SUPERNOVAE AND THE Ap PHENOMENON

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We present evidence that relates the phenomenon of the chemically peculiar stars of the upper main sequence to supernovae explosions in young galactic clusters and associations. In the Upper Scorpius region of the Scorpio-Centaurus association we find that the radio shell discovered by Sancisi and Van Woerden (1970) from 21 cm observations and interpreted by them as an old supernova remnant has interacted with dense clouds. This remnant is seen clearly in the deep sky, narrow-band, H-alpha pictures of Sivan (1974). We find that the peculiar stars lie close to, or along the edges of, the interaction.

Chevalier's (1974) models show that the supernova remnant, during the course of its evolution, is optically thick to hard radiation producing an increased ionised fraction of the elements. The interaction of the remnant with dense clouds slows down and heats up the material at the interface, which remains sharp.

We argue that stars at or near the cloud faces are capable of acquiring this enriched material which is sufficiently slowed down. The magnetic accretion process of Havnes and Conti (1971) and Havnes (1974, 1975) provides the mechanism for such an acquisition. This process, with the associated magnetic braking, accounts for the build-up in abundance anomalies and the slowing down of rotation with age observed by Abt (1979). We also suggest that this phenomenon provides a more natural explanation for the presence of blue stragglers in open clusters.

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