formation, to develop empirical rules for the occurrence of structural types and to uncover the physical reasons underlying such rules. His survey of *The Crystal Chemistry and Physics of Metals and Alloys* is therefore uniquely authoritative and comprehensive. This is no glib summary of the field—it runs to some 800 pages with 600 illustrations. It is at once a personal statement and a reference work that may prove indispensable.

The title is perhaps a little misleading. The author is mostly preoccupied with crystal structure *per se*. It is nature's endless variations on simple geometric themes that fascinate him, and he has little to say on the consequences of structure for other properties. Moreover, the passages that deal with fundamental theories of cohesion and structure are brief and apologetic. Pearson sees the deficiencies of early theories, which he recounts, in part, for historical reasons, and he so mistrusts most recent theories as to omit them entirely. In other fields such an omission might be a glaring fault, but in this one the few small successes of theory pale into insignificance before the mass of unexplained observations. Indeed, there has, in the past, been a tendency for metallurgists to snatch too eagerly at the few crumbs of insight that fell from the solid-state theorists' table. For instance, H. Jones's classic (1937) papers[1] on phase boundaries in noble-metal alloys have been reverentially cited and elaborated upon since their publication. They drew one immediate skeptical comment from a Mr Bucknall,[2] in the pages of the *Proceedings of the Physical Society*, who said that, while he looked "forward eagerly to the time when a sound generalized theory of alloys will have been developed by application of wave mechanical principles," he saw a real danger of oversimplification on the one hand and unjustified generalization on the other. However, for the next generation of metallurgists the prevailing mood was optimism and a ready acceptance of promising but unfulfilled theories.

Pearson's empiricism, although unsophisticated, is in the solid and sensible tradition of Hume-Rothery. Like a 19th-century botanist, he patiently gathers his data and then lets the facts, suitably arranged, speak for themselves. It is a pity that, in pursuing his single-minded approach, he neglected to devote much attention to phase equilibrium. Since the occurrence of an expected crystal structure may only just be frustrated by the existence of a slightly more favorable rival, the complete analysis of phase diagrams and their interpolation by computer methods[3] must surely be essential to the eventual achievement of a more complete understanding of alloy structures. In this connection, it should be noted that he does give a review of *metastable* phases, whose production (for example by rapid cooling) is a relatively modern and theoretically stimulating development.

Solid-state theorists who wish to improve their poor collective batting average in the area of theory of crystal structures may find in this book a fortunate opportunity to meet nature halfway. However, it will not be easy for the uninitiated to dip into its pages. Pearson has chosen to adopt, for his primary description of metallic structures, a method based on the visualisation of a given structure as a stacking of layers of atoms, and relegates atomic coordination to a secondary role. This point of view, while not novel, is certainly unorthodox when applied over the whole field. It remains to be seen whether it becomes more widely appreciated.

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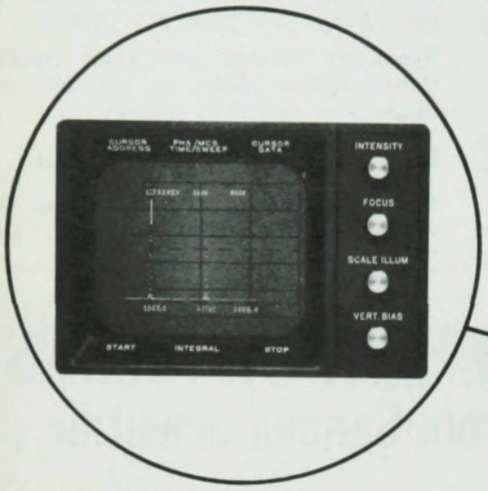

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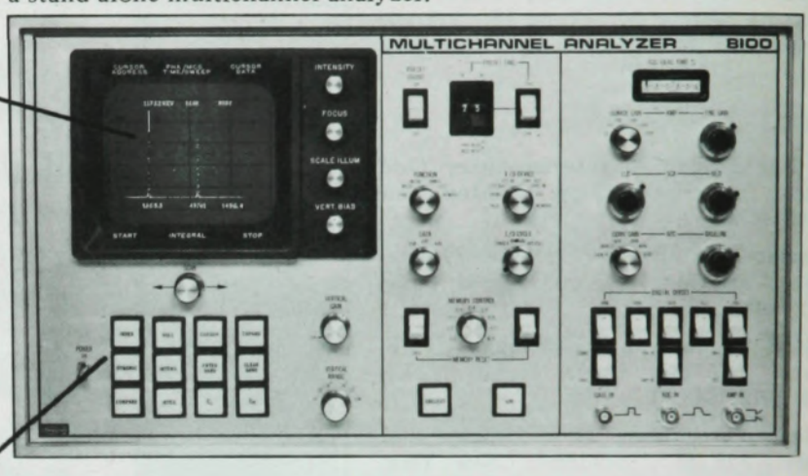

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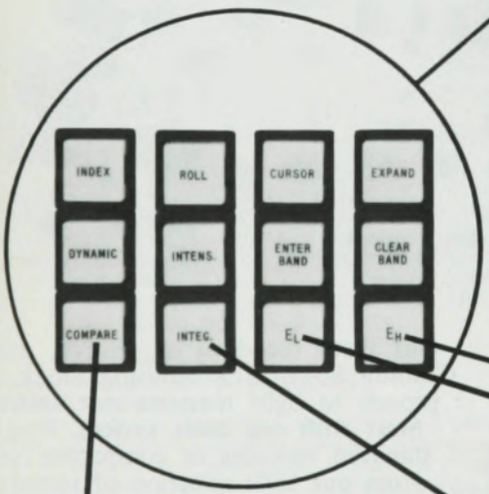

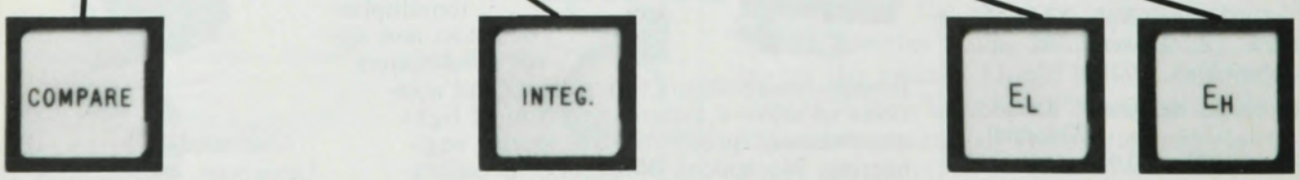

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