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**ANNUAL REPORT OF THE REPUBLIC  
OBSERVATORY**

**JOHANNESBURG**

**1971**

*(Acting Director: J.Hers)*

**STAFF**

In January, Mr P.Hauman was appointed Assistant Technical Officer and Mrs B.J.Kun Library Assistant. Mr J.Hoevers resigned in January, and Mr A.Swarts was appointed in his place as workshop Technician in September. Resignations were also accepted from Mrs M. and Mr P.N.J.Wisse in November, and from Mrs B.J.Kun in December. In August, Mr N.C.Roux was transferred to the Royal Observatory in Cape Town. Mr H.Jeschke was employed as a temporary student assistant during July and August.

**ASTRONOMICAL RESEARCH**

***Visual double stars***

With the 26-inch refractor, 378 measures of double stars were obtained, the observers being Klerk (205 measures on 69 nights) and Hauman (173 measures on 60 nights).

***Minor planets and comets***

The Franklin-Adams telescope at Hartbeespoort was used by Bruwer and Klerk on 22 nights to obtain 201 minor planet and 21 comet plates. From these, 272 minor planet positions were derived, as well as 10 positions of Comet Toba (1971 a).

***Photometric double stars***

The 20-inch reflector was used by Knipe on 86 nights to obtain about 6000 photometric observations of the following eclipsing binaries: QS Aql, ST Aqr, GV Car, TW Ceti, BU Vel, CV Vel, TU Mus, U Oph, ER Ori, Zeta Phe. 66 Eri was observed for possible eclipses, and the complete light curve of XZ Sgr was observed for determination of orbital elements.

The single-channel photoelectric photometer was further automated during the year, using a new integrating amplifier and electronic timer. constructed by the electronic instrumentation section of the C.S.I.R. A tentative design was made for a new three-channel photometer, in which U, B and V can be measured simultaneously.

**Variable stars**

P. and M.Wisse continued their photoelectric observations of long-period variable stars, obtaining approximately 22 500 measures on 127 nights.

**Occultations**

Thirty-four total occultations were observed by various members of the staff, while five occultations were timed photoelectrically by Knipe, using the 20-inch reflector and a high-speed chart recorder.

With the valued assistance of teams of local amateur observers under the direction of Mr M.D.Overbeek, the following grazing occultations were observed:

	May 28		ZC 1221	Potchefstroom
31	timings			
		29	ZC 1340	Bapsfontein
56	"			
	June 1		ZC 1635	Kroonstad
24	"			
	July 3		ZC 2109	De Wildt
6	"			
		12	ZC 3308	Villiers
12	"			
	Aug 6		ZC 3091	Bloemfontein
54	"			

(During total lunar eclipse, in collaboration with observers from Bloemfontein, Cape Town and Durban)

		8	ZC 3269	Kroonstad
18	"			
	Sept. 24		ZC 2220 (=ADS 9689)	Arthur's View
134	"			
	Oct . 25		ZC 2771	Zeerust
36	"			

**Planetary photography**

Observations of Mars and Jupiter, as part of the International Planetary Patrol Program, were continued by Roberts, Hauman and Jeschke. With the 26½-inch refractor, 37000 photographs were obtained of Jupiter, and 55 000 of Mars. Many of the latter were unfortunately seriously degraded as a result of the persistent dust storms on the surface of Mars.

### ***Occultation of Beta Scorpii by Jupiter: May 13***

A last-minute change in weather conditions made an excellent series of observations possible. The 20-inch reflector was used by guest observers Dr D.S.Evans and Mr W.van Citters, of the University of Texas, who had brought with them a photoelectric photometer and data analyser employing a portable computer. Using the 26½-inch refractor and the regular Planetary Patrol photographic equipment, Roberts obtained a continuous series of photographs of each of the two disappearances and reappearances, as well as of the near-occultation of Beta 2 by Io, from which an accurate time and distance at closest approach was derived by Hers. Visual observations were made by Knipe (6-inch refractor), Bruwer and Klerk (6-inch refractor at Hartbeespoort), and Hers (8-inch reflector).

## **TIME SERVICE**

In preparation for the planned transfer of the Time Service from the Republic Observatory to the National Physical Research Laboratory in Pretoria, the ZUO time signals have, as from December 2, been transmitted on a temporary basis from the Radio Space Research Station at Hartebeeshoek. Transmissions on 10 MHz and 100 MHz have been temporarily discontinued.

## **PUBLICATIONS**

***Republic Observatory Circular*** No. 131 was issued during the year. The following papers appeared elsewhere:

- Finsen, W.S., 1971. Twenty years of double star interferometry and its lessons,  
*Astrophys. Space Sci.*, **11**, 13.
- Hers, J. & Overbeek, M.D., 1971. Grazing occultation of ZC 2988, Heilbron, South Africa,  
1970 November 5, *Mon. Notes astr. Soc. Sth. Afrca*,  
**30**, 24.
- Hers, J., 1971. Visual observations of the occultation of Beta Scorpii by Jupiter,  
*Mon. Notes astr. Soc. Sth. Africa*, **30**, 64.
- Hers, J., & Overheek, M.D., 1971. Three grazing occultations,  
*Mon. Notes astr.Soc. Sth. Africa*, **30**, 85.
- Hers, J., 1971. R.T.A. Innes and the variable rotation of the Earth,  
*Mon. Notes astr. Soc. Sth. Africa*, **30**, 129.
- Knipe, G.F.G., 1971. The light curve and orbital elements of V539 Arae,  
*Astr Astrophys.*, **14**, 70.
- Knipe, G.F.G., 1971. Period changes in QS Aquilae, *Publ. astr. Soc. Pacific*, **83**,352.
- Knipe, G.F.G., 1971. A minimum of Zeta Phoenicis,  
*Mon. Notes astr. Soc. Sth. Africa*, **30**, 156.
- Knipe, G.F.G., 1971. The eclipsing binary ST Aquarii.

- Mon. Notes astr. Soc. Sth. Africa*, **30**, 157.
- Wisse, M., 1971. HD 197753-A new red variable? *Inf. Bull. Variable Stars*, **527**.
- Wisse, M., 1971. HD 184077-Another red variable. *Inf. Bull. Variable Stars*, **588**.
- Wisse, P.N.J. & Wisse, M., 1971. Photoelectric observations of southern long period variable stars, *Astr. Astrophys.*, **12**, 143.
- Wisse, P.N.J. & Wisse, M., 1971. Photoelectric observations of the P Cygni-type Stars AG Carinae and HR Carinae, *Astr. Astrophys*, **12**, 149.
- Wisse, P.N.J. & Wisse, M., 1971. Note on some constant variables, *Mon. Notes astr. Soc. Sth. Africa*, **30**, 112.