

Recent Comet Observations from southern Africa

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Abstract: Visual magnitude light curves, visual observations and CCD images are presented for several comets observed by the Comet and Meteor Section for the period April 1994 to September 1995.

1. Observers

Contributions to this paper were made by T Cooper (Director), A van Staden, D Overbeek, P van Blommestein, W Hollenbach, M Geysler, A Viljoen, L Barendse and M Begbie.

2. Comets appearing in 1994/95

In Table 1 I have summarised the comets that reached magnitude 12 or brighter and thus within reach of amateur instruments. The listing is in descending order of maximum brightness. Comets observed by the Section are shown in bold type, amounting to seven of the total seventeen. It should be noted that a number of the comets which became bright did so when they were not well placed for observation from southern Africa. Further details of the seven observed comets are given in Table 2.

The comets observed are discussed in this paper in order of appearance in Table 1.

3. Observations of comet Bradfield (C/1995 Q1)

Notification of the discovery of this comet was received from P Whitelock at SAAO on 1995 August 18. Despite phone calls to several observers in South

Africa and Zimbabwe to confirm the comet's position all had cloud, though Barendse managed to observe the comet briefly that evening from Pretoria. Cooper estimated the magnitude as 5.5 on August 23 with strong central condensation (DC=6). After these few early days interrupted by cloud the comet headed too close to the sun for observation. Further observations of this comet as yet unreported may come to hand. At closest approach on July 27 the comet was located in Puppis, 20° above the horizon at 03h00 UT. Two weeks earlier it was in Fornax nearly 60° in altitude. In other words, we missed the show!

4. Observations of comet Borrelly (19P)

This periodic comet was recovered [IAUC 6009] on 1994 June 12 at magnitude 16.7. Cooper located the comet on 1994 September 5 as a magnitude 10 object in Orion, classing it as easy in a 40cm reflector. It was later observed by Overbeek and van Blommestein as the comet brightened to magnitude 8. Observations were few in the latter parts of 1994, as cloudy weather limited the number of useful observing nights. Cooper managed one final observation on November 26 as the comet headed rapidly northward and just before the comet made its closest approach to earth. Thereafter the comet faded for northern observers at about the same rate as it brightened. The complete light curve determined from mean world-wide observations [International Comet Quarterly, various issues] is shown in Figure 1. ASSA results are shown in comparison to mean magnitudes. Date of perihelion is shown as P and date of closest approach to earth is shown as C.

One striking characteristic of comet Borrelly was the highly elongated coma, a phenomenon noted at previous apparitions of this comet. The CCD image in Figure 2 taken by van Staden on October 31, the

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Table 1. Comets Brighter than $m_v=12$ during 1994/95

Comet	New Designation	Old Designation	Perihelion Date	Brightest Mag. m_1
Bradfield	C/1995 Q1	—	1995/08/31	5.0
McNaught-Russell	P/1994 X1	1993v	1994/03/31	6.2
Encke	2P	1980 XI	1994/02/09	6.6
Machholz 2	P/1994 P1	1994o	1994/09/18	7.5
Mueller	C/1993 Q1	1993p	1994/03/24	7.8
Nakamura-Nishimura-Machholz	C/1994 N1	1994m	1994/07/12	8.2
Borrelly	19P	1994l	1994/11/01	8.2
Takamizawa-Levy	C/1994 G1	1994f	1994/05/22	8.3
Tempel 1	9P	1993c	1994/07/03	9.0
Mueller	C/1993 A1	1993a	1994/12/01	9.2
Machholz	C/1994 T1	1994r	1994/10/02	9.2
Takamizawa	C/1994 J2	1994i	1994/06/29	9.5
Kushida	P/1994 A1	1994a	1993/12/12	10.4
Schwassmann-Wachmann 2	31P	—	1994/01/23	10.5
Hale-Bopp	C/1995 O1	—	1997/04/02	10.5
Clark	71P	1994t	1995/05/31	~11
d'Arrest	6P	—	1995/07/27	~11

Table 2. Details of comets observed

Comet	Perihelion	r	Δ	Closest approach	Δ	Location at closest approach
Bradfield	95/08/31	0.44	1.33	95/07/27	0.46	Puppis
Borrelly	94/11/01	1.36	0.72	94/12/04	0.62	Lynx
Tempel 1	94/07/03	1.50	0.85	94/05/04	0.69	Virgo
Mueller	94/01/12	1.94	2.40	93/11/13	1.73	Draco
Takamizawa	94/06/29	1.95	1.60	94/05/23	1.00	Libra
Hale-Bopp	97/04/01	0.91	1.35	97/03/23	1.32	Andromeda
Clark	95/05/31	1.55	0.68	95/07/01	0.61	Sagittarius

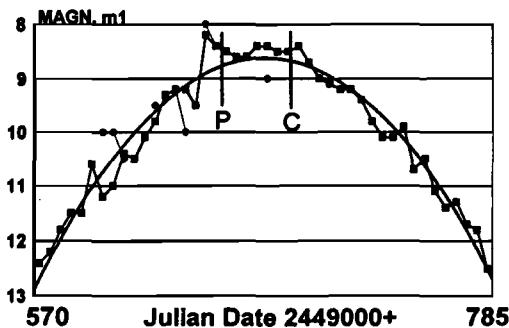


Figure 1. Light curve of comet Borrelly. The mean of world-wide observations are shown by a \blacksquare , whereas ASSA observations are represented by \bullet .

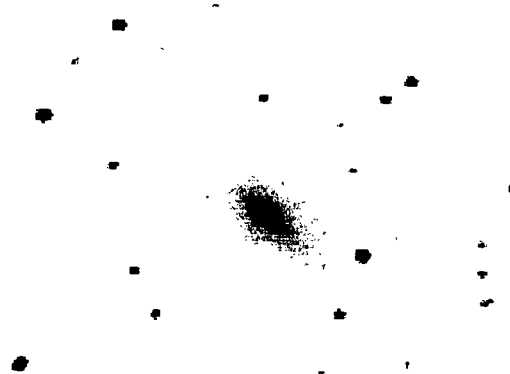


Figure 2. Comet Borrelly (19P) 1994 October 31, 00h22 UT, $m_1 = 8.5$. Image by A D van Staden.

day before perihelion, shows the elongated coma, short tail, and in the original image a faint antitail.

5. Observations of comet Tempel 1 (9P)

This comet was located by Cooper on 1994 April 1 as a slightly condensed object (DC=3) of about magnitude 11.5 in Virgo. He continued to follow this comet until July 3 when illness intervened, seeing the comet brighten to magnitude 9 and condensing to DC=5. When observations were resumed in September it had faded to below magnitude 11. Cooper's observations compare well with the mean light curve shown in Figure 3. The largest deviation is 0.7 magnitude.

Comet Tempel 1 was also observed by Hollenbach on 1994 June 10. He noted a bright stellar core of magnitude 8.5, coma diameter of at least 26" and a faint V-shaped tail of 30' length. This sighting was confirmed by CCD images taken the same night by van Staden.

Van Staden imaged comet Tempel 1 on several occasions. Plates 2,3 and 4 show the appearance in May, June and July when the comet was at magnitude 9.5-11.

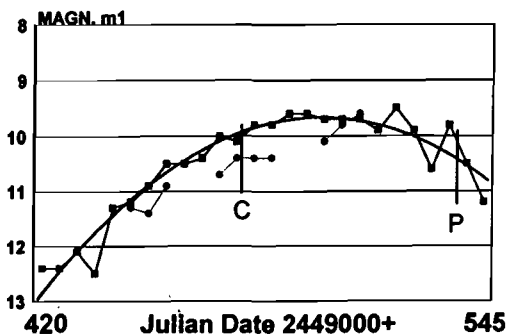


Figure 3. Light curve of comet Tempel 1. The mean of world-wide observations are shown by a ■, whereas ASSA observations are represented by ●.

6. Observations of comet Mueller (C/1993A1)

This comet was not observed visually. Van Staden secured a CCD image on 1994 July 28 when the comet was over 6 months past perihelion and 3.0 AU from the sun. The magnitude at this time was 12-13.

Nevertheless, the comatic nature of the image is quite clearly visible in Figure 4.

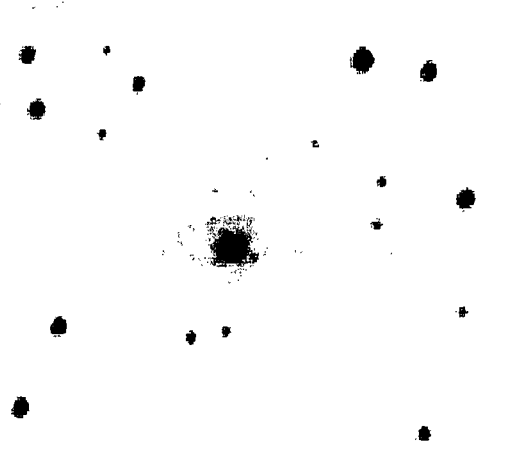


Figure 4. Comet Mueller (C/1993A1), 1994 July 28, 20h29 UT, m1 = 12-13. Image by A D van Staden.

7. Observations of comet Takamizawa (C/1994J2)

This comet was discovered [IAU Circular No. 5986] on 1994 May 6 at magnitude 11, just before closest approach to earth on May 23. Cooper located the comet on May 27, observing a strong central condensation (DC=6) and total magnitude (m1) 9.8. He continued to follow the comet into July, as the



Figure 5. Enlargement of an image of comet Takamizawa (C/1994J2) made on 1994 July 11, 18h40 UT, m1 = 10.6. Note the short, curved tail. Image by A D van Staden.

comet faded slowly, and became slightly less condensed (DC=5). Hollenbach observed the comet on June 10, when the comet was less than 1° south of Spica, seeing two distinct jets or short tails separated by about 45° . The comet faded slowly to perihelion on June 29, after which few visual observations were made. It faded to magnitude 11 by September.

The comet was imaged extensively by van Staden. A selection of his images from July 1994 to May 1995 is given in Plates 6 to 11 [Not reproduced here because of space limitations - Ed]. Most notable is the image of 1994 July 11 (Figure 5) which shows a short curved tail. His last image was taken in May 1995 when the comet was at about CCD magnitude 14.

8. Observations of comet Hale-Bopp (C/1995O1)

This comet was discovered on 1995 July 23 [IAU Circular No. 6187] while the discoverers were observing M70. Cooper located the comet on July 27 at magnitude 10.8 with only slight condensation (DC=2). The early brightness development was monitored by Cooper and Begbie. By August 19 it had brightened to magnitude 10.3 and became more condensed (DC=4). It faded to magnitude 10.5 by end August, again becoming slightly more diffuse (DC=3). Begbie found a mean coma diameter of 2.0' during this period. The comet was CCD imaged by Geysler and Viljoen on August 2, and by van Staden on August 27 and 29. Finally, several members of the Pretoria Centre observed the comet during their August 18 practical evening.

Current perihelion date is calculated as 1997 April 1. The predicted brightness of the comet at maximum is uncertain. The comet is certainly bright for an object so far from the sun, and may have been discovered during a prolonged outburst. It seems certain however that it will become within reach of most amateur instruments during 1996.

9. Observations of comet Clark (71P)

This periodic comet did not become bright enough for visual observation for most amateurs, but was located by van Staden. His images showed a 5' tail and several curved jets within the coma (Figure 6).



Figure 6. Comet Clark (71P), 1995 July 24, 19h44 UT, $m_1 \sim 12$. Image by A D van Staden.

10. Conclusions

The last few months has seen a gratifying surge in interest in comets, and if comet Hale-Bopp lives up to expectations we can expect further public interest as happened 10 years ago with the return of comet Halley. Even if it does not, amateurs in southern Africa are again contributing observations of comets after a hiatus. Our visual observations correlate well with world mean values. The use of CCD imaging is increasing and producing high quality images. I would like to encourage existing observers to continue this work, and those who wish to contribute to contact me for further information.

References

Appendix 1 - Edberg S, in *International Halley Watch Observers Manual*, p5-6, Sky Publishing, 1983

Acknowledgement

The data used in constructing the light curves was obtained from the International Comet Quarterly and is reproduced with the kind permission of Daniel Green.