

which the length of a needle has on its deviations, produced by the attraction of the shell of iron. When examined by the test of the formulæ given by the author, the law of the tangent of the deviation being proportional to the rectangle of the cosine of the longitude into the sine of the double latitude on which so much dependence had been placed, is found to give results so inconsistent with one another, that it cannot be considered as even affording an approximation to the truth, and must therefore be wholly rejected.

The close agreement which the author found between the observed and the computed deviations of needles, whose magnetism had been disturbed by contact with a magnet, as well as those which had suffered no disturbance, fully confirmed the author in the views which he originally took of the action of iron on magnetized needles. He conceives that his hypothesis, instead of being at variance with observation, is not only consistent with all the experiments that have been made, but by affording the proper corrections to be applied to them, derives the strongest support from these observations.

He concludes by mentioning a fact which he conceives to be irreconcilable with the hypothesis of induced magnetism; namely, that a steel bar, rendered as hard as it was possible to make it, produced, when its ends are reversed, precisely the same effect on the needle as a bar of the softest iron under similar circumstances.

Description of a Sounding Board in Attercliffe Church, invented by the Rev. John Blackburn, Minister of Attercliffe-cum-Darnall, Sheffield. Read June 5, 1828. [Phil. Trans. 1828, p. 361.]

The church at Attercliffe had long been remarkable for the difficulty and indistinctness with which a voice from the pulpit was heard. These defects have been completely remedied by the erection of a concave sounding-board, having the form resulting from half a revolution of one branch of a parabola on its axis. It is made of pine wood; its axis is inclined forwards to the plane of the floor, at an angle of about 10° or 15° ; it is elevated so that the speaker's mouth may be in the focus; and a small curvilinear portion is removed on each side, so that the view of the preacher from the side galleries may not be intercepted. A curtain is suspended from the lower edge for about 18 inches on each side.

The effect of this sounding-board has been to increase the volume of sound to nearly five times what it was before; so that the voice is now audible, with perfect distinctness, even in the remotest parts of the church, and more especially in those places which are situated in the prolongation of the axis of the paraboloid. But the side galleries are also benefited; probably from the increase of the secondary vibrations in a lateral direction. Several experiments are related illustrative of these effects; among which, the most striking, was one in which a person placed so as to have one ear in the focus of the paraboloid, and the other towards another person speaking

from the remote end of the church, heard the voice in a direction the reverse of that from which it really proceeded.

The superior distinctness of sounds proceeding from the focus is accounted for by their all arriving at the same moment of time at a plane perpendicular to the axis, after reflexion from the surface of the paraboloid; which is a consequence of the equality of the paths they have described.

On the mutual Action of Sulphuric Acid and Alcohol, and on the Nature of the Process by which Ether is formed. By Henry Hennell, Esq. Communicated by William Thomas Brande, Esq. F.R.S. Read June 19, 1828. [*Phil. Trans.* 1828, p. 365.]

The most abundant product resulting from the mutual action of sulphuric acid and alcohol, without the application of heat, is the sulphovinic acid; but on distillation this peculiar product disappears, and ether is formed; and it becomes a question what part the sulphovinic acid plays in this process. In opposition to the assertion of Messrs. Dumas and Boullay, that this acid is not concerned in the production of ether, the author contends that whenever ether is formed, it is in consequence of the decomposition of the sulphovinic acid. He obtained ether from this latter fluid by distillation, when neither sulphuric acid nor alcohol were present; but if a certain quantity of water has been previously added, the sulphovinic acid is resolved into alcohol and sulphuric acid, and no ether is obtained; whereas during the distillation of ether in the ordinary way, the sulphovinic acid is re-converted, more or less, entirely into sulphuric acid. Hence he infers that the formation of the sulphovinic acid is a necessary and intermediate step to the production of ether from alcohol and sulphuric acid. As ether may be formed from alcohol, by the intermedium of sulphuric acid, so by the same intermedium may alcohol be obtained from ether,—the sulphovinic acid being in either case formed according to the mode of combination of the hydrocarbonous base. This theory is also illustrated by the employment of olefiant gas as the hydrocarbonous base, for by combining this gas with sulphuric acid, we may form sulphovinic acid, from which we may obtain at pleasure, by varying the circumstances of the decomposition, either alcohol or ether.

Experiments and Observations on Electric Conduction. By William Ritchie, A.M. F.R.S. Rector of Tain Academy. Read June 19, 1828. [*Phil. Trans.* 1828, p. 373.]

According to the modern theory of electricity, metallic bodies, far from attracting the electric fluid, as is commonly believed, are of all bodies those which have the least attraction for that fluid, and being the best conductors for it, are entirely passive during its transit through them. In confirmation of these views, the author describes