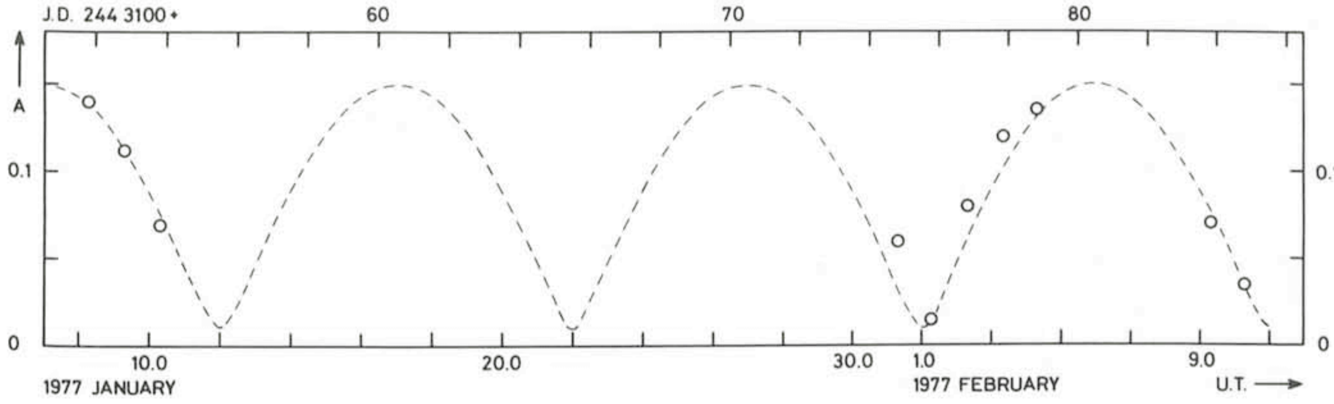


Fig. 2. — *The mean amplitudes A of the light variations for the observing nights early 1977. The beat period is around 10 days.*

The new variable looks like a quite normal member of its class. Remarkable are the maximum amplitudes (0.15 mag) of its light variations which are inferior only to those of BW Vul (0.2) and ν Eri (0.18). Large changes of radial velocity are to be expected. Their observation by means of slit spectra should be the next step in the investigation of HD 80383.

The detection and analysis of this star would have been impossible without the data-acquisition system of the ESO 50-cm photometric telescope which was used for all observations. I am obliged to the ESO staff for their help during the observations and to Dr. Kohoutek and Dr. Surdej for additional measurements on February 8 to 10, which are clearly important for the determination of the beat period.

Photometric results for the new β Cep-type star and its comparison star.

	HD 80383	CPD −54° 2147
V	(9.13)	9.603
B–V	0.041	0.095
U–B	−0.702	−0.596
y	(9.12)	9.595
b–y	0.101	0.130
m_1	0.019	0.028
c_1	0.111	0.189
β	2.626	2.650

The Recovery of Adonis

The ESO 1-metre Schmidt telescope has just played an important role in the successful recovery of a long-lost minor planet.

Forty-one years ago, Dr. E.J. Delporte of the Uccle Observatory in Belgium reported the discovery of a small planet (1936 CA) with an unusually fast motion. It was soon found that the new planet was very close to the Earth and when the preliminary orbit was computed it became apparent that it was of the Earth-crossing type, also known as "Apollos", cf. *Messenger* No. 8, p. 3. It was baptized *Adonis* and although it rapidly diminished in brightness due to increasing distance from the Earth, it was possible to follow it for two months through the world's largest telescope in 1936, the 100-inch reflector on Mount Wilson, just above Los Angeles.

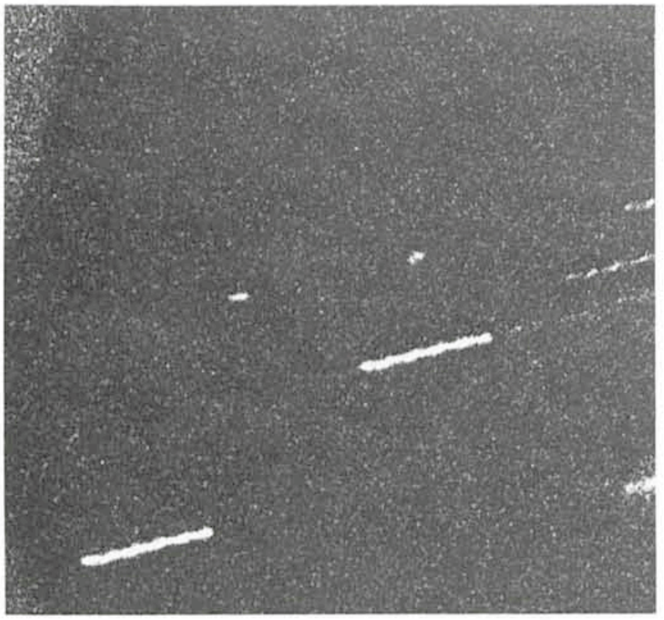
Experience shows that in order to determine orbits of minor planets with an accuracy sufficient to assure that they will never be lost again, it is normally necessary to observe them for many months during several oppositions. This was of course not possible with Adonis—its close 1936 approach to the Earth was a one-time performance —and it was soon placed on the list of "probably lost planets".

Is Adonis Retrievable?

Dr. Brian Marsden of the Smithsonian Observatory has one of the best existing computer programmes for orbit determinations and he was not so sure that Adonis was irretrievably lost. In any case, he decided to invest some effort in the problem of finding Adonis again and he therefore started a careful integration of the Adonis orbit to bring it from 1936 to 1977. Starting with the relatively few observations from early 1936, he computed the gravitational influence of all nine planets (Pluto included!) on the tiny object, day by day, and was able to determine where it would have been at any date afterwards. This process involves unavoidable errors because of the short interval of the 1936 observations and the long time interval to 1977. In general, the errors tend to increase with the time and serious troubles develop when the small planet passes close by one of the larger planets, as for instance when Adonis came within 6 million kilometres of Venus in 1964. However, the final result was that Dr. Marsden, after having followed Adonis not less than sixteen times around the Sun (Adonis' orbital period is about 2 $^1/_2$ years) was able to predict that it would make another close approach to the Earth in early 1977.

A Search for Adonis

In November 1976, Dr. Marsden alerted the big Schmidt telescopes around the world and asked them to be on the lookout for Adonis in late January and early February 1977. Because of the full moon on February 4 and hoping to improve the chances of recovering Adonis, H.-E. Schuster used the ESO Schmidt telescope during two nights in January to search for Adonis, but this effort was not rewarded. When searching for minor planets for which the orbits are not accurately known (as was the case for Adonis), one normally predicts expected positions, corresponding to various values of the perihel time T, i.e. the last time the planet went through the point of the orbit closest to the Sun. The uncertainty of T was estimated to be about ± 16 days for Adonis. Dr. Schuster searched for



The confirmation of the recovery of Adonis came from this ESO Schmidt plate (No. 1996, obtained on February 24, 1977 UT). Adonis is seen as two spots in the centre. The telescope was set to follow the expected motion of Kowal's candidate (see text) during 20 minutes, by means of a command to the Schmidt telescope computer that specified the tracking in R. A. and Declination. After the first exposure the telescope was reset to the initial position and a second 20-min exposure was made. Since Adonis had moved, a second image was formed. The stars were exposed as two straight lines on top of each other. The positions of the Adonis-images allowed Dr. B. Marsden to confirm the identification with the long-lost planet and to secure its orbit.

Adonis at the positions where it would have been seen if ΔT was negative, i.e. if Adonis passed somewhat *earlier* than expected through the perihel.

A similar search was carried out by Charles Kowal at the Palomar Observatory in the middle of February. On a plate taken on February 16 he found a small planet that appeared to move in the direction that was expected for Adonis. It took some time to find this object among the myriads of stars on the plates and it was only one week later that a telegram was received on La Silla about Kowal's possible Adonis candidate. The Moon was moving near to the object, but the ESO reaction was swift. Not only was the object quickly found on an ESO Schmidt plate, but it could be photographed on *five* consecutive nights (February 24 to 28), thereby securing five vital positions and definitely proving that Adonis had finally been recovered after almost half a century!

It also became clear that Adonis went slightly *later* than expected through the perihel (in December 1976)—that was why the ESO January plates did not show it.

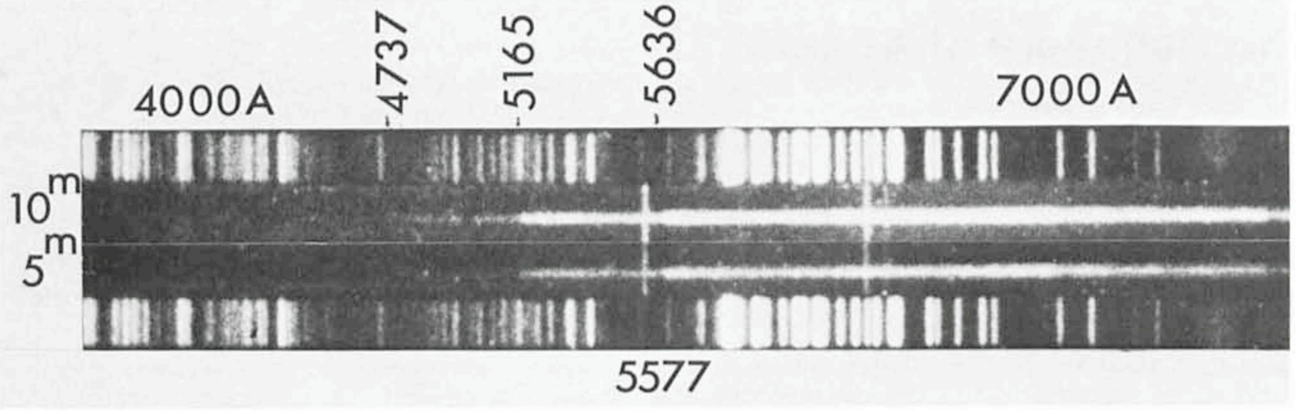
Adonis Secured

Once recovered, it was found that Adonis was somewhat fainter than expected, about 18^m. Due to an inconvenient cloud-out at Palomar in March it seemed for some time that the ESO positions would be the only ones to be secured before Adonis became too faint. However, it was detected again at the very plate limit on a March 13 ESO Schmidt plate and was later identified with great trouble on a few plates taken around March 20 with the large reflector at the Harvard Agassiz station.

Due to this commendable collaboration between the orbit computing and the observing astronomers, Adonis is now secure and will presumably never be lost again. The success is in a certain sense comparable to the discovery of Neptune in 1848 which was a similar joint effort. It is of course true that modern computers have facilitated the work involved in orbital computations, but one should not forget that a programme is never better than the theory that underlies it and the people who use it. The ESO people who participated in this recovery feel privileged to have been involved in an astronomical achievement that is bound to become a classic.

AN EXTREMELY RED STAR (Continued)

In the last issue of the *Messenger* we reported (p. 12) the presence of an extremely red star on a set of ESO Schmidt plates. It was possible to obtain two spectra of this star on the night between March 12 and 13, 1977, by means of the image-tube spectrograph attached to the 1-m telescope at the Las Campanas Observatory of the Carnegie Institution



Two spectra of the extremely red star, obtained at the Las Campanas Observatory, just north of La Silla. The original dispersion was 284 Å/mm and the exposure times were 5 and 10 minutes. Blue is to the left (4000 Å) and red is to the right (7000 Å). The three Swan bands of the C_2 molecule are indicated above. The strongest night-sky line is the green 5577 Å oxygen line. The comparison spectrum (on either side of the stellar spectrum) is from a Neon-Iron arc.