

Table 7 Working list of cometary meteor showers

**Recently active meteor showers and their parent comets.** Radiant and orbital elements in equinox J2000. Dates given are for AD 2000. Shower activity is expressed with peak solar longitude  $\lambda_{\odot}^{\max}$ , full-width-half-maximum ( $W$ , in degrees,  $\lambda_{\odot}$ ) and peak rate  $ZHR^{\max}$  (per hour), whereby:  $ZHR = ZHR^{\max} (W/2)^2 / ((\lambda_{\odot} - \lambda_{\odot}^{\max})^2 + (W/2)^2)$ . The magnitude distribution index is  $\chi = N(m+1)/N(m)$ . Sequence of mean orbit for each stream has most reliable values on top. In some cases, the original orbit (given from a mean of individual orbital elements) was made to intersect Earth's orbit. Parent body orbits are for the best corresponding theoretical orbit of a meteoroid intersecting the orbit of Earth, not to be confused with the orbit of the parent itself. Sources are given at end of Table.

Table legend:

IAU#	Code	Name	$a$ (AU)	$q$ (AU)	$i$ (°)	$\omega$ (°)	Node (°)	Peak $\lambda_{\odot}^{\max}$ (°)	$\chi$	$W$ (°)	$ZHR^{\max}$	src
#	Meteors						R.A. (°)	Decl. (°)	$\Delta R.A./\Delta\lambda_{\odot}$	$\Delta Decl./\Delta\lambda_{\odot}$	$V_g$ (km/s)	src
	Outburst	Notes					Peak $\lambda_{\odot}^{\max}$		$\chi$	$W$ (°)	$ZHR^{\max}$	src
(Epoch)	$a$ (AU)	$q$ (AU)	$i$ (°)	$\omega$ (°) <td>Node (°) <td>R.A. (°) <td>Decl. (°) <td></td> <td>--</td> <td>--</td> <td><math>V_g</math> (km/s)</td> <td>src</td> </td></td></td>	Node (°) <td>R.A. (°) <td>Decl. (°) <td></td> <td>--</td> <td>--</td> <td><math>V_g</math> (km/s)</td> <td>src</td> </td></td>	R.A. (°) <td>Decl. (°) <td></td> <td>--</td> <td>--</td> <td><math>V_g</math> (km/s)</td> <td>src</td> </td>	Decl. (°) <td></td> <td>--</td> <td>--</td> <td><math>V_g</math> (km/s)</td> <td>src</td>		--	--	$V_g$ (km/s)	src
Parent (Epoch)	Name	(Epoch)	$\lambda_{\odot}^{\max}$	$i$	Tisserand parameter $T_J$ , absolute magnitude $H_0$ ( $n$ ) or $H_N$ if asteroidal in appearance			$\Delta R.A./\Delta\lambda_{\odot}$	$\Delta Decl./\Delta\lambda_{\odot}$	$V_g$ (km/s)	$\Delta C-E$ (AU)	

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$	$W$	$ZHR^{\max}$	Notes
#89	PVI	January	$\pi$ -Virginids			01/10-01/21		Jan. 16	295	$\sim 2$	(4)	--	Apex
	$N=7$	12.6	0.396	160.6	283.0	295.2	179	+09	+09	+0.9	+0.1	64.4	SASY
	$N=22$	--	--	--	--	--	167	+10	+10	--	--	--	RRR
#90	JCO	Jan. Comae	Berenicids			01/19-01/23		Jan. 22	301	--	(1.6)	2	This work
	$N=3$	Inf.	0.512	137.3	267.8	300.5	188.9	+16.8	+16.8	+1.3	-0.3	63.9	
	$N=6$	Inf.	0.548	136.8	263.1	297.4	175	+25	+25	--	--	65	MP
Parent? (1913)	$C/Lowe$ (1913 I) - assumed to be Halley type.	0.405	120.5	280.7	304.4	187.9	$\lambda_{\odot} = 304.4$	$T_J = -0.23$ , $H_{10} = --$	--	--	--	59.4	$V_{13}$
	(30)						+21.9	--	--	--	--		0.0045

Table 7 (cont.) January

Code	Name	$q$	$i$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\lambda$	$W$	$ZHR^{\max}$	Notes	
$a$				$\omega$	R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta C-E$	
<b>#10</b>	<b>QUA</b>	<b>Quadrantis Muralids = BOO, Bootids)</b>									
	<i>= part of Machholz complex</i>	<i>12/31-01/06</i>									
N=85	3.14	0.979	72.0	172.0	283.3	230.0	<b>283.28</b>	0.35 ± 0.05	130 ± 24	PJ	
N=6	2.383	0.977	68.6	169.3	286.0	233.1	+49.5	-0.2	41.36	This work	
N=14	2.424	0.941	73.1	152.6	295.8	242.1	+49.1	-	38.9	PG	
N=17	2.612	0.974	72.4	170.5	283.5	229.4	+41.0	-	41.2	ZS	
<i>Parent</i>	<i>2003 EH<sub>1</sub></i>		<i>(Epoch 2005-01-30)</i>				$\lambda_{\odot} = 282.9$	$T_j = +2.06$	$H_N = +16.67$	L71B	
<i>(2005)</i>	3.126	0.979	70.782	171.369	282.952	231.0	+50.0	-0.3	40.77	0.2145	
<b>#91</b>	<b>JZA</b>	<b>Jan. (<math>\zeta</math>-)Aurigids</b>									
N=2	2.653	0.643	11.6	209.3	299.1	70.3	<b>292</b>	-	-	This work	
N=-,-	2.341	0.923	8.7	213.4	292.3	69.9	+60.1	-	12.1	T89	
N=22	1.851	0.836	11.1	221.0	293.9	83.9	+49.1	-	12.0	ZS	
<b>UER</b>	<b>v-Eridanids</b>										
N=6	1.89	0.971	12.3	17.4	115.6	69.3	+58.3	-	11.9	ZS	
<i>Parent?</i>	<i>2004 TB<sub>18</sub></i>		<i>(Epoch 2006-03-06)</i>				$\lambda_{\odot} = 301.1$	+2.12	+0.13	10.1	
<i>(2006)</i>	1.775	0.976	13.203	12.919	121.081	70.4	-34.8	-	9.89	+0.0211	
<b>#93</b>	<b>VEL</b>	<b>Puppids-Velids II</b>									
Visual	<i>= Columbids = <math>\tau</math>-Puppids = Jan. <math>\pi</math>-Puppids = <math>\gamma</math>-Velids = <math>\alpha</math>-Puppids = <math>\delta</math>-Velids?</i>										
N=9	2.4	0.93	62.0	33	145.7	152.4	-48.3	-0.19	33.1 ± 1.3	Mean	
N=3	7.1	0.86	49.9	43	143.7	133.4	-65.3	-	35.3	GE (2.13)	
Visual	<b>01/10-01/15</b>										
Visual	<b>12/01-12/06</b>										
				73.0	101.7	115.0	-30.2	-	-	M (#62)	
							-46.6	-	-	M (55)	

QUA – The proper name is *Quadrantis Muralids* after the full name of the constellation, but the Quadrantids concatenation is used. The activity profile has a main component and a background of fainter meteors. For more information, see Chapter 20.

#94	RGE	$\rho$ -Geminids*	01/15-01/23	Jan. 17	296.3	---	(4)	---
	Outburst	7 slow meteors		1993, Jan. 17	297.01	1.4	>0.05	>14
	(1993)	(2.96)	263	296.3	+24.9	---	---	MV
	N=	3	262.0	302.6	+25.5	---	---	T89 (8a)
	N=	3.3	266.3	287.7	+31.3	---	---	ZS73
	N=	6.4	268.5	300.7	+33.8	---	---	L71B
	N=	9.5	243.4	302.1	+28.9	1.1	-0.2	L71A
	N=	3.5	242.7	301.2	+32.2	---	---	SH
	N=	5.2	01/19-01/26	116	+27	---	---	AT (2)
	Fireballs	AD 1049-1216:	01/01-01/24	Jan. 17	296.3	3.0	10	~3.2
#95	(DCA) $\delta$ -Cancerids	= ecliptic antihelion source						
#96	NCC	N. $\delta$ -Cancerids	01/01-01/24	Jan. 17	296.3	3.0	10	~1.6
	Visual	= ecliptic antihelion source	$\lambda_{\odot}$ =297	130	+20	+0.75	-0.29	PJ
	N=	37	291.3	297.1	+19.7	---	---	IMO
	N=	27	287.9	292.9	+20.8	---	---	ZS
	N=	7	282.9	297.1	+19.5	+0.9	-0.2	ZS73
	N=	4	268.8	296.1	+27.7	---	---	L71A
	N=	6	116.7	120.2	+14.1	+1.1	---	SH
	Fireballs	AD 1005-1098:	01/30-02/05	125	+25	---	---	NL (61.1.1)
	Parent?	1991 AQ	(Epoch 2005-01-30)		$\lambda_{\odot}$ =303.69	$T_J$ =+3.16, $H_N$ =+17.05	---	AT (3)
	(2005)	2.214	3.192	241.006	+20.9	---	---	0.0336
#97	SCC	S. $\delta$ -Cancerids	01/01-01/24	Jan. 17	296.3	3.0	10	~1.6
	N=	3	100.7	126.9	+10.1	---	---	T89 (6a)
	N=	3	84.7	120.6	+07.7	---	---	NL (61.1.2)
	Parent?	2001 YB <sub>s</sub>	(Epoch 2006-03-06)		286.97	$T_J$ =+2.89, $H_N$ =+20.62	---	MZ
	(2006)	2.348	5.484	116.742	+16.0	---	---	0.004
#98	ECO	$\epsilon$ -Columbids	01/14-01/30	Jan. 28	307.1	---	(6)	---
	N=	3	26.0	114.1	-34.7	+0.76	+0.02	This work
	N=	3	22.9	118.4	-36.0	---	---	T89 (7a)
	N=	3	50.2	124.7	-09.1	---	---	T89 (7b)

RGE – after “MV:” from radiant meteor outburst, adopted speed.  
 ECO – “this:” Diffuse radiant from Decl. = -40° to -18°, low  $V_g$ .

Table 7 (cont.) February

Code	Name	$q$	$i$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta \lambda$	$W$ $\Delta \text{Decl.}/\Delta \lambda$	$ZHR^{\max}$ $V_g$	Notes $\Delta_{C-E}$
#99	JSC	Daytime Scutids		12/30-01/04		Jan. 02	280.4	--	(2.4)	--	Helion
		= <i>ecliptic helion source</i>									
	N=7	2.406	0.551	89.4	280.4	278.2	-07.8	--	--	24.1	ZS73
#100	XSA	Daytime $\xi$ -Sagittarids		01/17-02/01		Jan. 23	304.9	--	(6)	--	
	N=15	1.080	0.285	46.9	304.9	283.2	-21.9	--	--	24.4	ZS
	N=14	1.744	0.383	66.6	296.0	284.8	-18.6	--	--	26.3	ZS
February:											
#101	PIH	$\pi$ -Hydrids		02/01-02/13		Feb. 06	317.1	--	(5)	--	Apex
	N=8	32.8	0.892	36.2	137.1	210.3	-23.0	+1.3	-0.4	70.7	This work
	N=2	2.3	0.96	159	145.7	236.7	-20.2	--	--	67	GE (2.54)
#102	API	$\alpha$ -Pictorids		02/11-02/15		Feb. 14	325	--	(2.8)	--	
	(Inf.)		0.97	7	141	132	-56	--	--	(35)	PJ
	N=3	9.1	0.98	12	145.7	110.1	-65.1	--	--	30.0	GE (2.10)
	N=5	2.9	0.67	354	145.7	98.5	-76.0	--	--	28.9	GE (2.11)
	N=2	10.9	0.97	14	144	112.1	-64.1	--	--	31.0	GE (2.30)
#103	GBO	$\gamma$ -Bootids		02/06-02/13		Feb. 09	321.0	--	--	--	
	N=2	Inf.	0.849	221.0	321.0	222.4	+39.1	+1.06	-0.42	50.3	This work
#34	DSE	$\delta$ -Serpentids		02/12-02/22		Feb. 12	323	--	(4)	--	
	N=5	2.3	0.98	171	323.7	241.6	+14.9	--	--	57.9	GE (2.16)
	N=1	9.229	0.986	184.7	324.1	237.0	+09.6	--	--	64.97	HV6429
	N=1	11.089	0.933	151.7	333.2	255.5	+08.8	--	--	63.22	HV6546

PIH – “this” Diffuse radiant.  $q$  versus  $\Pi$  dependence.

Parent? (1974)	C/1947 F <sub>2</sub> (Beccvár) (30)	(Epoch 1947-05-04)	129.156	182.129	323.071	237.1	$\lambda_{\odot} = 323.07$ +10.7	T <sub>1</sub> = -0.59	H <sub>10</sub> = +11.2 (n=4)	65.43	0.0249		
#104	DCH	$\delta$ -Chamaeleontids	02/12-02/16		Feb. 14	325	(1.6)	-	-	-	-		
N=47	1.8	0.93	61.9	340	145.7	179.6	-83.3	-	-	34.2	GE (2.14)		
N=4	13.6	0.95	70.2	330	144.7	254.4	-86.1	-	-	42.6	GE (2.15)		
#105	BTU	$\beta$ -Tucanids	02/27-03/02		Feb. 29	340.4	(1.6)	-	-	-	-		
?N=11	2.13	0.98	55.3	347	178.7	50.3	-80.8	-	-	32.1	GE (3.04)		
?N=10	10.0	0.98	58.3	346	178	49.6	-77.8	-	-	36.3	GE (3.05)		
?visual				02/25-02/27	66.3	-62.8					M (#42)		
Parent (1976)	C/1976 D1 (Bradfield)	(Epoch 1976-03-03)	136.99	0.834	46.834	313.007	160.790	12.8	$\lambda_{\odot} = 340.4$ -63.5	T <sub>1</sub> = +0.82	H <sub>N</sub> = +11.6 (3.9)	32.86	0.0143
#106	FCM	Feb. Canis Majorids	02/17-02/20		Feb. 19	330.6	(1.6)	-	-	-	-	-	-
Outburst (1985)					1985, Feb. 19	330.60	(1.8)	-	-	-	-	-	>70
					$\lambda_{\odot} = 330.60$	104.3	-25.6	-	-	-	-	-	Fast
#107	ACN	$\alpha$ -Carinids	01/24-02/09		Feb. 01	311.2	2.5	3.9 ± 0.7	2.3 ± 0.6				Ch. 13 Antihelion
N=1	(2.5)	0.967	34.2	17.7	131.2	100.7	-54.8	+0.04	21.7				PJ
N=1	1.665	0.890	38.7	45.4	101.0	107.12	-45.28	-	23.5				HV9880
#108	AAN	$\alpha$ -Antilids	01/15-02/10		Feb. 02	313.1	3.4	1.6	<2				GB
N=327	1.788	0.142	64.3	141.9	$\lambda_{\odot} = 304.7$	140.0	-10.0	-	-	-	-	-	IMO
$\sigma$	-	$\pm 0.032$	$\pm 7.8$	$\pm 5.3$	133.1	161.9	-13.5	+0.68	42.6				GB
N=6					$\pm 2.4$	$\pm 2.3$	$\pm 3.1$	$\pm 0.03$	$\pm 2.6$				GK
Visual					178.3	135.9	-10.0	+0.98	42.6				M (#85)
#109	ACE	$\alpha$ -Centaurids	02/02-02/19		Feb. 08	319.4	2.0	3.4 ± 0.6	7.3 ± 1.5				PJ
Outburst (1980)					1980, Feb. 08	319.2	2.2	0.011 ±	>230				PJ
Visual	(14)	0.977	107.0	348.9	$\lambda_{\odot} = 319.2$	210.9	-58.2	-	-	-	-	-	JW
N=--	Inf.	0.986	108.3	357.3	138.9	212.1	-59.4	+1.9	58.2				PJ
	2.5	0.973	105.0	344	140.2	209.8	-58.4	+1.9	59.3				K88
					(146.7)	223.6	-61.3	-	54.2				GE

AAN - Stream detected in AMOR radar survey with limiting magnitude +14.

Table 7 (cont.) February

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta\lambda$ $\Delta\text{Decl.}/\Delta\lambda$	$W$ (18)	$ZHR^{\max}$ $V_g$	Notes $\Delta_{C-E}$
#110	<b>OCN Centaurids I</b>					<b>01/06-02/19</b>		<b>Feb. 12</b>	<b>323.4 ± 0.4</b>	<b>2.8</b>		<b>2.2 ± 0.3</b>	<b>PJ</b>
	<i>= o-Centaurids = <math>\alpha</math>-Crucids = <math>\eta</math>-Craterids</i>						$\lambda_{\odot} = 311.0$						
visual	Inf.	0.876	88.3	39.3			142.9	165.6	-60.3	+0.74	+0.41	43.7 ± 5.6	Mean
visual	(2.4)	0.844	82.5	50.7			142.9	174.6	-55.4	+0.9	-0.4	51.4	PJ
$N=3$	2.94	0.98	74.3	367			122.7	174.3	-55.3	-	-	45.5	PJ
$N=3$	2.38	0.98	70	360			119.7	160.5	-63.3	-	-	41.5	GE (1.01)
visual								156.4	-65.3	-	-	38.4	N62
								185.4	-64.6	-	-		M (#92)
#111	<b>TCE Centaurids II</b>					<b>01/23-03/12</b>		<b>Feb. 09</b>	<b>321</b>	<b>2.6</b>		<b>~3</b>	<b>PJ</b>
	<i>= <math>\theta</math>-Centaurids = <math>\mu</math>-Velids = <math>\beta</math>-Hydrids</i>												
visual	(7.2)	0.922	131.8	31.3			$\lambda_{\odot} = 321.0$	203.8	-39.6	+0.81	+0.01	60.2 ± 2.3	Mean
$N=2$	5.0	0.87	114.7	43			150.7	217.8	-43.7	+1.1	-0.4	64.6	PJ
$N=2$	1.7	0.92	145.4	39			146.7	202.8	-48.3	-	-	59	GE (2.45)
visual							144.7	218.8	-35.2	-	-	63	GE (2.49)
							02/10-02/13	207.5	-43.5	-	-		M (#112)
#29	<b>(DLE) <math>\delta</math>-Leonids</b>					<b>01/21-03/12</b>		<b>Feb. 23</b>	<b>334.7</b>	<b>3.0</b>		<b>1.1 ± 0.3</b>	<b>PJ</b>
	<i>= ecliptic antihelion source</i>												
#112	<b>NDL N. <math>\delta</math>-Leonids</b>					<b>01/21-03/12</b>		<b>Feb. 23</b>	<b>334.7</b>	<b>3.0</b>		<b>0.6 ± 0.3</b>	<b>PJ</b>
	<i>= ecliptic antihelion source</i>						$\lambda_{\odot} = 336$	168.0	+16.0	+0.80	-0.30	-	IMO
$N=8$	1.954	0.612	4.8	266.4			331.4	155.1	+17.9	-	-	20.6	ZS73
$N=24$	2.618	0.643	6.2	259.0			338.8	159.7	+18.8	-	-	20.1	L72B
Fireballs	AD 1043-1073:						02/19-02/23	115	+23	-	-	-	AT (4)
Parent?	1999 RD <sub>32</sub>					(Epoch 2005-01-30)			$\lambda_{\odot} = 346.00$	$T_1 = +2.87$ , $H_N = +16.32$			
(2005)	2.640	0.605	5.927	264.128			345.995	168.2	+13.8	+0.53	-0.14	22.77	+0.0679
#113	<b>SDL S. <math>\delta</math>-Leonids</b>					<b>01/21-03/12</b>		<b>Feb. 23</b>	<b>334.7</b>	<b>3.0</b>		<b>0.5 ± 0.3</b>	<b>PJ</b>
	<i>= ecliptic antihelion source</i>												
$N=-,-$	1.950	0.804	9.8	237.2			334.7	148.6	+18.6	-	-	17.3	This work
$N=-,-$	2.182	0.729	4.3	69.0			146.4	137.7	+17.8	-	-	17.4	T89 (6c)
$N=37$	2.473	0.702	6.4	91.3			134.5	136.1	+07.2	-	-	20.9	ZS

**Helion**

#114	DCS	Daytime Capricornids–Sagittariids				Feb. 02	312.5	–	(18)	~7	Helion
		01/13–02/28									
N=15	1.684	0.355	6.8	242.5	145.1	315.0	-23.3	–	–	ZS73	
N=3	2.08	0.36	4.5	246	144.7	316.7	-20.8	–	–	GE (2.01)	
N=1	1.5	0.28	2	234	143.7	308.7	-20.8	–	–	HV18043	
N=29	1.712	0.415	6.2	69.8	309.1	299.6	-14.2	–	–	ZS	
N=26	1.991	0.314	6.8	60.0	314.0	299.8	-15.3	–	–	ZS73	
Parent?	2001 ME <sub>1</sub>	(Epoch 2005-01-30)				$\lambda_{\odot}=318.80$	$T_1=+2.67$	$H_N=+16.81$			
(2005)	2.652	0.356	3.558	247.831	138.795	311.0	-21.2	–	–	29.59	
#115	DCQ	Daytime $\epsilon$ -Aquiriids				Feb. 13	325	–	–	–	
		(Twin of Sep. $\kappa$ -Aquiriids)									
N=11	2.3	0.82	2.1	299	144.7	346.7	-23.7	–	–	14.1	
Parent?	2004 NL <sub>8</sub>	(Epoch 2006-03-06)				$\lambda_{\odot}=314.7$	$T_1=+3.00$	$H_N=+17.12$			
(2006)	2.584	0.736	4.412	293.079	135.129	332.4	-20.4	–	–	17.75	
#116	DXC	Daytime $\chi$ -Capricornids				Feb. 01	311.3	–	(10)	–	
N=5	3.103	0.760	10.5	118.2	311.3	321.4	+06.0	–	–	18.5	
N=16	2.473	0.702	1.5	108.0	314.2	324.7	-11.2	–	–	18.5	
#117	DEQ	Daytime $\epsilon$ -Aquiriids				Feb. 04	315.8	–	(12)	–	
		= ecliptic helion source									
N=17	2.004	0.529	8.8	84.8	315.1	310.2	-6.8	–	–	23.1	
<i>March:</i>											
#118	APX	$\alpha$ -Pyxidids				Mar. 05	345.9	–	–	–	Apex
		Tim Cooper									
(1979)	(Inf.)	0.852	30.1	44.1	166.1	135.5	-35.2	–	–	25.9	
?Visual				03/07–03/14		175.2	-42.6	–	–	–	
#119	GNO	$\gamma$ -Normiids				Mar. 13	353	–	–	–	M (#82)
		Visual									
(Inf.)		0.976	130.9	15.5	173.1	251.6	-51.3	–	–	5.8 ± 1.0	
N=6	4.6	0.98	121.6	13	178.7	263.1	-56.0	–	–	(65.7)	
								–	–	58.9	
								–	–	GE (3.14)	

GNO – Also called Coronae–Australiids after a transcription error in the 1935 shower list by R. MacIntosh.

Table 7 (cont.) March

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta \lambda$	$W$ $\Delta Decl./\Delta \lambda$	ZHR <sup>max</sup> $V_g$	Notes $\Delta_{C-E}$
N=3	1.18	0.66	137.4	95.9	(179.7)	250.2	-42.7	-	-	-	-	56.8	GE (3.15)
N=2	3.12	0.85	145.4	49	(179.7)	254.0	-41.2	-	-	-	-	64.0	GE
radar					176	251.0	-50.1	-	-	-	-		WE55
visual					03/06-03/11	242.0	-53.1	-	-	-	-		M (#149)
#120	DME	$\delta$ -Mensids			03/13-03/21	Mar. 17	356.7	-	-	-	(3.2)	-	IMO
Visual					$\lambda_{\odot}=356.7$	58.0	-80.0	-	-	-	(1.6)	-	
#121	LCE	$\lambda$ -Centaurids			03/17-03/21	Mar. 19	359	-	-	-	-	-	GE (3.09)
N=3	7.74	0.774	59.3	58.0	178.7	173.7	-59.5	-	-	-	-	38.4	M (84)
?Visual					03/05-03/17	177.2	-56.6	-	-	-	-	-	
#43	ZSE	$\zeta$ -Serpentids			03/20-04/01	Mar. 25	365	-	-	-	(4.4)	-	
		Possibly related to $\delta$ -Aquilids											
N=1	4.771	0.985	150.0	193.1	360.1	266.3	-06.3	-	-	-	-	67.42	HV5688
N=1	6.358	0.946	150.3	207.9	11.5	273.7	-06.6	-	-	-	-	67.58	HV3024
#122	DPA	$\delta$ -Pavonids			03/11-04/16	Mar. 31	11.1	-	-	2.6	$8.4 \pm 1.6$	$5 \pm 1$	PJ
		= $\beta$ -Pavonids = $\phi$ -Pavonids											
Visual	(164)	0.959	108	337	191.1	309.1	-62.8	1.4	-	1.4	+0.2	58	PJ
Visual					04/13-04/15	305.2	-66.3	-	-	-	-	-	M (#244)
Parent	C/1907 G <sub>1</sub> (Grigg-Mellish) (Epoch 1907-03-28)								$\lambda_{\odot}=10.42$	$T_J=-0.23$	$H_{10}=+9.7$	$(n=8.4)$	
(1907)	(29.96)	0.928	110.057	328.736	190.417	309.0	-60.4	-	-	-	-	58.72	0.0039
Parent?	C/1742 C <sub>1</sub>				(Epoch 1742-02-09)				$\lambda_{\odot}=7.71$	$T_J=-0.25$	$H_{10}=-$		
(1742)	(29.96)	0.907	112.596	324.587	187.710	305.8	-58.9	-	-	-	-	59.50	0.1636
#123	NHY	v-Hydrids			03/01-03/06	Mar. 02	343.1	-	-	-	(2.0)	-	Antihelion
N=2	1.622	0.626	12.5	88.4	163.1	159.1	-12.2	-	-	-	-	19.7	This work
N=-,-	2.521	0.718	9.6	70.8	184.6	158.6	-11.3	-	-	-	-	19.3	T89 (18)
N=29	2.138	0.618	0.5	84.7	163.0	162.0	+06.8	-	-	-	-	20.9	ZS
N=3	12.5	0.75	7.3	62	178.7	159.6	-05.3	-	-	-	-	20.1	GE (3.02)

NHY - "this:" two video meteors from DMS database (+3.5 and +5.0<sup>th</sup>). Intrinsically faint comet. Association uncertain.



Parent? (2005)	1999 RM <sub>4s</sub> 1.681	(Epoch 2005-01-30) 10.881	90.716	160.888	158.4	$\lambda_{\odot} = 340.88$ -08.1	$T_J = +3.95$	$H_N = +19.33$	20.57	0.0071
<b>#124 MCA</b>	<b>Mar. Cassiopeids</b>	<b>02/11-04/10</b>	<b>Mar. 08</b>	<b>350</b>				(23)		
N=5	2.40	14.8	146.5	345.2	352.8	+52.3	+1.16	-0.10	14.5	This work
N=4	2.322	15.2	146.3	350.5	360.2	+50.9	-	-	13.4	PG
N=-,-	2.567	14.3	148.8	349.7	4.7	+48.3	-	-	13.6	T89 (17)
<b>#11 EVI</b>	<b><math>\eta</math>-Virginals</b>	<b>03/03-03/23</b>	<b>Mar. 14</b>	<b>354</b>			3.0	(8)	<1.5	PJ
= Southern Virginals										
Outburst?		2.0		1953 Mar. 12-13			$\lambda_{\odot} = 352.4$			MP
(1953)	2.19	0.387	113.8	172.4	181.6	-00.3	+1.00	-0.37	26.6	Ch. 28
N=7	2.562	0.382	349.1	280.5	182.1	+02.6	+1.00	-0.37	29.2	This work
N=3	4.336	0.424	282.4	352.4	180.7	+03.6	-	-	30.0	PG
N=-,-	2.324	0.394	289.6	335.9	168.7	+10.7	-	-	27.6	T89 (14N)
N=4	2.637	0.234	308.0	334.5	174.3	+04.7	+0.90	+0.31	34.2	L71B
N=3	2.027	0.431	287	357.1	185.6	-02.3	-	-	28	L71B
N=9	1.94	0.36	296.9	356.2	188.8	+00.9	-	-	28.4	KL (2)
N=3	2.38	0.26	304.3	355.2	188.8	-04.1	-	-	32.8	NL (61.3.3)
N=-,-	2.52	0.42	291.0	352.8	181.6	-00.3	-	-	25.6	MP
N=63	1.196	0.288	310.6	356.0	196.6	-01.5	-	-	26.2	ZS
N=9	1.869	0.325	299.7	345.5	183.3	+06.8	-	-	29.4	ZS73
N=24	1.329	0.222	315.7	360.2	202.6	-03.8	-	-	30.0	ZS73
N=23	1.815	0.312	121.8	184.4	198.1	-07.7	-	-	29.2	ZS73
N=3	2.82	0.403	285.8	355.1	183.6	+03.7	-	-	28.9	W57
N=-,-	4.00	0.42	284	354.7	182.6	+03.7	-	-	32	W54
N=-,-	2.578	0.384	109.4	160.8	170.6	+03.7	-	-	28.5	T89 (14Q)
N=-,-	4.312	0.498	93.4	161.5	162.3	-02.3	-	-	27.5	T89 (14S)
N=-,-	2.197	0.359	114.4	178.0	188.3	-05.3	-	-	28.2	T89 (19Q)
N=-,-	4.126	0.397	105.4	175.2	179.3	-11.3	-	-	30.5	T89 (19S)
N=2	2.93	0.41	105	177.7	183.6	-03.3	-	-	27.8	GE (3.17)
N=-,-	2.70	0.45	102	170.7	176.6	-00.3	-	-	29	JW
Parent? (1766)	D/1766 G <sub>1</sub> Helfenzrieder	(Epoch 2005-07-14)		$\lambda_{\odot} = 333.77$	$T_J = +2.70$	$H_{10} = -,-$				
(2004)	2.665	0.406	2.419	148.300	157.4	+7.1	-	-	28.61	0.1290
(2047)	2.658	0.362	0.187	153.774	165.3	+6.1	-	-	30.01	0.0192
	2.618	0.327	0.076	150.814	164.1	+6.1	-	-	31.07	0.0051

Table 7 (cont.) March

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta\lambda$	$W$ $\Delta\lambda$	$ZHR^{\max}$ $V_g$	Notes $\Delta C-E$														
#38	CUR ξ-Ursae Majorids	N=3 2.899	0.803	12.6	03/18-04/03	358.0	Mar. 19	358.0	-	-	(6)	-	This work														
														238.5	175.4	+30.1	-	18.9									
														234.8	172.4	+30.3	-	18.88									
														240.4	175.4	+26.1	-	18.59									
														238.4	187.4	+36.9	-	19.42									
#39	NAL N. α-Leonids	N=3 2.016	0.907	6.9	02/25-03/25	173.9	Mar. 07	349	-	-	(11)	-	This work														
														43.3	158.7	+31.0	+0.4	11.1									
														226.0	146.6	+31.3	-	12.3									
														241.8	167.2	+28.0	-	13.9									
														240.0	176.3	+22.7	-	-									
														218.2	160.2	+30.2	-	13.00									
														201.9	151.7	+33.6	-	10.68									
														256.4	181.3	+10.4	-	7.3									
														03/22-03/30	111	+27	-	-									
														02/18-04/25	Mar. 14	354	3.0	~22	4.5±0.7	IMO/PJ							
#125	NVI N. March Virginitids	N=19 1.119	0.853	2.4	02/18-04/25	2.6	Mar. 14	354	-	3.0	~22	2.2±0.7	IMO/PJ														
														03/22-03/30	111	+27	-	-									
#50	Fireballs (VIR) Mar. Virginitids	N=-,-	AD 1071-1188:	0.728	3.7	252.7	174.3	+08.7	-	+0.9	+0.4	(23.0)	GK														
														1.955	175.4	+30.1	-	18.9									
														1.691	172.4	+30.3	-	18.88									
#126	SVI S. March Virginitids	N=-,-	0.657	7.157	260.045	8.232	Mar. 14	354	+08.6	-	3.0	~22	2.3±0.7	IMO/PJ													
															1998 SJ <sub>70</sub>	368.09	3.0	~22	4.5±0.7	IMO/PJ							
															(2005)	2.234	7.157	260.045	8.232	188.0	Mar. 14	354	+	3.0	~22	2.3±0.7	IMO/PJ
															<i>antihelion source</i>												
															<i>antihelion source = southern Virginitids</i>												
N=13	2.160	0.565	6.1	91.2	182.0	179.7	-08.5	-	-	-	-	22.9	ZS73														
														3.607	158.3	+05.0	-	(22.9)									
														1.95	172.6	+02.7	-	20									
N=5	1.95	0.64	0.1	83	175.7	172.6	+02.7	-	-	-	20	KL (1)															

VIR - This includes the March η-Virginitids.

#127	SAL	S. $\alpha$ -Leonids		02/25-04/24		Mar. 19	359	---	(11)	---	This work T89 (16) M (#71)	
		N=5	2.016	0.907	6.9	221.8	358.8	-07.0	+1.1	+0.0		11.9
		N=---	2.313	0.904	10.5	40.3	168.0	-12.2	---	---		13.2
		Visual	March $\delta$ -Geminids		03/13-03/23		148.2	-05.4	---	---		---
#128	SGE	March $\delta$ -Geminids		03/22-04/15		Mar. 21	361	---	(10)	---	This work IAU#332FI AT (1)	
		N=2	1.66	0.94	2.1	32.8	152.9	+12.2	---	---		8.0
		N=1	2.054	0.996	0.7	182.9	1.4	+28.1	---	---		4.9
		Fireballs	AD 1062-1188:				112.7	+20.9	---	---		---
#45	PDR	$\phi$ -Draconids		03/11-04/17		Mar. 28	368	---	(15)	---	This work CL T89 (15) ZS ZS73 Helion	
		N=4	3.020	0.995	36.3	1793	8.3	+69.4	---	---		22.9
		N=---	2.770	0.996	37.5	171.1	14.4	+68.1	---	---		26.7
		N=---	2.248	0.978	26.5	164.7	356.1	+72.2	---	---		17.3
#129	MKA	Daytime $\kappa$ -Aquiriids		03/12-03/16		Mar. 14	354	---	(2)	---	GE (3.01) NL (61.3.2)	
		N=7	1.7	0.18	1.8	42	359.7	-7.7	---	---		33.2
		N=3	2.13	0.30	2.5	59.7	340.2	-7.3	---	---		29.8
		Daytime $q$ -Pegasids			03/11-03/16		Mar. 14	354	---	(2)		---
#130	QPE	Daytime $q$ -Pegasids		03/11-03/16		Mar. 14	354	---	(2)	---	NL (61.3.1)	
		N=5	2.94	0.88	9.7	101.3	354.5	+12.9	---	---		21.7
		Parent (2005)	2.845	0.755	10.925	115.757	347.537	+19.0	---	---		18.37
			2005 $EM_{169}$ (Epoch 2005-03-13)				$\lambda_{\odot}=31.48$	$T_J=+347.54$	$T_J=+2.81$	$H_N=+24.67$		-0.0022

April:

#27	KSE	$\kappa$ -Serpentids		04/01-04/07		Apr. 05	15.7	---	(3)	---	Apex AC HV10098	
		N=---	Inf.	0.45	65	275	15.7	+17.8	---	---		<4
		N=1	41.7	0.417	63.0	279.9	16.5	+15.4	---	---		45
		ZCY	$\zeta$ -Cygnids		04/08-04/11		Apr. 10	20.0	---	(1.2)		---
#40	ZCY	$\zeta$ -Cygnids		04/08-04/11		Apr. 10	20.0	---	(1.2)	---	ZS HV7161 HV10094	
		N=30	3.863	0.898	66.4	139.8	19.2	+44.8	---	---		39.0
		N=1	Inf.	0.692	79.9	112.5	19.9	+32.8	---	---		47.59
		N=1	167.7	0.677	80.4	110.5	20.0	+32.4	---	---		47.77

April

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	ZHR <sup>max</sup>	Notes
					$\omega$	R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta\text{Decl.}/\Delta\lambda$	$V_g$	$\Delta_{C-E}$
#131	<b>MDR</b> $\mu$ -Draconids				<b>04/16-04/21</b>	<b>Apr. 18</b>	<b>29.2</b>	--	(2.0)	--	
	$N=15$	2.359	0.997	48.1	172.6	281.0	+57.9	--	--	28.2	ZS
	$N=2$	10.02	1.00	45.4	189.6	260.2	+60.4	--	--	31.0	SH
#6	<b>LYR</b> April Lyrids				<b>04/16-04/25</b>	<b>Apr. 22</b>	<b>32.4</b>	2.9	2.74 ± 0.13	12.8 ± 0.7	PJ
	(1982)						32.085	2.9	0.018 ± 0.006	250	
	(1945)						32.053	1.4	--	>97	
	(1922)						≤32.006	>2.7	~0.017	≥800	
	(1803)						31.950	--	--	~860	
	$N=-,-$	45.7	0.921	79.6	214.3	272.0	+33.3	--	--	46.6	DMS
	$N=-,-$	31.61	0.918	79.61	214.53	271.6	+33.3	--	--	46.5	AW
	dispersion ( $\sigma$ )	--	±0.013	±1.1	±2.6	--	--	--	--	--	--
	$N=4$	Inf.	0.928	80.3	212.0	272.7	+33.7	--	--	47.6	PG
	$N=7$	56.0	0.918	79.5	214.5	271.9	+33.3	+1.23	+0.17	47.07	KP
	$N=5$	28	0.919	79.0	214.3	271.9	+33.6	+1.1	+0.0	47.6	AC
	$N=5$	25.812	0.879	78.6	217.2	271.5	+34.0	--	--	45.6	JW
Parent	C/1861 G <sub>1</sub> (Thatcher)				(Epoch 1861-05-25)		$\lambda_{\odot} = 31.48$	$T_J = +0.30$	$H_{10} = +5.5$	$(n = 4.0)$	$P = 415.5$ yr
(1861)	55.682	0.9225	79.776	213.484	31.860	271.9	+33.5	--	--	47.08	0.002
#132	<b>DAL</b> $\delta$ -Aquilids				<b>04/10-04/16</b>	<b>Apr. 13</b>	<b>23</b>				
	$N=2$	75	0.722	146.6	116.1	310.6	-00.2	+1.5	-0.2	66.2	This work
	visual				04/13-04/22	269.7	-10.0	B1900			M (185)
Parent?	C/1984 S <sub>1</sub> (Meier)				(Epoch 1984-10-14)		$\lambda_{\odot} = 14.20$	$T_J = < -0.77$	$H_{10} = --$	$P = \text{unknown}$	
(1984)	Inf.	0.828	146.308	130.984	14.198	298.0	-2.2	--	--	67.40	0.0459
#133	<b>BPA</b> $\beta$ -Pavonids				<b>03/11-04/16</b>	<b>Apr. 07</b>	<b>17.2</b>				
	Visual					308.0	-63.0	+1.40	+0.20	59	IMO
					$\lambda_{\odot} = 17.2$						

#49	LVI	$\lambda$ -Virginals = extension of $\eta$ -Virginals?	03/03-04/24	Apr. 10	20	(21)	Antihelion
	N=--	2.188	306.1	218.7	-16.2	--	T89 (23)
	N=--	2.630	295.0	210.7	-10.2	--	L71B
	N=--	2.374	106.0	205.7	-16.3	--	T89 (24)
	N=12	1.731	298.7	214.0	-01.3	--	Z73
	N=63	1.295	310.3	211.1	-08.7	--	ZS
	N=7	2.32	119.4	208.7	-14.2	--	L71A
#46	BCR	$\beta$ -Craterids	04/01-04/06	Apr. 03	13.5	(2)	HV10365
	N=1	2.716	75.6	191.7	-26.9	--	HV10478
	N=1	2.804	68.1	196.6	-28.3	--	
#134	SGV	Southern $\gamma$ -Virginals	03/27-04/28	Apr. 12	22.7	(13)	
		= $\gamma$ -Corvids = antihelion source meteors					
	N=5	2.262	50.0	212.7	-15.5	--	PG
	N=--	2.006	42.3	206.7	-22.3	--	T89 (22S)
	N=--	2.092	66.9	201.4	-11.3	--	T89 (20)
	Outburst!		1841 Apr. 19	31.14 $\pm$ 0.06		--	>34
	(1841)	55 in 2.25 hr, Caleb G. Forshey, LA		$\lambda_{\odot} = 31.14$	200	--	Slow
	Parent?	2003 BD <sub>44</sub>	(Epoch 2005-01-30)		$\lambda_{\odot} = 24.07$	$T_J = +3.62, H_N = +16.66$	
	(2005)	1.967	88.49	181.901	188.4	--	15.7
#135	NGV	Northern $\gamma$ -Virginals	04/01-04/26	Apr. 13	24.3	(10)	
	N=--	2.250	221.7	24.3	+17.7	--	11.7
	?Fireballs	AD 1030-1099:	04/02-04/10	151	+17	--	T89 (22N)
	Parent?	2002 FC	(Epoch 2005-01-30)		$\lambda_{\odot} = 37.30$	$T_J = +2.94, H_N = +18.82$	
	(2005)	2.831	208.091	37.300	183.2	--	11.66
#136	PUM	Apr. ( $\mu$ -)Ursae Majorids	04/10-04/13	Apr. 12	23	(1,2)	
	N=--	2.290	174.6	27.1	+52.9	--	8.4
	N=--	1.805	203.0	22.2	+58.7	--	10
	N=21	1.865	183.5	28.9	+58.6	--	8.6
	N=2	2.67	187.1	27.3	+55.7	--	10.6
	Outburst		1970	Apr. 02	11.535	--	20
	(1970)		$\lambda_{\odot} = 11.535$	160	+55	--	RM

Table 7 (cont.) April

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$	$W$	$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	$V_g$	ZHR <sup>max</sup>	Notes		
#21	<b>AVB</b>	<b><math>\alpha</math>-Virginids</b>																
		<i>= ecliptic antihelion source meteors</i>																
	$N = -,-$	2.58	0.688	4.2	240.4	21.7	185.4	+09.6	-,-	-,-	-,-	-,-	-,-	~5	~5	RK		
	$N = 19$	2.349	0.753	0.7	247.5	28.9	195.6	-05.3	-,-	-,-	-,-	-,-	-,-	16.8	16.8	SH		
	$N = 21$	2.56	0.812	3.1	239.7	31.8	195.6	+00.7	-,-	-,-	-,-	-,-	-,-	16.6	16.6	L71B		
	Parent?	1998 SH <sub>2</sub>														-,-	-,-	L71A
	(1998)	2.703	0.760	2.401	245.257	28.946	193.9	$\lambda_{\odot} = 28.95$	$T_J = +2.93$	$H_N = +20.81$	-,-	-,-	-,-	18.05	18.05	PW04		
								-01.9	-,-	-,-	-,-	-,-	-,-	~8.6	~8.6	0.0110		
#137	<b>SLE</b>	<b><math>\sigma</math>-Leonids</b>																
	$N = -,-$	2.141	0.561	6.2	271.9	9.4	193.3	+03.1	-,-	3.0	(23)	-,-	-,-	23.0	23.0	PG		
	$N = -,-$	2.278	0.605	2.2	266.3	14.5	192.6	-02.3	-,-	-,-	-,-	-,-	-,-	21.2	21.2	T89 (21)		
	Visual	1.53	0.48	1.9	286	13.7	200.7	-06.3	-,-	-,-	-,-	-,-	-,-	-,-	-,-	H48		
	Visual				04/04-04/30		209.9	-10.4	-,-	-,-	-,-	-,-	-,-	-,-	-,-	M (#116)		
	Parent?	2002 GM <sub>5</sub>														-,-	-,-	
	(2002)	2.126	0.647	7.355	262.328	25.794	205.0	$\lambda_{\odot} = 25.65$	$T_J = +3.36$	$H_N = +21.44$	-,-	-,-	-,-	20.52	20.52	0.0255		
	Parent?	1995 EK <sub>1</sub>														-,-	-,-	
	(2005)	2.266	0.509	5.903	277.490	14.414	199.5	$\lambda_{\odot} = 14.41$	$T_J = +3.12$	$H_N = +17.79$	-,-	-,-	-,-	25.01	25.01	0.0510		
#47	<b>DLI</b>	<b><math>\mu</math>-Virginids</b>																
	$N = 3$	2.531	0.418	9.1	286.5	38.3	226.8	-08.7	-,-	3.0	14 ± 3	-,-	-,-	1.1 ± 0.5	1.1 ± 0.5	PJ		
	$N = 7$	3.116	0.477	9.9	280.0	35.7	221.7	-05.2	-,-	+0.50	-0.19	-,-	-,-	28.3	28.3	PG		
#138	<b>GLI</b>	<b><math>\gamma</math>-Librids</b>																
	$N = 38$	0.926	0.191	5.8	326.7	15.9	223.9	-12.8	-,-	3.0	14 ± 3	-,-	-,-	1.1 ± 0.5	1.1 ± 0.5	PJ		
	$N = 17$	1.570	0.410	0.3	113.7	225.5	234.1	-19.7	-,-	-,-	-,-	-,-	-,-	26.0	26.0	ZS		
#139	<b>XLI</b>	<b>Apr. <math>\chi</math>-Librids</b>																
	$N = 20$	1.269	0.101	2.7	332.0	28.6	236.3	-18.9	-,-	-,-	(18)	-,-	-,-	24.7	24.7	ZS73		
	$N = 23$	1.408	0.159	5.6	324.1	27.1	232.7	-16.3	-,-	-,-	-,-	-,-	-,-	34.2	34.2	ZS		
	Visual				04/17-04/27		227.4	-22.4	-,-	-,-	-,-	-,-	-,-	32.2	32.2	ZS73		
#140	<b>PPU</b>	<b><math>\pi</math>-Puppids</b>																
	Outbursts (see Tab. 6e)				04/15-04/28		227.4	-22.4	-,-	2.0	(5)	-,-	-,-	<1	<1	M (#128)		
	Visual	2.97	1.00	21	359	33.640	110.4	-45.1	-,-	+0.40	-0.10	-,-	-,-	15	15	PJ		

<i>Parent</i> (1977)	26P/Grigg-Skjellerup 2.999	(Epoch 1977-04-07) 21,098	359.311	213.354	109.8	$\lambda_{\odot} = 33.354$ -45.0	$T_J = +2.81$ +0.46	$H_{10} = +11.7$ +0.12	15.10	+0.0122
(2002)	2.736	22,347	1.624	211.740	110.8	-48.5	-	-	15.46	+0.1127
(2044)	2.779	22,397	2.243	211.470	111.5	-48.5	-	-	15.54	+0.0881
#141	ABO $\alpha$ -Bootids	04/14-05/12	Apr. 28	Apr. 28	Apr. 28	36.7	-	-	-	-
	Outburst	Telescopic	1984	Apr. 28	1984	38.168	$\gg 4$	0.016	High rate	
						$\pm 0.002$				
(1984)	(155)	0.775	20.2	237.4	214.4	38.168	+19.3	-	(24.65)	Ch. 13
N=5	2.680	0.839	11.9	232.5	193.1	22.1	+22.9	-	16.7	PG
N=8	2.647	0.753	18.0	246.9	218.6	36.9	+18.8	+0.7	20	L72B
N=2	2.02	0.73	18.5	2527	210.7	23.3	+21.0	-	22.9	SH
?Fireballs	AD 1023-1099:	04/10-04/16	234	234	Apr. 19	29.7	-	-	-	AT (13)
#142	LPE Daytime $\lambda$ -Pegasis	04/15-05/12	Apr. 19	Apr. 19	Apr. 19	29.7	-	(11)	-	-
N=16	1.42	0.21	61	29.7	343.5	+19.9	-	-	38.4	Helion
N=16	1.412	0.108	42.0	47.1	362.2	+18.0	-	-	33.0	KL (5)
#143	APS Daytime Apr. Piscids	04/08-04/29	Apr. 20	Apr. 20	Apr. 20	30.3	-	(8)	-	ZS
	= extension of Taurid complex? Twin of NPI									
N=34	1.32	0.22	0.5	30.7	7.6	+03.3	-	-	28.9	KL (4)
N=16	1.55	0.34	6	30.7	12.7	+10.3	-	-	26.8	KL (6)
N=3	1.18	0.28	5.8	29.0	7.1	+04.6	-	-	25.1	NL (61.4.2)
N=4	2.44	0.34	12.8	64.9	9.1	+15.2	-	-	29.8	NL (61.4.1)
<i>Parent?</i> (2006)	2005 NZ <sub>6</sub> 1.835	(Epoch 2006-03-06) 8.512	51.562	36.166	14.3	$\lambda_{\odot} = 36.17$ +12.2	$T_J = +3.43$	$H_N = +17.40$	30.76	0.0096
#144	DCP Daytime $\chi$ -Piscids	03/28-04/21	Apr. 09	Apr. 09	Apr. 09	19.2	-	(10)	-	-
	= ecliptic helion source									
N=12	2.121	0.696	6.6	103.9	19.1	+21.0	-	-	18.0	ZS73
<i>May:</i>										
#31	ETA $\eta$ -Aquirids	04/19-05/28	May 06	May 06	May 06	46.9	2.7	11.0 $\pm$ 0.7	28 $\pm$ 4	Apex
	Outbursts (see Tab. 5e)									PJ
N=23	16.16	0.581	163.9	44.44	336.90	-01.47	+0.760	+0.422	65.95	LOS
N=942	11.60	0.545	165.1	45.6	339.0	-01.4	+0.73	+0.31	65.0	GB

ETA - The activity profile has at least two components. See Chapter 18.

Table 7 (cont.) May

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	ZHR <sup>max</sup>	Notes
						Node	R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta_{C-E}$
$\sigma$	--		$\pm 0.080$	$\pm 2.1$	$\pm 13.5$	$\pm 3.6$	$\pm 1.8$	$\pm 00.8$	$\pm 0.02$	$\pm 0.01$	$\pm 3.5$	
N=11	29.8		0.612	165.5	101.5	45.79	338.02	-01.75	+0.888	+0.456	--	L
N=9	5.536		0.587	164.6	96.7	47.8	339.0	-00.9	--	--	65.0	ZS73
N=51	3.34		0.54	161	90	47.7	338.6	+00.8	--	--	63	KL (17)
N=1	13.0		0.560	163.5	95.2	43.1	336.8	-01.3	--	--	65.5	JW
N=--,	6.140		0.541	165.4	91.4	45.5	339.1	-01.5	--	--	64.8	G
Parent	IP/Halley			(Epoch 1986-02-19)				$\lambda_{\odot} = 46.21$	$T_1 = -0.59$	$H_0 = +2.10$	$(n = 7.5)$	
(1986)	17.940		0.587	162.687	98.605	46.211	338.2	-0.3	--	--	65.93	0.0658
#145	ELY	$\eta$ -Lyrids			05/07-05/12		May 10	49.1	--	(2)	3 $\pm$ 1	
N=12	6.03		0.995	79.4	190.0	45.7	292.5	+39.7	--	--	3 $\pm$ 1	
N=5	Inf.		0.998	75.3	193.0	50.3	290.8	+42.7	--	--	45.3	KO
$\sigma$	$\pm 0.042$		$\pm 0.002$	$\pm 1.4$	$\pm 1.0$	$\pm 1.0$	$\pm 1.0$	$\pm 0.8$	--	--	$\pm 0.8$	
?Fireballs	AD 1049-1070:				05/08-05/12		292.3	+56.1	--	--		AT (15)
Parent	C/1983 H <sub>1</sub> (IRAS-Araki- Alcock)			(Epoch 1983-05-12)				$\lambda_{\odot} = 49.10$	$T_1 = +0.41$	$H_{10} = +9.8$	$(n = 0.9)$	$P = 959$ yr
(1983)	98.098		0.997	73.252	192.852	49.102	288.0	+44.0	--	--	43.77	0.0058
#146	CAU	$\beta$ -Coronae-Australids			04/23-05/30		May 15	54.7	--	(11)	<3	PJ
Visual	(12.1)		0.221	121.7	125.3	234.7	285.1	-39.9	+1.10	+0.00	56.4	IMO
Visual					04/28-05/05		285.7	-36.9	--	--		M (#208)
#147	MLV	May ( $\lambda$ -)Virgids			05/05-05/06		May 06	45	--	(2)	--	Antihelion
N=--,	3.232		0.547	13.3	90.5	223.4	217.7	-31.2	--	--	25.6	T89 (28S)
N=--,	6.705		0.686	3.5	72.0	225.2	210.7	-18.2	--	--	25	L71B
N=--,	2.157		0.482	1.3	101.4	224.3	227.7	-19.2	--	--	24.6	T89 (28Q)
#55	ASC	$\alpha$ -Scorpiids			04/21-05/26		May 16	55.2 $\pm$ 0.9	2.5	4.9 $\pm$ 1.1	3.2 $\pm$ 0.4	PJ
N=3	2.640		0.330	9.8	116.5	236.8	247.0	-28.8	+0.73	-0.07	31.0	PG
N=--,	2.469		0.324	8.9	117.7	233.1	243.8	-28.1	--	--	30.6	T89 (31)



N=2	2.235	0.212	3.5	132.0	230.2	247.8	-24.1	-	-	-	33	L71B
N=22	1.502	0.264	3.5	130.0	237.8	255.1	-25.2	-	-	-	29.0	ZS
N=29	1.458	0.243	0.6	132.9	232.5	251.1	-22.7	-	-	-	29.4	ZS73
N=3	2.097	0.189	2.3	136.7	217.0	238.7	-21.1	-	-	-	32.1	L71B
N=5	2.15	0.21	3	134	222.7	240.7	-22.1	+0.50	-	-	35	AC
N=30	1.464	0.283	13.5	308.3	58.4	257.1	-13.2	-	-	-	28.7	ZS
N=27	1.707	0.282	7.4	306.2	56.9	253.2	-17.3	-	-	-	29.7	ZS73
N=4	2.33	0.26	6.0	305.9	61.4	255.9	-19.2	-	-	-	32.5	NL (61.5.10)
N=3	2.170	0.133	10.0	322.0	44.7	247.7	-18.1	-	-	-	36.3	L71B
Fireballs	AD 988-1068:			05/25-06/01		240.7	-20.1	-	-	-	-	AT (18)
Parent?	2004 BZ <sub>74</sub>	(Epoch 2006-03-06)					$\lambda_{\odot} = 59.36$	$T_J = +2.37$	$H_N = +18.39$			
(2006)	3.048	0.330	16.506	115.415	239.509	249.3	-34.0	-	-	-	32.19	0.0289
#148	NOP	N. May Ophiuchids	= ecliptic antihelion source	04/25-05/31	May 13	49.7			(14)			
#149	SOP	S. May Ophiuchids	= ecliptic antihelion source	04/25-05/31	$\lambda_{\odot} = 49.7$	249.0	-14.0	+0.90	-0.10		27.8	IMO
#150	EAU	$\varepsilon$ -Aquilids		05/09-05/22	$\lambda_{\odot} = 56.7$	258.0	-24.0	+1.00	+0.00		27.8	IMO
N=17	0.873	0.354	59.6	318.3	59.5	284.9	+15.6	-	(5)			ZS
N=30	0.89	0.65	67	309	48.7	291.5	+29.1	-	-		30.8	ZS
N=16	0.78	0.41	68	327	55.7	293.5	+22.1	-	-		32.1	KL (9)
#151	PAQ	$\phi$ -Aquilids		05/19-05/23		May 21	60	-	(2)		31	KL (15)
N=-,-	2.78	0.56	174.1	270.4	239.7	350.9	-3.5	-	-		64	NL (5.12)
#152	ICA	<i>t</i> -Cassiopeids		05/09-06/01		May 23	62	-	(9)			
N=-,-	2.265	0.860	24.6	128.1	56.7	43.1	+69.2	-	-		19.1	T89
N=30	1.099	0.812	17.1	90.5	68.8	33.4	+66.7	-	-		11.5	ZS
#52	OUM	$\omega$ -Ursae Majorids		05/07-06/05		May 23	62	-	(12)			
N=5	2.93	1.017	16.7	170.5	66.3	174.7	+66.7	-	-		(27.1)	SH
N=11	1.971	0.993	14.0	170.8	58.6	172.4	+66.7	-	-		27.1	BL71A
												ZS73

May

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	Decl.	$\chi$	$W$	$ZHR^{\max}$	Notes
							R.A.			$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta_{C-E}$
<b>#153</b>	<b>N. Daytime <math>\omega</math>-Cetids</b>				<b>04/24-05/27</b>		<b>May 07</b>	<b>46.7</b>		--	(12)	<2	<b>Helion</b>
	= $\epsilon$ -Arietids												
N=86	1.27	0.10	27	28	32.7	356		+08.3		--	--	35.3	KL (3)
N=16	0.967	0.108	42.0	25.6	47.8	2.3		+17.8		--	--	33.0	ZS
N=18	1.412	0.147	29.1	35.9	48.0	12.8		+19.3		--	--	34.1	ZS
N=17	1.64	0.11	30	32	52.7	17.7		+19.3		--	--	37.4	KL (13)
N=3	1.01	0.08	15.5	22.8	62.1	24.4		+11.8		--	--	32.8	NL (61.5.13)
N=10	2.44	0.17	10.2	42.6	64.4	37.7		+20.0	1.7	--	--	35.8	NL (61.5.3)
<i>Parent?</i>	<i>C/2003 Q<sub>1</sub> (SOHO)</i>				<i>(Epoch 2003-08-21)</i>			$\lambda_{\odot}=43.4$		$T_J=(+3.37)$	$H_{10}=-,-$	<b>42.31</b>	<b>0.165</b>
(2003)	(1.64)	0.032	29.33	52.38	43.43	17.5		+20.5	--	--	--	~8	Ch. 23
<b>#154</b>	<b>OCE</b>				<b>05/05-06/09</b>		<b>May 07</b>	<b>46.7</b>		--	12 $\pm$ 2	~8	GB
N=970	1.583	0.133	37.1	214.9	225.0	19.0		-7.0	+0.80	+0.38		36.5	GB
$\sigma$	--	$\pm 0.035$	$\pm 7.5$	$\pm 6.0$	$\pm 7.9$	$\pm 3.3$		$\pm 2.1$	$\pm 0.02$	$\pm 0.01$		$\pm 2.6$	
N=11	1.623	0.122	32.6	213.9	228.6	22.5		-03.6	--	--	--	36.6	ZS
N=11	1.055	0.066	36.3	200.2	246.8	29.7		+01.5	--	--	--	34.6	ZS73
N=3	1.41	0.13	33.8	212.5	245.6	36.1		+01.2	--	--	--	35.7	NL (61.5.8)
radar	1.3	0.11	34	211	238.7	29.6		-03.5	--	--	--	36.7	L54
<b>#155</b>	<b>DEA</b>				<b>05/04-06/06</b>		<b>May 16</b>	<b>55</b>		--	(13)	<4	
	= <i>ecliptic helion source</i>												
N=25	2.026	0.592	2.8	90.0	48.1	44.7		+21.2	--	--	--	20.6	ZS
N=6	2.08	0.60	2.7	89.5	63.0	59.5		+23.8	+1.2	--	--	21.0	NL (61.5.5)
<i>Parent?</i>	<i>2002 SY<sub>50</sub></i>				<i>(Epoch 2005-08-18)</i>			$\lambda_{\odot}=53.05$		$T_J=+3.87$	$H_N=+17.57$		
(2005)	1.706	0.530	8.291	80.484	53.030	42.1		+27.5	--	--	--	21.48	0.0481
<b>#156</b>	<b>NMA</b>				<b>05/04-06/06</b>		<b>May 16</b>	<b>55</b>		--	(13)	<4	
	= <i>Daytime May Piscids, part of Taurid complex, twin of SOA</i>												
N=56	1.532	0.33	3.4	60.8	55.0	37.2		+18.1	--	--	--	25.2	ZS

N=11	1.56	0.39	2.9	64.8	47.2	62.8	47.2	+19.3	+1.0	--	24.4	NL (61.5.2)
N=16	1.94	0.44	6	74	41.7	54.7	41.7	+23.2	--	--	24.6	KL (10)
Parent?? (2003)	2003 QC <sub>10</sub> 1.376	0.369	2.469	59.722	60.960	60.960	43.4	+19.1	$T_J = +4.48, H_N = +17.83$	--	23.98	0.0773
<b>#157 SMA</b>	<b>S. Daytime May Arietids 05/04-05/27</b>											
<i>= part of Taurids complex, twin of NO4</i>												
N=43	1.68	0.27	5	233	33.7	232.7	33.7	+09.2	--	--	28.9	KL (11)
N=6	3.23	0.35	12.5	243.7	48.5	242.6	48.5	+08.3	+1.9	-1.2	31.8	NL (61.5.9)
N=9	1.39	0.22	16.7	224.1	41.3	244.7	41.3	+05.8	+1.4	--	30.1	NL (61.5.6)
<b>June:</b>												
<b>#158 ACI</b>	<b><math>\alpha</math>-Circinids 06/04-06/04</b>											
Outburst (1977)	Belinda Bridge (100)	0.855	33.4	46.8	253.92	218.6	1977 June 04	73.9	--	--	--	Apex
<b>#65 GDE</b>	<b><math>\gamma</math>-Delphinids 06/01-06/20</b>											
Outburst (1930)	51 meteors						June 11	80.4	--	(8)	--	PJ
N=6	1.041	0.774	143.0	280.1	$\lambda_{\odot} = 80.42$	312.6	June 11	80.42	~1.8	0.010	>200	PJ
N=2	3.4	0.42	123.6	286	87.0	342.3	June 04	74.02	--	0.008	>100	PJ
N=2	2.9	0.64	126.5	261	81.7	314.6	1977 June 04	74.02	--	--	(27.1)	Ch. 13
N=1	10.666	0.505	130.9	271.7	82.7	321.6	June 11	80.4	--	--	--	PJ
N=1	9.277	0.695	131.0	249.9	$\lambda_{\odot} = 80.42$	322.8	June 11	80.42	--	--	~60	PJ
<b>#159 CET</b>	<b><math>\pi</math>-Cetids 06/18-07/04</b>											
Outburst (1977)	J. C. Bennett, 20 meteors						June 28	95.0	(6)	5.6	4	PJ
Visual (55.5)	(55.5)	0.913	144.2	322.6	1977	June 28	96.63	-14.8	~3.4	--	--	Ch. 13
N=2	3.2	0.78	157.6	297	$\lambda_{\odot} = 96.63$	30.6	June 28	96.63	--	--	66.8	PJ
Parent? (1874)	C/1874 G <sub>1</sub> (Winnecke) (103)	0.956	148.41	331.717	275.7	24.1	June 28	96.63	--	--	65	GE (6.41)
$T_J = -0.94, H_{10} = +5.0 (n=4.0), P = unknown$												
											67.93	0.0671

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta_{C-E}$
#160	JLY	June Lyrids			06/11-06/21			June 15	85.167	2.7	23	3.1	MK
		= $\xi$ -Draconids											
	Outburst												
	(1966)												M96
	(1996)	(100)	0.994	52.2	196.9		$\lambda_{\odot} \sim 85.12$	278.5	+30.0	2.7	0.017	17	Ch. 13
	(1966)	(10)	0.84	50	231		85.167	280.3	+55.0	-	-	(33.4)	Ch. 13
	$N=11$	2.054	0.912	45.3	224.1		84.5	278.4	+35.0	-	-	(31)	AC
	$N=-,-$	3.58	0.98	50	201		86.2	281.9	+43.8	-	-	27.1	ZS
	$N=-,-$	Inf.	0.98	56	202		64	276.3	+52.0	-	-	32.4	T68
	TAQ	$\tau$ -Aquauiids			06/27-07/06		76	275.3	+50.0	-	-	39.3	T68
	Visual	(Inf.)	0.485	170.5	92.8		277.3	342.8	-11.8	2.5	$2.6 \pm 0.6$	$7.1 \pm 1.6$	PJ
	Visual				07/1-07/12			340.3	-11.5	1.0	+0.4	(65.3)	PJ
													M (#276)
#162	(OSC)	$\omega$ -Scorpiids			05/23-06/15			June 03	71.9 $\pm$ 0.4	3.0	$4.3 \pm 1.2$	$5.2 \pm 1.4$	Antihelion
		= ecliptic antihelion source meteors = $\chi$ -Scorpiids											PJ
#66	NSC	$N$ . $\omega$ -Scorpiids			05/23-06/15			June 01	70	-	(9)	$\sim 5$	GK
	$N=32$	2.116	0.663	4.1	261.4		73.6	248.1	-15.3	-	-	19.6	ZS
	$N=17$	1.943	0.639	6.8	265.4		65.9	244.3	-10.8	-	-	19.9	ZS73
	$N=11$	3.11	0.68	6	257		74.7	247.7	-13.1	+0.9	+0.5	21	AC
	$N=11$	3.112	0.679	6.0	256.7		74.6	246.7	-12.1	-	-	20.1	L71B
	$N=4$	2.63	0.755	3.3	249.1		70.5	238.7	-14.1	-	-	21	L71A
	Fireballs	AD 1037-1102:			06/07-06/19			260.7	-11.0	-	-		AT (21)
	Parent?	1996 JG	(Epoch 2005-01-30)						$\lambda_{\odot} = 63.37$	$T_1 = +3.77$	$H_N = +19.13$		
	(2005)	1.802	0.611	5.200	269.733		63.370	242.5	-13.2	-	-	20.0	0.0164
#163	SSC	$S$ . $\omega$ -Scorpiids			05/23-06/15			June 01	70	-	(9)	$\sim 5$	GK
		= $\theta$ -Librids			06/01-06/10			251.5	-22.2	-	-		M (163)
	$N=-,-$	2.852	0.693	1.7	74.7		250.0	243.7	-22.1	+0.90	-0.10	23.0	GK
	Fireballs	AD 995-1076:			06/14-06/19			246.8	-26.1	-	-		AT (18)

#61	TAH	$\tau$ -Herculids	05/19-06/14	June 03	72	--	(11)	<2
		Outbursts (see Tab. 6g)						
	N=14	2.695	18.6	204.2	72.6	228.5	+39.8	+0.9
	N=8	2.90	0.986	20.7	203.6	80.8	+40.8	--
	Parent	73P/Schwassmann-Wachmann 3	(Epoch 1930-07-03)				$\lambda_{\odot}=78.02$	$T_J=+2.78, H_{10}=+12.0$
	1930 VI	3.081	1.006	17.384	192.021	78.024	219.7	--
	(2022)	3.092	0.983	11.296	202.176	67.023	210.0	--
	(2027)	3.060	0.921	6.276	218.183	48.681	200.4	--
	(2049)	3.039	0.899	6.329	222.453	44.645	200.0	--
#164	(SAG)	Scorpiids-Sagittariids	04/21-07/12	June 28	97	2.8	~16	(2.3)
		= Ophiuchids, ecliptic antihelion source						
#67	NSA	N. $\mu$ -Sagittariids	05/26-07/10	June 09	78.0	2.8	12	1.5
		= $\theta$ -Ophiuchids, ecliptic antihelion source						
	N=--	2.390	0.566	4.5	271.2	91.7	271.9	-17.3
	N=28	2.224	0.503	0.3	279.3	86.2	270.3	-23.1
	N=--	2.415	0.544	3.2	274.8	87.5	270.7	-20.0
	N=30	1.858	0.665	1.5	263.3	99.4	275.5	-20.9
	Parent??	D/1770 L <sub>1</sub> (Lexell)	(Epoch 1770-08-14)					$\lambda_{\odot}=101.1$
	(1770)	3.15	0.674	1.325	256.400	103.095	275.6	-21.3
#69	SSG	S. $\mu$ -Sagittariids	05/26-07/12	June 09	78.0	2.8	12	1.5
		= $\theta$ -Ophiuchids, ecliptic antihelion source						
	N=--	2.142	0.650	2.6	84.3	279.4	276.4	-27.5
	N=4	2.33	0.52	1.0	97	260.7	262.8	-25.0
	N=4	2.90	0.460	4.2	101.4	263.0	267.8	-28.0
	N=31	1.908	0.384	2.5	113.8	271.1	283.3	-25.1
	N=11	1.981	0.430	3.9	108.4	280.2	290.8	-26.0
	N=6	2.797	0.405	4.7	108.0	258.7	266.8	-28.0
	N=3	2.08	0.52	5.0	97.0	266.0	268.0	-27.7
	Fireballs	AD 1080-1098:	06/22-07/17				283.8	-22.9
	Visual		06/28-07/05				286.5	-24.9
	Visual		06/08-06/15				277.6	-27.9
								19.6
								23.5
								26.7
								26.8
								25.6
								28
								23.3
								NL (61.6.9)
								AT (23)
								M (#211)
								M (#195)

June

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta\lambda$	$W$ $\Delta Decl./\Delta\lambda$	$ZHR^{\max}$ $V_g$	Notes $\Delta C-E$
#165	SZC					06/09-06/12		June 11	80	--	(1.2)	1.43	GK
	S. June Aquilids												
	= alpha Microscopiids												
N=4	1.15		0.11	33.5	152		259.7	297.8	-33.9	--	--	33.2	GE (6.08)
#166	NZC					06/09-07/02		June 17	86	--	(9)	3	JVF
N=19	1.364		0.150	45.0	325.0		81.7	292.7	-04.9	--	--	37.0	ZS
N=35	1.348		0.114	39.3	329.5		86.5	298.3	-07.1	--	--	36.3	ZS
N=11	1.143		0.152	43.1	326.7		99.7	311.1	+0.7	--	--	33.8	ZS
N=13	1.5		0.15	39.5	324.0		80.7	290.4	-05.8	--	--	36.3	GE (6.09)
N=2	1.8		0.18	37.9	318		78.7	285.7	-05.9	--	--	36.3	GE (6.33)
N=4	1.61		0.11	40.1	328.9		85.0	294.6	-08.3	--	--	38.5	NL (61.6.4)
	Visual					06/10-06/19		292.4	-11.8	--	(23)	--	M (#201)
#167	SSS					06/01-07/28		June 18	87	--	--	--	--
	S. $\sigma$ -Sagittariids												
	= $\gamma$ -Sagittariids												
N=29	2.594		0.361	2.8	113.6		267.4	278.6	-25.3	--	--	29.3	ZS73
N=2	2.2		0.26	5.8	127		260.7	278.8	-27.0	--	--	31	GE (6.22)
N=3	3.33		0.33	4.1	113.7		265.7	276.0	-24.5	--	--	31.1	NL (61.6.10)
	Fireballs					05/25-05/31		273.7	-28.0	--	--	--	AT (17)
#168	NSS					06/01-07/28		June 24	92.3	--	(23)	--	--
	N. $\sigma$ -Sagittariids												
	= $\rho$ -Sagittariids												
N=45	1.133		0.332	8.2	309.4		92.3	293.1	-14.0	--	--	23.2	ZS
N=4	1.72		0.38	4.5	296.6		86.6	278.4	-20.0	1.3	--	26.5	NL (61.6.6)
N=18	1.970		0.386	3.9	293.3		73.1	263.5	-19.8	--	--	27.1	ZS73
N=4	2.811		0.430	13.0	284.2		86.5	275.4	-11.0	--	--	28	L71B
	Parent? (2005)	2001 ME <sub>1</sub>	0.356	5.748	293.601	(Epoch 2005-01-30)	93.132	284.6	-18.1	$T_J = +2.67$	$H_N = +16.81$	29.70	+0.011
#169	SCU					06/07-07/22		June 27	94.9	--	(18)	--	--
N=32	1.361		0.599	13.7	278.8		95.6	281.7	+00.9	--	--	18.9	ZS

N=9	1.367	0.615	10.3	276.8	93.4	277.4	-06.4	-	-	17.5	ZS73
N=2	2.126	0.606	15.5	268.5	97.7	279.3	-02.0	-	-	18.9	L71B
<b>#63 COR</b>	<b>Corvids</b>			<b>06/04-06/30</b>		<b>June 26</b>	<b>94.9</b>				
Outburst	seen by C. Hoffmeister					1937, June	$\lambda_{\odot} = 94.9$			(10)	H48
(1937)	(3.0)	1.013	3.1	7.7	274.9	192.6	-19.4	-	-	-	H48
N=--	3.00	1.014	2.9	7.1	275.0	191.4	-18.2	-	-	9.10	KP
visual	2.5-10	1.012	3.5	7.7	274.9	192.6	-19.4	-	-	10±2	AC
(1953)	2.90	0.99	0.0	201	82.7	206	-09	-	-	10.0	HV7862
?Fireballs	AD 1079-1111:			06/20-06/21		214	-14	-	-	-	AT (22)

Parent	2004 HW										
(2006)	2.689	0.977	0.666	25.406	257.290	205.0	-13.0	-	-	10.23	0.0088
<b>#170 JBO</b>	<b>June Bootids</b>			<b>06/26-06/30</b>		<b>June 28</b>	<b>96.3</b>			(1.6)	<1
Outbursts	(see Tab. 6b)										
(1998)	3.3	1.016	18.4	183.65	96.046	222.88	+47.90	-	-	14.1	EN270698
Error	±0.3	±0.000	±0.4	±0.07	±0.000	±0.16	±0.06	-	-	±0.4	
(1998)	--	--	--	--	96.30	219.0	+49.0	+0.60	-	13.9	TOM
(1995)	3.157	1.016	26.7	182.1	92.633	237.6	+59.5	-	-	17.8	JN950624
N=--	2.140	1.004	18.4	194.2	75.8	229.4	+49.8	-	-	12.8	T89 (34)
N=54	2.479	1.000	21.7	168.0	91.2	208.9	+65.7	-	-	15.1	ZS
(1952)	2.89	1.01	21	189	83.7	227.4	+50.8	-	-	14.8	HV4106

Parent	7P/Pons-Winnecke										
(1915)	3.261	1.013	18.305	172.414	100.518	208.9	+53.0	-	-	14.24	-0.0419
(1995)	3.435	1.013	22.301	172.648	93.098	214.0	+61.1	-	-	16.05	0.2422
(2039)	3.359	1.016	17.194	177.484	89.230	207.6	+51.8	-	-	13.62	0.0339

<b>#171 ARI</b>	<b>Daytime Arietids</b>			<b>05/22-07/02</b>		<b>June 07</b>	<b>76.7</b>			<b>2.7</b>	<b>6.6±2.0</b>	<b>54±12</b>
N=1	2.581	0.064	36.963	25.376	(80.411)	44.9	+25.7	-	-	-	-	42.1
N=48	1.376	0.085	25.0	25.9	77.6	40.2	+23.8	-	-	-	-	35.7
N=55	1.750	0.094	27.9	29.5	78.7	43.7	+25.9	-	-	-	-	37.6
N=32	2.0	0.08	17.4	28	81.7	49.7	+23.2	-	-	-	-	39.4
N=380	1.67	0.10	18.7	29.9	77.3	44.0	+23.1	-	-	-	-	36.9
N=7	2.27	0.05	38.9	20.3	85.3	47.3	+25.2	-	-	+1.5	-	42.8

**Helion**

**PJ**

**U**

**ZS**

**ZS73**

**GE (6.05)**

**KL (14)**

**NL (61.6.1)**

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta\text{Decl.}/\Delta\lambda$	$V_g$	$\Delta_{C-E}$
N=8		1.49	0.06	33.4	23.0		85.5	46.8	+26.3	-	-	38.8	NL (61.6.2)
(1951)		1.61	0.090	21	29		77.5	44.1	+24.1	+0.70	+0.60	37	L54
(1950)		1.49	0.10	18	29		77.7	44.5	+22.1	-	-	36	L54
Parent	Marsden-group of comet fragments (Epoch 2004)								$\lambda_{\odot}=81.5$	$T_1 \sim +1.8$	$H_{10} > +18$		
(2004)	Inf.	0.0480		26.800	23.240		81.460	49.3	+23.2	-	-	45.68	0.006
(2004)	3.33	0.0483		26.800	23.240		81.460	47.8	+23.5	-	-	43.03	0.000
#172	TAS	Daytime Aurigids				06/09-07/25		June 27	96.0	-	(18)	-	
		= ecliptic helion source											
N=-		1.317	0.631	4.4	83.6		96.0	93.3	+31.3	-	-	15.8	ZS
#173	ZPE	Daytime $\zeta$ -Perseids				05/20-07/05		June 09	78.6	2.7	(18)	~20	
		= part of Taurid complex, twin of STA											
N=1		1.283	0.2860	5.506	50.012		(80.414)	58.3	+24.7	-	-	26.2	U
N=56		1.492	0.365	6.5	60.5		81.5	64.5	+27.5	-	-	25.1	ZS
N=73		1.918	0.319	5.3	59.2		78.3	61.1	+24.9	-	-	29.3	ZS73
N=6		1.72	0.30	7.1	69		81.7	65.8	+27.1	-	-	27.8	GE (D.01)
N=27		1.72	0.31	4.8	56		71.7	51.7	+22.2	-	-	27.8	NL
N=57		1.74	0.33	3.2	59		73.7	55.7	+21.2	-	-	26.8	BF66
N=60		1.55	0.31	5.7	57.0		71.3	52.2	+23.1	-	-	27.6	KL (12)
N=9		1.67	0.30	5.7	55.4		84.5	65.0	+25.5	-	-	28.4	NL (61.6.3)
N=-		2.33	0.35	8.0	61		77.0	63.8	+27.1	+1.1	+0.4	28.8	L54
Parent?	2P/Encke					(Epoch 1974-04-23)			$\lambda_{\odot}=98.6$	$T_1 = +3.03$	$H_{10} = +11.5$ (var.)		
(1974)	2.217	0.338		5.793	62.907		98.539	85.6	+28.0	-	-	29.18	0.1778
#174	BTA	Daytime $\beta$ -Taurids				06/05-07/17		June 28	96.7	-	(17)	~10	
		= part of Taurid complex, twin of NTA											
N=41		1.653	0.274	0.3	52.3		102.7	84.9	+23.5	-	-	29.0	ZS
N=57		1.853	0.325	2.2	239.2		275.2	80.2	+21.4	-	-	28.2	ZS73
N=-		2.2	0.34	6	246		276.4	86.7	+19.0	+0.8	+0.4	30	AC
N=2		1.7	0.31	4.8	237		261.7	65.7	+18.1	-	-	27.8	GE (6.21)



N=7	2.17	0.46	3.7	255.1	264.9	76.2	+20.4	+1.0	--	25.5	NL (61.6.5)
N=--	2.2	0.34	6	224	278.1	87.3	+19.3	+0.8	+0.4	31.4	L54
Parent (2006)	2.242	0.315	1.291	240.428	281.864	88.4	+22.5	--	--	29.90	0.0614
				(Epoch 2006-03-06)			$\lambda_{\odot} = 101.88$	$T_J = +3.56$	$H_N = +19.46$		

July:

#175	JPE	July Pegasids	07/07-07/13	July 09	107.5	3.0	3.5	2.7	Apex
Visual	(44)	0.536	267.2	340.0	+15.0	+0.6	+0.2	61.3	IMO
N=1	Inf.	0.64	243	339	+17	--	--	75.3	PJ
Parent?? (1980)	C/1979 Y <sub>1</sub> (Bradfield)	(Epoch 1980-01-24)	263.932	346.5	+11.2	--	--	63.99	HV8047
#176	PHE	July ( $\gamma$ -)Phoenicids	06/24-07/18	July 12	110.3	3.0	2.5±0.5	4.0±1.9	PJ
N=--	2.5-Inf.	0.96	31-24	31.6	-47.7	+1.04	+0.53	47±3	WE60
#88	ODR	o-Draconids	07/06-07/24	July 17	115.5	--	(7)	--	
N=3	3.52	1.01	190	279.7	+61.8	--	--	28.6	CL
N=14	4.329	1.006	192.2	285.0	+61.3	--	--	28.5	ZS
#177	OCY	o-Cygnids	07/17-07/22	July 19	117.2±0.5	2.7	4.9±1.2	2.5±0.8	PJ
Visual	= $\psi$ -Cygnids $\neq$ $\alpha$ -Cygnids			$\lambda_{\odot} = 117.2$	304	--	--	--	PJ
Photo				304.5	+49.7	--	--	39.4	BK65
N=1	4.57	0.97	206	306	+55	--	--	35.5	HV8018
#178	GDR	$\gamma$ -Draconids	07/21-07/29	July 26	124.4	--	(3.2)	--	
N=3	6.4	0.972	203.1	278.8	+48.8	--	--	25.1	B63
N=1	Inf.	0.973	203.7	281.0	+50.7	--	--	29.5	HV8089
#179	JCE	July Centaurids	07/01-07/07	July 05	103.3	--	(2.4)	--	
Outburst (1896)	07:45-09:00 UT Sydney, 50 short swift, none next hr			$\lambda_{\odot} = 103.282$	--	--	<0.030	>40	PJ
N=--	(Inf.)	0.967	25.4	~225	-35	--	--	15.3	
N=--	4.170	0.944	32.8	276.9	-10.2	--	--	12.8	T89 (35)
Parent?? (2005)	1997 QK <sub>1</sub>	(Epoch 2005-01-30)	13.255	296.436	221.9	--	--	9.11	0.0079
	2.797	1.006	2.830	296.436	-28.5	--	--	--	
						$T_J = +2.98$	$H_N = +20.10$		

Table 7 (cont.) July

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta_{C-E}$
#180	BCA	$\beta$ -Cassiopeids			07/03-08/19		$\lambda_{\odot} = 125$	July 30	126.6	3.43	5.0	10	D00
	$N=6$	18.194	0.995	89.1	192.1		125.5	14	+63	--	--	60	
	$N=12$						125.2	335.5	+59.1	+1.04	+0.20	50.4	PG
								335.5	+53.3	--	--		T65
#181	EUM	$\varepsilon$ -Ursae Majorids			07/1-07/15			July 08	106	--	(6)	--	Antiheilion
	$N=--$	2.994	0.980	20.0	156.3		105.8	192.5	+61.7	--	--	15.2	T89 (36)
#182	SCA	$\sigma$ -Capricornids			06/18-07/30			July 12	110	--	(17)	--	
	$N=--$	1.726	0.491	3.9	284.5		112.9	302.7	-15.9	--	--	22.5	T89
	$N=40$	1.310	0.272	4.5	311.2		110.2	311.1	-14.5	--	--	26.9	ZS
	$N=35$	1.782	0.431	2.1	290.3		107.6	298.7	-18.7	--	--	24.6	ZS73
	$N=5$	2.86	0.37	3.9	289.8		117.8	307.6	-15.2	1.0	--	28.9	NL (61.7.8)
	$N=3$	1.56	0.23	6.9	312.5		126.0	326.9	-12.1	--	--	30.0	NL (61.7.11)
#183	KPA	$\kappa$ -Pavonids			07/17-07/17			July 17	114.8	--	--	--	
	Outburst							1986:	114.827	2.2	0.027	~60	PJ
	(1986)	(34.2)	0.865	25.6	45.7		294.83	282.1	-68.0	--	--	23.5	PJ
	(1986)	(3.2)	0.874	21.3	48.1		294.80	282.3	-66.9	--	--	18.9	PJ
#184	PCA	$\psi$ -Cassiopeids			07/15-07/19			July 17	114.8	--	(2)	--	
	$N=25$	2.418	0.821	72.1	121.2		114.4	389.4	+71.5	--	--	40.3	ZS
	$N=23$	3.65	0.87	71	133		116.7	381.0	+75.3	--	--	40.5	KL (25)
	$N=41$	1.72	0.87	77	126		115.7	373.8	+66.3	--	--	40.5	KL (23)
	$N=23$	1.09	0.90	83	107		114.7	360.6	+56.3	--	--	39.4	KL (31)
Parent	1973 N/A								$\lambda_{\odot} = 101.09$	$T_J = +2.53$	$H_N = +15.30$		
(2006)	2.434	0.825	67.674	121.797	100.275	12.2			+69.0	--	--	38.40	0.0854
#1	CAP	$\alpha$ -Capricornids			07/19-08/18			July 30	127 $\pm$ 1	2.2 $\pm$ 0.3	15.1 $\pm$ 2.6	2.0	PJ
	$N=36$	2.618	0.602	7.68	266.67		128.9	306.6	128 $\pm$ 1	3.2 $\pm$ 0.2	15.4	2.5	IMO
	$\sigma$	$\pm 0.44$	$\pm 0.037$	$\pm 0.6$	$\pm 4.4$		$\pm 4.4$	$\pm 2.6$	-08.2	+0.54	+0.25	22.2	This work
									$\pm 1.5$	$\pm 0.02$	$\pm 0.02$	$\pm 1.5$	

N=269	2.155	0.550	7.7	273.3	122.3	306.7	-09.3	+0.91	+0.25	23.4	GB
$\sigma$	$\pm 0.40$	$\pm 0.036$	$\pm 1.2$	$\pm 5.3$	$\pm 5.2$	$\pm 2.7$	$\pm 1.3$	$\pm 0.02$	$\pm 0.01$	$\pm 1.7$	
N=--	2.540	0.594	7.2	267.6	123.8	303.4	-10.6	+0.75	+0.28	22.2	H02
N=15	2.283	0.626	4.9	266.2	138.5	315.9	-08.7	--	--	20.6	PG
N=--	2.038	0.544	7.0	275.9	123.5	306.4	-09.9	--	--	22.5	G
N=--	2.636	0.580	6.0	268.0	134.7	314.7	-08.8	--	--	23.0	JVF
N=44	1.920	0.620	6.1	267.9	136.6	315.9	-07.1	--	--	19.7	ZS
N=28	1.850	0.630	0.9	267.2	147.5	327.1	-11.7	--	--	18.8	ZS73
N=18	2.524	0.592	7.1	267.9	126.1	305.4	-09.6	--	--	25.0	L71B
N=21	2.565	0.590	7.0	269.0	127.7	308.4	-09.6	+0.9	+0.3	22.8	AC
<i>Parent 169 P/NEAT (= 2002 EX<sub>12</sub>)</i>											
(2005)	2.603	0.605	7.622	265.952	128.784	306.6	-08.4	--	--	22.21	0.1434
<i>(Epoch 2005-09-18)</i>											
#185	MSE	$\mu$ -Serpentids		07/03-07/31		July 16	114	--	(11)	--	
N=--	1.879	0.994	4.1	--	--	240.0	+11.0	--	--	7.7	J92
N=--	2.447	0.992	3.3	197.3	115.0	232.7	-4.2	--	--	8.6	T89 (37)
#186	PAU	Piscis Austrinids		07/09-08/17		July 27	123.7 $\pm$ 0.7	3.2	2.4 $\pm$ 0.5	2.9 $\pm$ 0.8	PJ
N=32	4.31	0.17	45	114	303.7	340.7	-25.7	+0.90	+0.40	40.5	KL (32)
radar					304	331.7	-17.8	+1.5	-0.3	--	WE60
radar						328.7	-26.8	--	--	--	ER55
Visual				07/26-08/08		338.4	-32.5	--	--	--	M (#290)
Visual				07/14-07/22		331.9	-29.5	--	--	--	M (#274)
#5	SDA	Southern $\delta$ -Aquariids		07/08-08/19		July 29	125.6 $\pm$ 0.3	3.3	13 $\pm$ 2	18 $\pm$ 4	PJ
<i>= part of Machholz complex</i>											
N=--	3.107	0.087	26.4	148.9	312.2	342.1	-15.4	--	--	40.5	DMS
N=2413	1.971	0.067	30.8	154.5	307.2	340.4	-16.3	+0.73	+0.26	40.2	GB
$\sigma$	--	$\pm 0.021$	$\pm 9.8$	$\pm 4.1$	$\pm 5.8$	$\pm 2.9$	$\pm 1.5$	$\pm 0.02$	$\pm 0.01$	$\pm 2.7$	
N=99	2.667	0.080	27.0	151.0	308.7	340.7	-15.7	--	--	41.0	JVF
N=10	3.228	0.097	25.8	147.1	314.7	345.7	-14.6	--	--	40.5	PG
N=70	1.630	0.069	28.2	155.4	306.4	343.0	-15.6	--	--	38.2	ZS
N=13	2.643	0.074	28.4	151.6	307.8	341.4	-15.4	--	--	41.5	L71B
N=28	2.80	0.079	25.5	150.6	306.7	339.6	-16.1	+0.75	+0.21	41.01	KP
N=151	2.04	0.08	28.4	151.1	307.5	341.9	-16.1	--	--	39.6	KL (30)
N=--	1.612	0.079	27.5	153.5	305.8	341.6	-15.9	--	--	38.5	G

Table 7 (cont.) August

Code	Name	$q$	$i$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	ZHR <sup>max</sup>	Notes	
$a$				$\omega$	R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta_{C-E}$	
N=13	2.875	0.069	27.2	152.8	334.5	-16.1	+0.80	+0.18	41.4	AC	
N=48	2.33	0.07	32.5	152.4	340.1	-17.0	+0.9	+0.2	40.8	NL (61.7.1)	
N=3	2.63	0.05	50.5	155.0	340.1	-19.1	-	-	43.5	NL (61.7.2)	
radar	(2.87)	0.058	94.5	154.8	348.7	-17.7	+1.4	+0.1	(48.3)	WE60	
--	2.83	0.074	26.6	151.6	333.2	-17.6	-	-	42.7	J	
Parent (2004)	Related to: Marsden Sgrazers (Epoch 2004)										
	(3.265)	0.0480	26.94	156.881	303.268	-15.5	-	-	43.00	0.3347	
#187	DBA	<b>Helion</b>									
N=13	0.599	0.139	59.4	07/01-07/03	July 02	100.5	-	(2)	--	ZS	
Parent? (2002)	96P/Machholz (Epoch 2002-07-25)	0.731	60.181	14.584	37.7	117.7	$T_J = +1.94$	$H_{10} = +12.5$	26.0	33.25 (var.)	
#188	XRI	Daytime $\xi$ -Orionids									
N=3	8.33	0.08	32.8	07/04-07/29	July 20	117.7	-	-	44.0	NL (61.7.5)	
N=23	5.18	0.18	16	228	98.7	+16.0	-	(10)	38.4	KL (22)	
#189	DMC	Daytime $\mu$ -Cancerids									
	= helion source										
N=43	1.720	0.443	2.1	71.0	122.7	+22.4	-	-	24.3	ZS	
N=5	2.50	0.25	5.1	53.2	108.4	+24.8	+1.0	-	31.1	NL (61.7.6)	
<b>August:</b>											
#190	ERI	<b>Apex</b>									
N=--	20.26	0.961	130.4	08/03-08/14	Aug. 10	137.5	-	(4)	<6	O	
Parent? (1852)	C/1852 K <sub>1</sub> (Chacornac)	0.910	131.097	37.367	42.9	139.38	$T_J = \sim -0.74$	$H_{10} = +9.8$	64.0	$(n=4.0)$ , P unknown	
	Inf.	0.910	131.097	37.367	319.380	-12.6	-	-	64.28	0.0052	

#7	PER	Perseids		07/17-08/24	Aug. 13	140.19	2.5	3.01 ± 0.16	84 ± 5	PJ
	Outbursts (see Tab. 5c)									
N=87	71.4	0.953	113.22	151.3	140.19	48.33	--	--	59.38	DMS
$\sigma$ (intrinsic) >50		±0.009	±1.5	±2.3	±3.3	--	--	--	--	
N=--	24.0	0.949	113.0	150.4	139.7	46.8	+1.38	+0.18	59.49	KP
N=193	62.50	0.948	113.1	151.3	138.0	45.3	--	--	59.5	PG
N=--	25.366	0.963	112.8	154.5	135.6	38.9	--	--	59.3	T89 (41)
N=8	8.04	0.960	110.2	152.5	140.5	46.2	--	--	57.5	ZS
N=10	11.0	0.95	113.1	150.9	137.2	41.9	--	--	58.8	KL (34)
N=20	22.527	0.934	113.2	147.9	139.5	46.9	--	--	59	L71A
N=--	22.53	0.934	113.2	147.9	139.4	47.0	--	--	59	JW
Parent	<i>109P/Swift-Tuttle (1992) (Epoch 1995-10-10)</i>									
(1995)	26.092	0.959	113.454	152.989	139.384	45.8	--	--	59.41	0.0004
#191 TRI	Aug. Triangulids			08/05-08/14	Aug. 12	139.8	--	(4)	--	
N=7	1.062	0.886	150.0	264.7	139.8	37.5	--	--	57.3	ZS
N=18	1.45	0.67	152	92	132.7	53.8	--	--	59	KL (33)
N=15	1.52	0.98	141	173	137.7	38.8	--	--	60	KL (35)
	Possibly related to #175 (BPE)									
#192 BPE	$\beta$ -Perseids			08/07-08/08	Aug. 08	135.4	--	--	--	
Outburst	High rate of faint meteors				1935 Aug. 08	135.358	>4	0.011	High	PJ
(1935)	(35.6)	0.863	142.7	134.3	135.4	52.8	--	--	(66.2)	Ch. 13
N=1	4.96	1.002	168.86	143.23	134.47	46.5	--	--	63.8	DMS
#193 ZAR	$\zeta$ -Arietids			08/13-08/25	Aug. 19	146	--	--	--	
N=2	17.903	0.973	172.6	19.5	326.7	49.7	--	--	70.1	L71B
Visual					$\lambda_{\odot}$ = 146.9	04.6	--	--	--	RM
Fireballs	AD 1063-1077:			08/07-08/15	45	+15	--	--	--	AT (28)
Parent?	<i>C/1862 N<sub>1</sub> (Schmidt-Tempel) (Epoch 1862-07-04)</i>									
(1862)	Inf.	0.956	172.109	27.166	328.437	49.5	--	--	70.57	0.0136
#194 UCE	$\nu$ -Cetids			08/15-08/22	Aug. 19	146	--	--	--	
N=--	2.560	0.640	144.0	82.0	325.7	38.6	--	--	61.0	JVF
#195 GDO	$\gamma$ -Doradids			08/27-09/03	Aug. 29	155.7 ± 0.5	2.8	3.7 ± 1.3	4.8 ± 1.6	PJ
Visual	(28.8)	0.970	65.6	23.0	335.7	61.2	+0.5	+0.2	(40.1)	PJ

Table 7 (cont.) August

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
									Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta_{C-E}$
#196	<b>BIN</b>	<b><math>\beta</math>-Indids</b>			<b>08/20-09/22?</b>			<b>Aug. 31</b>	<b>157.3</b>	-	-	-	
$N=$	--	2.205	0.907	14.9	43.1	345.7	342.8	-51.7	-	-	-	14.1	T89 (44S)
Parent	$C/1991 L_3$ (Levy)				(Epoch 1993-02-22)				$\lambda_{\odot} = 157.69$	$T_1 = +1.52$	$H_{10} = +8.0$	$(n=4)$	$P = 51.3$ yr
(1993)	13.853	0.932	18.161	32.743	337.692	320.2	-60.6	-	-	-	-	18.30	+0.0789
#197	<b>NPH</b>	<b><math>\nu</math>-Phoenicids</b>			<b>07/16-08/14</b>			<b>Aug. 03</b>	<b>129.7</b>	-	(12)	-	<b>Antihelion</b>
$N=$	--	(3.23)	0.674	74.0	76.1	311.8	20.0	-43.0	-	-	-	44.0	IMO
Parent?	1951 C <sub>1</sub> (Padjusakova)				(Epoch 1951-01-30)				$\lambda_{\odot} = 131.22$	$T_1 < +0.25$	$H_{10} = -$	-	This work
(1951)	Inf.	0.693	87.897	68.602	311.220	21.9	-38.5	-	-	-	-	50.19	0.0321
#3	<b>SIA</b>	<b>Southern <math>\iota</math>-Aquiriids</b>			<b>07/15-08/25</b>			<b>Aug. 04</b>	<b>131.7 <math>\pm</math> 1.0</b>	3.3	9 $\pm$ 2	1.5 $\pm$ 0.3	<b>Antihelion</b>
$N=$	--	2.676	0.190	8.6	137.5	306.9	339.0	-15.6	-	-	26	2.9	PJ
$N=$	4	3.547	0.266	0.0	121.5	304.7	321.4	-14.6	-	-	-	34.8	IMO
$N=$	13	2.12	0.26	7.6	125.9	307.3	328.5	-17.6	-	-	-	35.0	DMS
$N=$	--	2.364	0.208	6.9	131.8	311.7	334.7	-14.2	-	+1.07	+0.18	31.5	L71B
$N=$	4	1.98	0.232	1.2	133.5	301.8	324.5	-14.4	-	-	-	33.8	KL (27)
$N=$	--	2.24	0.214	4.6	131.5	305.7	327.6	-15.9	-	-	-	33.8	AC
#26	<b>NDA</b>	<b>Northern <math>\delta</math>-Aquiriids</b>			<b>07/15-08/25</b>			<b>July 26</b>	<b>123.4 <math>\pm</math> 1.0</b>	3.3	11.8 $\pm$ 2.3	1.0 $\pm$ 0.2	SH
$N=$	--	2.536	0.071	23.0	332.6	139.0	344.7	+00.4	-	-	20	3.5 $\pm$ 0.5	J
$N=$	8	2.80	0.096	19.8	327.4	140.7	345.3	+00.5	+0.75	-	-	40.5	PJ
$N=$	5	3.246	0.089	18.9	328.4	136.5	342.0	-01.6	-	-	-	39.78	IMO
$N=$	50	2.16	0.06	18.0	338.8	128.5	337.4	-04.6	-	-	-	40.5	DMS
$N=$	9	2.102	0.085	20.7	330.8	141.2	347.6	+01.3	-	-	-	40.3	KP
$N=$	3	3.57	0.18	21.8	311.2	122.1	320.3	-04.0	-	-	-	38.4	PG
$N=$	3	2.43	0.126	21.2	324.4	143.9	347.3	+02.9	-	-	-	36.9	KL (26)
$N=$	9	2.62	0.070	20.4	332.6	139.6	339.6	-04.7	+1.0	-	+0.2	39.8	L71B
												42.3	NL (61.7.9)
													SH
													J

#73	ZDR	$\zeta$ -Draconids		08/06-08/23	Aug. 14	141	(7)	--										
		= $\theta$ -Herculids																
		N=--	1.17						17	179	141.4	323.9	+52.2	--	18	BA		
		N=2	3.113						16.7	194.3	135.7	260.5	+30.0	--	14	L71B		
		N=--	2.518						0.957	--	--	260.7	+40.3	--	16.9	J92		
N=17	1.414	0.880	27.1	238.8	140.4	303.6	+42.9	--	17.0	ZS								
N=3	2.38	0.986	18.2	200.7	140.3	269.5	+34.7	--	17.2	SH								
Parent		6P/d'Arrest		$\lambda_{\odot} = 150.46$		$T_J = +2.70, H_{10} = +6.0$												
(1851)	2.960	1.009	13.907	174.546	150.463	239.1	+30.8	--	12.01	0.1625								
(1970)	2.941	1.013	16.670	178.845	142.095	242.1	+37.6	--	13.03	0.1537								
#198	AUD	Aug. Draconids		08/11-08/17	Aug. 15	142	(3)	--										
		N=54	1.515						1.007	30.4	185.6	141.9	272.5	+65.1	--	17.3	ZS	
		N=60	2.776						1.010	38.5	183.1	141.5	271.3	+65.3	--	23.6	ZS	
		N=2	2.820						1.015	33.0	183.5	150.2	269.2	+59.0	--	21.2	L71B	
		Aug. ( $\delta$ -)Capricornids																
#199	ADC	= $\lambda$ -Capricornids		08/13-08/31	Aug. 19	146	(7)	--										
		N=6	2.414						0.597	2.8	87.3	327.0	328.7	-16.0	--	21.6	PG	
		N=--	2.138						0.672	1.8	256.8	147.3	324.7	-13.8	--	22.0	T89 (43)	
		Parent							45P/Honda-Mrkos-		$\lambda_{\odot} = 141.71^{\circ}$		$T_J = +2.58, H_{10} = +14.0$					
		(2001)	3.021						0.528	0.355	93.406	321.710	325.5	-14.3	--	24.69	0.0599	
#200	BHY	$\beta$ -Hydrusids		08/17-08/17	Aug. 17	143.8	--	--										
		Outburst																
		(1985)	(32.7)						0.963	38.9	25.6	323.8	33.2	-75.1	--	(27.0)	PJ	
		(1985)	(3.25)						0.966	35.0	27.3	323.8	36.3	-74.5	--	(22.8)	PJ	
		KCG							$\kappa$ -Cygnids		08/03-08/31	Aug. 20	145.2 $\pm$ 0.8	2.2	8.8 $\pm$ 0.7	2.3 $\pm$ 0.4	24.8	IMO
1993:	5.12	0.984	35.9	201.4	139.4	284.0	+52.7	--	24.0	DMS								
N=4	$\pm 1.22$	$\pm 0.005$	$\pm 1.2$	$\pm 1.5$	$\pm 0.8$	$\pm 0.8$	$\pm 1.7$	--	$\pm 1.1$									
Parent		Pajdusaková		$\lambda_{\odot} = 145.0$		$T_J = +0.30$												
(2001)	3.021	0.528	0.355	93.406	321.710	325.5	-14.3	--	24.69	0.0599								

BHY – The correct name is “Hydrids” from Latin possessive “Hydri” (constellation Hydrus = water snake), but that is confused with “Hydrids” from Latin possessive “Hydrae” of the constellation Hydra (= water serpent). I have adopted the common name.

August

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta_{C-E}$
1993:	4.10	0.957	34.7	206.2	140.4	287.1	+49.5	287.1	+49.5	-	-	23.4	DMS
$N=5$	$\pm 0.57$	$\pm 0.003$	$\pm 1.3$	$\pm 0.9$	$\pm 0.5$	$\pm 1.6$	$\pm 0.8$	$\pm 1.6$	$\pm 0.8$	-	-	$\pm 0.9$	
$N=32$	3.19	0.995	32.6	197.4	140.9	276.9	+53.6	276.9	+53.6	-	-	21.4	DMS
$\sigma$	$\pm 0.91$	$\pm 0.016$	$\pm 3.7$	$\pm 7.6$	$\pm 5.9$	$\pm 6.9$	$\pm 6.8$	$\pm 6.9$	$\pm 6.8$	-	-	$\pm 2.0$	
$N=13$	3.513	0.991	33.0	197.7	142.0	278.4	+52.3	278.4	+52.3	-	-	21.7	PG
$N=8$	2.583	0.979	42.9	203.1	1523.2	299.1	+63.2	299.1	+63.2	-	-	25.9	ZS73
$N=3$	3.437	0.958	29.7	207.7	135.4	282.4	+42.1	282.4	+42.1	-	-	20.1	L71B
$N=8$	3.09	0.99	38	194	145	286.2	+59.1	286.2	+59.1	+0.0	+0.0	24.8	AC
Fireballs	AD 1059-1098:												AT(26+38)
#33	NIA Northern $\iota$ -Aquiriids				07/25-09/13	306.5	+40.2	306.5	+40.2	3.2	33	$\sim 2.1$	IMO
$N=-$	2.419	0.358	7.4	297.4	145.1	328.0	-04.7	328.0	-04.7	+0.90	+0.18	27.6	DMS
$N=3$	3.580	0.238	5.7	306.7	129.5	326.9	-09.3	326.9	-09.3	-	-	34.4	PG
$N=65$	1.045	0.249	4.4	319.1	138.0	343.1	-03.4	343.1	-03.4	-	-	24.5	ZS
$N=54$	1.356	0.302	5.2	307.4	153.1	350.2	+00.5	350.2	+00.5	-	-	26.1	ZS
$N=5$	1.20	0.30	7.9	310.4	146.7	344.1	+1.1	344.1	+1.1	-	-	25.1	(NL61.8.2)
$N=-$	1.625	0.260	5.0	308.0	147.7	328.4	-05.6	328.4	-05.6	+1.03	+1.13	31.2	AC
$N=3$	1.918	0.326	4.0	299.7	162.1	355.2	+01.6	355.2	+01.6	-	-	28.9	L71B
$N=29$	1.366	0.242	3.2	313.5	152.2	352.7	-00.7	352.7	-00.7	-	-	33.1	ZS73
$N=13$	1.92	0.20	12.0	313.4	120.3	321.4	-08.0	321.4	-08.0	-	-	32.9	KL (28)
Fireball	AD 1062-1164:				08/28-09/02	338	+06	338	+06	-	-	-	AT (39)
#201	$\eta$ -Serpentids				07/06-10/19	Aug. 24	151	Aug. 24	151	-	-	-	
	= $\lambda$ -Aquiriids												
$N=22$	1.795	0.956	4.5	213.2	149.5	287.7	-03.7	287.7	-03.7	-	-	8.6	PG
$N=-$	1.792	0.916	5.2	209.5	151.7	277.7	-04.0	277.7	-04.0	-	-	9.8	T89 (38)
$N=-$	2.294	0.898	2.8	39.7	356.2	322.4	-12.6	322.4	-12.6	-	-	11.8	T89 (44Q)
Parent?	2000 QS <sub>7</sub>	(Epoch 2005-01-30)								$\lambda_{\odot} = 149.69$	$T_J = +3.01$	$H_N = +19.55$	
(2005)	2.682	0.905	3.187	222.591	149.690	297.8	-11.7	297.8	-11.7	-	-	12.60	0.00437



#202	GLE	Daytime $\gamma$ -Leonids <i>= ecliptic helion source</i>	08/18-08/24	Aug. 22	148.7	--	(3)	--	Helion
N=40	1.527	0.569	2.1	262.0	321.8	139.9	+12.4	--	19.6 ZS
N=46	0.968	0.860	6.4	59.0	149.2	156.6	+19.7	--	22.0 ZS
N=4	2.38	0.60	7.5	90.6	148.7	153.4	+20.8	2.1	22.9 (NL61.8.4)
Parent? (2005)	1999 RD <sub>32</sub> 2.640	0.605	6.147	274.453	335.309	156.1	$\lambda_{\odot} = 155.3$ +01.1	$T_J = +2.87, H_N = +16.32$	22.77 -0.0501
#203	DXL	Daytime $\chi$ -Leonids <i>= twin of SCC</i>	08/26-08/30	Aug. 27	154	--	(3)	--	
N=25	1.598	0.330	2.5	238.4	334.9	142.1	+12.8	--	27.4 ZS
Parent? (2005)	2001 YB <sub>5</sub> 2.349	0.323	3.381	62.113	161.330	151.7	$\lambda_{\odot} = 161.33$ +14.3	$T_J = +2.89, H_N = +20.62$	30.46 0.0759
#204	ZCA	Daytime $\zeta$ -Cancerids	08/07-08/22	Aug. 20	147	--	--	--	
N=3	5.00	0.05	21.1	206.5	326.9	119.7	+19.0	--	43.8 (NL61.8.5)
<i>September:</i>									
#205	XAU	$\xi$ -Aurigids	08/30-09/03	Sep. 01	158	--	(3)	--	Apex
N=1	28.24	0.971	106.4	128.0	157.5	93.5	+62.6	--	56.9 PK#620125
N=1	11.49	0.793	117.5	123.8	159.4	92.6	+56.4	--	59.7 PK#621134
N=1	2.50	0.785	111.5	117.1	160.4	92.3	+58.5	--	55.0 PK#621204
#206	AUR	( $\alpha$ ) Aurigids <i>= <math>\theta</math>-Aurigids</i>	08/25-09/05	Sep. 01	158.7	2.6	2.7	4 $\pm$ 1	IMO
Outburst			1994		158.700	1.7	0.019	$\sim$ 400	PJ
Outburst			1986		$\pm$ 0.020		$\pm$ 0.002		
Outburst			1935		158.518	1.3	0.018	250 $\pm$ 30	PJ
N=3	Inf.	0.683	148.5	110.2	86.3	86.3	$\geq$ 158.664	$\geq$ 100	Ch. 13
N=--	Inf.	0.802	146.4	121.5	85.5	89.8	+41.0	$\pm$ 0.009	This work
					158.6	85.5	+38.7	+0.25	65.7
							+42.0	--	66.3 AC

Table 7 (cont.)

Code	Name	$q$	$i$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes	
$a$				$\omega$	R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta C-E$	
Parent (1911)	C/1911 N <sub>1</sub> (Kiess)	0.684	148.421	110.378	158.978	91.6	$\lambda_{\odot} = 158.98$	$T_J = -0.84$	$H_{10} = +7.9$	66.17	0.0027
#207	Sep. ( $\beta$ -)Cassiopeids			09/05-09/30	Sep. 16	173	-	(10)	-	-	This work
N=8	15.8	0.968	162.4	176.1	33.0	+68.9	-	-	69.1	-	
#208	Sep. ( $\varepsilon$ -)Perseids			09/07-09/23	Sep. 12	170	-	(6)	-	-	This work
N=8	31.1	0.742	138.9	241.9	50.2	+39.4	-	-	64.5	-	R92
N=10	15.0	0.750	142.8	241.3	51.5	+39.5	-	-	65.6	-	
$\sigma$	-	$\pm 0.033$	$\pm 3.9$	$\pm 3.6$			-	-	$\pm 1.7$	-	
N=3	Inf.	0.733	140.5	242.6	47.2	+38.9	-	-	65.4	-	PG
N=-	34.087	0.764	149.5	238.0	54.8	+36.2	-	-	67.1	-	T89 (46)
Fireballs	AD 1046-1069:			09/03-09/09	33.8	+38.2	-	-		-	AT (40)
#209	$\varepsilon$ -Eridanids			08/20-09/16	Sep. 12	170	2.8	$\sim 12$	1.5	-	PJ
= $\pi$ -Eridanids											
N=1	11.08	0.576	83.5	81.5	170.0	56.6	-13.8	+0.70	59.0	-	IMO
Outburst				1981 Sep. 10.6	59.3	-17.4	-	-	52.6	-	HV33606
Visual	(11.)	0.61	164	80	168.1	56.6	>168.12	-	>170	-	PJ
Parent? (1854)	C/1854 L <sub>1</sub> (Klinkerfues = 1854 III)	0.6481	108.110	73.871	347.487	53.5	$\lambda_{\odot} = 167.49$	$T_J = -0.11$	$H_{10} = +6.4$	56.52	0.0076
(1854)	(25.27)			(Epoch 1854-06-23)			-16.2	-	-	-	
#210	$\beta$ -Aurigids			09/19-09/25	Sep. 21	179.3	-	-	-	-	
Outburst	19 meteors				1968 Sep. 21	179.258	2.3	-	-	-	
(1968)					179.256	86	+43	-	-	Medium	Ch. 3
N=1	4.57	0.98	148	159	176.7	93	+42	-	66.5	-	HV4453
N=1	23.08	1.00	145	170	176.7	90	+45	-	67.9	-	HV4454
N=1	Inf.	1.03	146	168	176.7	91	+44	-	68.8	-	HV4460
N=1	8.04	0.97	147	157	182.7	102	+42	-	67.3	-	HV4554
Parent? (1790)	1790 A <sub>1</sub> (Hershel)	0.722	148.068	115.951	179.125	114.5	$\lambda_{\odot} = 179.13$	$T_J < -0.70$	$H_{10} = -$	66.76	0.0333
(1790)	Inf.						+38.2	-	-	-	

#81	SLY N=1	Sep. Lynxids 9.05	138.0	0.880	221.9	187.0	185.0	--	(2)	--	PK#572513								
												Sep. 28	81.2	+46.6	65.2	L71B			
												09/26-09/29	152.5	+47.9	65.0				
#211	AOR N=16	Sep. $\alpha$ -Orionids 1.52	152	0.91	47	2.7	183	--	(3)	--	KL (37)								
												Sep. 26	86.7	+09.0	62	HV4597			
												09/21-09/28	91	+12.0	60.8	HV4609			
#212	K-Leonids N=1	<i>k-Leonids</i> 1.63	157	0.80	66	3.7	181	--	(3)	--									
												Sep. 24	82.7	+11.0	63.4				
												09/21-09/29	66						
<i>= twin shower of Dec. Monocerotids</i>																			
Parent (1917)	N=21	C/1917 F <sub>1</sub> (Mellish)	26	0.11	39	180.7	162.7	+15.7	--	--	KL (39)								
												27.65	0.190	36.339	51.122	169.558	155.9	42.10	0.4955
												<i>(Epoch 1917-04-15)</i>							$T_1 = +0.64, H_0 = +7.4 (n = 3.9)$

<b>Antihelion</b>																
#213	BRC Visual	$\beta$ -Gruids (3.16)	16.9	0.852	50.8	340.3	160.3	--	(9)	--	IMO					
												Sep. 03	337	-47	21.0	This work
												08/23-09/15	43.0	327.7	167.7	
#214	BCP N=--, Fireballs	$\beta$ -Capricornids 2.429	13.0	0.170	43.0	327.7	305.7	-12.8	--	--	JFV					
												Sep. 10	305.7	-12.8	37.0	
												09/05-09/15	09/24-09/30	304.7	-13.8	AT (52)
#30	<i>(PSC)</i> Piscids	AD 1045-1068: <i>Piscids</i>	3.4	0.399	290.8	199.8	174	+14.3	--	--	IMO					
												Sep. 17	26.7	+14.3	~1.5	
												09/12-09/31	290.8	199.8	174	<23
#215	NPI N=7	Northern ( $\delta$ )-Piscids <i>= antihelion source meteors</i>	5.2	0.256	306.6	174.4	+07.7	+1.07	+0.12	31.2	This work					
												Sep. 27	9.2	+07.7	30.4	PG
												09/12-09/31	305.2	173.3	+07.0	25.6
#216	SPI N=5	Southern ( $\delta$ )-Piscids <i>= extension of Taurid complex?</i>	6.3	0.247	130.6	364.0	+05.1	--	--	26.5	This work					
												Sep. 17	23.6	+05.1	27.8	SS02
												09/12-09/23	126.6	359.7	+03.1	--

Table 7 (cont.)

Code	Name	$q$	$i$	$\omega$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	ZHR <sup>max</sup>	Notes
	$a$				Node	R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta_{C-E}$
$\sigma$	--	$\pm 0.021$	$\pm 0.9$	$\pm 3.0$	( $\pm 0.1$ )	$\pm 1.82$	$\pm 0.62$	--	--	$\pm 1.3$	
$N=19$	1.64	0.28	5.4	125.7	3.0	18.7	+05.2	+0.7	+0.9	28.6	NL (61.9.1)
$N=4$	2.5	0.28	8.4	123.9	2.9	20.3	+02.7	--	-0.7	31.9	NL (61.9.6)
$N=16$	1.792	0.493	14.6	102.4	02.9	17.0	-11.0	--	--	23.6	ZS73
Parent??	2003 QC <sub>10</sub>		(Epoch 2003-08-27)				$\lambda_{\odot} = 181.02$	$T_1 = +4.48$	$H_N = +17.83$		
(2003)	1.376	0.369	5.035	119.760	361.015	16.3	+01.6	--	--	24.06	0.00010
#217	OPC	$\omega$ -Piscids		09/12-09/23		Sep. 17	174	--	(4)	--	
		= ecliptic antihelion source									
$N=33$	2.864	0.525	1.5	273.6	190.8	10.6	+06.3	--	--	24.6	L71B
$N=6$	3.165	0.642	5.7	79.4	3.0	0.5	-08.8	--	--	21.4	This work
$N=7$	2.987	0.529	3.9	92.4	14.6	16.0	+01.7	--	--	24.5	PG
$N=3$	3.00	0.65	5.6	79.3	3.0	1.5	-08.6	--	--	24.6	B63 (II)
Parent?	2001 HA <sub>4</sub>		(Epoch 2005-01-30)				$\lambda_{\odot} = 179.00$	$T_1 = +2.77$	$H_N = +17.48$		
(2005)	2.687	0.552	17.079	90.915	359.002	10.7	-17.7	--	--	24.89	0.0033
#218	GSA	Sep. ( $\gamma$ -)Sagittariids		09/11-09/15		Sep. 13	170.1	--	(32)	--	
$N=--$	2.008	1.003	1.0	8.0	350.8	270.8	-31.0	--	--	6.2	T89 (48)
Fireballs	AD 1071-1163:			09/23-10/12		283.8	-25.9	--	--		AT (51)
Parent?	107P/Wilson-Harrington		(Epoch 1936-11-08)				$\lambda_{\odot} = 167.15$	$T_1 = +5.66$	$H_N = +15.99$		
(1936)	2.643	0.996	0.856	13.940	347.153	279.1	-26.9	--	--	8.61	0.0467
(2001)	2.643	1.001	0.377	8.948	353.036	276.1	-25.0	--	--	8.31	0.0481
(2048)	2.645	0.999	0.043	10.475	352.143	277.9	-23.4	--	--	8.38	0.0487
#219	NDR	$\gamma$ -Draconids		09/01-09/22		Sep. 13	170.3	--	(8)	--	
$N=--$	2.679	1.001	28.3	174.5	171.0	260.3	+54.0	--	--	18.4	T89 (45)
$N=49$	2.565	1.004	32.3	181.4	162.6	265.4	+59.8	--	--	20.3	ZS
#76	KAQ	$\kappa$ -Aquariids		09/08-10/12		Sep. 22	179	--	(14)	--	
$N=3$	2.564	0.884	1.0	45.2	359.8	334.0	-13.8	--	--	12.8	PG
$N=35$	2.606	0.741	7.6	247.8	179.5	343.0	+08.3	--	--	18.0	ZS

N=6	2.572	0.725	4.4	250.6	168.5	336.2	-01.2	--	--	18.1	ZS73
N=9	2.566	0.705	3.9	253.7	181.3	350.2	+03.2	--	--	18.2	ZS73
N=5	3.180	0.814	1.8	235.6	178.7	339.2	-04.4	--	--	16.5	L71B
N=4	2.940	0.867	2.1	229.2	186.6	342.3	-02.5	+0.80	+0.40	15.3	L71A
N=3	3.115	0.810	2.0	236.0	178.7	339.2	-04.4	--	--	16.0	AC
visual				09/14-09/23	$\lambda_{\odot} \sim 166$	346.3	+00.5	--	--	--	M (#299)
Fireballs	AD 1053-1163:		09/19-09/27			333.6	+00.2	--	--	--	AT (45)
Parent?	2006 AR <sub>3</sub>		(Epoch 2006-03-06)								
(2006)	2.458	0.878	4.743	46.724	6.389	345.4	-20.6	--	--	12.90	0.0095
<b>#220 SAR</b>	<b>Sep. <math>\mu</math>-Arietids</b>		<b>09/21-09/28</b>			<b>Sep. 22</b>	<b>179</b>	--	(3)	--	
N=17	1.283	0.068	22.9	336.8	179.5	28.5	+18.6	--	--	36.3	ZS
N=22	1.174	0.146	17.1	326.6	180.2	24.3	+19.0	--	--	31.2	ZS
N=46	1.238	0.091	3.6	333.6	178.3	27.1	+12.5	--	--	33.7	ZS
N=83	2.98	0.07	16	332	198.7	42.7	+20.2	--	--	41.5	KL (36)
N=5	3.6	0.18	14.8	312.9	183.3	19.3	+15.6	--	--	36.7	NL (61.9.3)
<b>#221 DSX</b>	<b>Daytime Sextantids</b>		<b>09/26-10/03</b>			<b>Sep. 30</b>	<b>188.35</b>	--	2.0 ± 0.2	20	<b>Helion</b>
	= part of Phaethon complex										O97
N=410	1.041	0.151	23.1	212.5	6.1	154.5	-01.5	+0.84	-0.43	31.2	GB
$\sigma$		±0.025	±5.0	±3.5	±3.5	±2.8	±1.5	±0.02	±0.01	±2.2	
N=--	1.25	0.16	22	213	4.3	153.2	-00.2	--	--	32.2	AC
N=14	1.0	0.130	19.0	211.0	3.7	153.2	+02.6	--	--	32.0	JVF
N=9	0.934	0.172	31.1	212.3	15.8	157.4	-08.6	--	--	29.7	ZS
N=--	1.00	0.160	22.2	212.2	5.9	153.2	-01.2	--	--	30.1	G
N=9	1.12	0.146	21.8	213.2	4.3	152.3	-00.3	--	--	32.2	NL (61.9.2)
$\sigma$	±0.05	±0.01	±2.3	±2.1		±0.9	±1.5	--	--	±0.6	N64
radar						155.6	-00.3	--	--		W60
Parent	2005 UD		(Epoch 2006-03-06)								
(2006)	1.275	0.163	21.560	217.151	9.181	159.9	-3.0	--	--	32.88	0.0790
<b>#222 DDL</b>	<b>Daytime <math>\delta</math>-Leonids</b>		<b>09/23-09/26</b>			<b>Sep. 25</b>	<b>183</b>	--	(2)	--	
N=3	1.89	0.32	23.2	59.9	182.8	172.7	+21.2	--	--	31.1	NL (61.9.11)

October

Table 7 (cont.)

Code	Name <i>a</i>	<i>q</i>	<i>i</i>	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta \lambda$	$W$ $\Delta Decl./\Delta \lambda$	$ZHR^{\max}$ $V_g$	Notes $\Delta_{C-E}$	
#223	<i>GVI</i>	<i>Daytime <math>\gamma</math>-Virginids</i>											
		<i>= ecliptic helion source</i>											
	<i>N</i> = 30	0.616	0.9	273.2	09/23-09/29	345.8	Sep. 27	184	--	(2)	--		
	<i>N</i> = 4	0.61	5.8	92.9		184.0	168.4	+03.6	--	--	23.3	ZS	
	<i>N</i> = 3	0.59	6.3	272.6		3.4	187.0	+05.8	--	--	21.2	NL (61.9.7)	
							179.6	-09.2	--	--	23.2	NL (61.9.8)	
<i>October:</i>													
#281	<b>OCT</b>	<b>October Camelopardalids</b>											
(1902)		(radiant unknown)											
(1942)		$\lambda_{\odot} = 192.006$											
(1976)		$\lambda_{\odot} = 192.8$ Cassiopeia											
		$\lambda_{\odot} = 193.34$											
		50 light tracks behind clouds, U.K.											
		Meteor shower											
		113 meteors $N > E$ , Florida											
#224	<b>DAU</b>	368	0.993	78.6	170.6	192.57	166.0	+79.1	--	--	46.6	This work	
	<i>N</i> = 14	24.1	0.845	130.2	09/29-10/18	191.0	Oct. 08	191.0	2	(8)	3.0		
	$\sigma$	--	$\pm 0.085$	$\pm 4.5$	226.7		83.5	+50.4	+1.10	+0.10	64.9	R92	
#225	<b>ZTA</b>	<b><math>\zeta</math>-Taurids</b>											
	<i>N</i> = 3	21.3	0.715	162.4	10/07-10/24	16.5	Oct. 09	196	--	(7)	--	This work	
	<i>N</i> = 6	1.632	0.231	163.1	70.9	193.5	71.5	+28.2	--	--	67.2	ZS	
	<i>N</i> = 17	1.48	0.38	152	311.8	23.7	88.7	+12.0	--	--	57	KL (43)	
#23	<b>EGE</b>	<b><math>\epsilon</math>-Geminids</b>											
	<i>N</i> = 3	10.0	0.731	172.9	10/14-10/27	209.0	Oct. 19	206.0	1.6	15	3.0	IMO	
	<i>N</i> = --	14.90	0.770	173.0	241.7	208.5	101.6	+26.7	--	--	68.8	This work	
	<i>N</i> = 7	26.77	0.77	173	236.7	208.5	102.0	+27.0	--	--	69	JW	
	<i>N</i> = 13	3.58	0.88	175	237	209.7	104.8	+26.9	+0.7	+0.0	69.4	AC	
	<i>N</i> = 4	14.895	0.770	173.0	223	203.7	104.8	+24.9	--	--	68	KL (41)	
					236.7	208.2	102.8	+26.9	--	--	69.1	L71B	

#8	<b>ORI</b> Orionids (1993)	<b>10/02-11/07</b>										<b>208.6</b>	2.9	5.4 ± 0.6	23 ± 4	PJ	
		1993 Oct. 7.8															
		616.2	0.613	163.5	76.5	24.069	92.0	204.5	2.0	1.0 ± 0.2	25.5 ± 5						PJ
		N = --	9.68	0.571	164.2	82.8	208.6	95.4	+0.70	+0.11	66.2						This work
		N = 30	18.0	0.578	164.3	81.5	28.7	94.7	+0.65	+0.11	66.53						KP
		N = 12	26.753	0.581	164.8	80.3	27.2	93.6	--	--	67.3						PG
		N = --	7.60	0.570	165.0	83.0	29.7	96.7	--	--	66.0						JVF
		N = 23	16.72	0.570	163.9	83.4	29.9	96.4	--	--	66.0						L71B
		N = 17	3.850	0.562	164.4	87.0	27.8	95.6	--	--	64.6						ZS
		N = 61	4.76	0.57	164.2	86.1	26.1	93.8	--	--	64.9						KL (49)
<b>Parent</b> (1986)	<i>1P/Halley</i> (Epoch 1986-02-19)										$\lambda_{\odot} = 208.67$	$T_J = -0.59$	$H_0 = +2.1$	$(n = 7.5)$	0.1545		
<b>#22</b>	<b>LMI</b> Leonis Minorids	<b>10/21-10/25</b>										<b>209.0 ± 0.7</b>	1.9 ± 0.7	4.3 ± 1.2	2.7	PJ	
N = 10	286	0.616	125.32	102.73	208.36	159.5	+1.42	-0.36	61.9	This work							
N = 4	33.6	0.641	124.5	106.3	209.9	160.7	+0.96	+0.08	61.8	MLB							
N = --	58.6	0.65	124	106	211.7	162.7	--	--	61.8	AC							
<b>Parent</b> (1739)	<i>C/1739 K<sub>1</sub> (Zanotti)</i> (Epoch 1739-06-18)										$\lambda_{\odot} = 211.04$	$T_J \sim -0.01$	$H_{10} = +3.3$	$(n = 4)$	$P = unknown$		
<b>#226</b>	<b>ICS</b> October <i>r</i> -Cassiopeids	<b>10/15-10/28</b>										<b>209</b>	--	(5)	--	This work	
N = 6	59.0	0.644	128.5	109.8	208.7	36.7	--	--	66.3	AT (61)							
Fireballs	AD 1032-1357:										+60.3	--	--	--			
<b>#227</b>	<b>OMO</b> Oct. Monocerotids	<b>10/18-10/22</b>										<b>206</b>	--	(2)	--	This work	
N = 3	5.2	0.865	135.0	46.4	25.7	101.9	--	--	63.5	GE (10.16)							
N = 2	5.4	0.97	136	341	25.7	117.6	--	--	65.0								
<b>Parent?</b> (1723)	<i>C/1723 T<sub>1</sub> (Keggler-Crossat-Stauderson)</i> (Epoch 1723-09-28)										$\lambda_{\odot} = 198.92$	$T_J \sim -0.01$	$H_{10} = +5.5$	$(n = 4)$	$P = unknown$		
<b>#228</b>	<b>OLY</b> Oct. Lyncids	<b>10/10-10/23</b>										<b>206</b>	--	(5)	--	This work	
N = 6	9.3	0.926	133.3	211.7	205.8	111.3	--	--	64.8								
<b>#229</b>	<b>NAU</b> <i>v</i> -Aurigids	<b>10/20-10/22</b>										<b>207.3</b>	--	(2)	--		
N = 7	1.298	0.267	134.3	311.0	208.0	87.9	--	--	53.1	ZS							

Table 7 (cont.)

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta\lambda$	$W$ $\Delta\lambda/\Delta\lambda$	$ZHR^{\max}$ $V_g$	Notes $\Delta C-E$
#230	SOR					09/26-10/26		Oct. 05	191.7	3.0	(12)	--	
							$\lambda_{\odot} = 191.7$	86.0	-03.0	+0.80	+0.00	65.00	IMO
	$N=1$	14.56	0.92	138	34		10	89	+00	--	--	65.9	HV8870
	$N=1$	57.18	0.66	145	71		28	95	+05	--	--	65.8	HV4974
#231	BCN					10/18-10/30		Oct. 26	213	--	(5)	--	
	$N=2$	2.8	0.93	152	325		24.7	121.7	+04.9	--	--	66.1	GE (10.17)
	$N=2$	2.6	1.00	153	359		25.7	114.7	+05.9	--	--	66.1	GE (10.18)
	$N=3$	4.3	0.95	156	334		32.7	127.7	+05.8	--	--	68.1	N62 (26.1)
	$N=3$	6.1	0.98	148	10		35.7	120.6	+00.9	--	--	66.1	N62 (26.3)
#232	OCC					09/20-10/24		Oct. 03	189.7	--	--	$2.3 \pm 1.5$	Antihelion
	Outburst				1978			Oct. 03	189.70	--	>0.15	--	PJ
	$N=-,-$	4.264	0.987	0.8	190.8		189.7	303.0	-10.0	+0.90	+0.20	10.0	IMO
	$N=-,-$	(3.65)	0.99	2.8	193.2		203.8	315	-14	--	--	10.4	T89 (53)
	Parent	$D/1978 R_1$ (Haneda-Campos)				(Epoch 1979-01-07)	189.3	301.5	-08.7	--	--	$15 \pm 3$	W88
	(1979)	2.070	0.997	3.407	190.543		183.491	287.6	-05.1	--	--	7.34	0.1381
#9	DRA					10/02-10/16		Oct. 08	195.1	2.6	--	<1	
	Outbursts (see Tab. 6d)												
	(1998)	3.572	0.9966	31.8	173.6		195.0188	263.40	+55.76	--	--	21.0	T
	(1998)	3.512	0.9964	31.8	173.4		195.081	263.16	+55.75	--	--	20.9	T
	(1998)	3.33	0.996	31.09	173.36		195.08	263.20	+55.42	--	--	20.5	SAYS
	$\sigma N=20$	$\pm 0.32$	$\pm 0.001$	$\pm 0.70$	$\pm 0.83$		--	$\pm 1.39$	$\pm 0.70$	--	--	0.6	
	$N=5$	3.02	0.996	31.4	172.9		196.4	264.1	+57.6	+1.9	+0.3	20.4	This work
	$N=7$	2.392	0.995	25.5	178.2		203.9	274.7	+52.4	--	--	16.7	PG
	$N=-,-$	2.120	0.992	27.6	171.4		204.6	267.2	+55.0	--	--	17.4	T89 (51b)



N = --	2.855	0.994	29.8	183.8	202.6	283.2	+57.1	--	--	22.4	T89 (56a)
N = 2	3.51	0.996	30.7	171.8	197.0	262.4	+54.1	--	--	20.43	AC
N = 2	3.330	0.999	25.0	177.0	196.7	276.3	+49.0	--	--	17.8	L71B
<i>Parent</i>	<i>21P/Giacobini-Zinner (Epoch 1936-12-13)</i>										
(1926)	3.513	0.994	30.73	171.748	196.946	261.9	+54.0	--	--	20.45	0.0005
(1998)	3.391	0.996	31.859	172.543	195.398	261.9	+55.9	--	--	20.92	+0.0381
(2045)	3.235	0.995	31.790	171.351	194.088	259.9	+55.9	--	--	20.80	+0.1040
<b>#233</b>	<b>EPC</b>	<b>Oct. (ε-)Piscids</b>	<b>10/02-10/12</b>	<b>Oct. 08</b>	<b>195</b>	<b>(4)</b>	<b>T<sub>J</sub> = +0.73, H<sub>10</sub> = +8.9</b>				
N = 5	2.919	0.616	2.8	262.5	195.0	8.7	+8.1	--	--	21.8	J92
N = --	1.780	0.479	1.6	283.8	197.3	20.7	+11.3	--	--	23.2	T89 (52N)
N = 45	1.843	0.566	0.7	93.6	11.6	12.8	+4.4	--	--	20.5	ZS
N = 6	2.19	0.550	0.7	274.0	195.5	15.6	+7.3	--	--	23.5	LB71A
<b>#234</b>	<b>GPU</b>	<b>γ-Puppids</b>	<b>09/28-10/30</b>	<b>Oct. 16</b>	<b>202.7</b>	<b>(1;3)</b>	<b>3.0</b>				
N = 4	17.8	0.980	71.6	16.1	λ <sub>⊙</sub> = 202.7	109.0	-44.0	+0.60	-0.20	43.0	IMO
<b>#28</b>	<b>SOA</b>	<b>Southern Oct. (δ-)Arietids</b>	<b>10/01-10/24</b>	<b>(Nov. 03)</b>	<b>58.0</b>	<b>110.1</b>	<b>-44.0</b>	<b>+1.74</b>	<b>+0.03</b>	<b>39.2</b>	<b>This work</b>
		= extension of STA									
N = --	2.883	0.381	6.6	108.8	33.0	41.7	+10.2	--	--	29.8	T89 (57)
N = --	2.540	0.482	11.2	98.7	26.4	33.6	+01.2	--	--	26.2	T89 (52S)
N = 83	1.435	0.333	2.9	122.5	18.5	33.1	+10.6	--	--	25.6	ZS
N = 58	1.723	0.273	1.4	126.9	08.5	24.6	+09.1	--	--	24.2	ZS73
N = 18	1.74	0.24	1.2	130.7	23.2	40.3	+14.9	--	--	30.7	KL (44)
N = 13	1.75	0.30	5.8	122.5	24.9	39.5	+10.7	--	--	27.8	MP
<i>Parent</i>	<i>2P/Encke (Epoch 2003-12-27)</i>										
(2003)	2.217	0.339	3.943	115.819	44.884	56.0	+16.5	--	--	29.06	0.1915
<b>#25</b>	<b>NOA</b>	<b>Northern Oct. (δ-)Arietids</b>	<b>10/01-10/24</b>	<b>(Nov. 03)</b>							
		= extension of NTA									
N = --	2.168	0.334	5.2	117.1	42.4	52.7	+18.2	--	--	29.1	T89 (59)
N = 15	4.05	0.22	12	307	201.7	34.7	+20.2	--	--	36.3	KL (45)
<i>Parent?</i>	<i>2005 UR (Epoch 2005-10-26)</i>										
(2005)	2.259	0.266	6.675	124.247	36.156	51.3	+14.1	--	--	31.65	0.0335

Table 7 (cont.) October

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	Decl.	$\chi$	$W$	$\Delta R.A./\Delta\lambda$	$\Delta\text{Decl.}/\Delta\lambda$	$V_g$	ZHR <sup>max</sup>	Notes
								R.A.	202			(5)					$\Delta C-E$
<b>#235</b>	<b>SSA</b>	<b><math>\sigma</math>-Arietids</b>			<b>10/10-10/22</b>			<b>Oct. 15</b>									
		= part of Phaethon complex															
	$N=28$	4.46	0.11	7	145		22.7	44.7	+14.2						40.5		KL (46)
	$N=24$	1.74	0.05	17	158		21.7	52.7	+15.2						40.5		KL (47)
<b>#236</b>	<b>LCY</b>	<b><math>\lambda</math>-Cygnids</b>			<b>10/20-11/07</b>			<b>Oct. 12</b>	<b>199</b>			(7)					
	$N=3$	2.768	0.972	13.9	199.4		213.2	319.1	+34.9						12.3		PG
	$N=-,-$	2.585	0.828	17.8	234.4		189.6	338.6	+31.3						18.0		T89 (49a)
	$N=-,-$	2.352	0.950	22.0	204.6		233.5	334.5	+57.3						15.8		T89 (49c)
	<i>Parent?</i>	<i>2005 CA</i>							$\lambda_{\odot}=202.8$		$T_J=+3.03$	$H_N=+15.34$					
	(2006)	2.359	0.967	17.006	203.186		202.759	313.3	+41.2						13.20		+0.131
<b>#237</b>	<b>GPS</b>	<b><math>\gamma</math>-Piscids</b>			<b>10/10-11/25</b>			<b>Oct. 13</b>	<b>200</b>			(18)					
	$N=-,-$	2.478	0.945	2.7	200.0		225.6	347.6	+0.3						10.4		T89 (54)
	$N=-,-$	2.866	0.871	1.4	224.9		229.8	377.7	+9.3						13.4		T89 (60)
		Outburst?	Radiant "SE Peg/NE Psc"				2003	Oct. 17	203.36						~20		
	<i>Parent?</i>	<i>6344 P-L</i>							$\lambda_{\odot}=203.9$		$T_J=+3.06$	$H_N=+21.36$					
	(1960)	2.645	0.931	4.058	213.516		203.905	339.0	+06.0						11.06		0.0280
<b>#86</b>	<b>OGC</b>	<b>Oct. <math>\gamma</math>-Cetids</b>			<b>10/19-10/24</b>			<b>Oct. 20</b>	<b>206.4</b>			(2)					Ch. 13
	Outburst	Coast of Maine, USA: 25/hr 01 UT, 100/hr 03 UT							206.36		~2	~0.09			~100		RM
	(1935)				1935 Oct. 20		$\lambda_{\odot}=206.36$	40.6	-04.8								RM
	$N=2$	0.950	0.832	2.7	119.3		26.7	50.4	-06.9						3.3		This work
	$N=-,-$	2.442	0.791	11.6	58.4		28.1	18.6	-18.7						17.1		T89 (50)
	$N=2$	1.760	0.783	8.5	67.0		27.7	22.6	-10.7						15.3		L71B
	Visual	AD 1052-1093:				10/15-10/23		48.8	-02.6								M (#35)
	Fireballs?	Oct. Cygnids				10/30-10/03		50	-10								AT (63)
<b>#83</b>	<b>OCG</b>	<b>Oct. Cygnids</b>			<b>10/04-11/07</b>			<b>Oct. 19</b>	<b>206</b>			(14)					
	$N=-,-$	3.428	0.904	25.0	218.1		190.7	322.5	+44						19.6		T89 (49b)
	$N=7$	2.764	0.976	25.0	198.6		195.9	317.8	+52.6						17.2		ZS73
	$N=2$	4.66	0.960	26.4	203.8		193.6	307.4	+48.2						22.2		W57

#238	DOR	$\alpha$ -Doradids	10/08-10/31	Oct. 21	208	--	(9)	<2	WE60
	Radar			$\lambda_{\odot} = 207.7$	69.3	--	--	--	
#239	OUI	Oct. Ursae Minorids	10/10-10/27	Oct. 21	208	--	(7)	--	This work
	N=4	3.98	0.995	51.5	179.1	209.1	246.6	+74.3	This work
	N=-,-	4.0	0.994	50.0	179.8	208.2	245.5	+73.8	ZS#82
	N=43	2.294	0.992	40.0	183.0	210.6	267.0	+69.2	T89 (56b)
	N=-,-	2.851	0.984	48.7	191.1	208.0	276.5	+76.0	
#240	XDR	$\xi$ -Draconids	10/05-11/05	Oct. 24	210.8	--	(12)	--	
	N=-,-	2.886	0.984	70.6	183.0	220.8	192.4	+74.7	T89 (61)
	N=38	1.279	0.988	69.0	175.3	210.8	170.3	+73.3	ZS
	N=8	2.052	0.927	71.0	143.1	194.1	176.6	+70.9	ZS73
	N=22	2.543	0.992	67.1	169.7	196.3	190.1	+78.9	ZS73
#241	ACM	Daytime $\alpha$ -Canis Majorids	10/12-10/22	Oct. 17	204	--	(4)	--	Helion
	Visual		10/12-10/22	92.1	-14.0	--	--	--	M (#51)
#242	DFV	Daytime $\psi$ -Virginids	09/28-10/24	Oct. 15	202	--	(10)	--	
		= ecliptic helion source							
	N=22	1.513	0.525	2.6	258.1	22.3	193.7	-09.6	ZS
November:									
#13	LEO	Leonids	10/31-11/23	Nov. 17	235.1	2.5	3.0 $\pm$ 0.6	13 $\pm$ 3	Apex
	Outbursts (see Tab. 4a)								PJ
	(2001)	10.1	0.9853	162.36	173.50	236.15	154.24	+21.60	HB
	(2000)	9.4	0.9853	162.42	173.47	236.10	154.16	+21.76	HB
	(1999)	9.9	0.9839	162.44	172.51	235.31	153.66	+21.76	HB
	(1998)	9.8	0.9839	162.05	171.89	234.68	153.29	+22.12	HB
	(1997)	8.5	0.9844	162.23	172.37	235.20	153.58	+21.90	HB
	(1995)	14.8	0.9827	161.55	171.85	235.24	154.08	+22.18	HB
	N=5	13.972	0.985	162.4	173.1	235.6	153.2	+22.0	PG
	N=-,-	11.5	0.985	162.6	172.5	235.2	153.0	+22.0	AC
	N=9	10.3	0.984	162.1	172.4	235.0	153.6	+22.1	KP

Table 7 (cont.)

Code	Name	$q$	$i$	Dates (2000)	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	ZHR <sup>max</sup>	Notes
$a$				$\omega$	R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta C-E$
$N=29$	15.2	0.984	162.53	172.36	235.7	153.9	+0.944	-0.603	70.92	BPS
$\sigma$	--	$\pm 0.003$	$\pm 1.26$	$\pm 3.06$	$\pm 1.10$	$\pm 1.0$	--	--	$\pm 0.92$	
Parent	55P/Tempel-Tuttle		(Epoch 1998-08-15)				$T_J = -0.29, H_0 = +8.5$	$(n = 10.7)$		
(1998)	10.338	0.984	162.482	172.229	235.021	153.4	--	--	70.63	0.0081
<b>#243</b>	<b><math>\alpha</math>-Monocerotids</b>			<b>11/15-11/25</b>	<b>Nov. 21</b>	<b>239.3</b>	2.7	3.8	3.5	IMO
(1995)	Outburst					239.322	1.80	0.008	500	PJ
$N=10$	(500)	0.488	134.13	90.66	59.322	117.10	--	--	63.0	DMS
$\sigma$	( $a > 28$ )	$\pm 0.005$	$\pm 0.34$	$\pm 0.78$	$\pm 0.4$	$\pm 0.13$	--	--	$\pm 0.2$	
(1985)				R.A. = 109.6°, Decl. = -7.1°		239.316	(2.7)	0.003	$\sim 600$	Ch. 13
(1935)				R.A. = 110.8°, Decl. = -5.1°		239.344	( $\sim 3$ )	$\sim 0.009$	$\sim 1200$	Ch. 13
(1925)						239.384	--	$\sim 0.005$	$\sim 2300$	Ch. 13
<b>#244</b>	<b><math>\psi</math>-Aurigids</b>			<b>10/20-11/16</b>	<b>Nov. 09</b>	<b>226.98</b>	--	(11)	--	BMS#759
Outburst	15-20.5 UT, 43 meteors 19?					226.98	--	--	$\sim 60$	RM
Outburst	23:15-00:15 UT (Jan Janssens, Belgium)			$\lambda_{\odot} = 226.98$	90.9	+40.0	--	--	--	A90
				1989 Nov. 04		222.687	--	--	$> 50$	A90
				$\lambda_{\odot} = 222.68729$		+64	--	--	--	A90
$N = --$	6.634	0.439	113.0	277.8	219.3	94.0	--	--	56.7	T89 (62)
Fireballs	AD 1024-1096:			10/30-11/03	80.9	+38.0	--	--	--	AT (64)
<b>#245</b>	<b><math>\zeta</math>-Cancerids</b>			<b>11/06-11/20</b>	<b>Nov. 07</b>	<b>225</b>	--	(6)	--	This work
$N=7$	2.98	0.443	166.1	100.7	55.40	120.5	--	--	63.4	AT (68)
Fireballs	AD 1026-1098:			11/02-11/18	101.7	+19.9	--	--	--	
<b>#246</b>	<b>Nov. Hydrids</b>			<b>11/16-11/23</b>	<b>Nov. 17</b>	<b>235</b>	--	--	--	This work
$N=2$	6.0	0.91	137.6	34.4	54.8	130.3	0.92	--	65.5	GE (10.16)
$N=2$	5.4	0.97	136	34.1	25.7	117.6	--	--	65.0	
Parent?	C/1943 W <sub>1</sub> (van Gent-Peltier-Dainaca) (Epoch 1994-01-12)						$T_J \sim -0.03, H_0 = +10.2$	$(n = 3.5)$		$P$ unknown
(1994)	(200)	0.902	136.007	34.249	59.495	132.9	-08.3	--	66.69	0.0336

**Antihelion**

#24	PEG	$\mu$ -Pegasids	09/29-11/18	Nov. 12	230.4	(5)	<2	Ch. 21
	Outburst?		1952, Nov. 12		$\lambda_{\odot} = 230.41$		>50	This work
	HV3570	3.856	195.80	230.412	+21.78		11.21	
	(error)	$\pm 0.16$	$\pm 0.10$		$\pm 0.12$		$\pm 0.14$	
	HV3570	3.860	195.66	230.412	+21.68		11.20	JW
	N=1	3.099	206.34	(235.04)	+26.1		11.1	U
	N=6	3.86	196	230.7	+21.3		11.2	AC
#18	<b>AND</b>	<b>Andromedids</b>	<b>10/08-11/22</b>	<b>Nov. 14</b>	<b>232</b>	(18)	--	
		Outbursts (see Tab. 6a)						
	N=18	2.76	238.9	231.0	+32.5	+0.63	17.2	This work
	N=5	1.749	--	221	+34.9	--	17.6	J92
	N=3	2.375	245.2	207.2	+31.8	--	18.1	PG
	N=--	2.441	248.6	201.9	+26.3	--	18.7	T89 (55)
	N=--	1.824	232.4	234.8	+46.3	--	14.1	T89 (63)
	N=23	2.90	242.7	225.5	+09.3	--	18.9	<b>SHS59</b>
	N=--	2.7	247	226	+25.2	--	18.0	<b>J</b>
	N=23	2.90	242.7	225.5	+09.3	--	18.9	<b>SHS59</b>
	<i>Parent</i>	<i>3D/Biela</i>	( <i>Epoch 1852-09-29</i> )		$\lambda_{\odot} = 246.56$	$T_1 = +0.78, H_{10} = +7.10$		
	(1852)	3.524	12.654	224.712	+43.4	--	16.15	-0.0066
	(2004)	3.491	7.501	236.175	+27.2	--	17.21	0.0410
	(2050)	3.510	5.950	234.913	+23.9	--	16.76	0.0891
#247	<b>IAR</b>	<b>Nov. <i>t</i>-Aurigids</b>	<b>11/01-11/23</b>	<b>Nov. 16</b>	<b>233.637</b>	1.88 $\pm$ 0.12 (9)	8.2 $\pm$ 2.8	HM
	N=25	1.076	1998 Nov. 18	$\lambda_{\odot} = 235.0$	+35.0	--	--	KZ99
	N=32	1.467	30.5	222.3	+33.3	--	34.0	ZS
	Fireballs	AD 1032-1083:	19.6	222.1	+30.2	--	34.2	ZS
	<b>NOO</b>	<b>Nov. (<math>\omega</math>-)Orionids</b>	10/30-11/03	80.9	+38.0	--	--	AT (64)
	Outburst		<b>11/16-11/29</b>	<b>Nov. 27</b>	<b>245</b>	(5)	--	
	(1964)	Inf.	1964	Nov. 25/26	244.12	1.8	140	(Outburst)
	N=16	12.7	123	244.12	+04.0	--	~45	Ch. 13
		0.088	145.8	(60.0)	+15.6	+0.71	43.3	This work

PEG - "U:." From two video meteors during the 1998 and 1999 Leonid campaigns.

Table 7 (cont.) November

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta Decl./\Delta \lambda$	$V_g$	$\Delta C-E$
N=8	7.32	0.089	29.1	146.6	57.5	83.8	+15.3	—	—	—	—	43.5	MB97
N=7	12.26	0.045	41.5	161.4	41.9	79.4	+14.6	—	—	—	—	38.8	ZS
Fireballs? AD 1053-1082:													
11/08-11/13													
<b>#249</b>	<b>(TAU) Taurids</b>			<b>09/16-12/29</b>		<b>Nov. 05</b>	<b>224 ± 1</b>			2.3	22 ± 3	7.3	PJ
<b>#2</b>	<b>Southern Taurids</b>			<b>09/25-12/19</b>		<b>Nov. 05</b>	<b>224 ± 1</b>			2.3	22 ± 3	3.3	PJ
							<b>225 ± 2</b>			2.3	50	4.0 ± 0.3	IMO
N=144	2.07	0.352	5.4	115.4	37.3	49.4	+13.0	—	—	+0.73	+0.18	28.0	PK
$\sigma$	±0.32	±0.058	±1.1	±7.2	±11.1	—	—	—	—	—	—	±2.1	—
N=19	2.096	0.357	5.6	114.4	38.7	49.8	+12.8	—	—	—	—	28.3	PG
N=49	1.67	0.30	7.1	129	24.7	44.7	+11.2	—	—	—	—	29	GE (D.01)
N=46	2.00	0.340	6.3	116.8	32.7	44.7	+11.5	—	—	+0.82	+0.22	28.35	KP
N=46	1.93	0.375	5.2	113.2	40.7	51.2	+13.8	—	—	+0.79	+0.15	27.0	AC
N=73	2.08	0.33	2.2	118.2	15.5	27.9	+08.8	—	—	—	—	28.8	KL (37)
N=17	2.08	0.50	4.2	99.0	56.8	59.7	+16.7	—	—	1.0	—	23.8	NL (61.11.1)
N=8	2.4	0.38	5.5	112	43.7	53.7	+14.2	—	—	—	—	27.8	W54
Fireballs	AD 1052-1170:			11/19-12/07		43.7	+04.2	—	—	—	—	—	AT (73)
<b>Parent</b>	<b>2P/Encke</b>			<b>(Epoch 2003-12-27)</b>						$T_1 = +3.03$	$H_{10} = +11.5$ (var.)		
(2003)	2.217	0.339	3.943	115.819	44.884	56.0	+16.5	—	—	—	—	29.06	0.1915
<b>#17</b>	<b>NTA Northern Taurids</b>			<b>09/16-12/29</b>		<b>Nov. 05</b>	<b>224 ± 1</b>			2.3	22 ± 3	4.0	PJ
N=80	2.12	0.350	3.1	294.9	226.2	58.6	+21.6	—	—	+0.80	+0.16	28.3	IMO
$\sigma$	±0.25	±0.053	±1.1	±6.5	±10.2	—	—	—	—	—	—	±1.9	PK
				$\lambda_{\odot} = 234.673$		62.0	+23.2	—	—	—	—	27.1	U
N=12	2.178	0.383	4.7	291.0	223.0	51.1	+22.8	—	—	—	—	28.2	PG
N=25	2.20	0.284	2.9	302.3	212.7	44.0	+18.9	—	—	+0.82	+0.22	30.69	KP
N=—	2.443	0.418	2.9	286.0	242.5	67.7	+22.1	—	—	—	—	27.3	T89 (69)
N=—	2.454	0.557	3.8	91.3	60.6	58.7	+20.1	—	—	—	—	22.5	T89 (65)

N=13	2.19	0.36	5.5	294.6	206.1	34.2	+18.4	--	--	28.4	KL (50)
N=45	2.59	0.359	2.4	292.3	230.7	59.0	+22.4	+0.76	+0.10	29.2	AC
Fireballs	AD 1062-1095:			11/21-11/25		55	+25	--	--	--	AT (74)
Parent	2004 TG <sub>10</sub>		(Epoch 2006-03-06)				$\lambda_{\odot} = 223.83$	$T_J = +2.99$	$H_N = +19.46$		
(2006)	2.242	0.315	3.622	298.443	223.865	54.7	+22.3	--	--	29.89	+0.0128
<b>#250</b>	<b>NAR</b>	<b>Nov. v-Arietids</b>		<b>11/17-11/29</b>		<b>Nov. 23</b>	<b>241</b>	--	(5)	--	
N=3	1.54	0.790	2.8	246.4	236.18	39.0	+23.2	--	--	12.3	NMS
N=-,-	2.608	0.794	5.3	238.2	241.3	38.7	+21.2	--	--	16.3	T89 (67a)
N=4	3.257	0.784	9.7	238.0	228.2	22.7	+30.3	--	--	17.8	L71B
											<b>Helion</b>
<b>#251</b>	<b>IVI</b>	<b>Daytime <math>\iota</math>-Virginids</b>		<b>11/05-11/07</b>		<b>Nov. 05</b>	<b>223</b>	--	(2)	--	
N=8	1.217	0.985	10.1	60.7	224.3	210.4	-03.8	--	--	29.0	ZS
<i>December:</i>											
<b>#32</b>	<b>DLM</b>	<b>Dec. Leonis Minorids</b>		<b>12/12-12/17</b>		<b>Dec. 14</b>	<b>262.4</b>	--	(2)	--	
N=6	11.9	0.554	133.8	265.6	262.2	156.1	+32.7	--	--	62.3	This work
N=3	4.70	0.549	133.97	265.98	262.41	156.5	+32.0	--	--	62.1	DMS
N=-,-	inf.	0.612	132.3	255.8	261.6	156.1	+34.6	--	--	63.7	CL
N=9	3.76	0.81	138	249	261.7	163.7	+39.7	--	--	64	KL (193f)
N=3	57.4	0.712	135.7	264.5	259.1	151.7	+32.8	--	--	63.4	W57
?Outburst	44 meteors									>80	
(1921)					$\lambda_{\odot} = 254.26$	<b>1921 Dec. 05</b>	<b>254.26</b>	9.1?	--	--	Ch. 13
Parent?	C/1798 X <sub>1</sub> (Boward)		(Epoch 1799-01-01)				$\lambda_{\odot} = 266.65$	$T_J = 0.01$	$H_{10} = +11.0$	(n=4), P unknown	
(1799)	(200)	0.775	139.354	234.967	266.648	169.0	+28.3	--	--	66.62	0.1165
<b>#19</b>	<b>MON</b>	<b>(Dec.) Monocerotids</b>		<b>11/27-11/17</b>		<b>Dec. 13</b>	<b>260.9 ± 0.6</b>	3.0	4 ± 3	2.0 ± 0.4	PJ
N=11	50.7	0.193	35.2	128.1	80.2	101.8	+08.1	+0.83	-0.05	42.0	This work
N=15	19.9	0.188	34.9	128.9	80.2	102.0	+08.3	+0.95	-0.03	41.6	O89
$\sigma$	--	±0.012	±3.1	±2.1	±2.2	±1.1	±1.2	--	--	±1.8	
N=12	27.6	0.187	34.9	128.9	81.1	102.2	+08.3	--	--	41.8	LO90
N=30	6.199	0.153	22.3	135.8	72.5	95.1	+14.5	--	--	40.0	ZS
N=52	7.114	0.119	24.7	141.2	68.0	92.1	+15.0	--	--	41.6	ZS73
N=-,-	52.24	0.175	31.5	131.0	82.5	100.7	+08.0	+0.80	+0.00	42	LB
N=3	7.69	0.19	39.9	130	82.7	106.7	+05.9	--	--	40.5	GE (12.09)

Table 7 (cont.) December

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta\lambda$ $\Delta Decl./\Delta\lambda$	$W$ $V_g$	ZHR <sup>max</sup>	Notes
N=6	5.56	0.11	39.0	138.9	76.9	102.3	+09.5	-	-	-0.5	42.2	NL (61.12.7)	
N=4	11	0.11	22.6	135.3	73.9	95.5	+14.5	+1.0	-	-	41.3	NL (61.12.2)	
N=-,-	3.464	0.121	22.3	141.9	89.0	113.7	+13.9	-	-	-	41.6	T89 (75S)	
N=4	20.00	0.20	18.7	131.5	77.3	96.8	+15.1	-	-	-	40.6	NL (60.12.9)	
N=3	42	0.14	24.8	135.8	77.6	100.5	+14.0	-	-	-	42.4	J	
N=2	Inf.	0.186	35.2	128.2	81.6	103.7	+07.9	-	-	-	42.4	W57	
Parent (1917)	C/1917 F <sub>1</sub> (Mellish)	0.190	35.981	128.263	80.267	102.0	$\lambda_{\odot} = 260.27$	$T_1 = +0.04$	$H_0 = +7.4$	$(n = 3.9)$	41.94	0.0615	
#16	HYD $\sigma$ -Hydrids			12/03-12/18		Dec. 17	265.5 $\pm$ 0.8	3.0	6.6 $\pm$ 2.0	2.5 $\pm$ 0.5	PJ		
N=18	12.3	0.224	124.9	124.0	84.8	131.9	+00.2	+0.72	-	-	58.0	This work	
N=4	37.046	0.294	132.5	114.4	73.2	124.2	+03.1	-	-	-	60.2	PG	
N=-,-	113.8	0.253	127.9	119.3	72.5	121.7	+03.9	-	-	-	58.5	T89 (71)	
N=2	11.525	0.230	125.0	124.0	82.7	129.6	+00.8	-	-	-	57.9	L71B	
N=-,-	11.53	0.230	125.0	124.0	82.7	127.6	+01.8	+0.80	-0.20	-	58	JW	
N=8	30.0	0.244	125.5	120.7	79.7	127.2	+01.4	+0.7	-0.2	-	58.4	J	
#15	URS Ursae Minorids (= Ursids)			12/17-12/26		Dec. 23	271.0 $\pm$ 0.3	3.4	(0.7)	12 $\pm$ 3	PJ		
Outbursts (see Tab. 5b)							270.6 $\pm$ 0.1	3.0	1.6	12 $\pm$ 1	IMO		
N=64	4.62	0.944	51.5	204.9	270.74	219.35	+75.34	-	-	-	33.0	This work	
$\sigma$	$\pm 1.3$	$\pm 0.007$	$\pm 1.0$	$\pm 1.9$	$\pm 0.07$	$\pm 4.0$	$\pm 0.7$	-	-	-	$\pm 0.9$		
N=-,-	2.62	0.89	52	224	270.7	190.5	+74.7	-	-	-	32	KL (195)	
Parent (2008)	8P/Tuttle	0.934	54.983	207.506	270.34	270.34	$T_1 = +0.31$	$H_0 = +8.0$	$(n = 6.0)$		34.27	0.0952	
(2049)	5.106	0.934	54.611	207.438	270.018	213.9	+74.4	-	-	-	34.08	0.1030	
#20	COM Dec. Comae Berenicids			12/12-01/15		Dec. 26	274	3.0	26	3.2 $\pm$ 0.7	IMO		
N=-,-	14.6	0.560	136.0	262.2	283.1	175.7	+24.7	-	-	-	64	L87	

HYD – “this:” Strong variation of  $q$  versus  $i$ . Values are for a cluster of orbits near the center of the range.  
 URS – The proper name is “Ursae Minorids.” The activity curve consists of two components with  $B = 0.9 \pm 0.4$  (ZHR = 10) and  $B + = 0.08 \pm 0.03/B - = 0.5 \pm 0.4$  (ZHR = 2.0), where  $B$  is the  $\log_{10}$  exponent of ZHR versus solar longitude.



$N = -$	11.1	0.86	149.4	137	260.7	190.6	+13.7	--	--	64	GE (12.22)
$N = 4$	14.4	0.541	139.4	265.0	283.3	175.2	+22.2	--	--	63.7	This work
$N = 11$	Inf.	0.580	134.0	259.6	282.0	175.8	+25.4	+0.88	--	64.0	AC
$N = 1$	18.92	0.556	136.4	263.2	284.3	176.4	+23.5	--	--	63.75	JW
<b>#252 ALY</b>	$\alpha$ -Lyncids			<b>12/10-01/03</b>		<b>Dec. 21</b>	<b>268.9</b>	--	--	--	Table III
Outburst	(M. Currie)			<b>1971 Dec. 20</b>			<b>&lt;268.78</b>	--	60	>350	PJ
(1971)	(25.4)	0.281	84.4	295.9	268.8	138.8	+43.8	--	--	50.4	ZS
? $N = 5$	1.193	0.206	153.8	318.4	264.6	149.8	+21.5	--	--	54.4	<b>Antihelion</b>
<b>#253 PHO</b>	<b>Phoenicids</b>		(1956)	<b>12/04-12/06</b>	<b>Dec. 05</b>	<b>253</b>	<b>2.9</b>	<b>2.8 ± 1.5</b>	<b>&lt;3</b>		PJ
Outbursts (see Tab. 6k)											AC
Visual	2.96	0.99	13	359	74	15.6	-44.7	--	--	11.7	
Parent	$D/1819 W_1$ (Blanpain)		(Epoch 1819-11-22)				$\lambda_{\odot} = 249.80$	$T_J = +0.51$	$H_{10} = +8.5$		
(1819)	2.957	0.986	8.970	360.164	69.795	357.4	-42.0	--	--	10.06	0.0971
Parent	2003 WY <sub>25</sub>		(Epoch 2005-01-30)				$\lambda_{\odot} = 252.25$	$T_J = +0.54$	$H_N = +20.88$		
(2005)	2.847	0.983	5.911	6.250	72.244	3.8	-26.6	--	--	9.15	0.0163
(1819)	2.993	0.889	9.23	349.65	80.020	347.9	-44.0	--	--	10.85	0.089
<b>#254 CMI</b>	<b>Dec. Canis Minorids</b>			<b>12/02-12/05</b>	<b>Dec. 03</b>	<b>252.4</b>	<b>252.4</b>	--	--	--	Ch. 13
Outburst					<b>1988 Dec. 03</b>	<b>252.4</b>	<b>+07.7</b>	--	--	~54	Swift
(1988)	93 meteors plotted					$\lambda_{\odot} = 253.3$	112.9	--	--		Ch. 13
$N = 1$	1.38	0.08	39	154	77	111	+11	--	--	38.8	HV5548
$N = 1$	3.79	0.08	36	149	80	109	+13	--	--	43.2	HV9544
<b>#4 GEM</b>	<b>Geminids</b>			<b>11/27-12/18</b>	<b>Dec. 14</b>	<b>262.08</b>	<b>(2.0)</b>	<b>0.90 ± 0.10</b>	<b>120 ± 10</b>		Ch. 22
	<i>Main peak:</i>										
$N = 221$	1.372	0.1410	24.02	324.42	261.49	113.2	+32.5	+1.02	-0.15	34.58	DMS
$\sigma$	±0.033	--	±1.29	±0.91	±0.30	±0.69	±0.24	--	--	±0.61	IAU
Mean	1.357	0.1400	24.27	324.63	261.433	At peak in year 2000					
$\Delta/\Delta_{\odot}$	-1.9e-3	+1.0e-3	-0.13	-0.41	+1.00						
$\Delta/\text{yr}$	-7.0e-4	+2.1e-6	+9.7e-3	+7.8e-3	+6.8e-4						
$N = 19$	1.386	0.137	24.4	324.7	260.2	112.0	+32.6	--	--	35.0	PG
	<i>Background component (radar):</i>										
$N = 48$	1.376	0.141	23.9	324.9	259.2	110.5	+32.9	+0.92	+0.07	34.63	This work

Table 7 (cont.) December

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak	$\lambda_{\odot}^{\max}$	$\chi$	$W$	$ZHR^{\max}$	Notes
								R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta Decl./\Delta\lambda$	$V_g$	$\Delta C-E$
$\sigma$	$\pm 0.12$	$\pm 0.009$	$\pm 2.1$	$\pm 1.2$	$\pm 1.7$	$\pm 0.76$	$\pm 0.36$					$\pm 0.80$	
$N=118$	1.306	0.139	23.2	325.2	262.1	114.2	+32.1					34.0	ZS
$N=20$	1.30	0.13	18.2	327	261.7	112.8	+29.9					34.2	GE
$N=11$	1.19	0.14	16.4	325.7	260.1	110.2	+29.9	+1.1				32.5	NL (60.12.1)
$N=401$	1.31	0.14	24	326	260.7	111.8	+32.9					34.2	KL (51)
Parent	3200 Phaethon	(Epoch 2005-08-18)											
(2005)	1.271	0.140	24.186	325.246	262.495	115.0	+32.4			$T_1 = +4.51, H_N = +14.6$		33.92	0.0208
<b>#255 PUV</b>	<b>Puppids-Velids I</b>												
	= core of Puppids-Velid Complex												
Visual													
$N=6$	1.3	0.98	70	360	$\lambda_{\odot} = 254.0$	128.0	-45.0	+0.50		-0.20		36.8 $\pm$ 2.2	Mean
$N=3$	1.1	0.98	75	361	82.7	141.5	-43.2					35.3	GE (12.07)
Visual					82.7	145.5	-45.2					37.4	GE (12.08)
Visual					12/03-12/12	113.4	-45.2						M (61)
Visual					12/03-12/04	118.4	-40.8						M (65)
<b>#256 CAR</b>	<b>Carinids</b>												
Visual													
$N=4$	2.94	0.91	66.6	323.7	$\lambda_{\odot} = 263.7$	129.0	-58.0	3.0	(25)			38.9 $\pm$ 2.5	Mean
$N=16$	1.940	0.970	70.0	347.0	76.9	155.3	-60.9					38.9	NL (60.12.7)
$N=3$	1.89	0.98	69.6	340.5	79.7	142.4	-54.2					39.0	JVF
$N=5$	2.08	0.98	70.1	353.4	77.2	143.6	-54.3					38.5	NL (61.12.6)
$N=7$	2.205	0.970	57.3	344	79.0	138.8	-53.1					39.1	NL (60.12.8)
<b>#14 (XOR) <math>\chi</math>-Orionids</b>													
<b>#257 ORN</b>	<b>Northern <math>\chi</math>-Orionids</b>												
	= Extension of NTA into Dec.												
$N=12$	2.22	0.449	2.5	283.9	257.3	83.9	+25.5	+0.54		+0.00		24.9	This work
$N=7$	2.271	0.417	3.3	286.6	254.2	82.1	+26.4					26.4	PG

PUV – Puppids-Velids – Name consists of two constellation names, both “-id”.

N=--	2.185	0.523	4.0	275.0	261.7	82.8	+23.0	--	--	23.6	T89 (72)
N=15	1.729	0.376	0.1	294.4	251.6	83.4	+23.4	--	--	26.2	ZS
N=49	1.475	0.265	0.0	309.2	256.9	97.0	+23.3	--	--	28.7	ZS73
N=4	2.216	0.472	2.5	281.0	259.0	83.8	+26.0	--	--	25.7	L71B
N=4	2.22	0.47	2	281	258	84.8	+26.0	--	--	25.2	AC
<i>Parent?</i> (2002)	2002 XM <sub>35</sub> 2.331	0.376	2.854	(Epoch 2002-12-02) 290.836	251.773	81.3	$\lambda_{\odot} = 251.77$ +25.7	$T_1 = +2.96$	$H_N = +22.96$	28.31	0.0196
<b>#258 ORS</b>	<b>Southern <math>\chi</math>-Orionids</b>			<b>12/01-01/16</b>	<b>Dec. 12</b>	<b>Dec. 12</b>	<b>260</b>	--	(22)	(0.6)	
	= Extension of STA into Dec.										
N=12	2.23	0.594	5.2	86.4	80.1	78.7	+15.7	+0.88	-0.03	21.5	This work
N=6	2.193	0.528	4.4	94.3	78.5	81.1	+17.6	--	--	23.3	PG
N=8	2.224	0.471	6.9	100.6	79.8	85.7	+16.0	--	--	23.1	L71B
N=4	1.85	0.56	4.6	93.7	79.3	80.7	+16.8	+1.3	--	21.5	NL(60.12.2)
N=32	1.790	0.420	2.6	109.0	78.2	87.8	+20.6	--	--	25.2	ZS73
N=8	2.1	0.47	7	101	79	85.7	+16.0	--	--	25.5	AC
N=4	1.64	0.38	15.7	114.3	78.3	91.6	+08.9	--	--	26.9	NL(60.12.3)
<b>#259 DAR</b>	<b>Dec. <math>\alpha</math>-Aurigids</b>			<b>12/14-12/31</b>	<b>Dec. 14</b>	<b>Dec. 14</b>	<b>262.2</b>	--	(7)	--	
	Outburst?			1996 Dec. 13			262.218	1.8	--	~110	
(1996)							+43.1	--	--	--	T89
N=5	2.279	0.668	7.2	257.7	270.0	84.9	+35.5	--	--	19.5	PG
N=--	2.365	0.694	11.2	253.6	274.7	85.9	+42.0	--	--	19.5	T89 (77)
N=--	2.096	0.760	21.8	245.4	276.5	91.2	+62.0	--	--	19.9	T89 (78)
N=22	1.851	0.901	11.1	221.0	293.9	85.0	+58.3	--	--	11.9	ZS
N=6	2.053	0.816	6.7	235.9	279.6	78.4	+39.1	--	--	14.2	ZS73
<b>#260 GTI</b>	<b><math>\gamma</math>-Triangulids</b>			<b>12/15-01/13</b>	<b>Dec. 24</b>	<b>Dec. 24</b>	<b>272</b>	--	(12)	--	
	= Dec. $\beta$ -Perseids										
N=3	2.545	0.926	7.1	212.0	273.0	43.3	+41.6	--	--	11.3	PG
N=--	2.292	0.932	4.7	209.3	272.3	40.8	+32.2	--	--	10.5	T89 (76)
N=14	2.420	0.857	2.1	228.0	262.6	54.7	+25.2	--	--	12.8	L71B

Table 7 (cont.) December

Code	Name	$a$	$q$	$i$	$\omega$	Dates (2000)	Node	Peak R.A.	$\lambda_{\odot}^{\max}$ Decl.	$\chi$ $\Delta R.A./\Delta \lambda$	$W$ $\Delta \text{Decl.}/\Delta \lambda$	ZHR <sup>max</sup> $V_g$	Notes
#261	DDC	Daytime $\delta$ -Scorpiids				12/05–12/07			Dec. 06	254	--	(2)	<b>Helion</b>
		<i>= ecliptic helion source</i>											
N=4		2.38	0.50	4.0	262.6	74.4	246.6	-26.3	--	--	--	25.3	NL (61.12.3)
N=3		2.27	0.43	5.6	255.4	79.5	248.8	-24.3	--	--	--	26.9	NL (60.12.5)
	Parent? (2006)	2004 YD <sub>5</sub>			(Epoch 2006-03-06)				$\lambda_{\odot} = 268.24$	$T_J = +0.39$	$H_N = +29.26$		
		2.274	0.494	3.610	262.331	88.195	263.1	-27.4	--	--	--	24.89	0.0002
#262	KLI	Daytime ( $\kappa$ -)Librids				12/08–12/12			Dec. 11	259	--	(2)	--
N=3		1.35	0.19	8.4	221.1	78.8	231.3	-20.8	--	--	--	31.9	NL (60.12.6)
	radar						235.7	-19.2	--	--	--		ER55

**Notes:**

ALE – “this:” Low  $q$ ; continuous change of  $\Pi$  with node. Three meteors on January 21  $\lambda_{\odot} = 301.5 \pm 0.3^\circ$  in three different years.  
 DFC – Possibly same stream as  $\mu$ -Sagittariids in June.  
 NDP – High rate of faint TV video meteor meteors ( $m$ ) = +4.8<sup>m</sup> on September 22, 2001 13:18–17:45 UT,  $\lambda_{\odot} = 179.699^\circ$ . Visual ZHR = 0.5/h at the same time (SSOP).

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