notes by Bopp *et al.* (*IAUC* 2424 and 2434), Crampton and Morbey (*ibid.*, 2428), and Koo (*ibid.*, 2441); the consensus seems to be that the absorption spectrum is that of a B or A star, apparently with He II λ4686 and perhaps other high-excitation emission lines of variable intensity.

2U1744 − 26 = GX3 + 1. Rodgers (*Nature*, **237**, 273) has examined the spectra of several candidates for an optical identification, but finds none to be persuasive.

2U1956 + 35 = Cyg X-1: the identification with HD 226868 = BD + 34° 3815 seems secure. The star is a B0 Ib single-line binary with a period of 5·6 days (Webster and Murdin: *Nature*, **235**, 37; Bolton, *ibid.*, **235**, 271). A secondary component has been detected viz emission He II λ4686 by Brucato and Kristian (*IAUC* 2421) and by Bolton (*IAUC* 2424).

2U2030 + 40 = Cyg X-3. Bolton considers the double-line A0 spectroscopic binary BD + 40° 4218 to be an unlikely candidate for the identification (*IAUC* 2424).

2U2142 + 38 = Cyg X-2. Bopp and van den Bout (*PASP*, **84**, 68) have found emission C III + + N III λ4650 of variable intensity.

The spectra of hot subluminous binaries in which one component is an eruptive U Gem variable have been discussed by Walker (Bamberg, p. 243). A careful spectrophotometric study of SS Cyg has been presented by Kharadse and Bartaya (*Vistas*, **13**, 257). The spectrum of the rapid eclipsing binary G61–29, featuring strong emission lines of He I, has been described by Burbidge and Strittmatter (*ApJ*, **170**, L39). Irvine (*PASP*, **84**, 671) has discussed the spectrum (G5eα) of the erratic variable EZ Peg, and suggests that it may be a U Gem star.

The spectrum of FG Sge, which has halted the steady brightening that has been underway since early in the century, is under intensive study by Maffei and by Kraft and Langer. The spectrum has become exceedingly complex and peculiar in recent years, and now features ions such as Zr II and other *s*-process elements in great strength. Herbig and Flannery have observed the doubling of the emission lines in the planetary nebula-like envelope around FG Sge, and find a well-determined expansion velocity near 35 km/sec, which is entirely normal for planetaries. Miller (*Bull. AAS*, **4**, II, 290) has suggested that the central star of the peculiar emission nebula Sharpless 71 may be an object like FG Sge.

APPENDIX IV

REPORT OF THE WORKING GROUP ON FLARE STARS

(a) *Participants*: The remarkable feature of the last three years is the increase in the number of observatories where the photoelectric technique is used for systematic monitoring of the solar neighbourhood red dwarf stars. These observations are carried out in the course of cooperative programmes on several well known flare stars as well as for a number of unstudied or little studied red dwarf stars.

The following investigators have continued the observations with photoelectric photometers: Godoli, Christaldi and Rodono at the Catania Observatory (91-cm reflector with B filter and 61-cm reflector used for simultaneous *UBV* observations); Osawa, Ichimura, Noguchi and Watanabe at the Okayama Station of the Tokyo Astronomical Observatory (91-cm reflector and either B or simultaneously *UBV*); Jarrett and Eksteen at the Boyden Observatory (40-cm reflector and B filter); Kunkel at the Cerro Tololo Observatory (16-inch or 36-inch reflectors, U-band); Oskanian at the Byurakan Observatory (50-cm reflector, B filter); Herr at the Mount Cuba Observatory, University of Delaware (61-cm reflector and either U or narrow-band ultra-violet filters); Chugainov and Shakhovskaya at the Crimean Observatory (64-cm meniscus telescope, B filter); Szeidl and his collaborators at the Konkoly Observatory (24-inch telescope, B filter).

Visual observing of flare stars by the Variable Star Section, Royal Astronomical Society of New Zealand has largely been discontinued because of its inherent drawbacks. Photoelectric minitoring is carried out at the Auckland Observatory and some results have appeared.

Mavridis and his collaborators have started a systematic series of photoelectric observations of selected flare stars using the 30-inch reflector of University of Thessaloniki installed at Stephanion

Astronomical Station. The first results have been already published. Further observations of flare stars especially during international campaigns are planned.

The observatories Ann Arbor, Belgrade, Prairie of University of Illinois and Uttar Pradesh also participated in cooperative programmes of flare star monitoring.

(b) *Results*: The activity of the Working Group in 1970–72 included, mainly, optical studies of flare stars which continued the studies begun earlier, partly combined radio-optical ones. Three main achievements are to be noted:

(1) Homogeneous series of photoelectric observations of YZ CMi, UV Cet, EV Lac, AD Leo and V 1216 Sgr, once per year and of duration of order of 15 days for each star, have been accumulated for 4–6 years;

(2) The total number of solar neighbourhood red dwarf stars known as flare stars has increased considerably;

(3) Extensive data have been obtained on the relation between *UBV* light curves of flares for different flare stars.

(c) *Search for X-ray emission from flare stars*: The first attempt was made of cooperative ground-based optical and satellite X-ray continuous observations of the flare star. AD Leo was observed in the period of April 13 to 18, 1971 by NASA Astronomy and Engineering Group with the X-ray detector installed on Uhuru satellite and by several optical observatories. The obtained X-ray data have not yet been published.

(d) *Further combined radio-optical studies*: Arrangements have been made by Prof. B. Lovell to observe flare stars with the large radio telescope at Jodrell Bank which is now operating after changes. The Variable Star Section, Royal Astronomical Society of New Zealand has continued special programmes with the radio astronomers at the University of Otago and the CSIRO.

Work in the International Programme has been published in: *IB* 349, 364, 379, 404, 406, 411–2, 423, 433–4, 439, 441, 450–1, 461, 481, 484–6, 488, 498–9, 521, 523, 525–6, 534, 538–9, 550–1, 553–4, 557, 581, 597, 600–2, 615–6, 616, 620, 627, 632, 640, 654, 669, 672, 678, 684–5, 691, 712; *Mon. Not. Ast. Soc. S.A.*, **28**, 70 + 131, **29**, 78 + 115, **30**, 77 + 93, **31**, 37; *RASNZ* 179, *Mem. Soc. Ast. Ital.* **42**, 99; *AA*, **12**, 152; *Atti XIV Con. Soc. Ast. Ital.*, p. 81; Bamberg 1971, p. 124; *Boll. SIF*, 50; *Tokyo Bull.* 198, 206.

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