3. The vaso-motor disturbances are on the same side as the lesion, and consist of vaso-dilation, swelling of the foot, and redness with rise of temperature of the skin of the foot, but, as compared with the opposite side, fall of temperature in the popliteal space on the side of the lesion, due, no doubt, to paralysis of the muscles.

4. The degenerations above and below the lesion are limited to the same side when the injury is perfectly unilateral. There are certain facts connected with the degenerations which serve to show the origin and course of certain long and short tract fibres.

5. Stimulation of the cortex cerebri on both sides some weeks or months after the hemisection had been performed gave, as a rule, *results* which showed that the block in the spinal cord produced by the hemisection still existed, although there had been a very complete return of associated movements.

6. In one case ablation of the leg area on the same side as the lesion in the spinal cord was performed many months afterwards.

II. "The Origin and Progressive Motions of Cyclones in the Western India Region." By W. L. Dallas. Communicated by R. H. Scott, F.R.S. Received June 2, 1891.

III. "Note on the Density of Alloys of Nickel and Iron." By J. Hopkinson, F.R.S. Received June 3, 1891.

In the 'Proceedings of the Royal Society,' December 12, 1889, January 16, 1890, and May 1, 1890, I described certain properties of alloys of nickel and iron containing respectively 22 per cent. and 25 per cent. of nickel. These alloys can exist in two states at temperatures between 20° or 30° C. below freezing and a temperature of near 600° C. After cooling, the alloys are magnetisable, have a lower electric resistance, a higher breaking stress, and lesser elongation; after heating the alloys are not magnetisable, have a higher electric resistance, a lower breaking stress, and greater elongation. I have now to add another curious property. These alloys are about 2 per cent. less dense when in the magnetisable than when in the non-magnetisable state. Two rings were tested containing respectively 25 per cent. and 22 per cent. of nickel with the following results, the densities being given without correction in relation to the density of water at the then temperature:—

	Nickel, 25 per cent.		Nickel, 22 per cent.	
	Density.	Temp.	Density.	Temp.
After heating, non-magnetisable.....	8·15	15·1	8·13	16·5
After cooling, magnetisable.....	7·99	14·5	7·96	15·6
After heating again, non-magnetisable	8·15	18·0	8·12	18·2
After cooling again, magnetisable	7·97	22·0	7·95	21·8

The rings were each time cooled to from −100° C. to −110° C. by carbonic acid and ether *in vacuo*.

IV. "An Apparatus for testing the Sensitiveness of Safety-lamps." By Frank Clowes, D.Sc., Lond, Professor of Chemistry, University College, Nottingham. Communicated by Professor Armstrong, F.R.S. Received June 4, 1891.

It is generally acknowledged that the Davy safety-lamp cannot with certainty detect less than 3 per cent. of firedamp in the air of the mine. Gas-indicators of much greater sensitiveness have been invented; amongt these the electrical apparatus of Liveing and the spirit safety-lamp of Pieler take first rank. The objection to these special forms is, however, a serious one. They do not serve for illuminating purposes, and therefore it becomes necessary to carry an ordinary safety-lamp, together with the testing apparatus. Many attempts have been made to obviate this inconvenience by producing a safety-lamp which shall serve the double purpose of illumination and of detecting minute percentages of firedamp. The discovery of such a lamp would be of great value to the miner, in view of the fact that very low percentages of firedamp have been proved to be dangerous in the presence of coal-dust.

The following apparatus has been devised to render easy the process of testing the sensitiveness of different forms of safety-lamps when used for detecting firedamp. To enable satisfactory tests to be made in the laboratory, it was necessary to insure (1) the easy and rapid production of mixtures of firedamp and air in known proportions; (2) to insure economy of the artificially prepared methane, which represented firedamp; and (3) to examine the flame of the lamp under conditions as satisfactory as those existing in the mine.

A wooden cubical box of about 100 litres capacity was constructed so as to be as nearly gas-tight as possible. It was then made absolutely gas-tight by painting it over with melted paraffin wax, which was afterwards caused to penetrate more perfectly by passing an ordinary hot flat-iron over the surface. This testing chamber was furnished with a small inlet tube at the top, and with a similar outlet