circle, on the north brow of the hill, the zenithal direction is disturbed towards the north and the astronomical latitude is too great.

There is only one point in this investigation upon which a doubt can be suggested as possible, namely the evaluation of the micrometer-scale. It was thus conducted:—The micrometer-plate contains 26 wires, and the fixed part of the instrument contains 25 crosses, each interval being nearly 256″. With this arrangement every wire-interval is measured with great ease, and the whole series of 25 intervals is accurately obtained in terms of the micrometer. By placing the instrument in a proper position, the same intervals are obtained in time of the star's transit, which is easily converted into arc. The comparison of these gives the value of micrometer-divisions which has been employed.

The following verification, of somewhat inferior accuracy, has been made by measures of the instrument. It appears that the ray of light passes through 0·9 inch of glass, 35·3 inches of water, and 0·8 inch of air, nearly (the measure of the last being slightly uncertain). Remarking that the dividing surfaces are horizontal and plane, it is easily seen that the micrometer-scale ought to be such as is due to an air-telescope whose length in inches $= \frac{0\cdot9}{1\cdot6} + \frac{35\cdot3}{1\cdot336} + 0\cdot8 = 27\cdot8$ inches. And from this, with observation of transit of the star, it was found that the measure of 25 intervals of wires ought to be 0·8693 inch: as measured with a pair of compasses, it was found sometimes 0·871, sometimes 0·875. The agreement is fully as close as can be expected from the rudeness of the operation, and shows distinctly that there can be no error of principle in the method of evaluing the micrometer-scale.

V. "Magnetic Survey of the East of France in 1869." By the Rev. S. J. Perry and the Rev. W. Sidgreaves. Communicated by the President. Received July 13, 1871.

(Abstract.)

This paper contains the results of a series of magnetic observations taken in the east of France during the months of August and September 1869, and is a continuation of the paper on the survey of the west of France, published in the Philosophical Transactions for 1870, p. 33.

No change was made in the observers, nor in the methods of observation, during the two surveys; and the only alteration in the instruments was the substitution in 1869 of a Jones theodolite in lieu of the small altazimuth by Cook used in 1868.

Observations were made at twenty-one stations in the following order:—Paris, Rheims, Metz, Strasbourg, Issenheim, Dôle, Mont Rolland, Dijon, Lyons, Avignon, Marseilles, Monaco, Montpellier, Grenoble, N. D. de

Myans (near Chambéry), Villefranche, St. Etienne, Clermont, Moulins, Paris, Douay, and Boulogne.

The magnetic elements are reduced to the epoch January 1st, 1869, the same as that adopted for the western stations.

Station.	Dip.	Declination.	Intensity.	Horizontal Force.
	°	°		
Avignon	61·841	16·046	9·7927	4·6224
Boulogne	67·126	18·227	10·1511	3·9458
Clermont	63·607	16·460	9·9010	4·4013
Dijon	64·409	16·612	9·9418	4·2943
Dôle	64·213	16·084	9·9307	4·3201
Douay	66·785	17·991	10·1301	3·9931
Grenoble	62·903	15·822	9·7293	4·4317
Issenheim	64·601	15·794	9·9585	4·2714
Lyons	63·268	.....	9·8826	4·4454
Marseilles	60·576	15·691	9·6092	4·7207
Metz	65·458	15·976	10·0012	4·1541
Monaco	61·368	14·524	9·7189	4·6571
Montpellier	61·614	16·545	9·7512	4·6358
Mont Rolland	64·260	.....	9·9692	4·3295
Moulins	64·081	16·487	9·9190	4·3356
N. D. de Myans	62·875	15·182	9·8293	4·4815
Paris	65·859	17·260	10·0618	4·1151
Rheims	65·936	16·722	10·0967	4·1170
St. Etienne	63·063	14·910	9·8472	4·4609
Strasbourg	64·687	15·578	9·9405	4·2502
Villefranche	63·498	16·942	9·8853	4·4111

The secular variations of these several elements are $-0°·054$, $-0°·1696$, $+0·0047$, and $-0·0195$. The yearly acceleration will therefore be $-0°·00082$ for the dip in 1863·5, the value found by General Sabine for the epoch 1780 to 1830 being $-0°·00085$.

As regards the horizontal force, the secular variation in the east of France is considerably less than in the west; but the change for the whole of France is almost identical with that deduced by Dr. Lamont for 1858, the yearly acceleration being less than 0·000007.

A comparison of the lines of equal dip, declination, intensity, and horizontal force, deduced from the observations taken in the east and west of France, leads to the following conclusions.

The isoclinals are found to be rather further apart and more inclined to the geographic meridian, but receding less quickly from it, in the east than in the west; the isogonics are more distant from each other, but make a less angle with the meridian, in the east than in the west; but the results obtained from the declination observations of 1869 are less trustworthy than those for 1868, on account of the unsteadiness of the new theodolite.

The distance between the isodynamics does not sensibly vary for east

and west, but the angle for the east is less; whilst for the horizontal-force lines both the angle and the distance are somewhat in excess in the east, though the difference is diminishing.

VI. "On the Behaviour of Supersaturated Saline Solutions when exposed to the Open Air." By Charles Tomlinson, F.R.S. Received July 26, 1871.

It is a remarkable proof of the difference between the air of a room and that of a field or garden in the country, that supersaturated saline solutions, which crystallize the moment they are uncovered in a room, may be kept uncovered in an open space during many hours without crystallizing.

During the last three years I have made many experiments to confirm this conclusion in the little garden at the back of my house at Highgate. I have no doubt that in a more open space further in the country the results would have been more perfect; but still I venture to think they are sufficiently striking to merit a place in the 'Proceedings.' The following were conducted during the spring of the present year.

A solution of two parts of sodic sulphate and one part of water was boiled and filtered into 3- and 4-ounce flasks, of which the opening of the short cylindrical neck is just three-quarters of an inch. The filtered solutions were reboiled and the flasks covered with watch-glasses. One flask was placed on a stool in the middle of a gravel-walk and the watch-glass removed. I now proceed to quote from my note-book some results in the order of time, and then to summarize them.

1871, March 17. Put out flask containing cold solution at 12.30 P.M.; temp. 56° Fahr.; clouds, and afterwards sun, 60° and upwards. At 2.50, therm. 50°. At 4.30 found the solution solid, and upon it a speck of soot which had evidently acted as a nucleus.

At 5.30 put out flask; temp. 43°, with slight wind; 6.30, 41°; 7.30, 42°, with a good deposit of the seven-atom salt. At 9, temp. 40°, and deposit much increased. At 11, solution solid, and the seven-atom deposit chalky white.

March 18. 2.15, put out flask and uncovered it under clear sky. At 4, temp. 57°, fine crop of crystals, evidently due to evaporation, which was so powerful that a round patch immediately below the opening of the neck was white and pulverulent from the formation of anhydrous salt. In this case the crystallization took place, as in the case of a saturated solution, in an open dish, only much more quickly, on account of the much larger quantity of salt in the supersaturated solution. There was no formation of the seven-watered salt*.

* With reference to some of the cases of crystallization given in my paper "On Supersaturated Saline Solutions, Part II." (Phil. Trans. 1871, p. 51), Professor Stokes