of water to the metropolis, in support of the practicability of affording a supply of filtered water from the Thames, adequate to the demand, and within reasonable limits in point of expense, proposes his plan of forming a filter under the bed of the river for each Company. He states that the deposit of mud on each side of the Thames does not reach below the low-water mark, and that the bed of the river throughout is generally a clean and strong, though porous gravel. The mud, therefore, will puddle in, and close the pores of the bed of gravel on which it lies, above low-water mark, so that the filtration into the neighbouring wells, the waters of which are remarkably pure, must take place below low-water mark. He therefore proposes to construct a filtering chamber below the bed of the river, from which chamber a main pipe or tunnel must be made for conducting the filtered water into a well on the river side, whence it is to be drawn up by steam power, and distributed to the houses to be supplied, by the mains and branches at present existing.

The filtering chamber and apparatus are to be prepared by erecting a coffer-dam in the river, of sufficient size to inclose the whole of the area required for that purpose. This coffer-dam will require piles of forty-five feet in length. The bed of the river, thus laid dry, is to be dug out, and a bed of brick-work, set in cement, laid down: a floor must then be constructed in the form of an inverted segment of an arch. On the top of the walls of this floor, plates are to be laid, and in the inclosed area, granite blocks placed; upon these again, the girders are to be laid, and over these the joists, which are to support a first layer of large flints. Upon these, successive layers of smaller flints are to be laid, each decreasing in size as they approach the bed of the river. Upon the uppermost of these, a stratum of clean shingle is to be deposited; then a bed of fine and very clean gravel; and lastly a bed of filtering sand, until it arrives within a foot of the bed of the river, which last space must then be filled up with clean gravel; thereby forming a filtering bed of eight feet in depth, the top of which will still be four feet below low-water mark. So that, allowing seven feet for the timbers and brick-work below, and eighteen feet for the rise and fall of the tide, the total depth at high-water will be thirty-seven feet.

The paper is accompanied by a lithographic drawing, which exhibits the several parts of the scheme.

A Paper was read, entitled, "On the Variable Intensity of Terrestrial Magnetism, and the Influence of the Aurora Borealis upon it." By Robert Were Fox. Communicated by Davies Gilbert, Esq. V.P.R.S.

The author gives the results of a series of observations on the vibrations of the magnetic needle, which he undertook last summer, for the purpose of ascertaining whether the intensity of its directive force is affected by the changes in the earth's distance from the sun, or by its declination with respect to the plane of its equator. He observed that the magnetic intensity is subject to frequent variations, which are sometimes sudden, and of short duration. These anoma-

lies he has been unable to refer to any obvious cause, except when they were accompanied by the appearance of the aurora borealis, which evidently affected the needle on many occasions. He also thinks that the vibrations of the needle became less rapid with a moist atmosphere, and more so when it was very dry. Changes of the wind and snow storms appeared also to be attended with fluctuations in the intensity of the magnetism. He endeavoured to ascertain whether there existed any decided and constant difference in the directive force of each pole; conceiving that, on the hypothesis of a central magnetic force, the north pole of the magnet would, in these northern latitudes, be acted upon with much greater energy than the south pole. From his observing that the relative intensity of the two poles is not always the same, he infers the probability of the earth's magnetism being derived from the agency of electric currents existing under its surface as well as above it, and that the rapid fluctuations in its intensity are owing to meteorological changes.

The author is led to conclude that the aurora borealis is an electrical phenomenon, and that it usually moves during the night nearly from north to south, and in an opposite direction during the day; that it is of the nature of positive electricity; and that its elevation above the earth is much greater than a thousand, and perhaps thousands of miles.

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