

Prospects for 1993

Highlights of the past year were undoubtedly the Giotto fly-by of P/Grigg-Skjellerup, and the recovery of P/Swift-Tuttle, both of which were triumphs for all concerned. The latter gave us our brightest comet since Levy in 1990, and will continue to interest southern observers during the first part of 1993. Apart from that, only P/Schaumasse promises to be reasonably bright, and as usual we must depend on the searchers to find something out of the ordinary.

Another interesting development in 1992 was the identification of P/Wilson-Harrington with an object previously designated as an asteroid. The former, 1949 III, was originally assigned the very short period of 2.3 years, but it seems that a timing error led to a false orbit solution, and re-working has enabled the comet to be identified with asteroid 1979 VA, which has been re-observed in 1988/89 and 1992, still of asteroidal appearance. The cometary nature of the original object has been definitely confirmed by re-examination of the plates, and it seems that we have here another quasi-asteroidal comet (Quack?) to add to a few others that spend most of their time looking like minor planets. This one appears to be two magnitudes fainter as an asteroid than it was as a comet, and will be down to 18^m by the end of 1992.

All comets known to be at perihelion in 1993 are included in these notes, together with a few previous ones that may continue to be of interest, and a couple of early ones from 1994 that should be within range before the end of the year. The increasing use of larger apertures in conjunction with CCD's should extend our magnitude limit to somewhat lower levels than in the past.

P/Schwassmann-Wachmann 1 This perennial and eruptive object has been fairly quiet in 1992, only one major outburst, in February, having been noted. Lesser brightenings occurred in August and at the end of November. Surveillance of the comet to detect unusual activity continues to be required, though even at best the outbursts rarely exceed 12^m. The comet is near to Beta Tauri in January and then moves eastwards for the rest of the year, ending it near Pollux. During May to early August the elongation is too small for observations to be made, but otherwise the comet is well-placed.

Helin-Lawrence, 1991 1 This long-enduring comet is now on the way out, perhaps never to return. Having reached 13th mag. at its best, it starts 1993 at 15th, fading as it moves slowly in the Square of Pegasus.

Shoemaker-Levy, 1991a₁ At one time it seemed that this comet might be quite bright in the summer sky, but it was disappointing, barely reaching 7^m. It is now a southern object, fading at 14^m in Carina.

Oshita, 1992a₁ Discovered with large binoculars on 1992 November 24 at 11th magnitude, this comet would have been much brighter had we not been prevented from seeing it by its proximity to the Sun. It is moving away now and fading, starting the year at 13^m in Ursa Major, then moving across into northern Draco and on into Cassiopeia during March, by which time it will be down to 18th mag.

P/Swift-Tuttle, 1992t Recovery of this long-sought comet reflects great credit on Kiuchi for finding it and Brian Marsden for predicting it. The sceptics (who included myself) have been confounded, and the identity with Comet Kegler, 1737 II, established, though problems still attend the reconciliation of the three orbits, mainly because of the large non-gravitational forces involved. With a peak brightness between 4th and 5th magnitude, this has been the best comet of the year, though it is a pity that perihelion was not at a more favourable time. During 1993 the comet moves rapidly across the southern sky, from Sagittarius through Grus and into Hydrus, fading quickly to 15^m by the end of June. It ends the year in Carina, at 20th magnitude.

P/Ciffreo, 1992s When recovered by Scotti with the Spacewatch telescope on 1992 Sept. 24, the comet was 18^mpg., with a 15" coma and a 25" tail. At discovery in 1985 November it was 10^m visually, though photographic estimates were one or two magnitudes fainter. There may have been some intrinsic fading, but if the original brightness is maintained the comet will start the year at 13^m, fading to 16^m by the end of May. During this period it moves from Pisces into Auriga, passing the Pleiades in the latter half of March.

P/Howell, 1992c Discovered in 1981, the maximum brightness was 15^mpg. The 1987 return, similar to that of 1981, yielded visual magnitudes of 12 - 13. The circumstances of the current return are a little less favourable, and between January and May the brightness will probably vary through 13½ - 13^m and back, fading to 15^m by the end of October. However, the elongation and the south declination are both unfavourable for us until the end of March, when the comet will be in the morning sky moving from Aquarius through Pisces and on into Aries.

The main disturbance of the orbit occurred in 1585, when the line of apsides was reversed and q reduced from 4.7 to 2.4 AU. Subsequent encounters with Jupiter reduced q again to 1.4 AU, and the comet is now librating smoothly about the 1/2 resonance.

P/Schaumasse, 1992x This comet has been dealt with in detail in the recent C.S. Newsletter. Since that was published, Denis Buczynski has photographed the comet at 12-13^m. It is usually rather slow to brighten on the approach to perihelion and may require a larger coefficient of $\log r$ in the magnitude formula than the standard value of 10. It is hoped that the observations at the present apparition will enable a reliable formula to be derived.

P/Forbes At its best this comet can be a 10th mag. object; during its first six observed apparitions, 1929 - 1980, it ranged at brightest from 10^m to 14½^m, with a short tail on each occasion. Missed in 1935, 1955 and 1967 owing to unfavourable circumstances, the comet was a difficult object in 1987. The present return is only moderately good, and we may expect the comet to be about 12 - 13^m during the first half of the year. Badly placed at first in Scorpius - Capricornus, during the second half of the year it moves northeast into Pisces, fading to 16^m. The orbit has been fairly stable for some time, librating around the 1/2 resonance but after the next return in 1999 more severe changes occur and it will become progressively more difficult to observe.

Helin-Lawrence, 1992q This southern object starts the year at 14^m in Grus, brightens slowly to 13^m during April as it passes through Hydra, then fades as it crosses into Hydra and Corvus, when it will be down to 17th - 18th mag.

Shoemaker, 1992y Faint and distant, this comet starts the year at 14^m and fades steadily to 18^m by December. As it does so, it loops in Aries-Pisces, then moves northeastwards into Camelopardus and through Ursa Major into Bootes.

P/Holmes Discovered in 1892 November, this comet was close to M31 and was brighter than that object. Various estimates gave it as 3rd - 5th magnitude, about 5' in diameter. Evidently it was in outburst, otherwise it would have been discovered sooner. It kept up its brightness during November, produced a 10 tail, and a nebulous knot was recorded just beyond the end - perhaps a disconnection event. One photograph showed a double nucleus, but this was not repeated. By the end of the month the coma was 30' across, but the comet faded during the next six weeks until another major outburst increased the brightness by 4 to 5 magnitudes. The returns of 1899 and 1906 showed nothing unusual, the magnitude being 14 - 15 at best. The next seven returns were missed, and the comet was regarded as lost until a re-examination of the orbit by Brian Marsden (who else?) enabled Roemer to recover it in 1964. At that and the next two returns the brightness was 18 - 19^m, and does not look like being better than 17 - 18^m this time. However, there might be another blow-up, and we should keep an eye on the position. After the end of May the comet moves northeast through Pisces, Aries and into Perseus, and is well placed from August onwards.

P/Vaisala 1, 1992u This small, faint and rather distant comet has been observed at every return since its discovery in 1939, but on no occasion has it distinguished itself in any way. The orbit is stable and the brightness reliable. At discovery it was designated as Asteroid 1939 CB, but soon revealed its cometary nature by showing a small coma and a 1' tail. This apparition is very similar to that of 1939, and during the first part of the year the comet will be well placed in Leo, around opposition and $14^m - 15^m$. By October it will have moved into Libra, close to the Sun, and fading to mag. 18 - 19.

P/Lovas 2 Discovered on 1986 November 28, at 14^m , this comet had a short tail, but quickly faded; its periodic nature remained uncertain for some time. Intrinsically faint, and rather distant, it is unlikely to be observed visually. At its poor best during the middle months of the year it will move northeastwards from Pisces into Aries, and is not expected to be brighter than 16^m .

P/Wiseman-Skiff This is another new short-period comet, discovered a month later than P/Lovas 2, and similar to it in many ways. The first apparition was very favourable and the comet was seen visually at $13^m - 14^m$ but the $6\frac{1}{2}$ year period means that alternate returns are unfavourable, and the present one could hardly be worse. The elongation at perihelion is 6° , dropping to 2° at the end of June. When available, the comet will be no brighter than 17 - 18 mag., and will not be of great interest to us. A close approach to Jupiter in 1984 evidently diverted the comet into its present orbit.

P/Slaughter-Burnham, 1992w Although making its fourth observed appearance this faint and distant object has never been recorded as brighter than 16^m , and it is unlikely that even that modest level will be reached this time. The apparition is not a good one, and the comet does not emerge into the morning sky until July, still 3 AU from the Earth. The peak brightness will probably be $17^m - 18^m$ in October.

P/Urata-Niijima This is another of the six new short-period comets found in 1986, and like most of the others it is very faint, owing its discovery to a particularly favourable apparition. Brian Manning managed to record it on three negatives at 16^m , but even he will be hard put to it to repeat his success this time, for it is a poor return and the maximum brightness is unlikely to exceed $19^m - 20^m$. Even its recovery is by no means certain, as at perihelion it is still 2.1 AU from the Earth, with an elongation of only 30° .

P/Ashbrook-Jackson, 1992j This comet was discovered in 1948 following a close approach to Jupiter in 1945 which reduced q from 3.8 to 2.3 AU. Although it is one of the intrinsically brightest of the short-period comets, the still-large perihelion distance keeps its observed magnitude at a modest level. At all except the worst of its six previous returns it has been recorded at $11^m - 12^m$, and occasionally sports a short tail. The present return is quite favourable; after emerging from conjunction with the Sun, the comet will in April be in the morning sky in Aquarius at about 13^m . During the following months it moves northeastwards, attaining maximum brightness around 11^m at opposition in late September while retrograding in Pisces.

P/Gehrels 3 This very faint and distant comet was discovered in 1975, $2\frac{1}{2}$ years before perihelion. However, the near-circular orbit and the large perihelion distance of 3.4 AU means that Earth-distance is the determining factor for the brightness. Discovery followed an extremely close pass of Jupiter in 1970 at only 0.001 AU from that planet, which resulted in temporary capture into a satellite orbit, at the same time reducing q from 5.7 to 3.4 AU. Starting at the middle of next century, a series of four further close encounters will change the orbit again, eventually shifting q out to 7 AU. The current return is a least-favourable one, the magnitude ranging from 18 to 20. When recovered on 1992 September 26, as 1992v by Scotti with the Spacewatch telescope it was 22^m

Spacewatch, 1992h So called because it was detected by computer-based inspection of a plate taken with the Spacewatch telescope at Kitt Peak, this comet, although fairly bright intrinsically, remains observationally faint because of its large (3.16 AU) perihelion distance. During 1993 it stays in the 16^m- 17^m range most of the time, but at the end of the year is a little brighter as it passes, at declination +88°, close to Polaris.

P/Neujmin 3 This faint object is unlikely to have been discovered but for a close approach to Jupiter in 1850, which reduced q from 2.7 AU to 2.1 AU. Even so, it was not found until 1929, and has been missed at alternate returns since then. Interestingly, the pre-1850 orbit is found to be almost identical to that of P/van Biesbroeck, and it is considered that the two comets are fragments of a parent that split. This is by no means a good return, and the magnitude is unlikely to exceed 18 - 19 at best in July-August. The comet remains in south declination throughout the year.

P/Shajn-Shaldach This comet has a turbulent orbital history involving close encounters with Jupiter. The last of these, in 1946, reduced q from 4.2 to 2.2 AU, reversed the nodes, and the previous perihelion became the aphelion of the new orbit. This led to discovery in 1949, at 12^m. The comet was then lost for two returns until a new prediction by Brian Marsden enabled recovery to occur in 1971. On that return and the subsequent ones the brightness has been rather less than expected, and the present estimates are based on the fainter performance. When the comet emerges into the morning sky in April, in Aquarius, it will probably be about 17^m, brightening to 14^m as it moves into Pisces in October. The orbit will remain largely unchanged for the next century.

P/West-Kohoutek-Ikemura Considerable confusion attended the discovery of this comet: not only were three observers involved, but Kohoutek found another comet nearby at the same time; its motion was undetermined and it was not clear as to which of the comets the various observations referred. Eventually the mess was sorted out, and it transpired that both objects were new short-period comets. As in the previous case, discovery followed an extremely close encounter with Jupiter, completely changing the original orbit, but only minor changes are now expected for the next couple of centuries. The 1993 return is just about as favourable as it can be - a very nearly perihelic opposition. The comet was 12^m at discovery in 1975, in rather less good circumstances, and if that is any guide we may hope for 11^m this time. However, the comet was fainter than expected at the last two, rather poor, apparitions, and the original brightness may be non-recurrent, as is often the case with newly-diverted comets. In the latter half of the year the comet moves northeastwards through Cetus into Taurus and at opposition in December will be well-placed, a little north of the Hyades.

P/Schwassmann-Wachmann 2 Since discovery in 1929, every return of this comet has been observed; in a good year, it reaches 11^m. The present return is the most favourable possible - an almost precisely perihelic opposition, and perhaps it will be a little brighter than its previous best. Reaching 12^m by November, it will be well-placed near Pollux, from whence it moves into Cancer at opposition in 1994 January at 10^m - 11^m, after which it continues into Leo, fading to 13^m as it does so. This will be our last chance to see the comet reasonably bright as it is due for a shake-up by Jupiter in 1997 that will shift q out to 3.35 AU, returning to the low-eccentricity orbit it had before a deep encounter in 1921 - 1928 brought it closer in.

P/Encke This frequent but elusive visitor, making its 56th observed return, is moderately well-placed this time. During November it should be around 12^m, moving southwards from Pegasus into Aries, brightening to 10^m at the end of the year, after which it dives rapidly into the evening twilight as it reaches 8^m - 9^m in mid-January. How bright one sees it subsequently depends on how far one can follow it towards perihelion on February 9, when the elongation will be a scant 3°.

Comets in 1993

Comet	Prov. desig.	T	Brightest			Moon	
			Mag.	Month	Elong.	New	Full
P/Schwassmann- Wachmann 1	-	1989 Oct.26.7	18(12)	Jan.	145E	Jan. 8	
Helin-Lawrence	1991l	1992 Jan.20.0	15	Jan.	65E	Jan.22	
Shoemaker-Levy	1991a ₁	July24.5	14	Jan.	85W	Feb. 6	
Oshita	1992a ₁	Nov. 1.6	13-14	Jan.	100E	Feb.21	
P/Swift-Tuttle	1992t	Dec.12.3	6	Jan.	13E	Mar. 8	
P/Ciffréo	1992s	1993 Jan.22.5	13-14	Jan.	80E	Mar.23	
P/Howell	1992c	Feb.26.1	12-13	Feb.	25W	Apr. 6	
P/Schaumasse	1992x	Mar. 4.0	8-9	Feb.	100E	Apr.21	
P/Forbes		Mar.14.6	12-13	Apr.	48W	May 6	
Helin-Lawrence	1992q	Mar.15.1	13	Apr.	80CS	May 21	
Shoemaker	1992y	Mar.25.7	14	Jan.	105E	June 4	
P/Holmes		Apr.10.7	17-18	Oct.	125E	June20	
P/Väisälä 1	1992u	Apr.29.2	14-15	Mar.	145E	July 3	
P/Lovas 2		June 2.4	16	June	50W	July19	
P/Wiseman-Skiff		June 4.4	17-18	Oct.	35W	Aug. 2	
P/Slaughter-Burnham	1992w	June22.4	17-18	Oct.	120E	Aug.17	
P/Urata-Niijima		July13.3	19-20	July	36W	Sep. 1	
P/Ashbrook-Jackson	1992j	July14.1	11-12	Sep.	150W	Sep.16	
P/Gehrels 3	1992v	July25.4	18-19	Jan.	135E	Sep.30	
Spacewatch	1992h	Sep. 7.6	15-16	Dec.	110CN	Oct.15	
P/Neujmin 3		Nov.13.0	18-19	July	110E	Oct.30	
P/Shajn-Shaldach		Nov.16.0	14-15	Oct.	165E	Nov.13	
P/West-Kohoutek- Ikemura		Dec.25.3	11-12	Dec.	165E	Nov.29	
P/Schwassmann- Wachmann 2		1994 Jan.23.9	11-12	Dec.	135W	Dec.13	
P/Encke	-	Feb. 9.5	10-11	Dec.	75E	Dec.28	

Elongations are for approx. mid-month. CS/CN = Circumpolar South/North

Short-Period Comets at Perihelion in 1994

P/Comet	T	q	P	Previous Apparitions		
	1994	AU	yrs	N	First	Last
Schwassmann- Wachmann 2	Jan.23.9	2.07	6.39	10	1929 I	1987 XIX
Encke	Feb. 9.5	0.33	3.28	55	1786 I	1990 XXI
Kojima,1992z	Feb.18.0	2.40	7.85	3	1970 XII	1986 VII
Tempel 2	Mar.16.8	1.48	5.48	18	1873 II	1988 XIV
Maury	Mar.19.1	2.03	8.74	1	1985 VI	-
Hartley 3	May 20.4	2.46	6.84	1	1987 XII	-
Tuttle, 1992r	June27.0	1.00	13.51	10	1790 II	1980 XIII
Bus	June28.1	2.18	6.52	2	1981 XI	1987 XXXIV
Reinmuth 2	June29.7	1.89	6.64	7	1947 VII	1987 XXVI
Kohoutek	June29.9	1.78	6.67	3	1975 III	1987 XXVII
Tempel 1	July 3.3	1.49	5.50	8	1867 II	1989 I
Wild 3	July21.2	2.30	6.91	2	1980 VII	1987 XX
Harrington	Aug.23.2	1.57	6.78	4	1953 VI	1987 XXVIII th
Brooks 2	Sep. 1.1	1.84	6.89	13	1889 V	1987 XXIV
Russell 2	Oct.27.4	2.28	7.38	2	1980 III	1987 XI
Borelly	Nov. 1.5	1.37	6.88	11	1905 II	1987 XXXIII
Whipple	Dec.22.4	3.09	8.53	9	1926 VIII	1986 XII

Complete precise elements for any of these comets can be provided on request.

Sources

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