into the meatus flowed out through the mastoid process. A polypus was seen in the cavity of the drum, which was injected with perchloride of iron, when the growth shrivelled up, and dropped out of the ear two days after, never to reappear.—A very instructive case. The essay is practical and philosophical.