physical science an experiment more conclusive nor an inference more certain than this one. Now, supposing the powder to be light enough to float in the air, and that we are enabled to see it there as plainly as the heavier powder in the palm of the hand. If, like the powder, such floating dust, sown in an appropriate soil, produce a definite living crop, with the same logical rigour as before we should conclude that the germs of this crop must have formed a portion of the dust." This reasoning applies, word for word, to the development of *Bacteria* from those suspended particles which the luminous beam reveals in the air, and in the absence of which life is never generated in previously sterilized infusions.

I respectfully submit this reasoning to Dr. Sanderson's friendly consideration.

VI. "Experimental Demonstration in respect to the Origin of Windings of Rivers in Alluvial Plains, and to the Mode of Flow of Water round Bends of Pipes." By Professor James Thomson, LL.D., D.Sc., F.R.S. Received June 21, 1877.

In a paper which I had the honour of submitting to the Royal Society rather more than a year ago, and which is printed in the 'Proceedings' for May 4, 1876, I proposed, on hydrokinetic principles, a theoretical view of the mode of flow of water round bends of rivers and of pipes, and offered under that view explanations of the origin of the windings of rivers flowing through alluvial plains. Wishing to bring under the test of experiment the views then put forward, and to render very clearly perceptible the phenomena anticipated, I constructed, in the summer of 1876, a small artificial river, about eight inches wide and an inch or two deep, having a bend turning about a half-round, or 180°, so that the course of the river might be likened to the capital letter U. The water flowing in this river showed very completely, and very remarkably, the phenomena which had been anticipated, and which are to be found described in the paper referred to. The courses of the water's flow at the various parts of the river, along the bed, and at the upper surface, and at places anywhere within the body of the current, were made to show themselves in several ways. One way was by means of threads of suitable length (about an inch or two long), some of which were anchored at bottom, while others were attached at various depths in the river to pins or slender wires standing upright like thin posts in the river. These threads, by the lines of direction which they assumed, showed very well the directions of the flow at bottom and at various depths. Another way, and one which proved very satisfactory for showing the bottom currents, was by dropping into the river granules of various kinds, such as

sand, and peas selected of good round form, and other small round seeds, such as clover-seed and poppy-seed. Granules such as these showed very clearly numerous phenomena, not only of the flow of the water, but also of the transmission of material-like detritus forward along the bottom in straight parts, and very obliquely across the bottom in the bend; and gave imitations on a small scale, easy for observation, of the processes of accumulation of detritus along the inner banks of the bends of rivers, and presented also interesting suggestions and considerations as to some of the details or secondary actions involved in the processes *.

VII. "An Attempt to form Double Salts of Nitrate of Silver and other Nitrates." By W. J. Russell, Ph.D., F.R.S., and Nevil Story Maskelyne, F.R.S. Received June 21, 1877.

(Abstract.)

When a solution containing silver and potassium nitrates, in equivalent proportions, is evaporated, the potassium nitrate separates out, uncombined with silver nitrate. If, however, the ratio of silver nitrate to potassium nitrate be increased beyond a certain limit (which has been determined), then a true double salt having the composition $AgNO_3KNO_3$ crystallizes out. The same salt can also be formed from a solution that would *not* yield it under ordinary circumstances, by either adding nitric acid or by increasing the temperature of the solution, both these alterations tending in the same direction, viz. to decrease the amount of silver nitrate as compared to that of potassium nitrate which can exist in solution.

Further it is shown, with regard to these two salts, that if an intimate mixture of them be treated with an amount of water insufficient to dissolve the whole of either constituent, still the composition of the solution found will vary with the composition of the mixture used. This arises from the two salts uniting in solution to form the double salt, and ultimately the amount of double salt that can remain in solution depending on the excess of silver nitrate present, which, from its greater solubility, can displace the double salt from solution. The residue in this case, from its crystalline form, can be identified as double salts.

With sodium nitrate a corresponding double salt does not form. In this case, on evaporating the solution it is the silver nitrate, not the

* The experiments here described were shown in the Mathematical and Physical Section of the British Association at the meeting held at Glasgow, in September 1876, and further in the temporary collection prepared in the Helvingrove Museum at Glasgow, for that meeting of the Association. As they were arranged expressly for testing and illustrating the theoretical views contained in a paper previously submitted to the Royal Society, the present brief account of them is offered here to the Society as a sequel to that previous paper.