

NEW AND MISCLASSIFIED PLANETARY NEBULAE

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ABSTRACT. 75 objects have been classified as new planetary nebulae since 1982. They are summarized in Table 1 which gives the designations, names, coordinates and references to the discovery. In the list of misclassified PN (Table 2) 41 objects have been included; Table 3 presents objects with incorrect identification in CGPN. The main properties of a PN and of its nucleus are given in a summary which can be useful for a correct classification of planetaries.

This third supplementary list to the "Catalogue of Galactic Planetary Nebulae" (CGPN - Perek, Kohoutek, 1967) contains 75 discoveries which were published mainly between 1982 and 1986. As in the previous lists the designations, names, coordinates and references to the discovery as PN are given in Table 1. An asterisk affixed to the galactic number means an uncertain classification (suspected, possible or probable PN).

It is suggested to remove 41 objects (Table 2) from the CGPN or from the previous supplementary lists (Kohoutek, 1978 - Paper I, 1983 - Paper II): they are mostly M stars without H α emission, galaxies, reflection nebulae or plate faults. There are numerous further objects the classification of which as PN is still questionable; it is possible to find them in both the list of planetaries and the list of other emission-line objects. The catalogue of symbiotic stars given by Allen (1984) contains 40 stars also classified as planetaries. We are rather reserved concerning their reclassification alone on the basis of symbiotic behaviours: let us mention the symbiotic object 330+4.1 (Cn 1-1) which was removed from the list of PN (Paper I) whereas the recent papers of Lutz (1984) and Bhatt, Mallik (1986) classify it again as a PN.

It is useful to present a list of planetary nebulae with incorrect identification in CGPN (Table 3). Besides

TABLE 1 NEW PLANETARY NEBULAE (1982-1986)

Design.	Name	R.A. (1950)	Decl.	Discovery	Rem.
124+10.1*	EL0103+73	1 ^h 03 ^m .6	+73° 17'	F Ellis, al. 1984	R
128 -4.1*	S 22	1 27.4	+58 07	F Arkhipova, Lozinskaya	1978 R
148-48.1*	GRO155+10	1 55.3	+10 43	F Ellis, al. 1984	
136 +5.1	HEFE 1	2 59.53	+64 43.0	F Heckathorn, al. 1982	
138 +4.1*	HtDe 2	3 06.9	+62 37	Hartl, al. 1983	
149 -9.1*	HtDe 3	3 23.8	+45 13	Hartl, al. 1983	
137+16.1*	EL0419+72	4 19.4	+72 42	Ellis, al. 1984	
166 -6.1*	CRL 618	4 39.56	+36 01.2	Proto-PN in Paper I	
158 +0.1*	Sh 2-216	4 41.3	+46 44	Reynolds 1985	R
205-26.1*	Mac 2-1	5 01.25	-6 13.7	MacConnell 1982	
203-18.1*	Mac 2-2	5 26.42	-0 43.1	MacConnell 1982	
156+12.1*	HtDe 4	5 33.8	+55 30	Hartl, al. 1983	
204-16.1*	Mac 2-3	5 35.71	+0 12.8	MacConnell 1982	
173 +2.1*	PP 40	5 37.53	+35 41.0	Turner, Terzian 1985	
204-13.1*	Mac 2-4	5 45.02	+0 37.7	MacConnell 1982	
197 -6.1	WeDe 1	5 56.64	+10 41.5	Weinberger, al. 1983	
218-10.1*	HtDe 5	6 21.2	-10 11	Hartl, al. 1983	
192 +7.1*	HtDe 6	6 37.2	+21 28	Hartl, al. 1983	
231 -8.1*	Y-C 34	6 49.64	-20 10.8	Cesco, al. 1984	R
221 +4.1*	Y-C 36	7 19.73	-5 50.0	Cesco, al. 1984	
221 +5.2*	Y-C 37	7 23.99	-5 16.0	Cesco, al. 1984	
223 +4.1*	Y-C 39	7 24.46	-7 26.8	Cesco, al. 1984	
219 +7.1*	RWT 152	7 27.4	-2 00	Pritchett 1984	R
247 -4.1*	FEGU 248-5	7 40.48	-32 40.7	Fesen, al. 1983	
235 +4.1*	Y-C 40	7 47.80	-17 44.4	Cesco, al. 1984	
211+18.1*	HtDe 7	7 52.2	+9 43	Hartl, al. 1983	
211+22.1*	BN0808+11	8 08.5	+11 06	Ellis, al. 1984	
271 -8.1*	Y-C 41	8 33.46	-54 53.3	Cesco, al. 1984	
214+31.1*	Y-C 42	8 43.24	+12 48.2	Cesco, al. 1984	
221+46.1	BN0950+13	9 50.3	+13 59	F Ellis, al. 1984	

Design.	Name	R.A. (1950)	Decl.	Discovery	Rem.
273	+6.1* HBDS 1	9 ⁿ 50.8	-46°03'	F Heber, Drilling 1984	R
299	-4.1* HtTr 1	12 13.82	-66 29.0	Hartl, Tritton 1983	R
315	+59.1* Y-C 43	13 14.26	-2 47.9	Cesco, al. 1984	
321	-3.1 HtTr 2	15 26.17	-60 51.4	Hartl, Tritton 1983	R
335	+12.1* DS 2	15 39.7	-39 10	F Drilling 1983	R
336	-1.1* VERA 90	16 34.40	-48 36.8	F Vega, al. 1980	
333	-4.1 HtTr 3	16 35.69	-52 43.4	Hartl, Tritton 1983	R
336	-2.1* VERA 104	16 38.31	-49 39.4	F Vega, al. 1980	
335	-3.1 HtTr 4	16 41.13	-51 06.8	Hartl, Tritton 1983	R
94	+38.1* EL1647+64	16 47.2	+64 18	Ellis, al. 1984	
343	-0.1* HtTr 5	16 57.90	-43 01.6	Hartl, Tritton 1983	R
11	+17.1* DeHt 1	17 04.17	-9 43.1	Dengel, al. 1979	R
75	+35.1 Sa 4-1	17 12.5	+49 19	F Sanduleak 1983	
358	+2.5* HtDe 8	17 28.7	-28 39	Hartl, al. 1983	
36	+21.1* Y-C 44	17 36.12	+12 42.6	Cesco, al. 1984	
36	+20.1* Y-C 45	17 40.75	+12 21.9	Cesco, al. 1984	
332	-16.1 HtTr 6	17 47.36	-60 22.6	F Hartl, Tritton 1983	R
332	-16.2* HtTr 7	17 49.60	-60 49.4	Hartl, Tritton 1983	R
6	+1.1* HtTr 8	17 52.90	-22 58.6	Hartl, Tritton 1983	R
1	-3.3* SAWI 1	17 59.27	-29 25.2	F Shaw, Wirth 1985	
1	-3.4* SAWI 2	17 59.85	-29 46.1	F Shaw, Wirth 1985	
1	-3.5* SAWI 3	18 00.08	-29 50.7	F Shaw, Wirth 1985	
1	-3.6* SAWI 4	18 00.45	-29 46.0	F Shaw, Wirth 1985	
1	-3.7* SAWI 5	18 00.70	-29 51.6	F Shaw, Wirth 1985	
1	-3.8* SAWI 6	18 00.80	-29 27.0	F Shaw, Wirth 1985	
1	-3.9* SAWI 7	18 01.88	-29 19.7	F Shaw, Wirth 1985	
351	-10.2 HtTr 9	18 05.41	-41 48.9	Hartl, Tritton 1983	R
22	+4.1* MA 2	18 12.52	-6 58.2	F Maehara 1982	
23	+4.1* MA 3	18 15.13	-6 49.6	F Maehara 1982	
30	+6.1* Sh 2-68	18 22.43	+0 49.9	F Fesen, al. 1983	R
23	+1.1* MA 13	18 27.80	-7 29.8	F Maehara 1982	

Design.	Name	R.A. (1950)	Decl.	Discovery	Rem.
40	+7.1* Y-C 46	18 ^h 34 ^m 04	+10° 16'.2	Cesco, al. 1984	
9	-8.1* Y-C 47	18 34.37	-24 29.2	Cesco, al. 1984	
31	-0.2* HtTr 10	18 47.82	-1 43.7	Hartl, Tritton 1983	R
68	+14.1* SP 4-1	18 58.75	+38 17.1	F Stephenson 1985	
36	-1.2* HtTr 11	19 00.48	+2 57.9	Hartl, Tritton 1983	R
38	-0.1* HtTr 12	19 01.32	+5 05.2	Hartl, Tritton 1983	R
11	-14.1* HtDe 10	19 02.63	-25 28.5	Hartl, al. 1983	R
36	-2.1* HtTr 13	19 05.52	+2 16.6	Hartl, Tritton 1983	R
41	-0.1* HtTr 14	19 06.79	+7 00.8	Hartl, Tritton 1983	R
51	+2.1* IRAS 1912+172P09	19 12.77	+17 17.5	WhiteLock, Menzies 1986	R
34	-10.1* HtDe 11	19 28.7	-3 49	Hartl, al. 1983	
14	+25.1* HtDe 12	19 55.1	-26 31	Hartl, al. 1983	
75	+5.1* V1016 Cyg	19 55.33	+39 41.5	Proto-PN in Paper I	
99	-8.1* HtDe 13	22 28.1	+47 15	Hartl, al. 1983	

* Possible planetary nebula. F Finding chart. R Remarks.

REMARKS
6 +1.1 F Hartl, Tritton (1985).
11+17.1 Coord. Weinberger (priv. comm.)
11-14.1 ESO 524-G706 (Lauberts, 1982).
30 +6.1 HtDe 9, discov. indep. by Hartl, al. (1983); Simeiz 291 (Gaze, Shajn, 1954); YM 15 (Johnson, 1955).
31 -0.2 F Hartl, Tritton (1985).
36 -1.2 F Hartl, Tritton (1985).
36 -2.1 F Hartl, Tritton (1985).
38 -0.1 F Hartl, Tritton (1985).
41 -0.1 F Hartl, Tritton (1985).
51 +2.1 F Hrivnak, al. (1985).
124+10.1 HtDe 1, discov. indep. by Hartl, al. (1983) No.1; see Lynds (1965).
128 -4.1 PN (Rosado, Kwitter, 1982); No.91
in Johnson (1955); Sh 2-188 (Sharpless, 1959).
YM 22 (Johnson, 1955); Simeiz 288 (Gaze, Shajn, 1954).
Confirmed by Pasachoff, al. (1984); F Rubin, al. (1974).
ESO 558-G01 (Lauberts, 1982).
LSS 1362
F Hartl, Tritton (1985).
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F Hartl, Tritton (1985).
LSE 125
F Hartl, Tritton (1985).
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- DeHt Dengel H., Hartl H., Weinberger R., 1979, Mitt. AG 45, 182.
- DS Drilling J.S., 1983, Astrophys. J. 270, L13.
- EL, GR } Ellis G.L., Grayson E.T., Bond H.E., 1984, Publ. Astron. Soc. Pacific 96, 283.
- BN } Fesen R.A., Gull T.R., Heckathorn J.N., 1983, Publ. Astron. Soc. Pacific 95, 614.
- Sh 2 } Gaze V.F., Shajn G.A., 1954, Izv. Krym. AO 11, 39.
- FEGU } Hartl H., Dengel J., Weinberger R., 1983, Mitt. AG 60, 325.
- Hartl H., Tritton S.B., 1983, Mitt. AG 60, 328.
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- HBDS Heber U., Drilling J.S., 1984, Mitt. AG 62, 252.
- HEFE Heckathorn J.N., Fesen R.A., Gull T.R., 1982, Astron. Astrophys. 114, 414.
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- Lynds B.T., 1965, Astrophys. J. Suppl. 12, 163.
- MaC 2 MacConnell D.J., 1982, Astron. Astrophys. Suppl. 48, 355.
- MA Maehara H., 1982, Contr. Bosscha Obs. 71, 1.
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- RWT Pritchett C., 1984, Astron. Astrophys. 139, 230.
- Sh 2 Reynolds R.J., 1985, Astrophys. J. 288, 622.
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- Sa 4 Sanduleak N., 1983, Publ. Astron. Soc. Pacific 95, 619.
- Sharpless S., 1959, Astrophys. J. Suppl. 4, 257.
- SAWI Shaw R.A., Wirth A., 1985, Publ. Astron. Soc. Pacific 97, 1071.
- SP 4 Stephenson C.B., 1985, Publ. Astron. Soc. Pacific 97, 930.
- PP Turner K.C., Terzian Y., 1985, Astron. J. 90, 59.
- VERA Vega E.I., Rabolli M., Muzzio J.C., Feinstein A., 1980, Astron. J. 85, 1207.
- WeDe Weinberger R., Dengel J., Hartl H., Sabbadin F., 1983, Astrophys. J. 265, 249.
- IRAS Whitelock P.A., Menzies J.W., 1986, Monthly Notices Roy. Astron. Soc. 223, 497.

TABLE 2 MISCLASSIFIED PLANETARY NEBULAE

Design.	Name	Remarks and references
0 +2.2	ESO-520-13	Plate fault (Fredrick, West, 1984)
0 -6.1	ESO-456-73	Plate fault (Fredrick, West, 1984)
3 -3.1	Sa 3-119	M star without H α emission (MacConnell, 1983)
3 -4.10	ESO-456-64	Plate fault (Fredrick, West, 1984)
9 -6.1	ESO-522-29	Plate fault (Fredrick, West, 1984)
28 -4.2	Th 1-I	M star without H α emission (MacConnell, 1983)
35 -2.1	K 4-14	M star without H α emission (MacConnell, 1983)
37 -2.1	Ap 3-1	M star without H α emission (MacConnell, 1983)
37 -3.1	K 4-18	M star without H α emission (MacConnell, 1983)
43 +1.1	K 4-13	M star without H α emission (MacConnell, 1983)
97 +3.1	A 77	Compact HII region (Sabbadin, al., 1986)
196-12.1	A 11	No em. lines, very probably a reflection nebula (Lutz, Kaler, 1983)
227+33.1	A 32	A galaxy or a plate defect on POSS (Lutz, Kaler, 1983)
239-18.1	ESO-426-13	Galaxy (Fredrick, West, 1984)
241 -7.1	M 4-1	Em.-line galaxy (Kohoutek, Pauls, 1985)
242 -3.1	ESO-429-04	Galaxy (Fredrick, West, 1984)
245 -3.1	ESO-429-17	Galaxy (Fredrick, West, 1984)
247-21.1	K 2-13	Plate fault (Kohoutek, Pauls, 1985) Plate fault (West, Kohoutek, 1985)
248-12.1	ESO-367-03	Bar galaxy (Fredrick, West, 1984)
249-22.1	ESO-308-08	Plate fault (Fredrick, West, 1984)
251 -4.1	ESO-369-01	Plate fault (Fredrick, West, 1984)
265 +5.1	ESO-314-12	Probably a galaxy (Fredrick, West, 1984)
266 +2.1	Pe 2-3	M star without H α emission (MacConnell, 1983)
274 -0.1	ESO-212-08	Plate fault (Fredrick, West, 1984)
284-39.1	Lo 2	Probably a galaxy (West, Kohoutek, 1985)
292 -3.1	SP 2-14	M star without H α emission (MacConnell, 1983)
308 -1.1	ESO-097-03	Plate fault (Fredrick, West, 1984)
309 +6.1	Sm 2	M star without H α emission (MacConnell, 1983)
310 +2.1	Sm 3	M star without H α emission (MacConnell, 1983)
327+14.1	ESO-328-04	Among galaxies (Fredrick, West, 1984)

Design.	Name	Remarks and references
329+12.1	ESO-328-40	A number of galaxies around the given position (Fredrick, West, 1984)
336 -8.1	ESO-180-05	Plate fault (Fredrick, West, 1984)
341+17.1	ESO-450-16	Probably a galaxy (Fredrick, West, 1984)
341-15.1	ESO-182-04	Galaxy (West, Kohoutek, 1985)
343+16.1	ESO-451-03	Late-type star plus nebula (Fredrick, West, 1984)
345+10.1	ESO-390-05	Em.-line galaxy (Fredrick, West, 1984)
346+19.1	ESO-515-19	Late-type star (Fredrick, West, 1984)
347 +7.1	ESO-391-02	Plate fault (Fredrick, West, 1984)
349-10.1	ESO-280-02	Either a galaxy or a reflection nebula (West, Kohoutek, 1985)
353-55.1	ESO-289-19	Probably a galaxy (West, Kohoutek, 1985)
358 -3.2	H 2-30	M star without H α emission (MacConnell, 1983)

REFERENCES TO TABLE 2

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 Kohoutek L., Pauls R., 1985, *Astron. Astrophys. Suppl.* 60, 87.
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those objects given in this table we would like to point out 1-3.1 (H 1-47) and 1-3.2 (Ap 1-7): the identification of both objects is identical whereas the respective coordinates differ. Therefore the chart(s) must be incorrect.

In order to answer the question "what is not a PN" with the consequence to remove such an object from the respective list it is necessary to indicate what is a normal PN. We have therefore collected (using the current review literature) the main properties which correspond to the general conception of PN - in the following summary the typical values are given, but they are changing very much during the evolution of the nebulae and of their nuclei (the nebular parameters correspond to the main nebular structure). We believe that only a thorough discussion of all properties can lead to the decision whether or not the respective object belongs (with a certain probability) to the class of PN. For such a discussion not only extensive observations but also a comprehensive theory are necessary.

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TABLE 3 MISIDENTIFIED PLANETARY NEBULAE

Design.	Name	Remarks and references
1 -0.1	B1 3-11	The CGPN identif.chart incorrect (Sanduleak, 1976). Misclassified PN (Paper II).
2 +1.1	H 2-20	Probably incorrect identification, the object is a AO star without em.lines (Lutz, Kaler, 1983).
59 -1.1	He 1-3	Misidentified in CGPN, correct chart given by Sab- badin, Bianchini (1979).
164+31.1	NGC 2474/75	Not identical with NGC 2474/75 (Barbieri, Sulen- tic, 1977). New name JnEr 1 proposed.
324 -1.1	He 2-133	Finding chart incorrect, the PN is located 1.5mm to the north and 1.2mm to the east of the star (AOV) indicated in the CGPN (Lutz, Kaler, 1983).
353 +8.1	MyCn 26	A- or early F-type star, no em.lines. A misidenti- fication or not a PN (Lutz, Kaler, 1983).
355 +2.3	Th 3-11	Not correctly identified on the CGPN chart (San- duleak, 1976).
356 -0.1	Th 3-34	Lies Sp object marked on CGPN chart (Allen, 1979).
358 +1.4	B1 B	Lies Np object marked on CGPN chart (Allen, 1979).
358 -2.2	B1 3-6	Sanduleak (priv.comm.) finds the object 30"E of the identification given in CGPN (Allen, 1979). Misclassified PN (Paper II).

REFERENCES TO TABLE 3

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 Lutz J.H., Kaler J.B., 1983, Publ. Astron. Soc. Pacific 95, 739.
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 Perek L., Kohoutek L., 1967, Catalogue of Galactic Planetary
 Nebulae, Academia Praha.

PLANETARY NEBULA:

MORPHOLOGY:	<p>symmetrical shape (mostly circular or elliptical disc or ring, sometimes bipolar structure) with apparently sharp outer boundary, often multiple shells (main nebula + faint outer structure or halo)</p> <p>-depending on: wavelength (stratification) intrinsic absorption</p> <p>-reflecting orientation in space</p>
DIMENSION:	<p>diam. 0.1pc - 0.2pc (limits ~0.005pc, ~1pc)</p> <p>-depending on wavelength (stratification)</p>
EL.DENSITY:	<p>$10^3 \text{ cm}^{-3} - 10^4 \text{ cm}^{-3}$ (but $<10^3 \text{ cm}^{-3}$ and $>10^4 \text{ cm}^{-3}$ possible for large and small nebulae)</p>
EL.TEMPERATURE:	<p>9000°K - 15000°K (limits 8000°K, 23000°K)</p>
TOTAL MASS:	<p>0.1M_{\odot} - 0.2M_{\odot} (limits ~0.001M_{\odot}, ~1M_{\odot})</p>
EXP.VELLOCITY:	<p>non-isotropic, ~25km/s (limits 4km/s, 60km/s)</p>
SPECTRUM:	<p>Em.lines:</p> <p>recombination lines mostly of H and He</p> <p>collisionally excited (forbidden) lines of C, N, O, Ne, Mg, Si, S, Cl, Ar</p> <p>fluorescent lines (rare) of OIII and NIII</p> <p>-depending on: exc.conditions (exc.class) stratification chemical composition</p> <p>$I([\text{OIII}]5007+4959)/I(\text{H}\beta) \approx 1 \text{ to } 15$ $\approx 0 \text{ to } 1$ for very low-exc.nebulae</p> <p>Continuum emission: free-bound, free-free, two-quantum processes, emission from grains (dust)</p>

CENTRAL STAR:

TEMPERATURE:	<p>50000°K - 100000°K (limits 25000°K, ~200000°K)</p>
LUMINOSITY:	<p>$\sim 5 \times 10^3 L_{\odot}$ (limits $\sim 10^4 L_{\odot}$, $\sim 10^1 L_{\odot}$)</p>
RADIUS:	<p>limits $\sim 0.005 R_{\odot}$, $\sim 1.5 R_{\odot}$</p>
MASS:	<p>$\sim 0.6 M_{\odot}$ (progenitors from 0.8M_{\odot} up to 6-8M_{\odot})</p>
MASS LOSS:	<p>$\sim 10^{-10} M_{\odot}/\text{yr} - 10^{-7} M_{\odot}/\text{yr}$</p>
GRAVITY:	<p>$\log g \sim 4.5 - 7.0$</p>
SPECTRUM:	<p>WR, Of, WR+Of, OVI, cont. O, sdO, peculiar</p>