— Why do all these stars rotate slowly? Did a magnetic field brake the rotation already during star formation or is such a process going on during the main-sequence lifetime of the star?

There are two main theories to explain how A stars can become peculiar:

(1) Diffusion Theory

This theory is based on a selective effect of the radiation pressure relative to gravitation. Elements with more absorption lines will be lifted by the radiation pressure relative to other elements with few absorption lines, where gravitational forces prevail. This diffusion process requires a quiet atmosphere which implies slow rotation. Slow rotation is needed for this theory, diffusion does not explain it.

(2) Accretion Theory

Accretion works via a selective trapping of elements from the interstellar medium by a rotating magnetosphere. Roughly spoken, heavy elements penetrate deeper into the magnetosphere than light elements. This means that in the time scale of 10^8 years heavy elements will be found to be overabundant in the atmosphere. On the other hand, those light elements, which are not captured, are accelerated by the rotating magnetosphere, thus decelerating the stellar rotation.

Measuring "Peculiarity"

Generally spoken, observational evidence is required for the time span during which a peculiar atmosphere is being built up as well as for the evolutionary phase during which this mechanism is active. Hence, it is important to discuss the question whether old Ap stars do rotate more slowly than younger ones. It should be emphasized that more rotational periods are needed and also more data on the stellar ages, radius and v · sin i. Pioneering work in the field of period determination was done by K. D. Rakosch and for the southern hemisphere at ESO by observers from Bochum, Liège and Amsterdam. In addition, one needs sensitive criteria for the peculiarity of Ap stars. In this respect, the broad-band flux depression in the visual spectra of Ap stars can be used. Observations obtained at La Silla with photoelectric photometry demonstrate that there is a flux depression of about 300 Å width around 5200 Å with a depth of about 10 per cent depending on the peculiarity of the star. This flux depression is characteristic for Ap stars only. It enables us to survey even distant stellar clusters for Ap members and relate a degree of peculiarity to their age which can be determined by conventional techniques for clusters (figure 3).

Another aspect which we have investigated at ESO is the question of the stability of Ap-star atmospheres. There are two distinct groups of astronomers which have published different results for the photometric stability in the range of minutes up to several hours. One group found photometric and Balmer-line variations in a number of Ap stars which can be characterized as periodic, and where the mechanism might be pulsation, flickering or flare-like. Others found that in some cases the same Ap stars are stable and do not show any variations besides those due to rotation. Are these contradicting findings caused by an instrumental or extinction effect in our atmosphere, or do these stars switch on and off, or are only parts of their stellar atmosphere unstable, for example those around the magnetic poles?

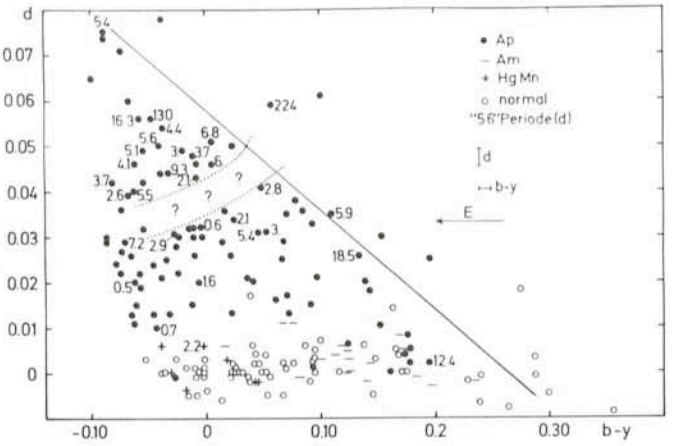

Fig. 3. — *Measurements (La Silla, 1973–74) of the peculiarity index Δd versus b-y. Error bars and the direction of the reddening vector are given, periods are in days (Physics of Ap-Stars, IAU-Coll. No. 32, Weiss et al., Eds.).*

However, if it is possible to demonstrate the existence of photometric variations in the time scale of up to some hours one can ask how diffusion is possible in such a dynamic atmosphere. In an observing run this summer, a sample of 21 Ap stars of different peculiarity has been observed and no variations larger than 0.004^m have been detected. As a by-product of this survey, two new bright δ Scuti type variables were discovered which originally were used as comparison stars.

The reader will find many question marks in this article. However, this is just the proof that Ap-star research is in a very active phase! Let us try harder!

NEWS and NOTES

The Sagittarius Dwarf Irregular Galaxy (SagDIG)

In the last issue of the *Messenger* we showed a picture of a new irregular galaxy in Sagittarius. Since then 21 cm hydrogen observations with the Nançay radio telescope have shown that it has a negative radial velocity, – 58 km s^{-1}. This is the same as the nearby member of the Local Group of Galaxies, NGC 6822, which is seen in almost the same direction. It is therefore likely that they have the same distance, 600 kpc (about 2 million light-years). In a letter to the journal *Astronomy & Astrophysics,* the Nançay and ESO astronomers Cesarsky, Laustsen, Lequeux Schuster and West write that SagDIG is "probably one of the smallest, faintest and less massive (irregular) galaxies known to date".

The Cluster of Galaxies STR 2232–380

In *Messenger* No. 10, Drs. A. Duus and B. Newell told about their new catalogue of southern clusters of galaxies. A photo of the cluster of galaxies STR 2232–380 accompanied their article. Dr. Duus asks us to mention that this cluster was discovered by MacGillivray and collaborators (1976, M.N.R.A.S., **176,** 649). We are happy to comply and would like to add that the photo of the cluster was reproduced (in October 1974) from ESO (B) Atlas plate No. 613, taken on August 20, 1974.

Planetary Nebula NGC 3132

In the same issue, Drs. Kohoutek and Laustsen showed photographs of the planetary nebula NGC 3132. We are sorry that the position was wrong: it should have been R. A. = $10^h\ 06^m$; Decl. = –40°, that is in the constellation of Vela (The Sail).