likely in view of the fact that when in 1792 Janety revealed the secret of his process for producing malleable platinum, it was to Janety and not to Seguin that the Academy of Sciences turned for the supply of platinum required for use in connection with the work of the various Commissions of Weights and Measures (13).

The problem of melting platinum in quantity was not quickly solved. It was not until 1859 that Deville and Debray announced their method for melting between 12 and 15 kilograms of platinum, and it is interesting to compare their method with that of the early French workers. For fuel they used a mixture of oxygen and coal gas, and their furnace was lined with lime, a material which they chose on two counts, namely, that it was the worst conductor of heat known and that it was a most effective radiator of heat and light (14).

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The Microstructure of Cobalt-Platinum

The equiatomic cobalt-platinum alloy exhibits extremely high values of coercivity when in the partially ordered condition. Since optical and electron micrographs of the partially ordered material yield comparatively little information, the mechanism of ordering has been investigated mainly by X-ray diffraction techniques (1). During ordering the diffraction lines become diffuse, and this has been interpreted in terms of coherency strains between regions of ordered and disordered material. Specifically in the optimum magnetic condition the microstructure has been regarded as consisting of a very fine dispersion of ordered domains within a disordered matrix. Craik recently reviewed current theories of the mechanism of high coercivity in such a microstructure (2).

Recently, Southworth of the Department of Metallurgy, Cambridge, has been studying the mechanism of ordering in this alloy using the technique of field-ion microscopy. As a result rather a different picture of the ordering process is proposed (3). It is suggested that a potent source of the diffraction line broadening is the existence of a certain range over which the degree of long range order within the ordered regions varies. Both homogeneous and heterogeneous ordering are thought to occur, their relative importance depending on the transformation temperature.

The optimum magnetic properties appear after ordering for about 40 minutes at 660°C, and here it was found that the microstructure could not be described as two-phase. There *was* a fine dispersion of ordered domains, but they were only partially ordered, and this was *also* true of the matrix in which they lay. There was in addition a considerable variation in the degree of this partial order over the specimen. The partially ordered domains were not aligned; instead their tetragonal *c* axes were distributed in approximately mutually perpendicular directions.

It is apparent from this work that the existing theories for the mechanism of the high coercivity require modification. However, a material which is single-phase from a structural point of view may still have the magnetic properties of a two-phase system when the magnetocrystalline anisotropy encourages abrupt changes in the direction of magnetization across the microstructure.

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