A Catalogue of Galactic Supernova Remnants
(2006 April version)

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The most recent conventionally published reference for this catalogue:

- Green D.A., 2004, Bulletin of the Astronomical Society of India, 32, 335–370.

(This paper – entitled 'Galactic Supernova Remnants: an Updated Catalogue and Some Statistics' – includes a description of the catalogue, and the summary data from the 2004 January version of the catalogue as an Appendix.) If you make use of the detailed web-based version of the catalogue, then please also cite:

- Green D.A., 2006, *'A Catalogue of Galactic Supernova Remnants (2006 April version)'*, Cavendish Laboratory, Cambridge, UK (available on the World-Wide-Web at "http://www.mrao.cam.ac.uk/surveys/snrs/").

1. The Catalogue Format

This catalogue of Galactic supernova remnants (SNRs) is an updated version of those presented in detail in Green (1984, 1988) and in summary form in Green (1991, 1996, 2004) – hereafter Versions I, II, III, IV and V respectively – and on the World-Wide-Web, in versions of 1995 July, 1996 August, 1998 September, 2000 August, 2001 December and 2004 January. (Version IV, although published in 1996, was produced in 1993, and a detailed version of this was made available on the World-Wide-Web in 1993 November. The summary data from the 2001 December version of the catalogue was also published as an Appendix in Stephenson & Green 2002.)

This, the 2006 April version of the catalogue, contains 265 SNRs (which is 34 more than in the previous, 2004 January, version: 35 new remnants have been added, and one has been removed), with over a thousand references in the detailed listings, plus notes on many possible or probable remnants.

For each remnant in the catalogue the following parameters are given.

- **Galactic Coordinates** of the source centroid, quoted to the nearest tenth of a degree as is conventional. (Note: in this catalogue additional leading zeros are not used.)
- **Other Names** that are commonly used for the remnant. These are given in parentheses if the remnant is only a part of the source. For some remnants, notably the Crab Nebula, not all common names are given.
- **Right Ascension** and **Declination** of the source centroid. The accuracy of the quoted values depends on the size of the remnant; for small remnants they are to the nearest few seconds of time and the nearest minute of arc respectively, whereas for larger remnants they are rounded to coarser values, but are in every case sufficient to specify a point within the boundary of the remnant. These coordinates are usually deduced from radio maps rather than from X-ray or optical observations, and are for J2000.0.
- **Angular Size** of the remnant, in arcminutes, usually taken from the highest resolution radio map available. The boundary of most remnants approximates reasonably well to a circle or an ellipse; a single value is quoted for the angular size of the more nearly circular remnants, which is the diameter of a circle with an area equal to that of the remnant, but for elongated remnants the product of two values is quoted, and these are the major and minor axes of the remnant boundary modelled as an ellipse. In a few cases an ellipse is not a satisfactory description of the boundary of the object (refer to the description of the individual object given in its catalogue entry), although an angular size is still quoted for information. For 'filled-centre' remnants the size quoted is for the largest extent of the observed radio emission, not, as at times has been used by others, the half-width of the centrally brightened peak.

- **Flux Density** of the remnant at 1 GHz in jansky. This is *not* a measured value, but is deduced from the observed radio frequency spectrum of the source. The frequency of 1 GHz is chosen because flux density measurements at frequencies both above and below this value are usually available.
- **Spectral Index** of the integrated radio emission from the remnant, α (here defined in the sense, $S \propto \nu^{-\alpha}$, where S is the flux density at a frequency ν), either a value that is quoted in the literature, or one deduced from the available integrated flux densities of the remnant. For several SNRs a simple power law is not adequate to describe their radio spectra, either because there is evidence that the integrated spectrum is curved or the spectral index varies across the face of the remnant. In these cases the spectral index is given as 'varies' (refer to the description of the remnant and appropriate references in the detailed catalogue entry for more information). In some cases, for example where the remnant is highly confused with thermal emission, the spectral index is given as '?' since no value can be deduced with any confidence.
- **Type** of the SNR: 'S' or 'F' if the remnant shows a 'shell' or 'filled-centre' structure, or 'C' if it shows 'composite' (or 'combination') radio structure with a combination of shell and filled-centre characteristics; or 'S?', 'F?' or 'C?', respectively, if there is some uncertainty; or '?' in several cases where an object is conventionally regarded as an SNR even though its nature is poorly known or not well understood. Until recently only a few remnants were classified as composite remnants, as available observations were only able to identify the more obvious pulsar-powered, flatter radio spectrum filled-centre components within shells. However, in recent years improved observations – particularly in X-rays with the *Chandra* satellite – have identified many faint, pulsar powered nebulae in what until then had been identified as pure shell remnants. (Note: the term 'composite' has been used in a different sense by some authors, to describe SNRs with shell radio and centrally-brightened X-ray morphologies. An alternative term used to describe such remnants is 'mixed morphology', see Rho & Petre 1998.)

In the detailed listings, for each remnant, notes on a variety of topics are given. First, it is noted if other Galactic coordinates have at times been used to label it (usually before good observations have revealed the full extent of the object), if the SNR is thought to be the remnant of a historical SN, or if the nature of the source as an SNR has been questioned (in which case an appropriate reference is usually given later in the entry). Brief descriptions of the remnant from the available radio, optical and X-ray observations as applicable are then given, together with notes on available distance determinations, and any point sources or pulsars in or near the object (although they may not necessarily be related to the remnant). Finally, appropriate references to observations are given for each remnant, complete with journal, volume, page, and a short description of what information each paper contains (for radio observations these include the telescopes used, the observing frequencies and resolutions, together with any flux density determinations). These references are *not* complete, but cover representative and recent observations of the remnant – up to the first few months of 2006 in this version of the catalogue – and they should themselves include references to earlier work. The references do not generally include large observational surveys – of particular interest in this respect are: the Effelsberg 100-m survey at 2.7 GHz of the Galactic plane $358° < l < 240°$, $|b| < 5°$ by Reich *et al.* (1990) and Fürst *et al.* (1990a); reviews of the radio spectra of some SNRs by Kassim (1989), Kovalenko, Pynzar' & Udal'tsov (1994) and Trushkin (1998); the Parkes 64-m survey at 2.4 GHz of the Galactic plane $238° < l < 365°$, $|b| < 5°$ by Duncan *et al.* (1995) and Duncan *et al.* (1997); the Molonglo Galactic plane survey at 843 MHz of $245° < l < 355°$, $|b| < 1\overset{\circ}{.}5$ by Green *et al.* (1999); the survey of $345° < l < 255°$, $|b| < 5°$ at 8.35 and 14.35 GHz by Langston *et al.* (2000); MAGPIS, see White, Becker & Helfand (2005) and Helfand *et al.* (2006); reviews of *Einstein* X-ray imaging and spectroscopic observations of Galactic SNRs by Seward (1990) and Lum *et al.* (1992) respectively; surveys of *IRAS* observations of SNRs and their immediate surroundings by Arendt (1989) and by Saken, Fesen & Shull (1992); the survey of HI emission towards SNRs by Koo & Heiles (1991); the *SPITZER* survey of inner galaxy SNRs by Reach *et al.* (2006); and the catalogue by Fesen & Hurford (1996) of UV/optical/infra-red lines identified in SNRs.

A summary of the data available for all 265 remnants in the catalogue is given in Table I. The other names for SNRs are listed in Table II, and the abbreviations for journals, proceedings and telescopes are listed in Table III. The detailed listings for each SNR are given in Table IV.

2. Revisions and Notes

2.1 Objects no longer thought to be SNRs

The following objects, which were listed in Version I of the catalogue were removed because they were no longer thought to be remnants, or were poorly observed (see Version II for references and further details): G2.4+1.4 (see also Gray 1994a; Goss & Lozinskaya 1995; Polcaro *et al.* 1995), G41.9–4.1 (=CTB 73, PKS 1920+06), G47.6+6.1 (=CTB 63), G53.9+0.3 (part of HC40), G93.4+1.8 (=NRAO 655), G123.2+2.9, G194.7+0.4 (the Origem Loop), G287.8–0.5 (see below), G322.3–1.2 (=Kes 24) and G343.0–6.0 (but see below). G350.1–0.3, which was listed in Version II of the catalogue, was removed as it is no longer thought to be a SNR (see Version III for details). G358.4–1.9, which was listed in Version IV of the catalogue, was removed, as following the discussion of Gray (1994a), as it is not clear that this is a SNR. G240.9–0.9, G299.0+0.2 and G328.0+0.3, which were listed in 1995 July version of the catalogue, were removed from the 1996 August version, following the improved observations of Duncan *et al.* (1996) and Whiteoak & Green (1996). For the 1998 September revision of the catalogue G350.0–1.8 was incorporated into G350.0–2.0, and G337.0–0.1 refers to a smaller remnant than that previously catalogued with the same name. G112.0+1.2, G117.4+5.0, G152.2–1.2 and G211.7–1.1 – which were reported as SNRs by Bonsignori-Facondi & Tomasi (1979) – were removed from the 2001 December version of the catalogue, as the first three of these are not confirmed as SNRs from the ongoing *Canadian Galactic Plane Survey* (Roland Kothes, private communication; but see below for further discussion of another proposed remnant, G213.0–0.6). G10.0–0.3, which was regarded as a remnant – possibly associated with a soft-gamma repeater – was removed from the 2004 January version of the catalogue, as it is now thought to be radio nebula powered by a stellar wind (see Gaensler *et al.* 2001, Corbel & Eikenberry 2004, and references therein).

G166.2+2.5 (=OA 184) – which has long been regarded as a SNR – has been removed from this version of the catalogue, following the studies of Foster *et al.* (2006), who identified this as an HII region.

The following objects, which have been reported as SNRs, but have not been included in any of the versions of the SNR catalogue, have subsequently been shown not to be SNRs.

- G70.7+1.2, which was reported as a SNR by Reich *et al.* (1985), but this has not been confirmed by later observations (see Green 1986; de Muizon *et al.* 1988; Becker & Fesen 1988; Caswell 1988; Bally *et al.* 1989; Phillips, Onello & Kulkarni 1993; Onello *et al.* 1995).
- G81.6+1.0 a possible SNR in W75 reported by Ward-Thompson & Robson (1991). From the published data (see the observations in Wendker, Higgs & Landecker 1991) it was noted in Version IV of the catalogue that this is thermal source not a SNR, because of its thermal radio spectrum, and high infrared-to-radio emission (see also the subsequent discussion by Wendker *et al.* 1993).
- Green & Gull (1984) suggested G227.1+1.0 as a very young SNR, but subsequent observations (Channan *et al.* 1986; Green & Gull 1986) have shown that this is most likely an extragalactic source, not an SNR.
- A candidate SNR, G274.7–2.8, identified by Helfand & Channan (1989), has been shown not to be a SNR by Caswell & Stewart (1991).
- G159.6–18.5, was suggested as a SN by Pauls & Schwartz (1989), from IRAS and other observations, but is probably an HII region (see Andersson *et al.* 2000).
- G25.5+0.2, which was reported as a very young SNR by Cowan *et al.* (1989), although this identification was not certain (see White & Becker 1990; Green 1990; Zijlstra 1991). Sramek *et al.* (1992) report the detection of recombination lines from this source (also see Subrahmanyan *et al.* 1993). Becklin *et al.* (1994) identify G25.5+0.2 as a ring nebula around a luminous blue star. See also Clark, Steele & Langer (2000), who identified a bipolar shell around G25.5+0.2 with similarities to η Carinae.
- Most of the possible SNRs listed by Gorham (1990) – following up SNR candidates suggested by Kassim (1988) – have been shown not to be SNRs by Gorham, Kulkarni & Prince (1993).
- G203.2–12.3, a optical ring about 3 arcmin in diameter, was reported as a possible SNR by Winkler & Reipurth (1992), but was shown to be a Herbig–Haro object (HH 311) by Reipurth, Bally & Devine (1997).
- G359.87+0.18 was reported as a possible young SNR near the Galactic Centre by Yusef-Zadeh, Cotton & Reynolds (1998), but was shown to be a radio galaxy by Lazio *et al.* (1999).
- G106.6+2.9, a small remnant proposed by Halpern *et al.* (2001), is incorporated into the larger catalogued remnant G106.3+2.7.

Some entries in the catalogue have been renamed, due to improved observations revealing a larger true extent for the object (previously G5.3–1.0 is now G5.4–1.2; G193.3–1.5 is now G192.8–1.1; G308.7+0.0 is now incorporated into G308.8–0.1). G337.0–0.1 now refers to a small (1.5 arcmin) remnant, rather than larger supposed remnant at this position (see Sarma *et al.* 1997), and G350.0–2.0 now incorporates the previously catalogued G350.0–1.8, based on the improved observations of Gaensler (1998).

2.2 New SNRs

The following remnants were added to Version II of the catalogue: G0.9+0.1, G1.9+0.3, G5.9+3.1, G6.4+4.0, G8.7–0.1, G16.8–1.1, G18.9–1.1, G20.0–0.2, G27.8+0.6, G30.7+1.0, G31.5–0.6, G36.6–0.7, G42.8+0.6, G45.7–0.4, G54.1+0.3, G73.9+0.9, G179.0+2.6, G312.4–0.4, G357.7+0.3 and G359.1–0.5.

The following remnants were added to Version III of the catalogue: G4.2–3.5, G5.2–2.6, G6.1+1.2, G8.7–5.0, G13.5+0.2, G15.1–1.6, G16.7+0.1, G17.4–2.3, G17.8–2.6, G30.7–2.0, G36.6+2.6, G43.9+1.6, G59.8+1.2, G65.1+0.6, G68.6–1.2, G69.7+1.0, G279.0+1.1, G284.3–1.8 (=MSH 10–53), G358.4–1.9 and G359.0–0.9.

The following remnants were added to Version IV of the catalogue: G59.5+0.1, G67.7+1.8, G84.9+0.5, G156.2+5.7, G318.9+0.4, G322.5–0.1, G343.1–2.3 and G348.5–0.0.

The following remnants were added to 1995 July version of the catalogue: G1.0–0.1, G1.4–0.1, G3.7–0.2, G3.8+0.3, G28.8+1.5, G76.9+1.0, G272.2–3.2, G341.2+0.9, G354.1+0.1, G355.6–0.0, G356.3–0.3, G356.3–1.5 and G359.1+0.9.

The following remnants were added to the 1996 August version of the catalogue: G13.3–1.3 G286.5–1.2, G289.7–0.3, G294.1–0.0, G299.2–2.9 G299.6–0.5, G301.4–1.0, G308.1–0.7, G310.6–0.3, G310.8–0.4, G315.9–0.0, G317.3–0.2, G318.2+0.1, G320.6–1.6, G321.9–1.1, G327.4+1.0, G329.7+0.4, G342.1+0.9, G343.1–0.7, G345.7–0.2, G349.2–0.1, G351.7+0.8, G351.9–0.9 and G354.8–0.8.

The following remnants were added to the 1998 September version of the catalogue: G0.3+0.0, G32.1–0.9, G55.0+0.3, G63.7+1.1 and G182.4+4.3.

The following remnants were added to the 2000 August version of the catalogue: G7.0–0.1, G16.2–2.7, G29.6+0.1, G266.2–1.2 and G347.3–0.5.

The following remnants were added to the 2001 December version of the catalogue: G4.8+6.2, G28.6–0.1, G85.4+0.7, G85.9–0.6, G106.3+2.7, G292.2–0.5, G343.0–6.0 G353.9–2.0, G356.2+4.5 and G358.0+3.8.

G312.5–3.0 was added to the 2004 January version of the catalogue.

The following remnants have been added to this version of the catalogue.

- G32.4+0.1, identified by Yamaguchi *et al.* (2004).
- Two 2nd quadrant remnants, G96.0+2.0 and G113.0+0.2, identified by Kothes, Uyanıker & Reid (2005).
- G337.2+0.1, which was confirmed as a SNR by Combi *et al.* (2005).
- 31 new SNRs in the region $4\overset{\circ}{.}5 < l < 22\overset{\circ}{.}0$, $|b| < 1\overset{\circ}{.}25$ (G5.5+0.3, G6.1+0.5, G6.5–0.4, G7.2+0.2, G8.3–0.0, G8.9+0.4, G9.7–0.0, G9.9–0.8, G10.5–0.0, G11.0–0.0, G11.1–0.7, G11.1–1.0, G11.1+0.1, G11.8–0.2, G12.2+0.3, G12.5+0.2, G12.7–0.0, G12.8–0.0, G14.1–0.1, G14.3+0.1, G15.4+0.1, G16.0–0.5, G16.4–0.5, G17.0–0.0, G17.4–0.1, G18.1–0.1, G18.6–0.2, G19.1+0.2, G20.4+0.1, G21.0–0.4 and G21.5–0.1) identified by Brogan *et al.* (2006).

2.3 Possible and probable SNRs not listed in the catalogue

The following are possible or probable SNRs for which further observations are required to confirm their nature or parameters, or for which observations are not yet in the published literature.

2.3.1 Radio

- A possible SNR near the Galactic centre reported by Ho *et al.* (1985) from radio observations (see also Coil & Ho 2000; Lu, Wang & Lang 2003; Senda, Murakami & Koyama 2003, and references therein).
- Gosachinskiĭ (1985) reported evidence for non-thermal radio emission, presumably from SNRs, associated with several bright, thermal Galactic sources. Some of these sources have been included in the catalogue, following improved observations (but also see Odegard 1986, who questions the reliability of some of Gosachinskiĭ's results).
- G300.1+9.4, a possible SNR nearly 2° in diameter reported by Dubner, Colomb & Giacani (1986).
- Routledge & Vaneldik (1988) report a possible faint radio shell SNR nearly 2° in diameter, near the young pulsar PSR 1930+22 – see also Gómez-González & del Romero (1983), who report a smaller (about 40 arcmin) possible SNR (G57.1+1.7) associated with this pulsar, and see Caswell, Landecker & Feldman (1985) and Kovalenko (1989).
- Five possible remnants (G45.9–0.1, G71.6–0.5, G72.2–0.3, G83.0–0.2 and G85.2–1.2) of the eleven reported by Taylor, Wallace & Goss (1992) from a radio survey of part of the Galactic plane. (Four of the other possible SNRs reported by Taylor *et al.*, are included in the catalogue as G55.0+0.3, G59.5+0.1, G63.7+1.1 and G76.9+1.0.)
- A faint, poorly defined possible remnant G41.1+1.2 reported by Gorham, Kulkarni & Prince (1993).
- G104.7+2.8, a possible SNR reported by Green & Joncas (1994) from radio observations. However, recent observations at 10.7 GHz (Wolfgang Reich, private communication) cast doubt on this identification, as they do not support a non-thermal radio spectrum for the source.
- G355.4+0.7, G356.6+0.1, G357.1–0.2, G358.1+1.0, G358.5–0.9, G358.7+0.7, G359.2–1.1, G3.1–0.6 and G4.2+0.0, which are among the possible SNRs listed by Gray (1994b) from radio observations near the Galactic centre. See also Roy & Pramesh Rao (2002) who present additional observations of G356.3-0.3, G356.6+0.1, G357.1-0.2 and G3.1–0.6 which they consider as possible SNRs, and Bhatnagar (2002) for additional observations of G4.2+0.0 which appears to be a thermal source.
- Duncan *et al.* (1995) and Duncan *et al.* (1997) list several large-scale (1.5 to 10 degree), and smaller, low radio surface-brightness candidate SNRs from the Parkes 2.4-GHz survey of $270° < l < 360°$. Several of these candidates have been confirmed as SNRs by subsequent, improved observations, and are included in the catalogue. (See also Camilio *et al.* 2004, who detected a young pulsar near one of the candidate SNRs, G309.8–2.6, and Russeil *et al.* 2005, who detected optical filaments from one of the candidates.)
- Whiteoak & Green (1996), from their radio survey of much of the southern Galactic plane, list 16 possible SNRs (G308.4–1.4, G317.5+0.9, G319.9–0.7, G320.6–0.9, G322.7+0.1, G322.9–0.0, G323.2–1.0, G324.1+0.1, G325.0–0.3, G331.8–0.0, G337.2+0.1, G339.6–0.6, G345.1+0.2, G345.1–0.2, G348.8+1.1 and G350.1–0.3).
- Several candidate SNRs reported by Combi & Romero (1998), Combi, Romero & Arnal (1998), Combi, Romero & Benaglia (1998), Punsly *et al.* (2000) and Combi *et al.* (2001).
- A possible SNR, near $l = 313°$, which is close to an unidentified Galactic plane γ-ray source (see Roberts *et al.* 1999), and to a pulsar (Roberts, Romani & Johnston 2001).
- G359.07–0.02, a possible SNR noted by LaRosa *et al.* (2000).
- Two possible SNRs near G6.4–0.1 (=W28) noted by Yusef-Zadeh *et al.* (2000).
- Gaensler *et al.* (2000), in a search for pulsar wind nebulae, found a small shell of radio emission near PSR B1356–60 – which they designate G311.28+1.09 – which may be a supernova remnant.
- A possible SNR, G328.6–0.0, noted by McClure-Griffiths *et al.* (2001) in the test region of the *Southern Galactic Plane Survey*.
- G346.5–0.1, an arc of radio emission observed by Gaensler *et al.* (2001), which is potentially part of a SNR, but requires further observations to confirm its nature.

- Giacani *et al.* (2001) presented observations of a pulsar wind nebula around PSR J1709–4428, which may be part of the catalogued remnant G343.1–2.3, or may represent another object.
- Several possible SNRs reported by Trushkin (2001), which were identified from Galactic radio surveys (one of which, G6.1+0.5, is included in the catalogue, due to improved subsequent observations).
- Two possibles SNRs (G336.1–0.2 and G352.2–0.1) discussed briefly by Manchester *et al.* (2002).
- G282.8–1.2, a possible young SNR noted by Misanovic, Cram & Green (2002).
- Three possible remnants – G41.5+0.4, G42.0–0.0 and G43.5+0.6 – identified by Kaplan *et al.* (2002).
- Two faint SNR candidates shown in Reich (2002).
- A possible faint remnant, G213.0–0.6, noted by Reich, Zhang & Fürst (2003), which is not well defined by current observations (this incorporates one of the faint remnants which was proposed by Bonsignori-Facondi & Tomasi 1979, see above).
- G107.5–1.5, a probable remnant identified at by Kothes (2003), but the full extent of which is not well defined at present.
- Zhang (2003) identified four candidate SNRs from radio surveys. One of these – called G41.9+0.04 by Zhang – is close to one of the possible remnant by Kaplan *et al.* (2002), see above. A second – G74.8+0.63 – which Zhang identified as a possible remnant partly on the basis of its non-thermal radio spectrum, actually has a flat, thermal radio spectrum, an has long been identified as an HII region (e.g. Weiler & Shaver 1978; Pineault & Chastenay 1990). Another source – G47.8+2.03 – also may have a thermal radio spectrum, given its published 2.7-GHz flux density (Fürst *et al.* 1990b).
- Four possible SNRs – labelled G5.71–0.08, G6.31+0.54, G15.51–0.15 and G19.13+0.90 – identified by Brogan *et al.* (2006) from deep radio surveys, for which further observations are required to confirm their nature.
- Helfand *et al.* (2006) list many SNR candidates in the region $5^\circ < l < 32^\circ$, $|b| < 0\overset{\circ}{.}8$ from MAGPIS.

2.3.2 UV/Optical/Infra-red

- A possible SNR overlapping G296.1–0.5, identified from optical (and X-ray) observations by Hutchings, Crampton & Cowley (1981).
- A SNR (G260.4–3.3) about 4 arcmin in diameter within the Puppis A remnant identified optically by Winkler *et al.* (1989). This has not been detected at radio wavelengths (see Dubner *et al.* 1991).
- A possible SNR (G32.1+0.1) reported from optical spectroscopy by Thompson, Djorgovski & de Carvalho (1991), following up radio and infrared observations of Jones, Garwood & Dickey (1988).
- G75.5+2.4, a possible large (about 2°) old SNR in Cygnus suggested by Nichols-Bohlin & Fesen (1993) from infra-red and optical observations (see also Dewdney & Lozinskaya 1994; Marston 1996; Esipov *et al.* 1996).
- A possible optical SNR (G247.8+4.9) noted by Weinberger (1995), which may be Balmer dominated (see also Weinberger *et al.* 1998 and Zanin & Kerber 2000).
- An optical shell around the Coalsack Nebula (near $l = 300^\circ$, $b = 0^\circ$) identified by Walker & Zealey (1998). This coincides with one of the large possible SNRs suggested by Duncan *et al.* (1995), from radio observations.
- Two possible SNRs, G340.5+0.7 and G342.1+0.1, identified by Walker, Zealey & Parker (2001) from filaments seen in Hα survey observations.
- A probably SNR which was identified by Bally & Reipurth (2001) – which they label as G110.3+11.3 – from optical filaments (and which is also associated with a large HI and CO cavity, and soft X-ray enhancement).
- A possible remnant, near $l = 70^\circ, b = 2^\circ$ noted by Mavromatakis *et al.* (2002).
- A large, approximately 24° diameter, optical and X-ray loop in Antila (McCullough, Fields & Pavlidou 2002).
- Optical filaments in Pegausus (Boumis *et al.* 2002) which suggest one or more possible SNRs.
- A possible remnant identified from optical filaments to the NE of the known SNR G116.5+1.1, as observed by Mavromatakis *et al.* (2005).
- A suggested small, young remnant observed by *Spitzer* (Morris *et al.* 2006).

2.3.3 X-ray/γ-ray

- H1538–32 a large X-ray source in Lupus, near l = 307°, b = +20° (Riegler, Agrawal & Gull 1980; see also Colomb, Dubner & Giacani 1984; Gahm *et al.* 1990) which is a possible old SNR;
- G189.6+3.3, a faint, possible SNR overlapping G189.1+3.0 (=IC443) identified by Asaoka & Aschenbach (1994) from ROSAT X-ray observations.
- G117.7+0.6, a faint shell of soft X-ray emission near CTB 1 (=G116.9+0.2), which contains a pulsar (Hailey & Craig 1995; see also Craig, Hailey & Pisarski 1997).
- A possible SNR identified in X-rays around the pulsar B1828–13 (see Finley, Srinivasan & Park 1996).
- A possible, large SNR, G69.4+1.2, identified as an X-ray shell by Yoshita, Miyata & Tsunemi (1999, 2000). See also Mavromatakis, Boumis & Paleologou (2002).
- Possible SNRs identified in the *ROSAT* All-Sky Survey are discussed briefly by Schaudel *et al.* (2002).
- G0.570–0.018 a small ring of X-ray emission near the Galactic Centre, which has been proposed as a very young remnant by Senda, Murakami & Koyama (2002). See also Senda, Murakami & Koyama (2003), who identify other possible SNRs near the Galactic Centre from their X-ray emission, and Renaud *et al.* (2006).
- Two probable SNRs (G25.5+0.0 and G26.6–0.1) identified by Bamba *et al.* (2003) from their hard X-ray emission.
- Five of the first quadrant candidate SNRs identified by Ueno *et al.* (2004) from the *ASCA* Galactic Plane Survey (see also Yamuguchi *et al.* 2004). Two of the candidates listed by Ueno *et al.* are included in the catalogue (as G28.6–0.1 and G32.4+0.1), as additional observations confirm their nature.
- A possible SNR identified from X-ray at γ-ray observations (Malizia *et al.* 2005).

2.3.4 Other

- G287.8–0.5, which is associated with η Carinae, was listed in Version I as a SNR, but was removed from the catalogue in Version II as its parameters are uncertain (see Jones 1973; Retallack 1984; Tateyama, Strauss & Kaufmann 1991; and the discussion in Version II).
- G359.2–0.8 (the 'mouse'), near the Galactic centre, which has been suggested as being analogous to the central region of CTB 80 (=G69.0+2.7) by Predehl & Kulkarni (1995), i.e. a pulsar powered nebula (see also Camilo *et al.* 2002).

It should also be noted that: (a) some large radio continuum and HI loops in the Galactic plane (e.g. Berkhuijsen 1973) may be parts of very large, old SNRs, but they have not been included in the catalogue (see also Combi *et al.* 1995; Maciejewski *et al.* 1996; Kim & Koo 2000; Normandeau *et al.* 2000; Woermann, Gaylard & Otrupcek 2001; Stil & Irwin 2001; Uyanıker & Kothes 2002); (b) some large ($>$ 10°) regions of X-ray emission that are indicative of a SNR are not included in the catalogue (e.g. the Monogem ring, near l = 203°, b = +12°, see Nousek *et al.* 1981, Plucinsky *et al.* 1996, Thorsett *et al.* 2003, Amenomori *et al.* 2005, and references therein, plus Weinberger, Temporin & Stecklum 2006, for observations of optical filaments; in the Gum Nebula near l = 250°, b = 0°, see Leahy, Nousek & Garmire 1992, and also see Reynolds 1976, Dubner *et al.* 1992, Duncan *et al.* 1996, Reynoso & Dubner 1997, Heiles 1998; in Eridanus near l = 200°, b = –40°, see Naranan *et al.* 1976, Burrows *et al.* 1993, Snowden *et al.* 1995, Heiles 1998, Boumis *et al.* 2001); (c) the distinction between filled-centre remnants and pulsar wind nebula is not clear, and isolated, generally faint, pulsar wind nebulae are also not included in the catalogue (e.g. Gaensler *et al.* 1998, Giacani *et al.* 2001, Jones, Stappers & Gaensler 2002, Wang, Lu & lang 2002, Braje *et al.* 2003; Gaensler *et al.* 2003, Gaensler *et al.* 2004, Hessels *et al.* 2004).

2.4 Questionable SNRs listed in the catalogue

As noted in Versions II and IV of the catalogue, the following sources are listed as SNRs, although, as discussed in each case, the identifications are not certain: G5.4–1.2, G39.7–2.0 (=W50), G65.7+1.2 (=DA 495), G69.0+2.7 (=CTB 80), G318.9+0.4 and G357.7–0.1. The nature of G76.9+1.0 (an unusual radio source similar to G65.7+1.2), and of G354.1+0.1 (which appears may be similar to G357.7–0.1 (=MHS 17–39)) are also uncertain (see Landecker, Higgs & Wendker 1993 and Frail, Goss & Whiteoak 1994).

There are also some objects that have been identified as SNRs and are listed in the catalogue, although they have been barely resolved in the available observations, or are faint, and have not been well separated from confusing background or nearby thermal emission, and their identification as SNRs, or at least their parameters remain uncertain.

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l	b	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
0.0	+0.0	17 45 44	–29 00	3.5 × 2.5	S	100?	0.8?	Sgr A East
0.3	+0.0	17 46 15	–28 38	15 × 8	S	22	0.6	
0.9	+0.1	17 47 21	–28 09	8	C	18?	varies	
1.0	–0.1	17 48 30	–28 09	8	S	15	0.6?	
1.4	–0.1	17 49 39	–27 46	10	S	2?	?	
1.9	+0.3	17 48 45	–27 10	1.2	S	0.6	0.7	
3.7	–0.2	17 55 26	–25 50	14 × 11	S	2.3	0.65	
3.8	+0.3	17 52 55	–25 28	18	S?	3?	0.6	
4.2	–3.5	18 08 55	–27 03	28	S	3.2?	0.6?	
4.5	+6.8	17 30 42	–21 29	3	S	19	0.64	Kepler, SN1604, 3C358
4.8	+6.2	17 33 25	–21 34	18	S	3	0.6	
5.2	–2.6	18 07 30	–25 45	18	S	2.6?	0.6?	
5.4	–1.2	18 02 10	–24 54	35	C?	35?	0.2?	Milne 56
5.5	+0.3	17 57 04	–24 00	12 × 15	S	5.5	0.7	
5.9	+3.1	17 47 20	–22 16	20	S	3.3?	0.4?	
6.1	+0.5	17 57 29	–23 25	18 × 12	S	4.5	0.9	
6.1	+1.2	17 54 55	–23 05	30 × 26	F	4.0?	0.3?	
6.4	–0.1	18 00 30	–23 26	48	C	310	varies	W28
6.4	+4.0	17 45 10	–21 22	31	S	1.3?	0.4?	
6.5	–0.4	18 02 11	–23 34	18	S	27	0.6	
7.0	–0.1	18 01 50	–22 54	15	S	2.5?	0.5?	
7.2	+0.2	18 01 07	–22 38	12	S	2.8	0.6	
7.7	–3.7	18 17 25	–24 04	22	S	11	0.32	1814–24
8.3	–0.0	18 04 34	–21 49	5 × 4	S	1.2	0.6	
8.7	–5.0	18 24 10	–23 48	26	S	4.4	0.3	
8.7	–0.1	18 05 30	–21 26	45	S?	80	0.5	(W30)
8.9	+0.4	18 03 58	–21 03	24	S	9	0.6	
9.7	–0.0	18 07 22	–20 35	15 × 11	S	3.7	0.6	
9.8	+0.6	18 05 08	–20 14	12	S	3.9	0.5	
9.9	–0.8	18 10 41	–20 43	12	S	6.7	0.4	
10.5	–0.0	18 09 08	–19 47	6	S	0.9	0.6	
11.0	–0.0	18 10 04	–19 25	9 × 11	S	1.3	0.6	
11.1	–1.0	18 14 03	–19 46	18 × 12	S	5.8	0.6	
11.1	–0.7	18 12 46	–19 38	11 × 7	S	1.0	0.7	
11.1	+0.1	18 09 47	–19 12	12 × 10	S	2.3	0.4	
11.2	–0.3	18 11 27	–19 25	4	C	22	0.6	
11.4	–0.1	18 10 47	–19 05	8	S?	6	0.5	
11.8	–0.2	18 12 25	–18 44	4	S	0.7	0.3	
12.0	–0.1	18 12 11	–18 37	7?	?	3.5	0.7	
12.2	+0.3	18 11 17	–18 10	5 × 6	S	0.8	0.7	
12.5	+0.2	18 12 14	–17 55	5 × 6	C?	0.6	0.4	
12.7	–0.0	18 13 19	–17 54	6	S	0.8	0.8	
12.8	–0.0	18 13 37	–17 49	3	S	0.8	0.5	
13.3	–1.3	18 19 20	–18 00	70 × 40	S?	?	?	
13.5	+0.2	18 14 14	–17 12	5 × 4	S	3.5?	1.0?	

l	*b*	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
14.1	–0.1	18 15 52	–16 34	6 × 5	S	0.5	0.6	
14.3	+0.1	18 15 58	–16 27	5 × 4	S	0.6	0.4	
15.1	–1.6	18 24 00	–16 34	30 × 24	S	5.5?	0.8?	
15.4	+0.1	18 18 02	–15 27	14 × 15	S	5.6	0.6	
15.9	+0.2	18 18 52	–15 02	7 × 5	S?	5	0.6?	
16.0	–0.5	18 21 56	–15 14	15 × 10	S	2.7	0.6	
16.2	–2.7	18 28 50	–16 11	17	S	2	0.5	
16.4	–0.5	18 22 38	–14 55	13 × 13	S	4.6	0.7	
16.7	+0.1	18 20 56	–14 20	4	C	3.0	0.6	
16.8	–1.1	18 25 20	–14 46	30 × 24?	?	2?	?	
17.0	–0.0	18 21 57	–14 08	5	S	0.5	0.5	
17.4	–2.3	18 30 55	–14 52	24?	S	4.8?	0.8?	
17.4	–0.1	18 23 08	–13 46	6	S	0.4	0.7	
17.8	–2.6	18 32 50	–14 39	24	S	4.0?	0.3?	
18.1	–0.1	18 24 34	–13 11	8	S	4.6	0.5	
18.6	–0.2	18 25 55	–12 50	6	S	1.4	0.4	
18.8	+0.3	18 23 58	–12 23	17 × 11	S	33	0.4	Kes 67
18.9	–1.1	18 29 50	–12 58	33	C?	37	varies	
19.1	+0.2	18 24 56	–12 07	27	S	10	0.5	
20.0	–0.2	18 28 07	–11 35	10	F	10	0.0	
20.4	+0.1	18 27 51	–11 00	8	S	3.1	0.4	
21.0	–0.4	18 31 12	–10 47	9 × 7	S	1.1	0.6	
21.5	–0.9	18 33 33	–10 35	4	C	6?	0.0	
21.5	–0.1	18 30 50	–10 09	5	S	0.4	0.5	
21.8	–0.6	18 32 45	–10 08	20	S	69	0.5	Kes 69
22.7	–0.2	18 33 15	–09 13	26	S?	33	0.6	
23.3	–0.3	18 34 45	–08 48	27	S	70	0.5	W41
23.6	+0.3	18 33 03	–08 13	10?	?	8?	0.3	
24.7	–0.6	18 38 43	–07 32	15?	S?	8	0.5	
24.7	+0.6	18 34 10	–07 05	30 × 15	C?	20?	0.2?	
27.4	+0.0	18 41 19	–04 56	4	S	6	0.68	4C–04.71
27.8	+0.6	18 39 50	–04 24	50 × 30	F	30	varies	
28.6	–0.1	18 43 55	–03 53	13 × 9	S	3?	?	
28.8	+1.5	18 39 00	–02 55	100?	S?	?	0.4?	
29.6	+0.1	18 44 52	–02 57	5	S	1.5?	0.5?	
29.7	–0.3	18 46 25	–02 59	3	C	10	0.7	Kes 75
30.7	–2.0	18 54 25	–02 54	16	?	0.5?	0.7?	
30.7	+1.0	18 44 00	–01 32	24 × 18	S?	6	0.4	
31.5	–0.6	18 51 10	–01 31	18?	S?	2?	?	
31.9	+0.0	18 49 25	–00 55	7 × 5	S	24	0.49	3C391
32.0	–4.9	19 06 00	–03 00	60?	S?	22?	0.5?	3C396.1
32.1	–0.9	18 53 10	–01 08	40?	C?	?	?	
32.4	+0.1	18 50 05	–00 25	6	S	0.25?	?	
32.8	–0.1	18 51 25	–00 08	17	S?	11?	0.2?	Kes 78
33.2	–0.6	18 53 50	–00 02	18	S	3.5	varies	

l	*b*	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
33.6	+0.1	18 52 48	+00 41	10	S	22	0.5	Kes 79, 4C00.70, HC13
34.7	–0.4	18 56 00	+01 22	35 × 27	C	230	0.30	W44, 3C392
36.6	–0.7	19 00 35	+02 56	25?	S?	?	?	
36.6	+2.6	18 48 49	+04 26	17 × 13?	S	0.7?	0.5?	
39.2	–0.3	19 04 08	+05 28	8 × 6	C	18	0.6	3C396, HC24, NRAO 593
39.7	–2.0	19 12 20	+04 55	120 × 60	?	85?	0.7?	W50, SS433
40.5	–0.5	19 07 10	+06 31	22	S	11	0.5	
41.1	–0.3	19 07 34	+07 08	4.5 × 2.5	S	22	0.48	3C397
42.8	+0.6	19 07 20	+09 05	24	S	3?	0.5?	
43.3	–0.2	19 11 08	+09 06	4 × 3	S	38	0.48	W49B
43.9	+1.6	19 05 50	+10 30	60?	S?	8.6?	0.2?	
45.7	–0.4	19 16 25	+11 09	22	S	4.2?	0.4?	
46.8	–0.3	19 18 10	+12 09	17 × 13	S	14	0.5	(HC30)
49.2	–0.7	19 23 50	+14 06	30	S?	160?	0.3?	(W51)
53.6	–2.2	19 38 50	+17 14	33 × 28	S	8	0.75	3C400.2, NRAO 611
54.1	+0.3	19 30 31	+18 52	1.5	F?	0.5	0.1	
54.4	–0.3	19 33 20	+18 56	40	S	28	0.5	(HC40)
55.0	+0.3	19 32 00	+19 50	20 × 15?	S	0.5?	0.5?	
55.7	+3.4	19 21 20	+21 44	23	S	1.4	0.6	
57.2	+0.8	19 34 59	+21 57	12?	S?	1.8?	?	(4C21.53)
59.5	+0.1	19 42 33	+23 35	5	S	3?	?	
59.8	+1.2	19 38 55	+24 19	20 × 16?	?	1.6	0.5	
63.7	+1.1	19 47 52	+27 45	8	F	1.8	0.3	
65.1	+0.6	19 54 40	+28 35	90 × 50	S	6	0.6	
65.3	+5.7	19 33 00	+31 10	310 × 240	S?	52?	0.6?	
65.7	+1.2	19 52 10	+29 26	18	?	5.1	0.6	DA 495
67.7	+1.8	19 54 32	+31 29	9	S	1.4	0.3	
68.6	–1.2	20 08 40	+30 37	28 × 25?	?	0.7?	0.0?	
69.0	+2.7	19 53 20	+32 55	80?	?	120?	varies	CTB 80
69.7	+1.0	20 02 40	+32 43	16	S	1.6	0.8	
73.9	+0.9	20 14 15	+36 12	22?	S?	9?	0.3?	
74.0	–8.5	20 51 00	+30 40	230 × 160	S	210	varies	Cygnus Loop
74.9	+1.2	20 16 02	+37 12	8 × 6	F	9	varies	CTB 87
76.9	+1.0	20 22 20	+38 43	12 × 9	?	2	0.6	
78.2	+2.1	20 20 50	+40 26	60	S	340	0.5	DR4, γ Cygni SNR
82.2	+5.3	20 19 00	+45 30	95 × 65	S	120?	0.5?	W63
84.2	–0.8	20 53 20	+43 27	20 × 16	S	11	0.5	
84.9	+0.5	20 50 30	+44 53	6	S	0.8	0.4	
85.4	+0.7	20 50 40	+45 22	24	S	?	0.5?	
85.9	–0.6	20 58 40	+44 53	24	S	?	0.5?	
89.0	+4.7	20 45 00	+50 35	120 × 90	S	220	0.40	HB21
93.3	+6.9	20 52 25	+55 21	27 × 20	S	9	0.54	DA 530, 4C(T)55.38.1
93.7	–0.2	21 29 20	+50 50	80	S	65	0.4	CTB 104A, DA 551
94.0	+1.0	21 24 50	+51 53	30 × 25	S	15	0.4	3C434.1
96.0	+2.0	21 30 30	+53 59	26	S	0.15?	0.7?	

l	b	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
106.3	+2.7	22 27 30	+60 50	60 × 24	C?	6	0.6	
109.1	–1.0	23 01 35	+58 53	28	S	20	0.50	CTB 109
111.7	–2.1	23 23 26	+58 48	5	S	2720	0.77	Cassiopeia A, 3C461
113.0	+0.2	23 36 35	+61 22	40 × 17?	?	?	?	
114.3	+0.3	23 37 00	+61 55	90 × 55	S	6?	0.3?	
116.5	+1.1	23 53 40	+63 15	80 × 60	S	11?	0.8?	
116.9	+0.2	23 59 10	+62 26	34	S	9?	0.5?	CTB 1
119.5	+10.2	00 06 40	+72 45	90?	S	36	0.6	CTA 1
120.1	+1.4	00 25 18	+64 09	8	S	56	0.61	Tycho, 3C10, SN1572
126.2	+1.6	01 22 00	+64 15	70	S?	7	varies	
127.1	+0.5	01 28 20	+63 10	45	S	13	0.6	R5
130.7	+3.1	02 05 41	+64 49	9 × 5	F	33	0.10	3C58, SN1181
132.7	+1.3	02 17 40	+62 45	80	S	45	0.4	HB3
156.2	+5.7	04 58 40	+51 50	110	S	5	0.5	
160.9	+2.6	05 01 00	+46 40	140 × 120	S	110	0.6	HB9
166.0	+4.3	05 26 30	+42 56	55 × 35	S	7?	0.4?	VRO 42.05.01
179.0	+2.6	05 53 40	+31 05	70	S?	7	0.4	
180.0	–1.7	05 39 00	+27 50	180	S	65	varies	S147
182.4	+4.3	06 08 10	+29 00	50	S	1.2	0.4	
184.6	–5.8	05 34 31	+22 01	7 × 5	F	1040	0.30	Crab Nebula, 3C144, SN1054
189.1	+3.0	06 17 00	+22 34	45	C	160	0.36	IC443, 3C157
192.8	–1.1	06 09 20	+17 20	78	S	20?	0.6?	PKS 0607+17
205.5	+0.5	06 39 00	+06 30	220	S	160	0.5	Monoceros Nebula
206.9	+2.3	06 48 40	+06 26	60 × 40	S?	6	0.5	PKS 0646+06
260.4	–3.4	08 22 10	–43 00	60 × 50	S	130	0.5	Puppis A, MSH 08–4*4*
261.9	+5.5	09 04 20	–38 42	40 × 30	S	10?	0.4?	
263.9	–3.3	08 34 00	–45 50	255	C	1750	varies	Vela (XYZ)
266.2	–1.2	08 52 00	–46 20	120	S	50?	0.3?	RX J0852.0–4622
272.2	–3.2	09 06 50	–52 07	15?	S?	0.4	0.6	
279.0	+1.1	09 57 40	–53 15	95	S	30?	0.6?	
284.3	–1.8	10 18 15	–59 00	24?	S	11?	0.3?	MSH 10–5*3*
286.5	–1.2	10 35 40	–59 42	26 × 6	S?	1.4?	?	
289.7	–0.3	11 01 15	–60 18	18 × 14	S	6.2	0.2?	
290.1	–0.8	11 03 05	–60 56	19 × 14	S	42	0.4	MSH 11–6*1*A
291.0	–0.1	11 11 54	–60 38	15 × 13	C	16	0.29	(MSH 11–6*2*)
292.0	+1.8	11 24 36	–59 16	12 × 8	C	15	0.4	MSH 11–5*4*
292.2	–0.5	11 19 20	–61 28	20 × 15	S	7	0.5	
293.8	+0.6	11 35 00	–60 54	20	C	5?	0.6?	
294.1	–0.0	11 36 10	–61 38	40	S	>2?	?	
296.1	–0.5	11 51 10	–62 34	37 × 25	S	8?	0.6?	
296.5	+10.0	12 09 40	–52 25	90 × 65	S	48	0.5	PKS 1209–51/52
296.8	–0.3	11 58 30	–62 35	20 × 14	S	9	0.6	1156–62
298.5	–0.3	12 12 40	–62 52	5?	?	5?	0.4?	
298.6	–0.0	12 13 41	–62 37	12 × 9	S	5?	0.3	
299.2	–2.9	12 15 13	–65 30	18 × 11	S	0.5?	?	

l	*b*	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
299.6	–0.5	12 21 45	–63 09	13	S	1.0?	?	
301.4	–1.0	12 37 55	–63 49	37 × 23	S	2.1?	?	
302.3	+0.7	12 45 55	–62 08	17	S	5?	0.4?	
304.6	+0.1	13 05 59	–62 42	8	S	14	0.5	Kes 17
308.1	–0.7	13 37 37	–63 04	13	S	1.2?	?	
308.8	–0.1	13 42 30	–62 23	30 × 20?	C?	15?	0.4?	
309.2	–0.6	13 46 31	–62 54	15 × 12	S	7?	0.4?	
309.8	+0.0	13 50 30	–62 05	25 × 19	S	17	0.5	
310.6	–0.3	13 58 00	–62 09	8	S	5?	?	Kes 20B
310.8	–0.4	14 00 00	–62 17	12	S	6?	?	Kes 20A
311.5	–0.3	14 05 38	–61 58	5	S	3?	0.5	
312.4	–0.4	14 13 00	–61 44	38	S	45	0.36	
312.5	–3.0	14 21 00	–64 12	18 × 20	S	3.5?	?	
315.4	–2.3	14 43 00	–62 30	42	S	49	0.6	RCW 86, MSH 14–6*3*
315.4	–0.3	14 35 55	–60 36	24 × 13	?	8	0.4	
315.9	–0.0	14 38 25	–60 11	25 × 14	S	0.8?	?	
316.3	–0.0	14 41 30	–60 00	29 × 14	S	20?	0.4	(MSH 14–5*7*)
317.3	–0.2	14 49 40	–59 46	11	S	4.7?	?	
318.2	+0.1	14 54 50	–59 04	40 × 35	S	>3.9?	?	
318.9	+0.4	14 58 30	–58 29	30 × 14	C	4?	0.2?	
320.4	–1.2	15 14 30	–59 08	35	C	60?	0.4	MSH 15–5*2*, RCW 89
320.6	–1.6	15 17 50	–59 16	60 × 30	S	?	?	
321.9	–1.1	15 23 45	–58 13	28	S	>3.4?	?	
321.9	–0.3	15 20 40	–57 34	31 × 23	S	13	0.3	
322.5	–0.1	15 23 23	–57 06	15	C	1.5	0.4	
323.5	+0.1	15 28 42	–56 21	13	S	3?	0.4?	
326.3	–1.8	15 53 00	–56 10	38	C	145	varies	MSH 15–5*6*
327.1	–1.1	15 54 25	–55 09	18	C	7?	?	
327.4	+0.4	15 48 20	–53 49	21	S	30?	0.6	Kes 27
327.4	+1.0	15 46 48	–53 20	14	S	1.9?	?	
327.6	+14.6	15 02 50	–41 56	30	S	19	0.6	SN1006, PKS 1459–41
328.4	+0.2	15 55 30	–53 17	5	F	15	0.12	(MSH 15–5*7*)
329.7	+0.4	16 01 20	–52 18	40 × 33	S	>34?	?	
330.0	+15.0	15 10 00	–40 00	180?	S	350?	0.5?	Lupus Loop
330.2	+1.0	16 01 06	–51 34	11	S?	5?	0.3	
332.0	+0.2	16 13 17	–50 53	12	S	8?	0.5	
332.4	–0.4	16 17 33	–51 02	10	S	28	0.5	RCW 103
332.4	+0.1	16 15 20	–50 42	15	S	26	0.5	MSH 16–5*1*, Kes 32
335.2	+0.1	16 27 45	–48 47	21	S	16	0.5	
336.7	+0.5	16 32 11	–47 19	14 × 10	S	6	0.5	
337.0	–0.1	16 35 57	–47 36	1.5	S	1.5	0.6?	(CTB 33)
337.2	–0.7	16 39 28	–47 51	6	S	2?	0.7	
337.2	+0.1	16 35 55	–47 20	3 × 2	?	1.5?	?	
337.3	+1.0	16 32 39	–46 36	15 × 12	S	16	0.55	Kes 40
337.8	–0.1	16 39 01	–46 59	9 × 6	S	18	0.5	Kes 41

l	*b*	RA (J2000.0) (h m s)	Dec (° ′)	size /arcmin	type	Flux at 1 GHz/Jy	spectral index	other name(s)
338.1	+0.4	16 37 59	–46 24	15?	S	4?	0.4	
338.3	–0.0	16 41 00	–46 34	8	S	7?	?	
338.5	+0.1	16 41 09	–46 19	9	?	12?	?	
340.4	+0.4	16 46 31	–44 39	10 × 7	S	5	0.4	
340.6	+0.3	16 47 41	–44 34	6	S	5?	0.4?	
341.2	+0.9	16 47 35	–43 47	16 × 22	C	1.5?	0.6?	
341.9	–0.3	16 55 01	–44 01	7	S	2.5	0.5	
342.0	–0.2	16 54 50	–43 53	12 × 9	S	3.5?	0.4?	
342.1	+0.9	16 50 43	–43 04	10 × 9	S	0.5?	?	
343.0	–6.0	17 25 00	–46 30	250	S	?	?	RCW 114
343.1	–2.3	17 08 00	–44 16	32?	C?	8?	0.5?	
343.1	–0.7	17 00 25	–43 14	27 × 21	S	7.8	0.55	
344.7	–0.1	17 03 51	–41 42	10	C?	2.5?	0.5	
345.7	–0.2	17 07 20	–40 53	6	S	0.6?	?	
346.6	–0.2	17 10 19	–40 11	8	S	8?	0.5?	
347.3	–0.5	17 13 50	–39 45	65 × 55	S?	?	?	
348.5	–0.0	17 15 26	–38 28	10?	S?	10?	0.4?	
348.5	+0.1	17 14 06	–38 32	15	S	72	0.3	CTB 37A
348.7	+0.3	17 13 55	–38 11	17?	S	26	0.3	CTB 37B
349.2	–0.1	17 17 15	–38 04	9 × 6	S	1.4?	?	
349.7	+0.2	17 17 59	–37 26	2.5 × 2	S	20	0.5	
350.0	–2.0	17 27 50	–38 32	45	S	26	0.4	
351.2	+0.1	17 22 27	–36 11	7	C?	5?	0.4	
351.7	+0.8	17 21 00	–35 27	18 × 14	S	10?	?	
351.9	–0.9	17 28 52	–36 16	12 × 9	S	1.8?	?	
352.7	–0.1	17 27 40	–35 07	8 × 6	S	4	0.6	
353.9	–2.0	17 38 55	–35 11	13	S	1?	0.5?	
354.1	+0.1	17 30 28	–33 46	15 × 3?	C?	?	varies?	
354.8	–0.8	17 36 00	–33 42	19	S	2.8?	?	
355.6	–0.0	17 35 16	–32 38	8 × 6	S	3?	?	
355.9	–2.5	17 45 53	–33 43	13	S	8	0.5	
356.2	+4.5	17 19 00	–29 40	25	S	4	0.7	
356.3	–0.3	17 37 56	–32 16	11 × 7	S	3?	?	
356.3	–1.5	17 42 35	–32 52	20 × 15	S	3?	?	
357.7	–0.1	17 40 29	–30 58	8 × 3?	?	37	0.4	MSH 17–39
357.7	+0.3	17 38 35	–30 44	24	S	10	0.4?	
358.0	+3.8	17 26 00	–28 36	38	S	1.5?	?	
359.0	–0.9	17 46 50	–30 16	23	S	23	0.5	
359.1	–0.5	17 45 30	–29 57	24	S	14	0.4?	
359.1	+0.9	17 39 36	–29 11	12 × 11	S	5?	?	

γ Cygni SNR	G78.2+2.1
1156–62	G296.8–0.3
1814–24	G7.7–3.7
3C10	G120.1+1.4
3C58	G130.7+3.1
3C144	G184.6–5.8
3C157	G189.1+3.0
3C358	G4.5+6.8
3C391	G31.9+0.0
3C392	G34.7–0.4
3C396	G39.2–0.3
3C396.1	G32.0–4.9
3C397	G41.1–0.3
3C400.2	G53.6–2.2
3C434.1	G94.0+1.0
3C461	G111.7–2.1
4C–04.71	G27.4+0.0
4C00.70	G33.6+0.1
(4C21.53)	G57.2+0.8
4C(T)55.38.1	G93.3+6.9
CTA 1	G119.5+10.2
CTB 1	G116.9+0.2
(CTB 33)	G337.0–0.1
CTB 37A	G348.5+0.1
CTB 37B	G348.7+0.3
CTB 80	G69.0+2.7
CTB 87	G74.9+1.2
CTB 104A	G93.7–0.2
CTB 109	G109.1–1.0
Cassiopeia A	G111.7–2.1
Crab Nebula	G184.6–5.8
Cygnus Loop	G74.0–8.5
DA 495	G65.7+1.2
DA 530	G93.3+6.9
DA 551	G93.7–0.2
DR4	G78.2+2.1
HB3	G132.7+1.3
HB9	G160.9+2.6
HB21	G89.0+4.7
HC13	G33.6+0.1
HC24	G39.2–0.3
(HC30)	G46.8–0.3
(HC40)	G54.4–0.3
IC443	G189.1+3.0
Kepler	G4.5+6.8
Kes 17	G304.6+0.1
Kes 20A	G310.6–0.3
Kes 20B	G310.8–0.4
Kes 27	G327.4+0.4
Kes 32	G332.4+0.1
Kes 40	G337.3+1.0
Kes 41	G337.8–0.1
Kes 67	G18.8+0.3
Kes 69	G21.8–0.6
Kes 75	G29.7–0.3
Kes 78	G32.8–0.1
Kes 79	G33.6+0.1
Lupus Loop	G330.0+15.0
MSH 08–4*4*	G260.4–3.4
MSH 10–5*3*	G284.3–1.8
MSH 11–5*4*	G292.0+1.8
MSH 11–6*1*A	G290.1–0.8
(MSH 11–6*2*)	G291.0–0.1
(MSH 14–5*7*)	G316.3–0.0
MSH 14–6*3*	G315.4–2.3
MSH 15–5*2*	G320.4–1.2
MSH 15–5*6*	G326.3–1.8
(MSH 15–5*7*)	G328.4+0.2
MSH 16–5*1*	G332.4+0.1
MSH 17–3*9*	G357.7–0.1
Milne 56	G5.4–1.2
Monoceros Nebula	G205.5+0.5
NRAO 593	G39.2–0.3
NRAO 611	G53.6–2.2
PKS 0607+17	G192.8–1.1
PKS 0646+06	G206.9+2.3
PKS 1209–51/52	G296.5+10.0
PKS 1459–41	G327.6+14.6
Puppis A	G260.4–3.4
R5	G127.1+0.5
RCW 86	G315.4–2.3
RCW 89	G320.4–1.2
RCW 103	G332.4–0.4
RCW 114	G343.0–6.0
RX J0852.0–4622	G266.2–1.2
S147	G180.0–1.7
SN1006	G327.6+14.6
SN1054	G184.6–5.8
SN1181	G130.7+3.1
SN1572	G120.1+1.4
SN1604	G4.5+6.8
SS433	G39.7–2.0
Sgr A East	G0.0+0.0
Tycho	G120.1+1.4
Vela (XYZ)	G263.9–3.3
VRO 42.05.01	G166.0+4.3
W28	G6.4–0.1
(W30)	G8.7–0.1
W41	G23.3–0.3
W44	G34.7–0.4
W49B	G43.3–0.2
W50	G39.7–2.0
(W51)	G49.2–0.7
W63	G82.2+5.3

Journals

A&A	Astronomy & Astrophysics
A&AS	Astronomy & Astrophysics Supplement
AJ	Astronomical Journal
AN	Astronomische Nachrichten
ApJ	Astrophysical Journal
ApJS	Astrophysical Journal Supplement
ApL	Astrophysical Letters
ApSS	Astrophysics & Space Science
AuJPA	Australian Journal of Physics Astrophysical Supplement
AuJPh	Australian Journal of Physics
BASI	Bulletin of the Astronomical Society of India
JApA	Journal of Astrophysics & Astronomy
JRASC	Journal of the Royal Astronomical Society of Canada
MNRAS	Monthly Notices of the Royal Astronomical Society
PASAu	Proceedings of the Astronomical Society of Australia
PASJ	Publications of the Astronomical Society of Japan
PASP	Publications of the Astronomical Society of the Pacific
RMxAA	Revista Mexicana de Astronomía y Astrofísica
SerAJ	Serbian Astronomical Journal
SvAL	Soviet Astronomy Letters

Proceedings

SNRISM is *'Supernova Remnants and the Interstellar Medium'*, (IAU Colloquium 101), eds Roger R.S. & Landecker T.L., (Cambridge University Press), 1988.

NSPS is *'Neutron Stars, Pulsars, and Supernova Remnants'*, (MPE Report 278), eds Becker W., Lesch H. & Trümper, J., (Max-Plank-Institut für extraterrestrische Physik, Garching bei München), 2002.

NSSR is *'Neutron Stars in Supernova Remnants'*, (ASP Conference Series, Volume 271), eds Slane P.O. & Gaensler B.M., (Astronomical Society of the Pacific, San Fransico), 2002.

XRRC is *'X-Ray and Radio Connections'*, eds Sjouwerman L.O. & Dyer K.K., (available at `http://www.aoc.nrao.edu/events/xraydio/`), 2005.

Radio Telescopes

5km	Cambridge 5-km Telescope
6C	Cambridge low frequency northern survey
ATCA	Australia Telescope Compact Array
BIMA	Berkeley–Illinois–Maryland Array
CLFST	Cambridge Low Frequency Synthesis Telescope
DRAO	Dominion Radio Astrophysical Observatory
FIRST	Fleurs Synthesis Telescope
MOST	Molonglo Observatory Synthesis Telescope
NRAO	National Radio Astronomy Observatory
NRO	Nobeyama Radio Observatory
TPT	Clark Lake Teepee-Tee telescope
VLA	Very Large Array
VRO	Vermillion River Observatory
WSRT	Westerbork Synthesis Radio Telescope

Satellites

HST	Hubble Space Telescope
ISO	Infrared Space Observatory
ASCA	Advanced Satellite for Cosmology and Astrophysics
EXOSAT	European X-ray Observatory Satellite
ROSAT	Röntgensatellit
XMM	X-ray Multi-Mirror(-Newton)