A CATALOGUE OF RADIO SOURCES BETWEEN DECLINATIONS +10° AND −20°

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Summary

A catalogue has been prepared of the radio sources observed between declinations +10° and —20°, using the Sydney cross-type radio telescope at a wavelength of 3·5 m : a total of 1159 sources is listed in the area of 3·24 steradians. This supersedes an earlier catalogue of Mills and Slee in portion of the area, but the differences between the two are small. A number of new identifications with galaxies are suggested, and an analysis made of the statistics of the source distribution. It is concluded that cosmological effects displayed by the distribution, if present, are small. Possibilities are discussed of separating from this distribution the effects of the instrument, the finite angular sizes, and/or the physical clustering of the sources.

I. Introduction

A preliminary catalogue of radio sources has been published in the declination interval +10° to −20° and between Right Ascensions 00^h and 08^h (Mills and Slee 1957). The observations were made with the Sydney cross-type radio telescope at a wavelength of 3·5 m. This catalogue was preliminary in the sense that adequate checking had not been possible in some places, but was published at that time to draw attention to the large discrepancies between it and the catalogue of Shakeshaft *et al.* (1955) of Cambridge.

The area concerned has now been checked thoroughly and extended between the same declination limits over the whole 24 hr of Right Ascension ; in the additional area a great deal more observational data have been used than previously. Other catalogues of more southerly regions are in preparation and will be published in due course.

Very few drastic changes have been needed in the preliminary catalogue, but a large number of minor improvements were possible as the result of accumulating more observations. Accordingly, it has been found desirable to repeat in full the list of sources in the original area. A total of 1159 sources is now listed between +10° and −20° ; the area involved is 3·24 steradians.

These more extensive data strengthen the conclusions reached in the earlier paper. There is again extremely poor detailed agreement with the Cambridge catalogue ; moreover, the new statistics agree closely with our earlier more limited results but disagree grossly with the Cambridge statistics. It is concluded, as before, that the source count ogive is not significantly different from that expected with a uniform spatial distribution of sources. However, there is

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evidence for a slightly excessive slope which could be due to a *small* excess of faint sources, physical clustering of the sources, or simply a statistical deficiency of stronger sources in our immediate neighbourhood. These possibilities are considered in Section IV. The catalogue has been examined for identifications with various celestial bodies using the Skalnate Pleso Catalogue (Bečvar 1951) and some parts of the Palomar Sky Atlas that are now available. There are a number of possible new identifications with extragalactic nebulae, including the Hydra II and Pegasus I and II clusters of galaxies: these are very briefly discussed.

II. The Catalogue

The preparation of the catalogue, given in Tables 1, 2, and 3, follows the methods outlined by Mills and Slee (1957); that paper will henceforth be referred to as paper I. Over most of the area, at least two normal " scanning " type records were available (i.e. quasi-simultaneous recordings on five declinations); in addition, " non-scanning " records had been taken in a large number of areas. In general, sources were systematically picked out using the best of the available scanning records and checked against all other records of the same region. During the checking process, a few additional weak sources were noted which had been obscured on the original records by noise fluctuations or interference; these were also included. There remain a few areas where checking was not possible, either because of the absence of a second record or because of interference. Sources in these areas are indicated in the catalogue and must generally be regarded as less reliable than the others; experience indicates that the main effects of using a single record are to miss some of the weaker sources and to introduce rather large errors in the flux densities. In estimating the positions and flux densities of the remaining sources the best possible use of all the data has been made by taking averages or, where indicated, weighted averages of the measurements available. This procedure has resulted in slight modifications to at least one of the three listed measurements of a substantial proportion of the sources in paper I. Flux densities, in general, are given to two significant figures, but for the weaker sources the second figure has no significance and has been retained only for consistency in the statistics. Regions where possible confusion arises with bright sources in the side lobes have been indicated by Mills *et al.* (1958).

The same general method of cataloguing has been adopted as in paper I, and, for convenience, a reference number has been attached to each source which is defined in a similar way. The first two digits of the reference number denote the hour of the Right Ascension; these are followed by the sign and tens digit of the declination in degrees and an italicized serial number arranged in order of increasing Right Ascension within the 1-hr period. To save space, however, only the italicized serial numbers are given in the catalogue as the others are immediately evident; for example in Table 1, the second source listed would be referred to in the text as 00+*02*.

As before, the probable errors in the final digit of a position measurement have been estimated and are indicated by superscripts. Some comparisons

TABLE 1

SOURCES BETWEEN DECLINATIONS +10° AND 0°

Sources observed on one record only are indicated by an asterisk. Sources which may be "extended", that is, resolvable, are indicated by a dagger. A colon has been placed beside uncertain flux densities

Ref. No.	Position (1950) R.A. (h m)	Position (1950) Dec. N. (° ′)	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	00		
1	04·9^{3}	06 05^{8}	*35* (20)[1]
2	10·2^{2}	00 37^{5}	20
3	14·2^{3}	06 48^{7}	18
4	16·0^{4}	08 20^{8}	11
5	24·8^{4}	07 28^{6}	11
6	30·0^{6}	01 40^{10}	*68* (20)[2]
7	30·8^{3}	05 53^{5}	25
8	32·1^{4}	04 28^{6}	16[3]
9	34·2^{3}	00 12^{6}	15
10	36·7^{4}	03 35^{6}	14
11	37·4^{2}	09 30^{5}	37
12	40·1^{3}	06 53^{7}	14
13	40·6^{4}	02 20^{8}	7:
14	42·6^{4}	05 26^{7}	19
15	55·3^{3}	01 14^{6}	16
16	55·5^{4}	08 47^{8}	14
17	59·8^{3}	04 32^{6}	19
	01		
1	14·9^{3}	06 05^{6}	11
2	16·3^{2}	08 11^{6}	14
3	17·3^{4}	03 20^{5}	*33* (16)[4]
4	23·1^{3}	01 22^{5}	20[5]
5	24·4^{3}	09 13^{7}	16
6	28·7^{2}	03 52^{6}	18
7	29·2^{2}	06 07^{5}	23
8	33·5^{4}	07 53^{6}	15
9	34·9^{4}	06 34^{8}	7·4
10	43·0^{3}	02 01^{6}	9·4
11	46·2^{3}	06 10^{8}	19†
12	47·2^{3}	07 07^{6}	19†
13	52·1^{4}	03 32^{6}	*49* (27)[6]
14	57·4^{3}	01 10^{6}	16
	02		
1	02·3^{4}	04 20^{8}	10
2	07·4^{2}	09 35^{8}	23
3	11·0^{2}	02 58^{5}	24
4	12·5^{5}	06 11^{8}	14
5	19·4^{2}	08 08^{6}	24
6	26·2^{3}	02 35^{7}	9·0
7	35·7^{3}	07 01^{8}	10
8	50·4^{4}	01 19^{6}	10
9	53·4^{3}	06 48^{7}	11
10	55·1^{1}	05 53^{4}	51
11	58·9^{3}	01 35^{5}	27
	03		
1	00·2^{3}	07 20^{6}	18
2	00·9^{3}	09 37^{6}	13
3	05·4^{2}	03 50^{5}	34
4	09·2^{4}	05 11^{8}	10
5	25·2^{3}	02 25^{5}	41
6	34·1^{4}	09 51^{7}	24
7	35·8^{4}	07 40^{7}	13
8	40·5^{3}	04 55^{5}	35
9	45·6^{3}	00 41^{5}	15
10	46·6^{3}	05 42^{6}	15
11	51·4^{4}	02 58^{6}	16
12	58·2^{2}	00 27^{5}	19
	04		
1	00·0^{3}	05 35^{8}	13
2	00·1^{3}	02 21^{5}	11
3	04·7^{2}	03 45^{4}	37
4	11·9^{4}	05 43^{7}	8·6
5	21·9^{4}	00 24^{8}	14
6	23·2^{4}	04 26^{6}	13
7	28·6^{2}	01 02^{5}	20†
8	32·8^{2}	03 57^{5}	25†
9	38·2^{5}	07 05^{8}	8:[7]
10	41·8^{3}	02 15^{5}	30†
11	51·5^{4}	02 33^{6}	10
12	54·9^{5}	06 43^{8}	13
13	56·3^{3}	05 20^{8}	10
14	58·5^{4}	01 24^{6}	15

[1] Perhaps two sources.
[2] Complex brightness distribution; may be several sources.
[3] Perhaps a background irregularity. [4] (NGC 470/474). [5] (NGC 533).
[6] Perhaps two sources or interference from 05N2A.
[7] Doubtful, not visible on all records.

TABLE 1 (*Continued*)

Ref. No.	Position (1950) R.A. (h m)	Position (1950) Dec. N. (° ′)	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	05		
1	04·5^{3}	07 20^{7}	16
2	10·9^{3}	01 02^{6}	38
3	16·4^{4}	09 58^{8}	20
4	16·5^{2}	03 59^{8}	17
5	28·9^{3}	06 35^{6}	30
6	38·8^{4}	05 43^{8}	9·2
7	41·5^{3}	02 46^{6}	22†[8]
	06		
1	00·5^{4}	02 23^{7}	11
2	02·3^{3}	00 54^{5}	12
3	05·4^{5}	08 08^{10}	*109* (28)
4	14·2^{4}	05 43^{8}	18†
5	15·3^{4}	03 36^{8}	8·8
6	20·3^{4}	09 00^{10}	*153* (45)
7	24·8^{3}	02 50^{5}	18*
8	29·6^{2}	05 01^{3}	*250* (87)[9]
9	32·6^{3}	02 09^{4}	29
10	34·8^{3}	07 15^{8}	*72* (40)
11	42·7^{4}	05 15^{8}	27
12	42·8^{4}	00 10^{10}	16
13	52·5^{4}	03 00^{8}	22
14	54·1^{3}	08 36^{10}	24†
	07		
1	17·9^{4}	08 48^{8}	11
2	19·4^{3}	01 34^{5}	17*[10]
3	29·6^{3}	03 06^{8}	21
4	41·9^{2}	02 05^{5}	36
5	44·9^{4}	09 57^{8}	13
6	53·7^{4}	07 10^{7}	8·2[10]
	08		
1	03·4^{4}	04 48^{8}	8·7
2	12·4^{3}	01 33^{6}	*29* (22)
3	19·8^{2}	06 07^{4}	*125* (60)[11]
4	33·4^{3}	00 42^{7}	17
5	34·5^{3}	09 30^{7}	13
6	38·5^{5}	03 17^{8}	17†
7	41·0^{4}	07 28^{7}	14
8	43·3^{4}	02 20^{8}	9·4
9	54·9^{4}	09 55^{8}	14
10	55·0^{4}	03 36^{8}	9·0[12]
	09		
1	09·2^{3}	08 23^{7}	13
2	15·2^{2}	09 35^{6}	40[13]
3	34·1^{2}	04 50^{5}	24
4	34·4^{4}	02 13^{6}	14†
5	41·8^{3}	09 57^{7}	32
6	43·0^{3}	02 21^{5}	7·1
7	44·9^{2}	07 39^{4}	89
8	49·7^{2}	00 06^{5}	36
9	50·5^{3}	09 00^{7}	16
10	55·3^{2}	03 35^{5}	18
	10		
1	05·7^{2}	07 54^{6}	30
2	08·6^{3}	06 32^{6}	39
3	09·9^{4}	04 50^{10}	8·7
4	10·9^{3}	03 11^{6}	9·4
5	22·0^{3}	09 36^{8}	15
6	24·0^{3}	06 41^{6}	35*
7	38·2^{3}	02 36^{8}	13
8	47·3^{3}	04 25^{7}	13†
9	48·8^{2}	00 00^{5}	21†
10	54·0^{4}	02 09^{6}	*24* (14)[14]
11	56·8^{4}	09 15^{7}	19
	11		
1	06·5^{5}	09 45^{7}	16†
2	07·1^{4}	03 48^{7}	15
3	08·0^{5}	01 56^{8}	7·0
4	20·2^{4}	07 40^{8}	8·2*
5	20·9^{3}	05 25^{7}	19
6	22·5^{4}	02 20^{8}	8·5
7	26·3^{4}	00 42^{8}	7·1
8	37·4^{3}	01 24^{7}	15
9	38·4^{4}	05 43^{8}	8·2*
10	42·4^{3}	08 14^{7}	14
11	42·5^{5}	09 30^{10}	8·6
12	47·0^{3}	05 40^{7}	11*
13	54·1^{3}	04 26^{10}	12†
14	59·6^{3}	00 36^{7}	8·5

[8] Could be associated with Barnard's ring. [9] (NGC 2237).
[10] A doubtful source. [11] Possibly interference from 08S4A.
[12] (Hydra II cluster). [13] Possibly interference from 09S1A. [14] Perhaps two sources.

TABLE 1 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. N. ° ′	Flux Density (10^{-26} W m^{-2} $(c/s)^{-1}$)
	12		
1	$01{\cdot}7^{5}$	$07\ 14^{8}$	13
2	$04{\cdot}2^{2}$	$04\ 19^{5}$	25
3	$07{\cdot}4^{3}$	$08\ 39^{10}$	12
4	$14{\cdot}8^{2}$	$04\ 00^{6}$	30[15]
5	$16{\cdot}7^{1}$	$05\ 59^{5}$	100[16]
6	$18{\cdot}0^{3}$	$09\ 50^{10}$	24
7	$19{\cdot}0^{2}$	$02\ 46^{6}$	12*
8	$26{\cdot}6^{2}$	$02\ 17^{4}$	167
9	$35{\cdot}3^{3}$	$01\ 42^{8}$	16
10	$46{\cdot}9^{5}$	$09\ 23^{8}$	14[17]
11	$51{\cdot}5^{3}$	$08\ 53^{6}$	17[18]
	13		
1	$02{\cdot}0^{2}$	$09\ 02^{7}$	22
2	$04{\cdot}5^{4}$	$07\ 02^{7}$	18
3	$08{\cdot}0^{3}$	$06\ 10^{7}$	22*†
4	$09{\cdot}7^{2}$	$04\ 00^{7}$	7·5
5	$12{\cdot}6^{5}$	$07\ 41^{8}$	16
6	$18{\cdot}7^{3}$	$01\ 00^{8}$	*50* (27)
7	$30{\cdot}3^{3}$	$02\ 18^{8}$	19
8	$32{\cdot}8^{3}$	$06\ 22^{10}$	8·0
9	$40{\cdot}3^{4}$	$02\ 20^{9}$	13
10	$45{\cdot}6^{3}$	$00\ 42^{6}$	8·3
11	$50{\cdot}0^{5}$	$06\ 19^{7}$	*54* (22)*
12	$55{\cdot}0^{2}$	$01\ 24^{6}$	19
13	$55{\cdot}4^{3}$	$04\ 50^{7}$	10
	14		
1	$01{\cdot}0^{3}$	$09\ 22^{7}$	28
2	$09{\cdot}4^{3}$	$07\ 31^{6}$	14
3	$13{\cdot}0^{5}$	$05\ 49^{8}$	17
4	$15{\cdot}8^{3}$	$01\ 06^{7}$	13
5	$16{\cdot}7^{1}$	$06\ 43^{4}$	114
6	$17{\cdot}0^{2}$	$04\ 00^{5}$	22[19]
7	$24{\cdot}3^{3}$	$04\ 19^{7}$	13*
8	$25{\cdot}4^{4}$	$00\ 36^{6}$	16
9	$32{\cdot}5^{3}$	$06\ 38^{7}$	17*[20]
10	$35{\cdot}5^{2}$	$03\ 36^{6}$	*47* (31)
11	$35{\cdot}5^{2}$	$00\ 23^{6}$	14
12	$37{\cdot}1^{5}$	$08\ 58^{8}$	12*
13	$40{\cdot}6^{2}$	$05\ 04^{6}$	15
14	$45{\cdot}0^{2}$	$07\ 54^{6}$	19*
15	$56{\cdot}5^{3}$	$04\ 01^{6}$	11
	15		
1	$00{\cdot}1^{4}$	$06\ 15^{10}$	15*
2	$08{\cdot}2^{2}$	$08\ 09^{7}$	42†
3	$08{\cdot}6^{2}$	$06\ 08^{6}$	24*
4	$09{\cdot}8^{5}$	$01\ 42^{8}$	20
5	$14{\cdot}2^{2}$	$07\ 11^{6}$	140
6	$14{\cdot}4^{5}$	$00\ 18^{8}$	16
7	$19{\cdot}3^{2}$	$07\ 55^{6}$	50*†
8	$33{\cdot}3^{5}$	$09\ 29^{8}$	13
9	$34{\cdot}1^{2}$	$02\ 38^{6}$	17
10	$36{\cdot}1^{4}$	$01\ 42^{7}$	12
11	$37{\cdot}4^{3}$	$06\ 08^{8}$	22*
12	$42{\cdot}1^{3}$	$04\ 06^{7}$	17*
13	$42{\cdot}4^{2}$	$02\ 20^{5}$	16
14	$48{\cdot}9^{2}$	$03\ 10^{6}$	18*
	16		
1	$00{\cdot}0^{2}$	$02\ 13^{5}$	100[21]
2	$02{\cdot}8^{4}$	$01\ 05^{7}$	45
3	$03{\cdot}3^{2}$	$00\ 06^{6}$	35
4	$07{\cdot}0^{4}$	$04\ 25^{7}$	17
5	$13{\cdot}3^{3}$	$04\ 25^{6}$	27
6	$22{\cdot}2^{3}$	$08\ 21^{6}$	14
7	$29{\cdot}0^{5}$	$09\ 08^{10}$	22*†[22]
8	$38{\cdot}1^{3}$	$03\ 44^{10}$	23*
9	$44{\cdot}7^{3}$	$01\ 43^{8}$	33†
10	$48{\cdot}8^{1}$	$05\ 04^{2}$	890[23]
	17		
1	$03{\cdot}2^{3}$	$09\ 16^{10}$	*78* (49)*[22]
2	$22{\cdot}3^{3}$	$05\ 44^{4}$	36*†[24]
3	$56{\cdot}1^{4}$	$02\ 46^{10}$	48:*

(15) (NGC 4234). (16) (NGC 4261), (NGC 4270).

(17), (18) Perhaps one extended source. (19) (NGC 5566).

(20) Perhaps E.-W. side lobe of Virgo-A.

(21) Perhaps slightly extended.

(22) A doubtful source.

(23) IAU 16N0A.

(24) Perhaps a galactic irregularity.

TABLE 1 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. N. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)	Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. N. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	18				21		
1	03·9^{4}	00 12^{7}	33†	*4*	26·4^{2}	07 15^{7}	27
2	04·3^{4}	03 40^{10}	27	*5*	27·1^{5}	01 06^{8}	*67* (25)[28]
3	15·3^{4}	00 04^{10}	14	*6*	36·0^{4}	03 47^{6}	12
4	17·4^{3}	03 05^{6}	41	*7*	39·8^{4}	02 45^{7}	18†
5	26·5^{4}	00 25^{6}	*50* (24)	*8*	42·4^{3}	07 54^{8}	15
6	29·6^{4}	09 40^{10}	45†	*9*	42·5^{4}	04 00^{5}	11
7	34·6^{3}	03 37^{6}	20:†	*10*	49·6^{4}	07 52^{8}	23
8	42·7^{7}	09 30^{10}	54†	*11*	50·5^{4}	05 17^{7}	17
9	43·3^{4}	07 15^{8}	28:	*12*	52·2^{4}	02 08^{7}	15
10	44·0^{5}	05 07^{8}	25†	*13*	58·3^{5}	05 16^{7}	8·3*
11	53·7^{1}	01 29^{5}	550[25]	*14*	59·9^{3}	04 25^{5}	8·4
	19				22		
1	09·0^{3}	05 05^{6}	59†[26]	*1*	06·5^{4}	01 54^{7}	26
2	12·7^{3}	00 09^{8}	29†	*2*	10·0^{5}	07 41^{6}	14
3	17·5^{3}	00 54^{10}	20†	*3*	10·8^{5}	08 48^{7}	31*†
4	30·1^{3}	00 54^{7}	20	*4*	21·4^{5}	02 17^{7}	8·1
5	32·4^{4}	09 43^{6}	30:	*5*	22·4^{4}	05 55^{5}	16
6	33·8^{3}	05 55^{8}	18†[26]	*6*	26·6^{3}	08 27^{7}	19
7	37·4^{3}	04 13^{12}	34†	*7*	34·9^{4}	05 43^{8}	12
8	37·7^{4}	01 06^{10}	8·3	*8*	39·9^{4}	04 28^{8}	12
9	43·8^{3}	09 16^{8}	13*	*9*	46·9^{3}	07 00^{8}	15
10	49·8^{3}	02 26^{2}	64	*10*	49·5^{5}	09 43^{7}	17
				11	50·4^{2}	03 35^{5}	11
	20			*12*	51·7^{3}	00 54^{7}	13
1	15·2^{3}	08 49^{8}	15*	*13*	52·3^{3}	02 43^{7}	16
2	15·7^{3}	01 54^{7}	14	*14*	55·3^{4}	08 08^{6}	16
3	16·9^{3}	04 00^{7}	13	*15*	57·2^{4}	09 43^{8}	15
4	25·6^{6}	06 22^{8}	16				
5	35·7^{5}	04 13^{10}	11		23		
6	37·3^{5}	05 20^{8}	14	*1*	05·1^{4}	03 23^{6}	9·4
7	39·1^{3}	00 48^{7}	12	*2*	08·2^{3}	07 28^{6}	22[29]
8	42·4^{5}	03 29^{7}	11	*3*	09·6^{4}	09 16^{8}	*51* (29)[30]
9	45·9^{3}	01 54^{7}	19	*4*	10·5^{3}	04 50^{6}	18
10	45·9^{3}	06 57^{7}	22†	*5*	14·0^{1}	03 53^{3}	57
11	47·7^{3}	04 00^{7}	10	*6*	19·0^{4}	09 16^{7}	7·8*
12	55·4^{4}	00 42^{4}	*104* (23)	*7*	24·9^{4}	06 49^{8}	15
13	55·7^{4}	05 43^{8}	19	*8*	25·0^{4}	03 54^{6}	17
				9	31·3^{4}	01 03^{6}	8·6
	21			*10*	35·5^{7}	05 39^{7}	13
1	07·6^{4}	06 19^{10}	12*[27]	*11*	39·3^{3}	04 38^{5}	13†
2	12·7^{3}	04 06^{5}	12	*12*	57·1^{5}	09 48^{5}	12*
3	21·9^{3}	02 45^{6}	17				

(25) Perhaps slightly extended. (26) Perhaps a galactic irregularity.
(27) A doubtful source. (28) May be several sources.
(29) (Pegasus I cluster). (30) (Pegasus II cluster).

TABLE 2

SOURCES BETWEEN DECLINATIONS 0° AND —10°

Sources observed on one record only are indicated by an asterisk. Sources which may be "extended", that is, resolvable, are indicated by a dagger. A colon has been placed beside uncertain flux densities

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	00		
1	03·3^{3}	00 56^{4}	35
2	06·0^{4}	06 19^{8}	15
3	17·4^{3}	05 01^{6}	9·5
4	17·7^{3}	02 51^{4}	23
5	18·8^{3}	01 42^{6}	9·8
6	21·5^{4}	08 14^{6}	24†
7	32·3^{2}	08 27^{4}	13[1]
8	32·6^{3}	07 32^{6}	9·0
9	36·4^{2}	02 50^{5}	*120* (67)[2]
10	39·0^{4}	06 23^{5}	10
11	39·2^{1}	09 43^{3}	56
12	42·9^{3}	00 05^{5}	12
13	46·0^{3}	07 01^{5}	12
14	46·7^{3}	02 48^{6}	18
15	51·7^{3}	03 42^{4}	23
16	52·4^{4}	05 06^{6}	8·5
17	54·5^{1}	01 39^{2}	*90* (72)
	01		
1	06·5^{3}	00 57^{6}	13
2	10·5^{3}	05 07^{6}	15
3	19·6^{3}	00 13^{5}	19
4	21·1^{4}	03 50^{6}	18
5	23·5^{1}	01 35^{2}	88
6	28·8^{3}	07 03^{6}	19[3]
7	30·8^{3}	00 26^{5}	10
8	35·1^{2}	09 25^{4}	18
9	35·4^{3}	02 06^{5}	13
10	43·7^{2}	02 27^{5}	12
11	45·5^{4}	00 02^{6}	12
12	47·6^{4}	09 09^{6}	9·4
13	49·9^{2}	03 52^{4}	20
14	51·6^{4}	07 26^{6}	9·0
15	52·2^{3}	05 17^{7}	6·8
16	55·1^{3}	00 39^{6}	8·0
17	57·0^{4}	02 31^{6}	8·5
	02		
1	02·6^{4}	05 33^{6}	8·5
2	08·3^{4}	03 38^{6}	12[4]
3	10·7^{3}	08 11^{6}	8·5
4	10·8^{4}	04 54^{6}	8·7
5	12·4^{3}	02 46^{6}	7·5
6	14·2^{3}	00 54^{6}	12
7	18·6^{2}	02 11^{3}	74[5]
8	18·6^{4}	03 45^{6}	7·5
9	29·4^{3}	04 55^{5}	12
10	29·8^{4}	00 18^{6}	14
11	29·8^{3}	06 57^{5}	15
12	30·8^{4}	02 40^{6}	11
13	39·4^{4}	02 30^{6}	15
14	40·0^{1}	00 09^{3}	35[6]
15	42·8^{3}	05 21^{5}	25†
16	43·6^{3}	09 50^{7}	8·7
17	46·3^{4}	07 46^{6}	9·0
18	54·1^{4}	03 30^{6}	11
19	56·8^{3}	05 06^{6}	8·8
20	57·8^{3}	07 30^{5}	11
	03		
1	12·6^{3}	03 37^{4}	20
2	29·8^{3}	07 40^{5}	12
3	31·7^{2}	01 25^{4}	64
4	39·0^{3}	04 55^{5}	8·8[7]
5	46·0^{4}	04 20^{7}	16
6	49·6^{2}	07 25^{6}	25
7	56·5^{5}	03 50^{6}	11
8	59·2^{3}	02 10^{6}	16[8]

[1] (NGC 157). [2] May be two sources.
[3] (NGC 584). [4] Perhaps background irregularity.
[5] IAU 02S0A. [6] NGC 1068.
[7] (NGC 1417).
[8] Interpretation difficult, complex response.

TABLE 2 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)	Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	04				05		
1	00·1^{3}	09 56^{6}	10	*14*	40·1^{4}	05 16^{6}	9·5[15]
2	00·9^{3}	08 54^{6}	19	*15*	45·6^{4}	04 42^{8}	6·1
3	05·5^{3}	05 37^{5}	12	*16*	46·6^{4}	06 41^{6}	9·0
4	06·0^{3}	06 46^{6}	17	*17*	48·0^{4}	08 08^{6}	15
5	09·5^{3}	01 50^{5}	15	*18*	52·0^{3}	02 00^{6}	29[16]
6	09·6^{1}	01 02^{4}	35	*19*	53·1^{5}	01 00^{6}	19[17]
7	15·5^{3}	05 35^{7}	*36* (18)[9]	*20*	54·8^{3}	03 27^{6}	18[18]
8	15·7^{2}	03 21^{4}	28	*21*	56·8^{3}	08 03^{5}	14
9	20·3^{4}	09 28^{6}	8·5				
10	26·4^{4}	01 15^{6}	9·7		06		
11	28·2^{3}	09 58^{6}	7·3	*1*	04·5^{3}	04 02^{5}	9·0
12	30·9^{2}	08 44^{6}	11	*2*	06·1^{2}	07 21^{4}	23†
13	32·9^{3}	05 30^{4}	10	*3*	12·0^{2}	03 53^{5}	15
14	39·0^{2}	09 52^{5}	17	*4*	25·0^{1}	05 56^{3}	120
15	39·6^{3}	00 49^{6}	12	*5*	27·7^{4}	02 25^{6}	8·7
16	46·8^{3}	09 55^{5}	16	*6*	38·9^{5}	06 40^{8}	9·5
17	47·3^{4}	04 33^{6}	*46* (23)[9]	*7*	39·0^{5}	08 01^{6}	*50* (25)
18	49·3^{3}	06 38^{4}	9·6	*8*	45·0^{4}	02 06^{6}	33†
19	49·6^{4}	02 31^{5}	13	*9*	45·3^{4}	08 10^{6}	17
20	52·4^{4}	00 24^{6}	*20* (12)	*10*	45·6^{4}	09 16^{6}	11
21	58·7^{4}	03 39^{6}	18	*11*	47·2^{3}	05 37^{5}	25
22	59·6^{3}	05 48^{6}	8·5	*12*	56·7^{2}	02 12^{5}	24
	05				07		
1	00·0^{4}	08 37^{6}	9·1	*1*	07·0^{3}	00 38^{7}	11†
2	10·0^{3}	07 36^{6}	16	*2*	10·4^{3}	09 06^{5}	21
3	12·4^{3}	02 19^{5}	17†	*3*	12·7^{2}	02 41^{4}	25
4	13·0^{2}	01 15^{6}	18	*4*	22·3^{3}	09 49^{4}	36
5	13·3^{3}	09 41^{6}	8·8	*5*	23·1^{3}	06 10^{6}	*94* (47)
6	18·3^{3}	06 15^{5}	17[10]	*6*	24·4^{2}	02 00^{4}	29
7	22·2^{4}	02 46^{6}	16	*7*	31·4^{4}	05 31^{6}	8·6
8	22·3^{4}	07 22^{6}	15[11]	*8*	36·2^{3}	02 03^{5}	19
9	23·6^{3}	09 36^{6}	12	*9*	38·8^{3}	01 01^{6}	15
10	27·9^{3}	00 03^{5}	15	*10*	44·2^{2}	08 05^{6}	17
11	32·5^{2}	05 24^{3}	*83* (69)[12]	*11*	48·6^{3}	06 52^{6}	11
12	38·0^{5}	02 20^{10}	*88* (24)[13]	*12*	58·9^{4}	02 06^{6}	7·3
13	39·1^{4}	01 25^{6}	23[14]	*13*	59·7^{3}	09 40^{6}	17

[9] May be two sources.
[10], [11] Perhaps one extended source.
[12] M 42.
[13] IC 434 etc.
[14] Possibly connected with source 05—0*12*.
[15] (M 42—eastward extension).
[16], [17], [18] Perhaps part of Barnard's ring.

TABLE 2 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	08		
1	01·0^{2}	04 13^{6}	14
2	03·1^{3}	00 30^{6}	15
3	03·9^{4}	07 54^{7}	9·7
4	09·3^{2}	05 40^{5}	22
5	13·4^{2}	02 53^{5}	35[19]
6	21·5^{2}	09 32^{6}	20†
7	22·7^{4}	04 38^{7}	8·8
8	27·2^{3}	03 15^{6}	*27* (19)
9	32·0^{3}	05 10^{6}	13
10	32·3^{3}	07 25^{6}	13
11	34·3^{3}	01 04^{7}	13
12	40·3^{4}	09 15^{7}	7
13	53·5^{3}	06 07^{6}	12
14	57·6^{4}	02 05^{7}	7·8
15	59·9^{3}	05 07^{6}	18
	09		
1	01·3^{3}	06 46^{6}	13
2	06·5^{3}	09 38^{6}	17[20]
3	06·9^{4}	03 15^{7}	7·6
4	07·0^{3}	01 22^{7}	7·3
5	21·6^{4}	04 22^{7}	9·5
6	34·9^{3}	04 00^{6}	15
7	38·8^{3}	01 17^{6}	12
8	41·4^{4}	07 14^{7}	8·4
9	42·0^{5}	09 39^{8}	*100* (28)*[21]
10	48·7^{3}	04 57^{6}	9·3
11	48·9^{3}	08 31^{6}	12
	10		
1	05·3^{2}	09 45^{5}	17
2	07·3^{3}	03 44^{6}	10
3	08·1^{3}	07 25^{6}	17
4	11·8^{4}	09 30^{6}	9·4
5	16·9^{3}	02 34^{6}	16
6	17·7^{4}	03 00^{7}	7·3
7	23·1^{3}	08 10^{6}	11
8	24·1^{3}	02 19^{6}	17
9	24·3^{3}	04 47^{7}	5·3
10	25·4^{3}	07 20^{6}	10
11	27·3^{2}	05 57^{6}	17†
12	30·1^{4}	09 10^{7}	6·5†
13	33·4^{3}	02 29^{6}	16
14	33·7^{4}	06 17^{7}	6·5
15	36·0^{4}	00 53^{6}	8·2
16	41·9^{5}	08 12^{7}	17†
17	44·7^{3}	01 06^{6}	14
18	46·3^{2}	02 33^{5}	20
19	48·5^{4}	09 19^{7}	8·5*
20	59·6^{4}	09 39^{6}	6·5*
21	59·8^{2}	00 52^{5}	23
	11		
1	00·3^{3}	06 18^{6}	15
2	03·0^{4}	08 22^{7}	8·5
3	05·4^{4}	03 55^{7}	5·0
4	09·0^{3}	06 10^{6}	12
5	11·8^{3}	01 54^{6}	18
6	13·3^{3}	07 10^{6}	16
7	16·1^{3}	08 43^{6}	15
8	16·9^{2}	02 46^{5}	31
9	25·4^{4}	06 52^{7}	14†
10	28·1^{3}	03 15^{6}	10
11	31·4^{4}	07 43^{7}	6·0
12	34·2^{4}	00 30^{7}	8·2
13	39·3^{4}	01 28^{7}	6·3
14	41·6^{3}	03 45^{5}	8·4*
15	42·7^{5}	06 06^{7}	6·0
16	42·9^{2}	00 12^{5}	24†
17	46·4^{3}	06 59^{6}	16†
18	56·2^{3}	00 30^{6}	16

[19] IAU 08S0A.

[20] Perhaps together with 09—1*3* makes an extended source.

[21] Complex distribution, may be several sources.

TABLE 2 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	12		
1	$01{\cdot}8^{3}$	$04\ 36^{6}$	11·8
2	$03{\cdot}7^{3}$	$07\ 37^{7}$	18
3	$04{\cdot}4^{2}$	$07\ 27^{5}$	9·9
4	$05{\cdot}0^{3}$	$08\ 42^{6}$	11
5	$08{\cdot}6^{4}$	$09\ 38^{7}$	11
6	$11{\cdot}2^{3}$	$04\ 36^{10}$	9·9
7	$11{\cdot}9^{3}$	$00\ 36^{8}$	15
8	$15{\cdot}9^{3}$	$04\ 47^{7}$	15·7
9	$15{\cdot}9^{2}$	$09\ 54^{7}$	23
10	$16{\cdot}1^{2}$	$07\ 03^{5}$	9·2
11	$35{\cdot}9^{3}$	$00\ 31^{6}$	8·0 [22]
12	$37{\cdot}1^{5}$	$07\ 19^{6}$	*52* (24)
13	$37{\cdot}7^{3}$	$04\ 24^{6}$	25
14	$39{\cdot}2^{2}$	$08\ 33^{7}$	20
15	$40{\cdot}5^{4}$	$06\ 07^{8}$	12
16	$43{\cdot}1^{4}$	$03\ 06^{6}$	10
17	$44{\cdot}8^{3}$	$05\ 21^{8}$	14
18	$45{\cdot}5^{4}$	$06\ 12^{8}$	17
19	$48{\cdot}0^{2}$	$01\ 36^{6}$	14
20	$53{\cdot}7^{1}$	$05\ 38^{5}$	37
21	$57{\cdot}3^{2}$	$00\ 24^{6}$	7·5
	13		
1	$04{\cdot}2^{3}$	$05\ 42^{8}$	8·5
2	$06{\cdot}0^{4}$	$09\ 49^{7}$	19
3	$07{\cdot}3^{2}$	$00\ 29^{5}$	25
4	$09{\cdot}6^{2}$	$02\ 29^{7}$	11
5	$12{\cdot}8^{4}$	$08\ 05^{8}$	*45* (23)
6	$13{\cdot}0^{3}$	$06\ 17^{6}$	7·0
7	$13{\cdot}1^{3}$	$01\ 25^{8}$	16
8	$16{\cdot}8^{4}$	$00\ 30^{7}$	13
9	$28{\cdot}4^{4}$	$06\ 07^{6}$	13
10	$33{\cdot}8^{3}$	$07\ 54^{7}$	8·7
11	$35{\cdot}7^{2}$	$06\ 21^{6}$	35
12	$41{\cdot}8^{2}$	$03\ 04^{7}$	16
13	$43{\cdot}0^{3}$	$07\ 48^{7}$	*53* (23)
14	$48{\cdot}1^{3}$	$09\ 55^{7}$	8·0
15	$48{\cdot}3^{3}$	$05\ 36^{6}$	12
16	$50{\cdot}0^{3}$	$06\ 07^{7}$	7·8 [23]
17	$53{\cdot}4^{2}$	$08\ 10^{10}$	8·7
18	$56{\cdot}7^{4}$	$09\ 57^{8}$	8·5

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	14		
1	$04{\cdot}2^{2}$	$02\ 09^{8}$	12†
2	$05{\cdot}5^{2}$	$06\ 19^{5}$	18
3	$06{\cdot}1^{2}$	$09\ 49^{8}$	10
4	$06{\cdot}5^{3}$	$08\ 59^{8}$	*27* (17)
5	$09{\cdot}0^{2}$	$02\ 58^{8}$	7
6	$09{\cdot}6^{2}$	$06\ 52^{7}$	14
7	$14{\cdot}7^{3}$	$03\ 50^{7}$	24·4†
8	$19{\cdot}7^{3}$	$05\ 20^{6}$	5·0
9	$20{\cdot}1^{3}$	$09\ 09^{7}$	16
10	$23{\cdot}4^{6}$	$08\ 00^{7}$	7·5
11	$26{\cdot}6^{4}$	$01\ 18^{5}$	25
12	$29{\cdot}1^{3}$	$03\ 38^{5}$	16
13	$34{\cdot}7^{2}$	$08\ 21^{6}$	14
14	$37{\cdot}4^{3}$	$06\ 56^{5}$	22†
15	$42{\cdot}4^{4}$	$08\ 44^{7}$	20†
16	$43{\cdot}0^{3}$	$03\ 45^{7}$	7·6
17	$52{\cdot}7^{2}$	$04\ 10^{6}$	22
18	$53{\cdot}5^{2}$	$05\ 44^{5}$	16
19	$55{\cdot}5^{3}$	$00\ 54^{7}$	19 [24]
	15		
1	$02{\cdot}6^{3}$	$00\ 18^{13}$	18
2	$04{\cdot}3^{2}$	$06\ 41^{6}$	17
3	$08{\cdot}3^{3}$	$00\ 42^{6}$	19
4	$09{\cdot}0^{2}$	$09\ 17^{5}$	18
5	$09{\cdot}0^{4}$	$05\ 26^{6}$	8
6	$09{\cdot}2^{3}$	$08\ 15^{7}$	7·5
7	$20{\cdot}4^{3}$	$05\ 12^{7}$	14†
8	$21{\cdot}8^{3}$	$06\ 52^{7}$	12†
9	$21{\cdot}9^{4}$	$03\ 13^{6}$	7·0
10	$22{\cdot}1^{3}$	$07\ 28^{7}$	18
11	$22{\cdot}9^{3}$	$08\ 17^{6}$	12
12	$38{\cdot}1^{5}$	$01\ 54^{6}$	*37* (21)
13	$39{\cdot}0^{3}$	$04\ 59^{7}$	12
14	$42{\cdot}5^{3}$	$03\ 41^{9}$	23
15	$45{\cdot}3^{5}$	$07\ 20^{9}$	14·8*
16	$46{\cdot}0^{2}$	$07\ 55^{8}$	12
17	$51{\cdot}8^{5}$	$02\ 52^{5}$	9·7
18	$52{\cdot}4^{2}$	$06\ 57^{8}$	19
19	$53{\cdot}4^{4}$	$09\ 05^{7}$	10
20	$57{\cdot}3^{3}$	$04\ 38^{7}$	7·0*

[22] (NGC 4592).
[23] (NGC 5324).
[24] (NGC 5792).

TABLE 2 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} $(c/s)^{-1}$)
	16		
1	$02\cdot7^{3}$	$09\ 15^{6}$	20
2	$05\cdot8^{3}$	$06\ 36^{6}$	9·5
3	$12\cdot3^{2}$	$02\ 30^{4}$	9·1
4	$12\cdot4^{2}$	$00\ 35^{5}$	15
5	$14\cdot0^{3}$	$05\ 44^{7}$	9·5
6	$16\cdot0^{3}$	$08\ 42^{7}$	8·0
7	$26\cdot4^{4}$	$06\ 20^{6}$	9·0
8	$26\cdot6^{4}$	$03\ 24^{6}$	17
9	$34\cdot1^{3}$	$03\ 33^{8}$	12
10	$36\cdot9^{5}$	$00\ 30^{6}$	26
11	$42\cdot7^{2}$	$07\ 14^{7}$	21
12	$49\cdot3^{4}$	$00\ 18^{6}$	*80* (50)
13	$52\cdot0^{4}$	$05\ 09^{6}$	11
14	$52\cdot6^{2}$	$02\ 17^{9}$	*60* (26)
15	$54\cdot6^{3}$	$09\ 08^{6}$	11
16	$56\cdot0^{3}$	$01\ 11^{7}$	15:
	17		
1	$05\cdot8^{4}$	$01\ 36^{6}$	17
2	$06\cdot2^{3}$	$04\ 41^{5}$	12†[25]
3	$09\cdot7^{4}$	$00\ 26^{7}$	15:[26]
4	$12\cdot5^{4}$	$03\ 16^{7}$	21
5	$16\cdot9^{3}$	$04\ 25^{8}$	31
6	$18\cdot1^{1}$	$00\ 55^{3}$	475[27]
7	$22\cdot1^{3}$	$03\ 50^{9}$	16
8	$24\cdot6^{4}$	$08\ 21^{7}$	15†
9	$30\cdot9^{2}$	$05\ 10^{7}$	16*
10	$33\cdot7^{3}$	$06\ 52^{8}$	19
11	$37\cdot7^{4}$	$01\ 18^{8}$	39
12	$48\cdot1^{3}$	$02\ 06^{8}$	53
13	$53\cdot8^{3}$	$08\ 10^{8}$	21*
14	$54\cdot4^{3}$	$05\ 34^{6}$	55*
15	$55\cdot7^{2}$	$01\ 24^{6}$	50†
	18		
1	$02\cdot4^{3}$	$05\ 19^{7}$	25
2	$05\cdot2^{3}$	$00\ 59^{8}$	62†
3	$12\cdot4^{3}$	$05\ 59^{7}$	*82* (48)
4	$14\cdot9^{3}$	$07\ 03^{8}$	30:[28]
5	$17\cdot6^{4}$	$09\ 32^{5}$	*50* (25)[28]
6	$20\cdot6^{2}$	$01\ 34^{6}$	*76* (55)
7	$25\cdot3^{3}$	$04\ 38^{8}$	40:†
8	$31\cdot6^{2}$	$08\ 42^{10}$	160
9	$38\cdot5^{2}$	$05\ 10^{6}$	20:
10	$41\cdot7^{4}$	$03\ 51^{5}$	*180* (100)
11	$41\cdot8^{5}$	$01\ 48^{10}$	25:
12	$46\cdot3^{4}$	$00\ 53^{8}$	20:
13	$50\cdot3^{4}$	$07\ 48^{8}$	17
14	$53\cdot0^{4}$	$02\ 42^{7}$	*150* (40)[28]
15	$57\cdot9^{3}$	$04\ 13^{5}$	34
	19		
1	$04\cdot2^{4}$	$03\ 06^{7}$	*53* (34)
2	$08\cdot9^{3}$	$06\ 41^{7}$	16
3	$11\cdot3^{3}$	$09\ 41^{7}$	15†
4	$14\cdot1^{5}$	$02\ 17^{7}$	28
5	$18\cdot5^{3}$	$05\ 33^{8}$	9·8*[29]
6	$20\cdot0^{6}$	$03\ 38^{7}$	16
7	$26\cdot2^{5}$	$02\ 05^{5}$	23
8	$28\cdot1^{3}$	$06\ 41^{6}$	12
9	$32\cdot6^{3}$	$09\ 46^{8}$	23
10	$39\cdot8^{3}$	$04\ 36^{8}$	12
11	$40\cdot8^{5}$	$07\ 29^{6}$	*33* (24)
12	$42\cdot9^{4}$	$04\ 55^{8}$	20
13	$43\cdot5^{2}$	$02\ 45^{6}$	22
14	$44\cdot8^{4}$	$00\ 13^{7}$	22
15	$45\cdot8^{3}$	$08\ 54^{8}$	9·5
16	$53\cdot3^{3}$	$05\ 22^{8}$	10
	20		
1	$06\cdot4^{3}$	$04\ 25^{7}$	19
2	$09\cdot7^{3}$	$09\ 00^{7}$	9·5
3	$18\cdot7^{4}$	$09\ 38^{7}$	9·0
4	$23\cdot2^{4}$	$01\ 18^{7}$	14
5	$27\cdot0^{4}$	$00\ 47^{7}$	8·7
6	$28\cdot6^{2}$	$08\ 09^{7}$	14
7	$33\cdot5^{2}$	$09\ 27^{8}$	14
8	$37\cdot5^{3}$	$02\ 54^{7}$	9·7
9	$44\cdot1^{3}$	$02\ 17^{7}$	18
10	$45\cdot0^{3}$	$07\ 59^{8}$	9·0
11	$45\cdot1^{3}$	$03\ 15^{7}$	*27* (19)
12	$53\cdot2^{4}$	$06\ 52^{8}$	15
13	$58\cdot8^{4}$	$08\ 49^{7}$	17†

[25] May be two sources. [26] Possibly side lobe of source 17–06.
[27] Perhaps superimposed on extended source.
[28] Perhaps a galactic irregularity. [29] A doubtful source.

TABLE 2 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	21		
1	00·2^{3}	09 45^{6}	12
2	00·9^{3}	04 02^{7}	19†
3	02·1^{3}	00 30^{7}	11
4	05·4^{3}	07 06^{5}	17
5	10·5^{3}	09 50^{7}	11
6	13·7^{3}	02 47^{10}	*28* (15)
7	24·9^{3}	05 35^{8}	19[30]
8	25·0^{4}	06 36^{6}	10[31]
9	25·7^{5}	00 59^{7}	15*
10	28·1^{5}	09 15^{7}	16†
11	31·9^{3}	02 28^{6}	9·0
12	31·6^{3}	01 16^{6}	6
13	38·0^{4}	07 02^{8}	12
14	40·6^{4}	09 14^{7}	7·0
15	41·7^{3}	04 02^{8}	12
16	43·8^{3}	08 10^{7}	13
17	50·7^{3}	03 40^{7}	6·0
18	54·2^{3}	01 29^{8}	15·6
19	56·3^{3}	05 55^{8}	11
20	57·7^{3}	03 55^{8}	13
	22		
1	02·2^{3}	08 43^{8}	11
2	04·6^{2}	09 16^{5}	10
3	05·4^{2}	05 30^{6}	7
4	05·7^{3}	03 27^{8}	13
5	10·8^{2}	09 29^{5}	17
6	16·3^{3}	03 46^{6}	*33* (18)
7	16·9^{3}	00 42^{9}	13
8	19·4^{4}	08 43^{10}	7·1
9	21·5^{1}	02 18^{3}	60
10	23·1^{3}	05 13^{5}	30
11	24·5^{3}	03 39^{8}	9·6
12	29·2^{4}	08 33^{6}	15†
13	33·3^{3}	07 03^{8}	8·0
14	36·9^{3}	04 13^{6}	16
15	43·5^{4}	02 10^{7}	14[32]
16	45·0^{3}	02 52^{7}	20[33]
17	49·2^{4}	03 25^{8}	9:
18	53·1^{5}	06 37^{8}	12
19	53·9^{5}	00 18^{6}	*32* (19)
20	54·9^{2}	01 16^{6}	6·6
21	55·3^{3}	08 32^{8}	13
	23		
1	01·7^{4}	02 17^{8}	7
2	02·6^{3}	05 27^{6}	10
3	02·8^{4}	01 00^{8}	9·5
4	03·6^{3}	03 43^{6}	14
5	05·5^{3}	07 59^{7}	6·7
6	07·5^{4}	09 22^{8}	9·0
7	12·6^{3}	05 57^{6}	6·7
8	15·6^{3}	02 29^{7}	9·8
9	19·5^{2}	09 16^{5}	6·0
10	24·3^{3}	05 15^{6}	*35* (19)
11	25·1^{3}	02 22^{6}	19
12	25·2^{4}	08 10^{8}	9·0
13	32·7^{3}	04 59^{5}	9·7
14	33·4^{5}	00 19^{5}	9·5[34]
15	38·0^{3}	00 08^{6}	11
16	42·5^{3}	05 22^{7}	7·6
17	46·1^{3}	03 36^{8}	8·6
18	48·7^{3}	04 21^{8}	13
19	49·7^{3}	08 10^{7}	10
20	49·9^{3}	01 23^{7}	18
21	51·3^{3}	05 30^{7}	9

[30], [31] Perhaps one extended source.
[32], [33] Perhaps one extended source.
[34] (NGC 7716).

Table 3

SOURCES BETWEEN DECLINATIONS —10° AND —20°

Sources observed on one record only are indicated by an asterisk. Sources which may be "extended", that is, resolvable, are indicated by a dagger. A colon has been placed beside uncertain flux densities

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)	Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	00				01		
1	00·0^{2}	17 32^{5}	28	*13*	36·9^{4}	17 49^{6}	10[2]
2	00·3^{3}	15 28^{5}	15	*14*	38·4^{4}	18 25^{7}	8·0[3]
3	00·6^{3}	12 23^{6}	12	*15*	40·4^{2}	16 51^{4}	28
4	05·6^{3}	19 58^{6}	17	*16*	45·6^{3}	18 44^{7}	16
5	09·2^{2}	19 07^{5}	13	*17*	47·6^{3}	11 11^{6}	10
6	12·4^{3}	15 07^{8}	*34* (20)	*18*	47·9^{3}	13 11^{7}	8·1
7	15·9^{3}	13 02^{5}	*52* (33)[1]	*19*	50·6^{4}	14 54^{6}	12
8	16·2^{2}	10 46^{5}	23	*20*	55·1^{3}	10 45^{6}	16
9	18·6^{3}	19 11^{5}	8·7	*21*	59·6^{3}	11 47^{6}	14
10	25·0^{4}	16 48^{6}	6·0				
11	25·3^{4}	13 10^{7}	13		02		
12	27·6^{2}	11 50^{10}	14	*1*	02·0^{4}	19 43^{7}	8·5
13	29·4^{3}	15 33^{6}	8·8	*2*	03·5^{3}	18 16^{6}	17
14	32·5^{3}	16 50^{6}	12	*3*	08·0^{2}	11 18^{6}	*30* (19)
15	32·5^{3}	18 14^{5}	17	*4*	11·4^{3}	16 02^{6}	8·2
16	35·0^{5}	12 35^{8}	9·6	*5*	13·2^{1}	13 19^{3}	42[4]
17	38·0^{4}	13 13^{7}	10	*6*	14·8^{4}	17 58^{8}	8·5
18	39·0^{3}	15 44^{6}	14†	*7*	22·9^{3}	11 38^{8}	13
19	43·5^{4}	14 49^{6}	9·0	*8*	26·5^{3}	17 31^{6}	19
20	45·8^{4}	17 58^{7}	8·9	*9*	30·8^{3}	10 12^{5}	17
21	48·6^{3}	12 28^{5}	18	*10*	35·4^{1}	19 42^{3}	44
22	50·1^{3}	19 53^{7}	11	*11*	36·0^{4}	14 45^{7}	14
23	52·3^{4}	16 19^{6}	12	*12*	36·3^{4}	18 20^{6}	9·5
24	56·9^{3}	13 40^{6}	13	*13*	45·8^{3}	16 47^{6}	6·2
25	57·2^{3}	15 22^{6}	17	*14*	46·2^{4}	13 29^{8}	15
26	57·6^{3}	17 24^{5}	29	*15*	47·5^{3}	18 10^{5}	9·3
27	58·9^{3}	14 30^{6}	9·8	*16*	56·2^{3}	16 52^{6}	12
	01				03		
1	01·6^{2}	12 27^{5}	18	*1*	03·5^{3}	12 21^{5}	18
2	05·9^{1}	16 15^{2}	53	*2*	05·4^{4}	16 44^{6}	17
3	07·2^{3}	18 51^{6}	9·0	*3*	07·5^{3}	13 33^{7}	16
4	08·2^{4}	14 33^{6}	16	*4*	15·1^{3}	14 48^{6}	9·5
5	11·7^{4}	10 07^{6}	7·8	*5*	27·9^{3}	16 51^{5}	16
6	14·5^{3}	11 53^{6}	11	*6*	31·1^{4}	18 48^{6}	12
7	16·8^{5}	16 45^{10}	13†	*7*	44·1^{2}	11 13^{4}	34
8	16·8^{3}	19 00^{6}	14	*8*	46·4^{4}	13 08^{6}	10
9	18·0^{2}	15 34^{3}	45	*9*	49·3^{2}	14 38^{3}	44
10	24·9^{3}	12 10^{6}	7·0	*10*	49·7^{2}	10 08^{5}	21
11	25·1^{2}	14 13^{3}	30	*11*	57·5^{3}	16 20^{7}	18
12	27·9^{3}	15 38^{5}	18†				

[1] Extended N.-S., may be two sources. [2], [3] May be one extended source.
[4] IAU 02S1A.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	04		
1	05·0^{3}	13 20^{8}	14†
2	05·4^{1}	12 26^{3}	31
3	08·9^{4}	16 27^{6}	10
4	11·4^{4}	19 36^{7}	9·4
5	11·8^{4}	11 26^{6}	18
6	13·8^{3}	15 22^{8}	15*
7	16·3^{3}	18 13^{5}	13
8	23·0^{3}	16 57^{6}	14*
9	23·9^{3}	12 07^{5}	16
10	25·9^{3}	11 38^{7}	11
11	27·2^{5}	18 36^{8}	9·0
12	32·0^{2}	13 26^{5}	38
13	32·9^{4}	16 38^{6}	15
14	36·9^{4}	15 00^{7}	7·3
15	38·3^{3}	12 10^{6}	8·0
16	42·8^{5}	18 52^{7}	7·0
17	48·0^{3}	17 34^{6}	14
18	52·1^{4}	19 07^{8}	7·3
19	54·2^{3}	11 51^{6}	17
20	59·9^{2}	12 16^{4}	14
	05		
1	03·0^{3}	10 13^{5}	20
2	06·5^{3}	14 29^{6}	16
3	08·5^{2}	18 42^{3}	41
4	13·0^{3}	15 56^{8}	11
5	13·6^{2}	13 41^{6}	16
6	15·5^{2}	16 34^{5}	16
7	21·2^{4}	11 59^{6}	11
8	23·8^{3}	18 24^{6}	14
9	24·2^{3}	13 36^{6}	16
10	24·9^{3}	16 31^{7}	12
11	24·9^{3}	17 35^{6}	8·2
12	25·4^{3}	10 45^{6}	16
13	26·6^{4}	14 48^{7}	8·3
14	33·3^{3}	12 01^{6}	15
15	34·6^{4}	18 31^{8}	12
16	35·0^{4}	17 18^{8}	15
17	35·3^{3}	13 16^{8}	14[(5)]
18	37·1^{3}	16 04^{8}	9·7
19	42·0^{4}	12 33^{8}	8·0
20	43·7^{3}	17 33^{7}	17
21	48·7^{3}	15 48^{6}	8·7
22	49·3^{2}	10 32^{4}	17
23	51·0^{3}	16 59^{6}	8·5
24	51·7^{5}	14 19^{7}	8·7
25	51·9^{3}	12 29^{6}	9·5*
26	57·6^{3}	16 50^{6}	13
	06		
1	03·9^{3}	10 45^{6}	9·2
2	04·6^{4}	17 49^{7}	15
3	07·3^{4}	14 40^{7}	14†
4	14·8^{5}	15 00^{7}	19
5	17·8^{5}	16 36^{10}	*63* (21)
6	20·3^{4}	13 39^{8}	9·5
7	25·8^{3}	12 52^{8}	16†
8	34·1^{4}	15 46^{7}	16
9	34·9^{3}	13 44^{8}	9·3
10	36·3^{3}	16 50^{6}	18
11	42·2^{4}	10 19^{6}	*84* (27)[(6)]
12	44·0^{2}	15 33^{6}	18
13	49·7^{5}	12 43^{10}	*55* (11)[(7)]
14	53·2^{3}	19 15^{7}	7·6†
	07		
1	03·2^{2}	11 02^{7}	*55* (25)[(8)]
2	03·6^{4}	19 13^{7}	10
3	12·0^{3}	14 30^{10}	17†
4	13·8^{4}	11 20^{5}	25†
5	16·2^{4}	17 07^{7}	17†
6	21·4^{3}	18 38^{5}	19
7	23·8^{3}	13 16^{7}	13†
8	26·1^{2}	14 51^{6}	17
9	29·7^{4}	18 17^{8}	*29* (17)
10	32·9^{3}	15 59^{6}	12
11	34·2^{3}	19 38^{6}	11
12	34·8^{3}	15 00^{7}	9·2
13	38·6^{3}	13 58^{6}	12
14	41·5^{4}	17 43^{7}	9·8
15	43·4^{5}	16 32^{7}	10
16	45·6^{4}	10 01^{6}	13
17	45·5^{2}	19 00^{4}	52
18	46·2^{4}	11 53^{7}	20
19	51·3^{5}	19 22^{8}	17

[(5)] Rather doubtful because of a large side lobe of 05N2A at this declination.

[(6)], [(7)] Perhaps one extended object elongated parallel to the galactic circle.

[(8)] Extended source with apparently complex brightness distribution. May be associated with the emission nebulae IC 2177 and NGC 2327.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	08		
1	00·3^{4}	14 40^{7}	*33* (18)*
2	03·4^{3}	17 11^{5}	18*
3	05·3^{3}	12 37^{6}	14*
4	07·0^{2}	10 27^{3}	40
5	13·1^{4}	11 49^{7}	4·2
6	13·8^{3}	15 57^{5}	14*
7	17·6^{4}	11 00^{7}	8·9[9]
8	27·3^{4}	17 39^{6}	14
9	33·1^{4}	16 04^{7}	8·8*
10	35·0^{3}	11 27^{6}	18
11	39·6^{3}	17 49^{6}	10[10]
12	43·8^{3}	11 28^{6}	12
13	44·6^{4}	17 44^{7}	9·4[11]
14	45·6^{4}	15 33^{7}	6·6[9]
15	48·4^{4}	10 15^{7}	7·6
16	51·3^{2}	14 18^{5}	24
17	53·2^{3}	12 27^{6}	13
18	54·4^{5}	15 38^{8}	9·4*
19	55·6^{3}	19 38^{7}	17
	09		
1	00·0^{3}	14 18^{6}	12
2	03·5^{3}	12 32^{6}	16
3	06·4^{4}	10 22^{7}	9·5[12]
4	15·7^{1}	11 53^{2}	690[13]
5	30·0^{3}	19 56^{6}	11
6	31·4^{3}	16 47^{6}	13
7	38·2^{4}	17 18^{6}	15†
8	39·3^{3}	16 09^{7}	10*
9	39·7^{3}	11 28^{5}	*50* (25)
10	42·7^{3}	19 33^{6}	12
11	43·5^{2}	13 19^{5}	*25* (16)*
12	47·0^{4}	18 15^{7}	12
13	53·3^{4}	12 50^{7}	9·7[14]
14	54·0^{3}	13 36^{6}	14[15]
	10		
1	03·8^{4}	10 38^{7}	7·3
2	07·6^{3}	11 47^{7}	*32* (16)
3	08·3^{3}	14 47^{6}	17[16]
4	10·1^{3}	18 15^{6}	14
5	10·3^{4}	15 16^{7}	9·2[17]
6	18·9^{3}	19 43^{6}	7·5
7	19·9^{3}	10 25^{7}	6·5*
8	22·4^{3}	10 43^{6}	18
9	23·0^{4}	11 44^{7}	8·5
10	23·6^{4}	18 10^{6}	10*
11	28·0^{3}	15 28^{6}	18
12	30·0^{4}	13 36^{7}	7·5
13	31·0^{4}	17 04^{8}	9·0
14	32·4^{4}	19 15^{7}	11
15	33·5^{3}	10 20^{5}	9·4
16	34·7^{3}	18 24^{6}	14
17	38·7^{4}	11 53^{7}	6·5
18	39·4^{4}	14 00^{7}	9·3
19	44·8^{4}	17 08^{7}	7·5†
20	46·6^{3}	18 46^{6}	24†
21	48·7^{3}	20 12^{6}	13
22	54·6^{4}	16 00^{7}	9·2
	11		
1	00·6^{5}	15 01^{10}	*56* (14)*
2	10·4^{3}	11 50^{6}	10
3	11·2^{3}	13 15^{6}	17*
4	19·9^{3}	12 00^{6}	12*
5	30·4^{4}	15 16^{6}	9·4*[18]
6	30·9^{2}	19 22^{4}	32
7	32·6^{3}	17 25^{6}	19
8	36·5^{1}	13 41^{4}	44[19]
9	39·8^{3}	17 11^{6}	7·3
10	40·0^{2}	15 08^{5}	25
11	40·3^{3}	11 29^{6}	14
12	42·6^{3}	15 43^{6}	15
13	47·1^{3}	11 47^{6}	17
14	50·4^{4}	10 10^{7}	7·7
15	52·0^{4}	15 22^{6}	6·6
16	53·1^{3}	17 39^{6}	9·5
17	56·6^{4}	11 42^{7}	7·3
18	59·5^{2}	18 41^{6}	10[20]
19	59·9^{3}	10 27^{5}	16

[9] A doubtful source. [10], [11] Perhaps one extended source.
[12] Perhaps one extended source with 09—0*2*. [13] IAU 09S1A.
[14], [15] Perhaps one extended source. [16], [17] Perhaps one extended source.
[18] A rather doubtful source. [19] IAU 11S1A.
[20] NGC 4038/39.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	12		
1	01·8^{3}	15 33^{8}	14
2	02·4^{5}	17 39^{10}	*48* (16)[21]
3	04·0^{3}	12 53^{10}	*56* (20)
4	09·1^{2}	10 55^{5}	10
5	09·3^{3}	19 27^{5}	11†
6	13·7^{3}	14 39^{7}	6·3*
7	18·2^{2}	16 30^{5}	12
8	22·5^{3}	19 32^{6}	9·0*
9	23·4^{2}	11 22^{6}	16
10	28·4^{1}	16 59^{4}	38[22]
11	34·0^{3}	14 13^{7}	9·6
12	35·2^{3}	19 53^{6}	*24* (12)*
13	37·3^{5}	15 38^{6}	14†
14	41·9^{2}	19 36^{5}	18*
15	43·3^{3}	17 50^{5}	7·0
16	43·6^{2}	11 06^{5}	18
17	51·6^{2}	18 20^{7}	13
18	52·3^{1}	12 19^{4}	53[23]
19	57·0^{4}	17 16^{6}	*27* (14)
20	58·1^{3}	11 17^{5}	19
	13		
1	00·0^{3}	18 03^{8}	18
2	08·3^{3}	19 53^{7}	7·0*
3	12·0^{3}	12 07^{7}	8·7
4	12·8^{2}	18 41^{5}	22
5	31·7^{6}	14 18^{10}	13
6	31·9^{3}	10 00^{7}	18
7	34·4^{3}	10 57^{7}	17
8	34·7^{3}	17 55^{6}	11[24]
9	41·4^{4}	19 22^{6}	14
10	41·7^{4}	12 21^{6}	18*
11	45·4^{3}	11 07^{7}	15
12	46·8^{4}	12 58^{7}	14
13	47·2^{4}	16 30^{5}	12
14	52·1^{3}	19 23^{5}	15
15	53·9^{2}	17 39^{6}	18†
16	56·8^{3}	16 17^{7}	8·7
17	59·1^{2}	11 35^{5}	13
18	59·9^{2}	14 50^{9}	15†
	14		
1	01·3^{4}	19 23^{7}	14†
2	09·8^{4}	18 41^{7}	15
3	15·3^{4}	17 15^{10}	14†
4	16·0^{2}	15 47^{8}	*34* (22)
5	17·7^{3}	19 14^{8}	11
6	20·4^{2}	14 29^{8}	*26* (16)*
7	20·5^{5}	13 14^{8}	12
8	20·9^{3}	18 20^{10}	9·0
9	23·6^{4}	17 28^{8}	11
10	24·6^{2}	11 44^{4}	22
11	31·4^{5}	19 13^{8}	8·9*
12	32·0^{4}	12 22^{6}	6·5
13	32·8^{3}	11 11^{8}	8·5*
14	37·2^{2}	17 08^{8}	11
15	41·7^{2}	18 00^{8}	11†
16	42·9^{2}	19 23^{6}	14
17	44·1^{3}	11 36^{7}	17*
18	46·9^{4}	15 53^{6}	*42* (20)
19	50·2^{3}	12 58^{6}	19
20	51·7^{3}	18 30^{7}	9·3
21	53·4^{2}	11 02^{5}	41†
22	59·2^{5}	19 53^{3}	16*[25]
	15		
1	00·3^{2}	14 41^{7}	13*
2	02·7^{2}	12 00^{10}	9·3
3	03·3^{3}	16 36^{8}	10
4	04·5^{2}	13 52^{7}	13*
5	08·1^{3}	18 05^{8}	15
6	10·6^{5}	19 23^{6}	*49* (30)
7	14·1^{3}	13 58^{7}	19*
8	16·6^{2}	12 32^{6}	13
9	23·5^{2}	13 41^{4}	16*
10	27·1^{3}	12 21^{6}	8·2
11	31·5^{3}	18 36^{8}	13
12	37·8^{2}	17 23^{7}	16†
13	40·9^{5}	16 02^{8}	7·5*[25]
14	41·3^{3}	13 36^{10}	8·8*
15	43·9^{2}	12 23^{7}	9·5
16	48·6^{2}	19 51^{5}	11
17	50·0^{3}	16 57^{10}	*21* (14)
18	53·3^{3}	16 10^{7}	10†

[21] Possibly several sources.
[22] Possibly a side lobe of IAU 12N1A, but appears genuine.
[23] (NGC 4783), (NGC 4782). [24] (NGC 5247). [25] A doubtful source.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	16		
1	03·2^{3}	17 19^{6}	16*
2	04·1^{3}	18 20^{10}	7·6
3	05·5^{3}	16 18^{8}	8·5
4	07·7^{3}	12 45^{7}	15
5	08·1^{4}	10 44^{7}	11
6	16·9^{4}	10 05^{7}	17
7	17·6^{3}	13 36^{6}	12*
8	21·1^{3}	11 28^{4}	20
9	22·0^{3}	17 34^{7}	15*
10	22·8^{5}	19 23^{5}	11
11	30·4^{2}	12 48^{6}	15*
12	32·6^{5}	15 18^{9}	14*
13	34·9^{3}	14 18^{7}	16*
14	36·9^{5}	12 53^{7}	8·9*
15	38·0^{2}	19 35^{6}	23*
16	38·1^{5}	17 50^{10}	19
17	40·4^{3}	15 19^{5}	30:*
18	43·1^{4}	18 20^{6}	18
19	45·4^{2}	10 48^{6}	37*
20	48·1^{3}	12 53^{7}	14*
21	55·5^{4}	18 51^{8}	17*
22	55·7^{3}	14 03^{5}	22*
	17		
1	05·2^{3}	10 02^{6}	15*
2	05·4^{3}	17 13^{6}	*60* (35)*
3	10·5^{5}	13 41^{8}	32*†
4	15·0^{7}	12 43^{7}	16*†
5	15·9^{4}	16 25^{7}	15*
6	19·4^{5}	18 45^{7}	*150* (50)*[26]
7	22·3^{4}	10 49^{8}	21*
8	37·1^{4}	11 40^{6}	16*
9	47·7^{4}	13 04^{9}	18*
10	48·7^{4}	17 28^{8}	30:*†[27]
11	51·1^{3}	14 56^{9}	19*
12	51·3^{5}	10 43^{8}	16*[28]
13	53·9^{3}	11 39^{6}	12*[29]
14	55·4^{3}	16 07^{7}	24*

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	18		
1	00·1^{5}	17 49^{7}	40:
2	04·7^{5}	11 26^{7}	29†
3	11·6^{2}	17 12^{3}	160:
4	12·0^{4}	12 40^{10}	20:
5	14·9^{3}	10 57^{7}	35:†
6	18·9^{5}	18 38^{10}	15:
7	21·5^{3}	13 50^{5}	40:
8	21·8^{3}	12 24^{4}	150
9	25·0^{3}	11 17^{4}	50
10	26·5^{3}	17 54^{7}	15:
11	27·5^{3}	12 46^{6}	40:
12	28·7^{3}	14 36^{8}	30:
13	30·1^{2}	10 01^{4}	230
14	42·1^{4}	19 40^{8}	*56*: (28)
15	42·9^{4}	13 37^{8}	24†
16	48·9^{3}	10 55^{7}	23
17	51·1^{3}	17 08^{7}	15†
	19		
1	04·9^{5}	19 01^{9}	20
2	05·8^{3}	12 37^{5}	17[30]
3	11·3^{3}	15 11^{6}	17
4	14·7^{3}	16 30^{8}	12
5	14·9^{2}	11 58^{6}	25
6	24·1^{5}	14 18^{9}	28
7	27·1^{2}	15 19^{6}	23
8	29·5^{2}	19 44^{7}	22
9	31·7^{3}	17 18^{8}	12
10	32·2^{4}	10 55^{7}	*75* (34)
11	37·7^{2}	15 36^{4}	38:
12	39·7^{3}	13 26^{7}	13
13	48·9^{3}	14 08^{8}	15
14	49·9^{3}	18 10^{7}	11
15	50·6^{4}	19 43^{7}	18:†
16	53·3^{4}	12 30^{7}	19
17	54·1^{3}	16 30^{6}	9·2

[26] Perhaps two sources.

[27] Measurements doubtful because of side lobe difficulties.

[28], [29] Perhaps one extended source.

[30] A doubtful source.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	20		
1	04·1^3	19 32^8	15
2	08·2^3	16 14^8	8·3
3	21·3^3	17 38^8	8·5
4	21·9^3	13 56^9	6·7*
5	22·4^4	19 43^7	8·8†
6	25·5^2	15 41^4	20
7	33·2^3	17 54^6	15
8	36·5^4	13 47^7	13
9	40·9^4	15 00^8	9·0
10	43·0^4	10 12^{10}	8·0
11	45·0^3	18 20^7	15
12	48·5^3	14 45^7	13
13	48·8^3	16 15^9	17
14	50·2^3	16 23^7	13
15	50·3^3	18 41^7	9·0
16	53·5^3	12 22^7	8·5
17	56·8^2	15 00^6	13
18	58·2^3	17 48^6	24
19	59·7^3	13 20^7	14
	21		
1	01·4^2	10 44^5	14
2	03·4^2	11 28^6	12
3	07·3^3	13 25^8	10
4	15·3^3	16 03^7	9·3
5	15·8^4	14 08^7	14
6	17·0^3	12 02^6	7·1
7	17·7^2	15 16^7	17
8	19·1^3	18 40^8	9·7
9	20·2^4	16 49^7	30:†
10	24·5^4	19 27^8	8·2
11	25·9^3	12 11^5	15
12	26·0^3	14 37^7	8·4
13	32·7^3	13 09^7	15
14	33·3^2	11 39^6	28
15	34·7^2	14 39^5	33
16	35·2^3	18 54^7	23
17	38·2^3	16 35^6	16
18	46·2^3	17 07^8	13†
19	46·9^4	13 36^7	*25* (13)
20	48·7^3	15 54^7	8·8*
21	48·9^3	19 53^7	18†
22	53·7^2	12 53^7	8·8
23	54·2^3	18 25^6	25
24	58·2^2	17 04^5	14
25	58·5^4	13 30^6	12[31]
	22		
1	03·0^2	18 40^5	16:
2	03·4^3	15 33^{10}	6·7
3	07·6^3	14 13^5	10
4	08·5^3	10 12^6	9·5
5	08·5^3	12 58^7	14
6	10·3^3	11 58^6	16
7	12·0^1	17 11^4	127[32]
8	21·4^3	15 43^6	10
9	22·6^3	14 08^6	15
10	23·0^2	16 46^6	15
11	27·1^3	18 51^7	11†
12	28·0^3	10 23^8	6·5
13	34·9^2	13 56^6	10
14	35·4^2	12 03^7	16
15	35·8^2	17 36^6	17
16	36·7^3	19 33^7	17
17	39·9^4	14 56^7	6·0
18	40·6^4	16 36^7	8:
19	43·7^2	19 02^5	8·0
20	56·0^2	12 11^6	8·6
21	56·9^3	15 12^8	12
22	57·4^3	13 35^8	6·7
23	58·0^5	10 28^8	8·0

(31) (NGC 7171).

(32) Perhaps slightly extended.

TABLE 3 (*Continued*)

Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)	Ref. No.	Position (1950) R.A. h m	Position (1950) Dec. S. ° ′	Flux Density (10^{-26} W m^{-2} (c/s)$^{-1}$)
	23				23		
1	$04{\cdot}8^4$	12 01^7	8·6	*14*	$26{\cdot}7^2$	19 37^5	19
2	$06{\cdot}5^3$	19 53^7	11	*15*	$27{\cdot}3^2$	17 56^6	11
3	$07{\cdot}7^3$	10 45^7	7·6	*16*	$27{\cdot}6^2$	18 47^6	13
4	$09{\cdot}6^3$	12 54^6	11	*17*	$29{\cdot}2^4$	16 51^6	10
5	$13{\cdot}9^3$	14 18^7	9·6	*18*	$30{\cdot}0^3$	10 16^7	10
6	$14{\cdot}1^3$	12 10^6	8·6	*19*	$34{\cdot}9^3$	14 52^6	16
7	$15{\cdot}9^5$	11 07^7	6·9*	*20*	$39{\cdot}5^4$	12 51^7	6·9
8	$17{\cdot}6^3$	16 30^5	23	*21*	$39{\cdot}7^3$	16 46^6	16
9	$18{\cdot}1^3$	19 32^6	15	*22*	$42{\cdot}9^4$	15 22^8	13
10	$18{\cdot}5^3$	13 36^8	7·4	*23*	$48{\cdot}1^4$	16 25^6	13
11	$20{\cdot}1^4$	15 33^8	10	*24*	$54{\cdot}5^3$	13 20^8	8·3
12	$22{\cdot}6^2$	12 29^5	30	*25*	$59{\cdot}6^2$	17 26^6	14
13	$25{\cdot}3^3$	15 02^7	14				

have been made between different sets of measurements on the same sources and it appears that our estimates do represent the probable errors reasonably well; they may indeed be rather pessimistic, but the effects of systematic error or confusion due to finite resolutions would not show up in such a comparison. The Right Ascensions have been given only to the nearest 0·1 min, since this is the highest accuracy justified in the great majority of cases. As shown by Mills *et al.* (1958), there is probably a collimation error of -4^s in Right Ascension, so for the most accurate positions, having a probable error of $\pm 0^m{\cdot}1$, a correction of $+4^s$ has been applied before selecting the nearest 0·1 min. For some of the stronger sources the position accuracy is somewhat better than indicated in the catalogue; they will be discussed elsewhere.

Sources resolved by the aerial beam have been treated as before, both their peak flux density and their integrated flux density being given, the former in parentheses. Possible identifications with bright nebulae are also indicated and discussed in the next section.

Every effort has been made to produce a uniform treatment of the whole area, but this has not been possible for the weakest sources because of sensitivity variations. For instance, at the northern border of the catalogue zone, the sensitivity is only half that at the southern border. This has been compensated to some extent by taking more observations at the most northerly declinations, but simple inspection of the catalogue shows that there are many more faint sources listed in the southern zone. Similarly, close to the galactic circle at the crossing near the centre, the sensitivity is reduced by a magnitude or more, because of the very high brightness temperature of the galactic disk and the great complexity of the brightness distribution. However, it is considered that the catalogue of Class II sources (i.e. those for which $|b|>12\frac{1}{2}°$) is complete down to a flux density of 2×10^{-25} W m^{-2} (c/s)$^{-1}$ over the whole area, and to a much lower level in regions of low sky temperature in southerly declinations.

III. Identifications

A study of possible identifications of the radio sources with visible nebulae is in progress, using the Palomar Sky Atlas. This is a large undertaking which, to be really useful, requires the collection of information about any suspected nebula and, in addition, the measurement of the angular size of the associated radio source. As an interim measure we will therefore merely list some of the brighter sources which may possibly be identified with faint galaxies on the Palomar prints and, as in paper I, discuss in some detail possible identifications with objects listed in the Skalnate Pleso Catalogue (Becvar 1951) for which additional data are usually available.

Objects examined in the Skalnate Pleso Catalogue include emission nebulae, novae, planetary nebulae, globular clusters, and galaxies. The situation as regards emission nebulae is not different from that described in paper I and will not be enlarged upon. No additional identifications were obtained in the central galactic crossing now included in our catalogue, but this is not surprising in view of the high background brightness (e.g. Mills, Little, and Sheridan 1956). Of the novae, planetary nebulae, and globular clusters, the only coincidence in position is between the globular cluster NGC 7089 and the radio source 21–012. However, the position agreement is not at all close and, in view of the lack of radio emission from other globular clusters, it cannot be regarded as significant.

In the case of the galaxies the situation is different; two reasonably certain identifications have been made, and, on a statistical basis, it appears probable that there are several " radio galaxies " among a total of 20 coincidences noted in the catalogue. These coincidences are noted where source and galaxy have positions within 1^m in Right Ascension and 20′ in declination, which correspond approximately to three times the mean probable errors in each coordinate. There are 315 galaxies listed in the area of the catalogue and it is easily shown that the number of coincidences expected is about 9 if galaxies and sources are completely uncorrelated. The number of actual coincidences, 20, is therefore significantly greater, but not enough to warrant further analysis. To reduce the chance coincidences we therefore restrict attention to those galaxies within $0^m{\cdot}7$ in Right Ascension and 13′ in declination, that is, within twice the mean probable error in each coordinate; there are 14 such coincidences and less than 5 expected by chance. The coincidences are listed in Table 4 together with our estimate of the quality of position agreement and the difference between radio and optical magnitudes, $m_{1\cdot9}-m_p$, on the assumption that the source may be identified with the galaxy. The radio magnitude is defined by

$$m_\lambda=-53{\cdot}4-2{\cdot}5\log S_\lambda,$$

and, for comparison with other data, it is converted to the scale of Brown and Hazard (1952) at 1·9 m by addition of the factor, 0·8 magnitude (Mills 1958, in press). The photographic magnitude used is the *total* magnitude as listed by de Vaucouleurs (1953).

The number of good and very good coincidences is the same as the difference between the actual and chance coincidences, suggesting that most may be real. The galaxies NGC 1068 and NGC 4038/4039 are almost certainly associated with the coincident radio sources, as the radio emission in each case is only about 2 magnitudes greater than the mean of the "normal" galaxies for which $m_{1\cdot 9}-m_p \simeq +1$ and in each case the extra emission is compatible with peculiarities in the galaxies; e.g. NGC 1068 is known to have strong and broad gaseous emission lines in the nucleus and the galaxies NGC 4038 and NGC 4039 appear to be undergoing a mild collision. No abnormalities are listed among the other galaxies, but this means little, for there seems no reason why an optically normal galaxy should not emit substantially more than normal at radio frequencies; an established example is NGC 1316. In one case, NGC 7171, for which a Palomar print is available, there is an adjacent cluster of faint galaxies with several close to the radio position, one or more of which could well be the radio source; angular size measurements would clearly be useful here.

TABLE 4

POSSIBLE IDENTIFICATIONS WITH BRIGHT GALAXIES

Radio Source	Galaxy		Agreement in Position	$m_{1\cdot 9}-m_p$
	NGC	Type		
00—07	157	Sc	Very poor	—1·3
01+03	470	Sbc	Fair	—3·5
01+03	474	E0	Good	—4·0
01+04	533	E3	Very good	—3·6
01—06	584	E3–4	Very good	—1·9
02—014	1068	Sbp	Very good	—1·0
03—04	1417	S:	Good	—2·3
11—118	4038/39	Scp	Very good	—0·7
12+04	4234	I	Good	—3·6
12+05	4261	E2–3	Very good	—3·8
12—118	4782	SO:	Very poor	—4·7
12—118	4783	SO:	Poor	—4·7
14—019	5792	S	Very good	—2·5
21—125	7171	SBb	Very good	—2·3

If the coincidences are taken at their face value, the suggestion is clear that a substantial proportion of galaxies may have a slightly abnormal radio emission. On the figures quoted, out of the 315 galaxies in the catalogue area, about 1 in 30 emits between 2 and 5 magnitudes more than a normal galaxy. While not very much weight can be given to this conclusion, it in no way contradicts the observed lack of correspondence between the majority of the sources and the brighter galaxies. It is necessary to increase the statistical reliability of the identifications by extending the catalogue to a larger area and, if possible, by increasing the sensitivity.

Our prints of the Palomar Sky Atlas are, at present, very incomplete, so that a systematic examination of the catalogue area is not yet possible. However, it is worth noting a number of strong sources which correspond with the positions of galaxies on the Palomar prints down to a magnitude of about 18. These are the sources 02 −1*5*, 09 +0*7*, 12 −1*10*, 13 −0*11*, 16 +0*2*, 17 −0*6*, 21 −1*25*, and 23 −1*12*. Sources in an area between 00^h and 06^h near the celestial equator, which has been investigated by Minkowski, have not been included in this list. While positive identifications are not suggested for the above sources, they undoubtedly need further investigation.

We may also mention the IAU sources 09S1A (09 −1*4*) and 16N0A (16 +0*10*) for which Minkowski has suggested possible identifications. The former may possibly be identified with a faint double galaxy at position $09^h\ 15^m\ 42^s$, $-11°\ 53'$ (1950); our most accurate radio position, after allowing for a probable collimation error of $1'$ in the aerial, is $09^h\ 15^m\ 44^s \pm 3^s$, $-11°\ 52'\cdot 5 \pm 2'$ (1950). The angular size of the galaxy is about $\frac{1}{2}'$ compared with $1\frac{1}{2}'$ for the radio source (Carter 1955). Minkowski (unpublished data) notes that the λ3727 line of [O II] in emission is detectable in the galaxy, but is not unusually strong. The corrected position of the radio source 16N0A is $16^h\ 48^m\ 46^s \pm 3^s$, $+5°\ 04' \pm 2'$ (1950) compared with the position of a faint galaxy at position $16^h\ 48^m\ 49^s$, $+5°\ 01'\cdot 8$ (1950). Minkowski (1957) states that the galaxy displays a double nucleus and rather strong emission lines of [O II] and [O III], indicating that an active collision may be in progress. The angular size of the galaxy is about $\frac{1}{2}'$ and that of the radio source about $2\frac{1}{2}'$ (Carter, unpublished data).

Finally, the coincidences noted in the catalogue between the source 08 +0*10* and the Hydra II cluster of galaxies, and the source 23 +0*2* and the Pegasus I cluster of galaxies are probably significant. The less good coincidence between the source 23 +0*3* and the Pegasus II cluster may also be real. These and other observations of southern clusters will be discussed in a future paper.

IV. Statistics

Two properties of the distribution of radio sources in the catalogue area have been investigated statistically; these are the two-dimensional distribution across the celestial sphere and the distribution in depth based on counts to different flux density levels. Because of the finite resolution of the aerial, spatial clustering may affect the source counts substantially; clustering is therefore dealt with first, principally by consideration of the two-dimensional distribution and some observations of source sizes and background irregularities.

(*a*) *Clustering*

In paper I it was suggested that the radio sources might display large-scale clustering. This conclusion was based essentially on applying the χ^2 test to areas measuring 10° by 10°; the distribution was found to be non-random at the 2 per cent. confidence level. We now have a much greater quantity of more homogeneous data, and similar tests which have been applied indicate that large-scale deviations from randomness are much less than before and perhaps not significant. The χ^2 test was applied to sources above various limiting intensity levels in areas of different sizes well away from the galactic circle. It is only with 30° by 30° squares that a significant non-randomness is indicated.

This applies to all sources, and also to sources stronger than 10^{-25} W m^{-2} (c/s)$^{-1}$; in both cases, however, the confidence level is only 5 per cent. It appears that large-scale clustering, if present, is small; with the accumulation of more data it may be possible to usefully apply more sophisticated tests.

In paper I it was also noted that the number of " extended " sources listed in the catalogue was significantly more than expected from chance blending effects in a universe of randomly distributed " point " sources. This conclusion is strengthened by analysis of the present catalogue.

We have considered areas from 21^h–00^h–05^h and from 09^h–15^h, that is, areas well away from the galactic circle. Of the sources with flux densities greater than 40×10^{-26} W m^{-2} (c/s)$^{-1}$, 20 are listed as " extended " and 2 as " perhaps extended ": of sources stronger than 20×10^{-26} W m^{-2} (c/s)$^{-1}$, 36 are listed as " extended " and 17 as " perhaps extended ". The numbers of chance blends classified as a single source which is " extended " or " prehaps extended " may be estimated as in paper I. The expected number of such blends having flux densities greater than 40×10^{-26} W m^{-2} (c/s)$^{-1}$ is 2, and the number greater than 20×10^{-26} W m^{-2} (c/s)$^{-1}$ is 15. These numbers are very much smaller than those observed. We therefore conclude that a substantial proportion of the stronger sources have an angular size which is resolvable with our aerial ($>\frac{1}{4}°$) and/or that small-scale clustering effects are significant.

Both these explanations are consistent with present astronomical knowledge. It is now commonly accepted, for instance, that the majority of galaxies are organized into clusters of various sizes, and in a large cluster the conditions would seem favourable for the production of radio sources by collision or interaction; thus the existence of several physically related radio sources very close together is quite conceivable. There is also evidence for clustering of a higher order into " supergalaxies " (for example, de Vaucouleurs 1956) to which the same arguments apply. Clusters of galaxies in general emit much more at radio frequencies than the integrated emission of their component normal galaxies (e.g. Brown and Hazard 1953). This may be attributable to associated " radio galaxies " or sometimes equally well to radiation from the cluster as a whole, that is, to intergalactic emission. The latter process has been discussed in some detail by Shklovsky (1954) in its application to radiation from the local supergalaxy. Thus, on present evidence, it would seem quite possible that individual radio galaxies should appear relatively frequently in physically related groups of two or more, and that close clusterings of galaxies can create vast radio sources of large angular size even at very great distances. These possibilities will be considered quantitatively in future papers. A further possibility which should not be ignored is that some, at least, of the Class II sources of large angular size may be located in our galaxy. Analysis of variations in brightness of the background radiation observed with the 3·5 m cross aerial shows that some bright regions at moderate distances from the plane are probably related to the galactic emission: obvious examples in the present catalogue (not, however, included in the area analysed for obvious reasons) are the large sources associated with the nebulosities in Orion. Such aspects of the galactic emission will also be considered in future papers. At the moment it is sufficient to note that a model comprising a random distribution of " point " sources is inadequate to explain all the observational data.

(b) Source Counts

In order to investigate the distribution of the radio sources in depth, source counts have been made to various limiting flux density levels. As in an earlier paper (Mills 1952) the sources have been divided into two classes, those within $12\frac{1}{2}°$ of the galactic circle (Class I sources) and the remainder (Class II sources).

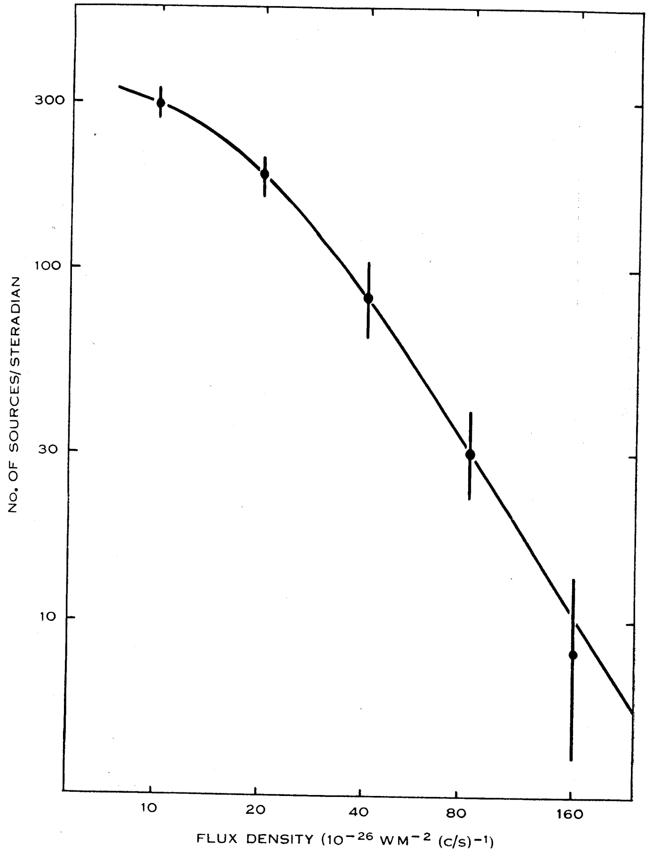

Fig. 1.—Counts of Class I sources, that is, sources within $12\frac{1}{2}°$ of the galactic circle.

The counts are shown in Figures 1 and 2, where the logarithms of the number density of sources with flux densities S or higher are plotted against log S; the standard errors in the plotted points due to chance effects in the distribution ($\sqrt{N}$) are shown as vertical wings in the figure. The actual numbers from which the diagrams were constructed are given in Tables 5 and 6.

There are clearly insufficient Class I sources for a detailed analysis. There are enough, however, to show that their statistics are greatly different from the Class II sources, which is consistent with the original results of Mills (1952); as before, the smaller slope suggests an origin in the galactic disk for the majority of the stronger sources. It is interesting that there are substantial differences shown in the catalogue for the sources near the centre and anticentre of the Galaxy, those near the centre being, on the average, much stronger and more numerous. This again suggests a relation with the galactic structure, and it is clear that these sources must be considered in relation to the general distribution of the galactic emission. This will be done in some papers dealing with the Galaxy which are now in preparation.

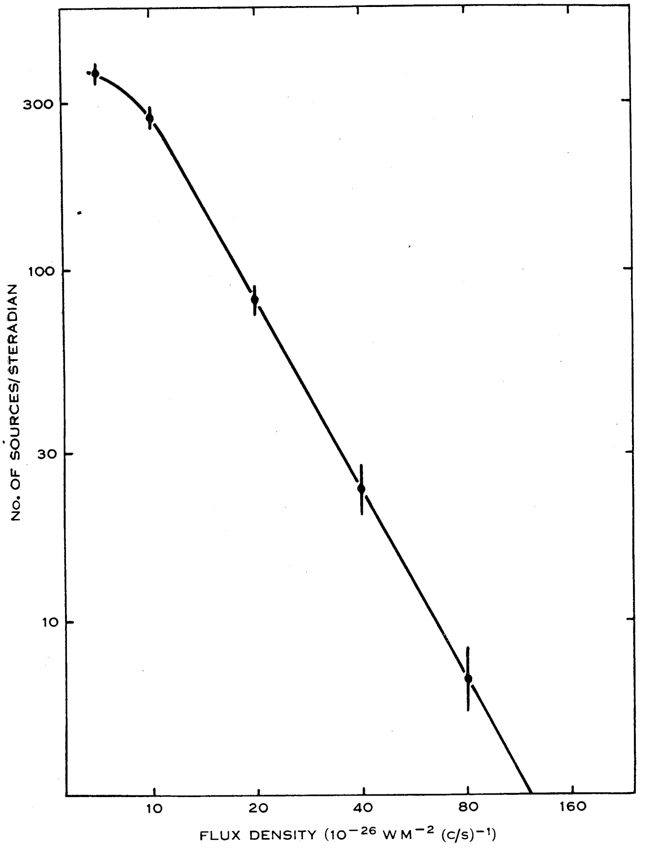

Fig. 2.—Counts of the Class II sources.

The Class II sources are sufficiently numerous for further analysis. The straight line shown in Figure 2 passing through the derived points has a slope of $-1 \cdot 8$. As discussed in paper I, there are two instrumental factors which contribute to this slope, the finite resolution of the aerial and the uncertainties in the weaker flux densities due to noise. However, with randomly distributed sources neither of the effects is large; from the data in paper I a mean increase of slope of about $-0 \cdot 15$ is estimated, leaving a net slope of $-1 \cdot 65$. It is well known that, after all corrections, the slope should be $-1 \cdot 5$ for a random distribution of " point " sources in a static Euclidean universe; thus there is, in addition to the previous evidence of angular size and clustering, some evidence from the source counts that the above model is inadequate. However, the evidence is not conclusive, for inspection of Figure 2 shows that the standard errors due to statistical effects are large and the apparent small excess of faint sources could equally well be a statistical deficiency of close and strong sources.

It is interesting to compare the evidence from the angular size data and the source counts to see if (i) an excess of faint and distant sources, corresponding to a slope of $-1 \cdot 65$ in the source counts ogive, can increase the number of blends sufficiently to account for the excessive number of "extended" sources, or (ii) a large number of "extended" sources can result in an increased apparent

TABLE 5

THE NUMBERS OF CLASS I SOURCES ABOVE DEFINED FLUX DENSITY LEVELS

Flux density (10^{-26} W m^{-2} (c/s)$^{-1}$) ..	10	20	40	80	160
No. of sources, N .. .. .. (Total=156)	142	88	40	15	4

TABLE 6

THE NUMBERS OF CLASS II SOURCES ABOVE DEFINED FLUX DENSITY LEVELS

Flux density (10^{-26} W m^{-2} (c/s)$^{-1}$) ..	7	10	20	40	80	160
No. of sources, N .. .. .. (Total=1003)	982	754	218	63	19	4

slope of the magnitude observed. It is easy to see from the earlier data that (i) is not possible; the increase in the number of blends would be negligible, as the parameters of the model source distribution were fixed largely by the numbers of faint sources. On the other hand it is evident that, if the clustering is greater than in a random distribution, the increased slope due to blending will be enhanced; quantitatively the attribution of all extended sources to blends is adequate to explain the observed slope. It might appear that sources of finite angular size could have no effect on the slope, since integrated fluxes are used in the counts. However, the possibility arises because the catalogue is restricted to sources of angular size less than 2°, in order to eliminate background irregularities as far as possible; it seems likely that, at the same time, many large-scale extragalactic concentrations are excluded. One obvious example which comes in this category is the "Local Supergalaxy".

In principle we may investigate the importance of these factors by comparing the proportion of extended sources listed at different flux density levels. The bottom end of the catalogue must be excluded from comparisons of this kind because of the difficulty of identifying an extended source: the lowest level at which consistent recognition seems possible is 40×10^{-26} W m^{-2} (c/s)$^{-1}$. In Subsection (a) we gave the number of extended sources above this level as 20, with 2 listed as " perhaps extended ", in a defined area well away from the galactic circle. The total number of sources above the same level in the same area is 44 ; whence it would appear that about half the sources are either of large angular size or physical blends. For sources with flux densities greater than 160×10^{-26} W m^{-2} (c/s)$^{-1}$, that is, sources which, on the average, are at half the distance, the number of extended Class II sources listed in the whole southern sky is 3 out of a total 10 sources (excluding the Magellanic Clouds as belonging to the class of " normal " galaxies with which we are at present not concerned). Unfortunately these numbers are too low to permit a firm conclusion, although they are consistent with some systematic omission of very large sources. The data are obviously inadequate to correct for such effects in order to derive counts which are dependent only on the large-scale distribution in depth, which is required before they may usefully be applied to a cosmological model. Further information on these questions might be expected to come from the Cambridge interferometer surveys which discriminate strongly against large sources.

In paper I it was shown that the Cambridge 2C catalogue (Shakeshaft *et al.* 1955) can be accorded little weight, principally on account of the poor primary resolution of the instrument. Ryle (1956) has criticized this conclusion on the basis of conjecture as to the assumptions made in paper I, which was at that time unpublished. However, comparisons of the assumptions and method of analysis used in the paper with Ryle's conjectures shows that the latter were unfounded. The assessment of the reliability of 2C appears to have received confirmation in a report by Hewish (1957) of greatly improved agreement between Sydney and a more recent Cambridge survey. This survey has been made using their original instrument at double the 2C survey frequency and hence four times the resolution of the earlier work.

However, he also reports that the source counts again have a very large slope, $-2 \cdot 2$ in one area and $-2 \cdot 7$ in another, although somewhat less than the slope of $-3 \cdot 0$ obtained in the original survey (Ryle and Scheuer 1955). We have no detailed information about these results but it would appear that the increased resolution has reduced the slope, and the question remains whether the excess slope is again the result of instrumental effects, or whether it is real. If the latter, it would suggest strongly, when taken in conjunction with our pencil-beam survey, that the effects of angular size or small-scale clustering are significant. Hewish also remarked that the statistics of the output envelope fluctuations are inconsistent with a uniform distribution of " point " sources. This has already been noted by Ryle and Scheuer in connexion with the 2C survey ; but with the data supplied it was not possible to verify this, or to make use of their probability density distribution. It is to be hoped that some quantitative information will be published on this important point.

One of the regions discussed by Hewish is bounded by Right Ascensions 00^h and 08^h and declinations $+10°$ and $-10°$; that is, within our present catalogue. For this area he quotes a slope of $-2 \cdot 7$ for the log N—log S relation. We have performed a source count in this region and find a slope of $-1 \cdot 7$. It is interesting that if the *peak* values of the flux densities of our extended sources are used instead of the integrated fluxes, thus to some extent simulating the results obtained with an interferometer, the slope is increased to $-2\cdot0$, making up at least some of the difference.

It is clear that the accumulation of data of this kind and intercomparisons between surveys carried out under different conditions will go a long way towards sorting out the complex picture. However, it is hoped that a more direct approach which is now being instituted will yield definite answers to the more important questions. Since the principal uncertainty is in the proportion of distant sources of small angular size, the most obvious procedure is to use an interferometer with sufficient spacing between aerials to respond to these alone. Such an instrument is now being put into operation at the Radiophysics Laboratory, in which the aerial spacing is 3000λ, yielding a lobe separation of 1·2 min of arc: the sensitivity is expected to be similar to that in our survey.

To conclude, it seems hardly necessary to point out the futility of attempting to analyse the cosmological implications of these source counts in detail until the above problems are sorted out. It would seem that, as in the optical case (although for different reasons), the straightforward counting of observed sources to various flux density levels is inadequate to define the form of the Universe. We have some hope that additional angular size data which we are planning to collect may make a significant contribution towards this end.

V. References

Becvar, A. (1951).—" Atlas Coeli Skalnate Pleso." (Prirodovedecke Vydavatelstvi: Prague.)

Brown, R. H., and Hazard, C. (1952).—*Phil. Mag.* **43**: 137.

Brown, R. H., and Hazard, C. (1953).—*Mon. Not. R. Astr. Soc.* **113**: 123.

Carter, A. W. L. (1955).—*Aust. J. Phys.* **8**: 564.

Hewish, A. (1957).—The distribution of radio stars. A paper presented at the American Astronomical Society Meeting, Urbana, Illinois.

Mills, B. Y. (1952).—*Aust. J. Sci. Res.* A **5**: 266.

Mills, B. Y. (1958).—Radio frequency radiation from external galaxies. " Handbuch der Physik." Vol. 53. (Springer-Verlag: Berlin.) (In press.)

Mills, B. Y., Little, A. G., and Sheridan, K. V. (1956).—*Aust. J. Phys.* **9**: 218.

Mills, B. Y., Little, A. G., Sheridan, K. V., and Slee, O. B. (1958).—*Proc. Inst. Radio Engrs., N.Y.* **46**: 67.

Mills, B. Y., and Slee, O. B. (1957).—*Aust. J. Phys.* **10**: 162.

Minkowski, R. (1957).—Radio Astronomy, Symposium No. IV of the International Astronomical Union, p. 107. (Cambridge Univ. Press.)

Ryle, M. (1956).—*Sci. Amer.* **195** (6): 10.

Ryle, M., and Scheuer, P. A. G. (1955).—*Proc. Roy. Soc.* A **230**: 448.

Shakeshaft, J. R., Ryle, M., Baldwin, J. E., Elsmore, B., and Thompson, J. H. (1955).—*Mon. Not. R. Astr. Soc.* **67**: 106.

Shklovsky, I. S. (1954).—*Astr. J. Moscow* **31**: 533.

de Vaucouleurs, G. (1953).—A revision of the Harvard survey of bright galaxies. Aust. Nat. Univ. Mimeograph, Canberra.

de Vaucouleurs, G. (1956).—" Vistas in Astronomy." (Ed. A. Beer.) Vol. 2, p. 1574. (Pergamon Press: London.)