On the magnetic metals

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through the gases and vapours which constitute the entire mass of a comet.

It is certain that the greater portion of the light transmitted by comets comes from the interior of their mass, and that it has traversed deep strata of gas or vapours; it must have undergone there the elective absorption proper to those vapours and to the compounds which result from them. It is therefore natural that dark lines or bands should be produced, different from Fraunhofer's lines, which are peculiar to the light of the sun. Thus, besides the faint but complete spectrum of that light, produced by reflection from the external parts where the absorption is insensible, another spectrum must be produced, coming from the deeper parts and greatly modified by more powerful absorption.

The limits of a mere Note do not permit me to enter into the details of my numerous spectroscopic observations of the comet *b* 1881; but I can affirm that they appear to confirm this view; that is to say, the phenomena do not seem to require the intervention of a light due to the incandescence of the cometary matter. Hence it would follow that the discontinuity of this spectrum comes from the same cause which gives rise to wide dark bands in the spectrum of the sun when he is near the horizon, or in the spectra of the atmospheres of the planets, with the sole difference that in the comets the phenomenon is exaggerated in consequence of the enormous thickness of the absorbing strata, their richness in chemical compounds, and the faintness of the light which they reflect toward us. It would therefore be necessary, for the spectral analysis of the comets, to proceed as we do for that of those atmospheres—that is to say, to fix our attention not so much upon the bright bands as upon those which owe their darkness to absorption.—*Comptes Rendus de l'Académie des Sciences*, 5th September 1881, t. xciii. pp. 439, 440.

ON THE MAGNETIC METALS. BY M. GAIFFE.

With the view of seeking out the best conditions for the preparation of magnets of cobalt and nickel, of which I have the honour to submit some specimens to the Academy, I tried those metals in different states.

The samples which were used for the trials were obtained by means of the electrochemical processes communicated to the Academy by Mr. Adams and me on January 7, 1870, and July 15, 1878, by employing currents of suitable intensity for rendering the metals very hard.

After dividing the samples into bars of nearly equal dimensions, I left some bars of each metal in the hard state; others were annealed; and others were annealed and forged. All were afterwards magnetized in the same manner, and the magnetism measured directly with the magnetometer. After thirty-six and seventy-two hours of rest, it was measured again.

Although only taken very approximately, these measurements (recorded in the annexed Table) will nevertheless, I hope, suffice to show what relatively great coercive force these metals, especially cobalt, can acquire in a state of purity, when it is known that pure iron, obtained by the same means, gave under the same circumstances only inappreciable deflections.

For completeness I add that some examples of cobalt which took only a weak magnetization two years since, when I made these experiments, became strongly magnetized now, without having been annealed, and having lost nothing of their original hardness.

It would *a priori* seem that the feeble coercive force of these metals when they issue from the galvanoplastic baths is due to the presence of hydrogen in combination with them, and that as soon as it has disappeared, either by the action of heat or by spontaneous liberation, nickel and cobalt resume their real coercive force. In that case the action of hydrogen would be analogous to that of the metals which are combined with nickel to constitute argentan: it would paralyze their magnetic power.

Comparative Table of the Coercive Forces of Nickel and Cobalt in different States.

Conditions of the experiments.	Deflection in the magnetometer.	
	Nickel.	Cobalt.
Immediately after magnetization :		
Bar not annealed	2° 15'	5° 30'
„ annealed	5 20	11 0
„ annealed and forged	7 0	14 45
Thirty-six hours after magnetization :		
Bar not annealed	1 45	5 0
„ annealed	3 30	9 30
„ annealed and forged	6 0	14 0
Seventy-two hours after magnetization :		
Bar not annealed	1 30	4 45
„ annealed	3 5	9 0
„ annealed and forged	5 30	13 30
„ annealed, magnetized, and again annealed.....	0 5	1 15
Bar annealed, magnetized, and afterwards forged	0 25	6 0

Comptes Rendus de l'Académie des Sciences, 12th Sept. 1881, t. xciii. pp. 461, 462.