

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

experiments in which the electric spark was found to have penetrated through the side of a glass globe blown to an extreme degree of thinness. An electric jar, from which the air had been partially exhausted, could not be made to receive as high a charge as when the contained air was of the usual density, and when entirely exhausted could not be charged in any sensible degree; when filled with condensed air on the other hand, it retained a higher charge than before. The heated and consequently rarefied air surrounding a red-hot iron rod is found to conduct electricity with great facility. The same property is observed in the flame from a blowpipe, which may be regarded as a hollow cone containing highly rarefied air; as also, in a larger scale, in that of a volcano. Sir H. Davy had concluded from his experiments on voltaic electricity, that the conducting powers of metals are diminished by heat; but Mr. Ritchie infers from several experiments which bear more directly upon the question, that the metals afford no exception to the general law, that in all bodies heat increases the conducting powers; and explains the apparent anomaly in Sir H. Davy's experiments, by the dissipation of the electricity by the rarefied air surrounding the heated metals, which were used as conductors. He concludes his paper by describing an experiment which appears to establish, in respect to this law, a striking analogy between the electric and magnetic influences.

*On Magnetic Influence in the Solar Rays.* By Samuel Hunter Christie, Esq. M.A. F.R.S. &c. Read June 19, 1828. [*Phil. Trans.* 1828, p. 379.]

From the experiments described by the author in a former paper, it appeared that a magnetized needle vibrated under exposure to the sun's rays, came to rest sooner than when screened from their influence; that a similar effect was produced on a needle of glass or of copper, but that the effect on the magnetized needle greatly exceeded that upon either of the others. In the prosecution of this inquiry, the author has endeavoured to vary the experiments so as to obviate several causes of inaccuracy which might tend to invalidate the general conclusions he had before drawn. His first object was to compare the effects of the solar rays on an unmagnetized steel needle with one that was magnetized under the same circumstances; and the result was, that the latter was influenced in a more considerable degree than the former; and a similar difference was observed when the vibrations of a magnetized needle were compared with those of a needle made of glass or of copper. He ascertained that the diminution of the terminal arc of vibration, on exposure to the sun, was not occasioned merely by the heat imparted to the needles or surrounding medium, although this cause appeared in some instances to measure the intensity of the action which produced the diminution. In order to determine the comparative influence of the separate rays, he allowed them to fall on the needles after transmission through differently coloured fluids and glasses; but owing to