THE ASTROPHYSICAL JOURNAL, 178:281–308, 1972 December 1

THE *UHURU* CATALOG OF X-RAY SOURCES

R. GIACCONI, S. MURRAY, H. GURSKY, E. KELLOGG,
E. SCHREIER, AND H. TANANBAUM
American Science & Engineering, Cambridge, Massachusetts
Received 1972 May 4

ABSTRACT

A catalog of X-ray sources observed with the *Uhuru* satellite is presented. About 70 days of data have been analyzed for this catalog resulting in 125 sources. Approximately two-thirds of the sources are located within $\pm 20°$ of the galactic plane. Some of the sources at higher galactic latitudes are identified with known extragalactic objects. Most of the strong sources near the galactic plane are found to be variable.

I. INTRODUCTION

The X-ray observatory *Uhuru* has now been operating continuously for over a year. From time to time we have reported in this *Journal*, particularly exciting results on individual sources both galactic and extragalactic. These reports were based on the analysis of data processed specifically to study selected objects. A more comprehensive and time-consuming analysis is required to examine results about the X-ray sky as a whole. We have presently completed the analysis of data from the nighttime portion of about 70 days of observations. Although this represents a small fraction of the data that will ultimately be available, the coverage of the sky is sufficiently extensive to give at least a qualitative idea of the distribution of sources and of the relationship between sensitivity and the number of sources observed.

Previous reports on X-ray source locations have appeared in several letters in this *Journal* and in private communications to members of the astronomical community. There have also been two earlier catalogs of *Uhuru* sources, the 1 ASE list of 16 sources (Giacconi *et al.* 1971*a*) and the 2 ASE list of 116 sources (Giacconi *et al.* 1971*b*). These reports were preliminary, and the current catalog, *2 Uhuru*, supersedes them.

II. DATA ANALYSIS

The *Uhuru* instrumentation has been described elsewhere in some detail (Giacconi *et al.* 1971*c*). In order to establish the existence of an X-ray source and its location, the analysis of data from the experiment proceeds along the following lines which are illustrated graphically in figure 1.

a) From the star sensor data, individual star sighting times are determined which yield the instantaneous direction of the X-ray collimators. A function, which describes the celestial position of the fields of view of the X-ray detectors with respect to time, is fitted to these data over an entire orbit. The functional form used in this fit takes into account all of the known significant physical effects that perturb the orientation of the satellite. The detailed mathematical forms for some terms have been determined empirically to maximize the quality of the fit. The resulting equation of motion for the direction of the X-ray detectors is precise to about 0′.5, that is, the rms deviation of predicted star sightings from the actual sightings is 0′.5 or less.

b) The equation of motion of the X-ray sensors for each orbit allows us to convert the observed X-ray counting rates versus time to counting rates versus azimuthal

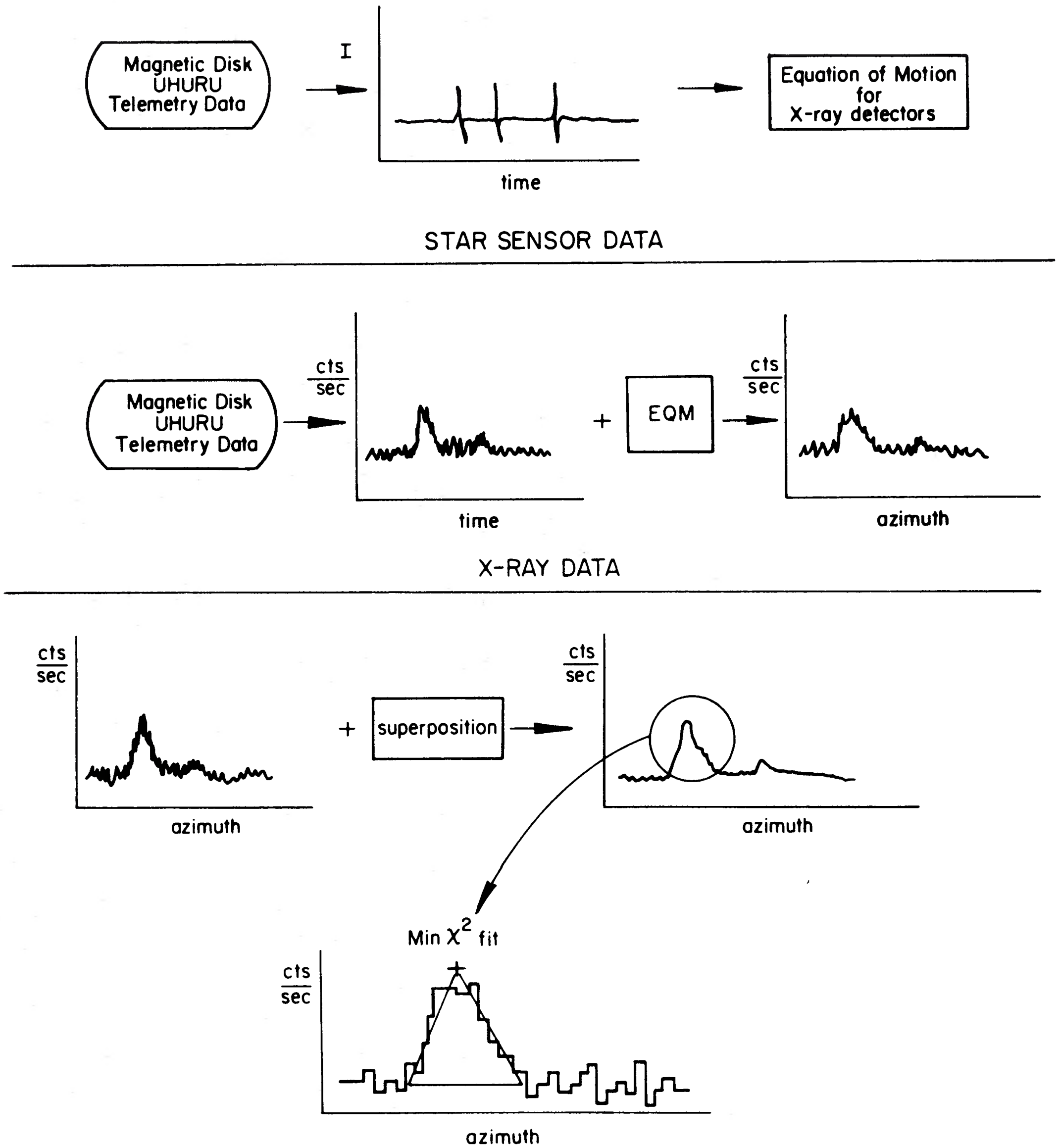

FIG. 1.—The processing of data is schematically illustrated. Star-sensor data are extracted from the telemetry data which were stored on magnetic disks, and an equation of motion for the X-ray detectors is determined. Using this, the X-ray data which are on the telemetry disk as counting rates versus time can be transformed to counting rate versus azimuth. The data from a single spin-axis orientation are summed (superposed), increasing the signal-to-noise ratio, and then these data are scanned for statistically significant peaks which are fitted to the collimator response using a minimum χ^2 technique.

angle in the band of the sky being scanned (see fig. 2). In addition, the orientation of the satellite is generally held constant over a day so that data from successive spins over several orbits can be superposed, thus providing increased sensitivity; typical exposure times are 10–20 seconds in the narrow field of view detector (side 1) and 100–200 seconds in the wide field of view detector (side 2). The superposed data for 68 spin-axis orientations is the base of data out of which this catalog has been constructed.

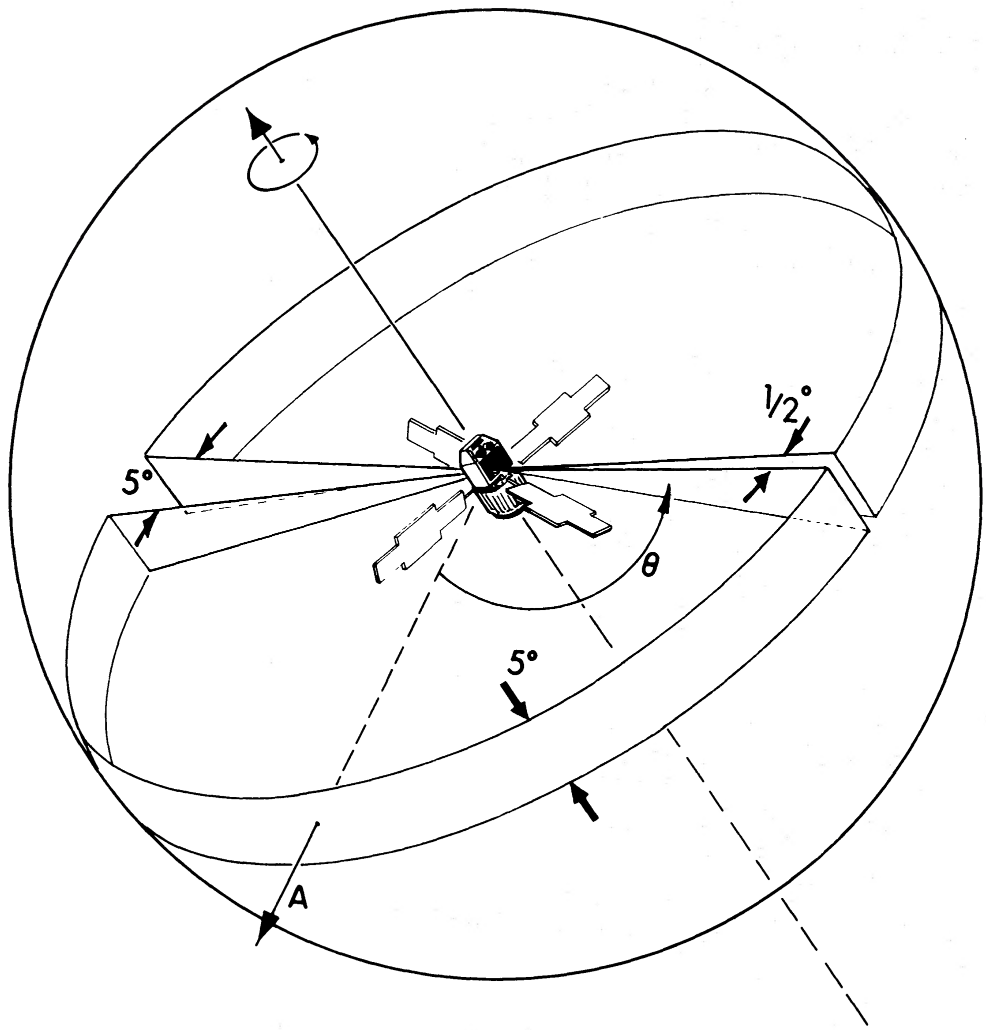

FIG. 2.—Band of the sky swept out by the *Uhuru* X-ray detectors during a satellite spin. The fields of view are indicated as the FWHM of each collimator. The angular position (Θ) of a detector is the relative location in this band with respect to a fixed direction in the sky (A). This coordinate is called the azimuth of the detector.

c) For each set of superposed X-ray data, a computer search is made for peaks above the local background which are statistically significant and consistent with the triangular response of the collimators. The local background used in this is calculated for each 3° in azimuth for side 1 and for each 10° in azimuth for side 2. The background calculation is an iterative process in which the statistically significant peaks are not included. The minimum significance levels which are accepted in the automatic scan are 2.4 σ above local background in side 1 (X1) and 2.0 σ above the local background in side 2 (X2). These levels were chosen so that the bulk of the sources with observed intensities greater than 1 count s^{-1} could be picked out from the background while limiting the expected number of random peaks included to an acceptable low level. At the 2.4 and 2.0 σ levels used, we expect about three peaks due to random fluctuations in side 1 and about one peak due to random fluctuations in side 2 for each set of data corresponding to a spin-axis orientation.

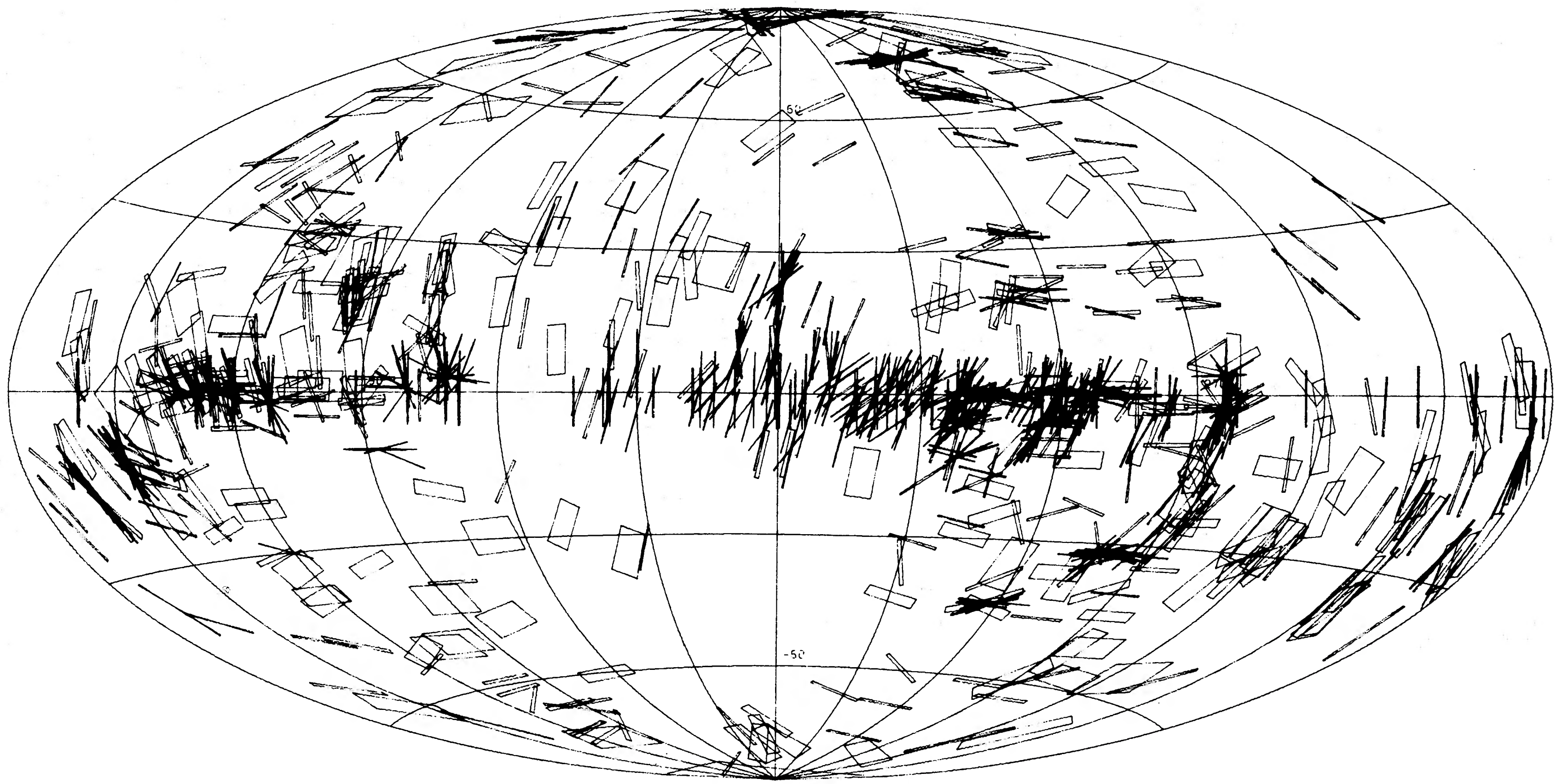

FIG. 3.—Lines of position which result from the computer scan of superposed data are plotted on an equal area projection of the sky in galactic coordinates. The line widths are $\pm 1\ \sigma$ as determined by the minimum χ^2 fits. There are 1171 lines on the plot.

d) For each peak in the superposed data which is selected by the computer scan a minimum χ^2 fit is made to the triangular collimator response. The amplitude and location of the peak are the parameters of this fit. Those peaks for which a satisfactory fit can be obtained yield lines of positions on the sky which are about 10° long (the acceptance angle of the collimators along the spin-axis direction) and have widths determined by the accuracy of the fit. Analysis of the 68 sets of superposed data yielded 1171 lines of position. Based on the statistical cutoff levels of 2.4 and 2.0 σ, we estimate that about 275 of these lines may be due to statistical fluctuations in the background. In figure 3 these lines of position are plotted in galactic coordinates giving a picture of the sky in X-rays as seen by *Uhuru*.

III. SOURCE EXISTENCE

The map of the sky generated from all of the lines of position as described in the previous section enables us to approximately locate the potential X-ray sources. These potential sources are assumed to be located where two or more lines of position of width $\pm 3\ \sigma$ in azimuth (as determined from the minimum χ^2 fit) intersect. The lines of position for each tentative source are then examined to determine if the following criteria are satisfied.

a) For intersections of only two lines of position we require that each line have no more than a 10 percent chance of being due to a statistical fluctuation of the background. This gives at most a 1 percent chance that the intersection is the chance coincidence of two random fluctuations; and at most an 18 percent chance that one of the two peaks is spurious and therefore the source is not located at the intersection of the lines. To satisfy these conditions we have determined that for our data set a peak from side 1 must be at least 3.4 σ above background and a peak from side 2 must be at least 2.4 σ above background.

b) For intersections of three lines of position, we require that all of the lines yield consistent intensities for the source, and that there be no more than a 1 percent chance of the intersection being due to a chance coincidence of random fluctuations of the background. For those intersections where a single intensity is not consistent with the data, we require that at least one of the peaks have a less than 1 percent chance of being spurious.

c) For intersections made by more than three lines of position, no additional requirements are made.

d) For weak sources with marginal statistics, we extend our analysis to lower statistical levels by searching the original superposed data for excesses above background to ascertain that the source was observed at the expected intensity when within the field of view of the detector.

The above requirements eliminate about one-half of the intersections at galactic latitudes greater than 20°, and impose a bias which discriminates against weak variable sources throughout the sky. The effect of such stringent criteria is that no more than one of the weak sources (of which there are about 50) is expected to be due to a chance coincidence of statistical fluctuations of the background. However, it is also likely that as many as 50 true sources are not included in this catalog as a result of the above conditions. The analysis of additional data for future editions of *Uhuru* catalogs will enable us to confirm the existence of these sources and to obtain their locations.

IV. LOCATION

In terms of position, the X-ray sky as seen by *Uhuru* can be categorized by regions where isolated sources are present and by more complex regions where it is necessary to postulate the existence of several sources to explain the observations. For isolated sources, existence is established in a straightforward manner by application of the criteria given above. Then the lines of position assigned to a source are used to determine its location and a 90 percent confidence error box, as described below.

The complex regions, however, require an iterative approach in which the most obvious sources (those previously known, or those with many lines of position intersecting at one location, or some other properties which uniquely characterize a source) are eliminated from the region. That is, the lines of position which are due to known sources are eliminated from consideration. When no further simplification can be made in this manner, models are constructed to be consistent with the data, using the smallest number of sources possible and conforming with the criteria for source existence as given above.

This catalog contains the results from unraveling many complex regions, especially in the galactic plane where the density of sources is high. In some of these complex regions, both in and away from the galactic plane, our interpretation of the data may not be unique. One such example is the Large Magellanic Cloud (LMC) (fig. 4),

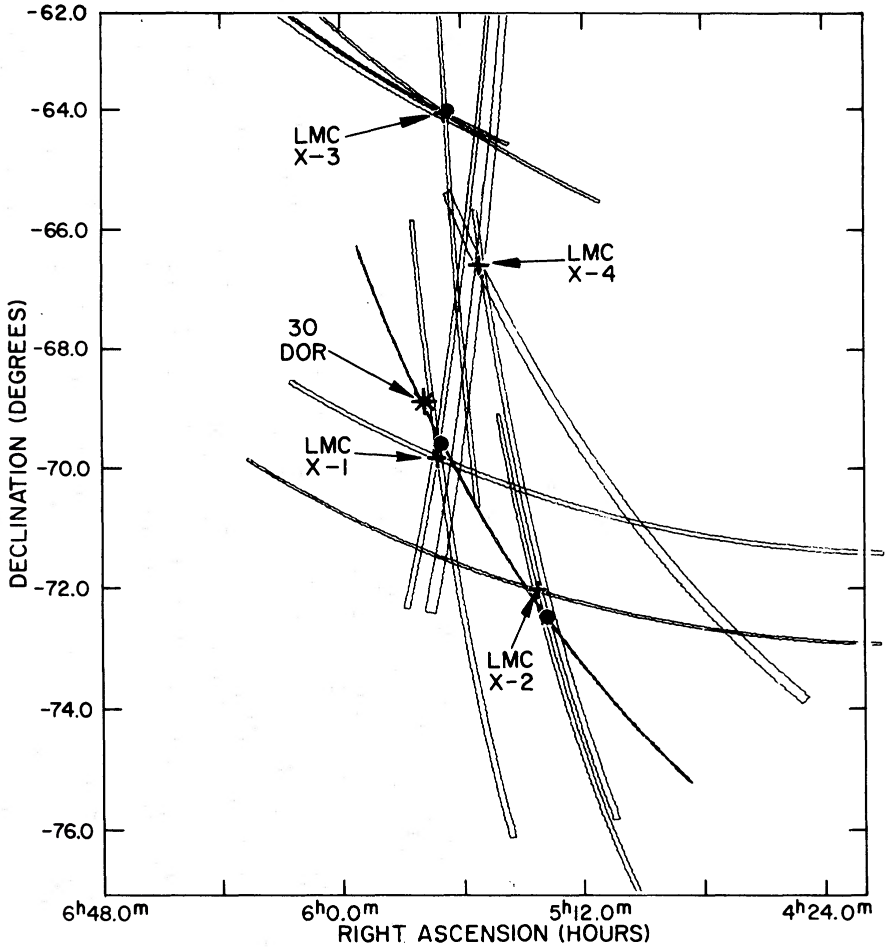

FIG. 4.—The Large Magellanic Cloud as seen with the narrow field of view *Uhuru* X-ray detector. Each line of position has a width of $\pm 1\ \sigma$ as obtained from a minimum χ^2 fit to the data. The four sources which are associated with the LMC as given in this catalog are indicated by crosses. *Filled circles*, the previously reported source locations (Leong *et al.* 1971). The radio source 30 Doradus is also shown.

which was initially thought to contain three sources of X-rays, one of which was extended (Leong *et al.* 1971). This model for the LMC was based on the analysis of a smaller sample of data than is included in this catalog. We now interpret the data as being consistent with three point sources (2U 0521−72, 2U 0539−64, and 2U 0540−69), which correspond to the previous model (see table 1), and an additional point source (2U 0532−66) which was previously masked by the assumed extended source. Clearly, in complex regions additional data at more favorable scan orientations are necessary to enable us to find unambiguous models of source locations and strengths.

Once a source has been established to exist at an approximate location and the lines of position associated uniquely with that source are determined, then a precise location is calculated. The technique used is equivalent to a maximum-likelihood analysis subject to the condition that the set of lines of position used can be assigned to only one source. In practice a probability calculation is made as follows.

From each line of position an estimated location in one direction and a standard deviation for this location are known. Assuming that the experimentally determined location is a random variable with a normal distribution, we can calculate, for any point in space near the estimated location, the differential probability that it is the correct location. Each line of position is an independent measurement of the source location, and therefore the product of the one-dimensional probability density distributions gives the joint probability density distribution for the source location. The point with the maximum probability density is then the most likely source location, and by integrating the joint distribution over regions bound by iso-probability density contours a 90 percent confidence error box can be found. In this catalog the error boxes are approximated by quadrilaterals on a Cartesian projection of the sky near the source location. In some instances the joint probability density distribution is highly asymmetric due to a source being near the edge of the field of view of a

---

EXPLANATION OF TABLE 1

Column (1): Source name is given in right ascension (1950) and declination (1950) truncated to minutes of right ascension and degrees of declination.

Column (2): Source locations are determined by using a probability density distribution as described in the text. The location of the maximum of this distribution is given in both equatorial (col. [2a]) and new galactic (col. [2b]) coordinates. The equatorial coordinates are given in time and arc notation and also in decimal degrees.

Column (3): Error-box corners are for a 90 percent confidence region obtained by integrating the joint probability density distribution as described in the text. The corner locations are given in equatorial coordinates; as for the source location, the coordinates are in time and arc notation and also in decimal degrees. The error box areas are also given (in units of square degrees).

Column (4): Intensities given are in counts per second from 2 to 6 keV as observed by *Uhuru*. These intensities are corrected for elevation in the collimator field of view by using either the location of the maximum of the probability density distribution given in column (2) or the location of the accepted X-ray counterpart (indicated by an asterisk). For sources with no apparent variability the intensity listed is the average for all sightings and the uncertainty is the statistical uncertainty derived from minimum χ^2 fits to the data as discussed in the text. For variable sources the maximum observed intensity and the ratio of the maximum to the minimum intensities are listed.

Column (5): The comments are divided into three areas. General comments give peculiar features of the X-ray emission. Counterparts indicate identification with radio or optical objects. Question marks (?) are used to indicate possible identification. Previous X-rays indicate reported X-ray observations which correspond to the *Uhuru* source. Tentative correspondence is indicated by a question mark (?). The lists of potential counterparts scanned is given in table 2 as well as the references for previous X-ray observations and general comments.

TABLE 1

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	Location of Maximum Probability Density: l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	Error Region for 90 Percent Confidence: 2 α δ (3b)	Error Region for 90 Percent Confidence: 3 α δ (3c)	Error Region for 90 Percent Confidence: 4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Intensity: Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Comments and General Remarks: Previous X-Ray (5b)
2U 0022+63 . . .	$0^h22^m\ 0^s$ 63°54′ 0″ 5.50 63.90	120°03 1°46	$0^h22^m48^s$ 63°50′ 24″ 5.70 63.84	$0^h22^m41^s$ 63°57′ 36″ 5.67 63.96	$0^h20^m58^s$ 63°56′ 24″ 5.24 63.94	$0^h21^m\ 2^s$ 63°49′ 12″ 5.26 63.82	0.023	10.7 ± 0.3*		Tycho's supernova 3C 10	Cep XR-1 (1) Tycho (2) Cep 1 (3)
2U 0022+42 . . .	0 22 5 42 0 0 5.52 42.0	117.67 −20.32	1 8 0 43 0 0 17.0 43.0	0 20 48 43 0 0 5.2 43.0	0 20 48 41 0 0 5.2 41.0	1 8 0 41 0 0 17.0 41.0	17.000	1.9 ± 0.3*		M31	
2U 0033+24 . . .	0 33 41 24 9 36 8.42 24.16	118.55 −38.31	1 8 48 24 36 0 17.2 24.6	0 30 0 25 0 0 7.5 25.0	0 30 0 23 0 0 7.5 23.0	1 8 24 22 36 0 17.1 22.6	18.000	5.9 ± 1.2		NGC 169?	
2U 0043+32 . . .	0 43 7 32 48 0 10.78 32.80	121.58 −29.78	0 46 0 33 4 48 11.50 33.08	0 39 31 32 34 48 9.88 32.58	0 39 41 32 27 0 9.92 32.45	0 46 10 32 58 12 11.54 32.97	0.180	7.8 ± 0.6			
2U 0114+63 . . .	1 14 24 63 24 0 18.60 63.40	125.84 0.94	1 14 48 63 25 48 18.70 63.43	1 13 58 63 25 48 18.49 63.43	1 13 58 63 22 12 18.49 63.37	1 14 48 63 22 12 18.70 63.37	0.006	70	7		
2U 0115−73 . . .	1 15 2 −73 41 24 18.76 −73.69	300.48 −43.58	1 14 19 −73 39 0 18.58 −73.65	1 14 10 −73 41 24 18.54 −73.69	1 15 41 −73 43 12 18.92 −73.72	1 15 53 −73 41 24 18.97 −73.69	0.004	28	≥9	Spectrum cutoff at 2.5 keV In SMC	SMC X-1 (7)
2U 0143+61 . . .	1 43 17 61 19 12 25.82 61.32	129.47 −0.60	1 44 0 61 24 0 26.00 61.40	1 42 29 61 24 0 25.62 61.40	1 42 29 61 14 24 25.62 61.24	1 44 0 61 14 24 26.00 61.24	0.029	7.2 ± 0.5			
2U 0227+43 . . .	2 27 12 43 42 0 36.80 43.70	141.16 −15.42	3 2 0 43 24 0 45.50 43.40	2 12 0 44 45 0 33.00 44.75	2 11 48 43 15 0 32.95 43.25	3 0 0 42 9 0 45.00 42.15	13.000	4.2 ± 0.6		3C 66?	

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 0240+44 . . .	$2^h40^m\ 0^s$	142°98	$2^h42^m48^s$	$2^h37^m12^s$	$2^h37^m36^s$	$2^h43^m12^s$	0.310	3.1 ± 0.4			
	44°31′ 12″	−13°74	44°48′ 0″	44°36′ 0″	44°18′ 0″	44°30′ 0″					
	40.00		40.7	39.3	39.4	40.8					
	44.52		44.8	44.6	44.3	44.5					
2U 0258+13	2 58 7	164.92	2 59 24	2 56 55	2 56 43	2 59 12	0.210	2.9 ± 0.3		Cluster: Abell 401?	
	13 3 0	−38.85	13 18 0	13 21 0	13 0 0	12 57 0					
	44.53		44.85	44.23	44.18	44.80					
	13.05		13.30	13.35	13.00	12.95					
2U 0316+41 . . .	3 16 35	150.58	3 17 0	3 16 3	3 16 8	3 17 6	0.012	43.1 ± 0.3*		0°7 extent	
	41 21 11	−13.23	41 25 59	41 19 12	41 15 54	41 22 30				Perseus cluster—	Per X-1
	49.145		49.252	49.011	49.035	49.277				centered on	(4)
	41.353		41.433	41.320	41.265	41.375				NGC 1275	
2U 0328−52 . . .	3 28 0	264.45	3 42 0	3 12 0	3 12 0	3 42 0	18.000	1.7 ± 0.4		IC 1954?	
	−52 28 48	−51.33	−50 24 0	−50 24 0	−54 24 0	−54 24 0				NGC 1249?	
	52.00		55.5	48.0	48.0	55.5					
	−52.48		−50.4	−50.4	−54.4	−54.4					
2U 0352+30 . . .	3 52 10	163.08	3 52 46	3 51 41	3 51 48	3 52 53	0.019	20.2 ± 0.5		Variable star: X Per?	
	30 52 48	−17.16	30 58 48	30 52 12	30 48 0	30 54 36					
	58.04		58.19	57.92	57.95	58.22					
	30.88		30.98	30.87	30.80	30.91					
2U 0410+10 . . .	4 10 43	182.42	4 27 43	4 10 24	4 10 41	4 28 0	1.100	3.0 ± 0.4		Cluster: Abell 478?	
	10 21 36	−28.27	11 30 0	10 31 48	10 12 0	11 19 48				3C 113?	
	62.68		66.93	62.60	62.67	67.00					
	10.36		11.50	10.53	10.20	11.33					
2U 0426−63 . . .	4 26 34	274.89	4 33 12	4 30 24	4 21 12	4 23 36	1.000	2.6 ± 0.4			
	−62 37 12	−39.94	−61 48 0	−61 42 0	−64 54 0	−65 0 0					
	66.64		68.3	67.6	65.3	65.9					
	−63.62		−61.8	−61.7	−64.9	−65.0					
2U 0426−10 . . .	4 26 58	205.61	4 34 0	4 26 0	4 26 0	4 34 0	1.600	2.3 ± 0.3			
	−10 19 12	−36.14	−9 36 0	−9 48 0	−10 42 0	−10 18 0					
	66.74		68.5	66.5	66.5	68.5					
	−10.32		−9.6	−9.8	−10.7	−10.3					

TABLE 1—*Continued*

UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 0440+07 . . .	$4^h40^m19^s$	190°27	$4^h43^m41^s$	$4^h36^m5^s$	$4^h36^m34^s$	$4^h44^m7^s$	0.600	4.7 ± 0.8		Cluster:	
	7° 2′ 24″	−24°38	7°43′ 12″	6°29′ 24″	6°16′ 12″	7°27′ 0″				V Zw 0444.7+0828?	
	70.08		70.92	69.02	69.14	71.03					
	7.04		7.72	6.49	6.27	7.45					
2U 0447+44 . . .	4 47 2	160.56	4 48 0	4 45 43	4 45 58	4 48 17	0.090	5.5 ± 0.9		3C 129?	
	44 58 48	0.38	45 10 48	44 58 12	44 47 24	44 57 36				3C 129.1?	
	71.76		72.00	71.43	71.49	72.07					
	44.98		45.18	44.97	44.79	44.96					
2U 0449+66 . . .	4 49 55	143.63	4 53 36	4 48 0	4 48 0	4 53 36	0.170	7.7 ± 2.3			
	66 51 36	14.47	67 6 0	66 54 0	66 36 0	66 48 0					
	72.48		73.4	72.0	72.0	73.4					
	66.86		67.1	66.9	66.6	66.8					
2U 0515−34 . . .	5 15 36	237.94	5 46 5	5 41 50	5 12 50	5 17 12	12.000	4.4 ± 0.7			
	−34 27 36	−33.40	−30 42 0	−29 20 24	−34 18 0	−35 34 48					
	78.90		86.52	85.46	78.21	79.30					
	−34.46		−30.70	−29.34	−34.30	−35.58					
2U 0521−72 . . .	5 21 36	283.10	5 21 41	5 20 14	5 21 14	5 22 38	0.014	14.9 ± 1.0		In LMC	LMC X-2 (7)
	−72 1 12	−32.66	−71 56 24	−72 3 0	−72 6 0	−72 0 36					
	80.40		80.42	80.06	80.31	80.66					
	−72.02		−71.94	−72.05	−72.10	−72.01					
2U 0525−38 . . .	5 25 7	242.53	5 28 0	5 7 50	5 18 34	5 39 50	12.000	2.0 ± 0.3			
	−38 0 0	−32.26	−35 49 12	−38 43 12	−40 0 0	−37 21 36					
	81.28		82.00	76.96	79.64	84.96					
	−38.00		−35.82	−38.72	−40.00	−37.36					
2U 0525−06 . . .	5 25 12	208.75	5 42 48	5 14 48	5 15 36	5 44 24	2.700	3.8 ± 0.4		M42?	
	−6 7 12	−21.39	−4 0 0	−7 6 0	−7 24 0	−4 12 0				Orion radio nebula?	
	81.30		85.7	78.7	78.9	86.1					
	−6.12		−4.0	−7.1	−7.4	−4.2					
2U 0531+22 . . .	5 31 24	184.53	5 31 30	5 31 16	5 31 16	5 31 30	0.004	947 ± 21*		Crab nebula	Tau X-1 (1)
	22 0 0	−5.80	+22 2 6	22 2 6	21 57 54	21 57 54				NP 0531?	Crab (2)
	82.85		82.876	82.815	82.815	82.876					Tau 1 (3)
	22.00		22.035	22.035	21.965	21.965					

TABLE 1—*Continued*
UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 0532−66 . . .	5h32m19s −66°37′ 12″ 83.08 −66.62	276°.60 −32°.55	5h34m48s −66°16′ 12″ 83.70 −66.27	5h32m 0s −66°14′ 24″ 83.00 −66.24	5h30m24s −66°57′ 0″ 82.60 −66.95	5h32m48s −66°59′ 24″ 83.20 −66.99	0.190	9.4 ± 2.1		In LMC	LMC X-4 (7)
2U 0539−64 . . .	5 39 22 −64 4 48 84.84 −64.08	273.54 −32.01	5 39 41 −64 1 12 84.92 −64.02	5 38 14 −64 6 36 84.56 −64.11	5 39 2 −64 9 0 84.76 −64.15	5 40 24 −64 3 36 85.10 −64.06	0.014	20.7 ± 1.0		In LMC	LMC X-3 (7)
2U 0540−69 . . .	5 40 58 −69 48 0 85.24 −69.80	280.23 −31.44	5 41 46 −69 42 36 85.44 −69.71	5 40 19 −69 42 36 85.08 −69.71	5 40 19 −69 53 24 85.08 −69.89	5 41 46 −69 53 24 85.44 −69.89	0.022	19.3 ± 1.3		In LMC	LMC X-1 (7)
2U 0544−39 . . .	5 44 43 −39 0 0 86.18 −39.00	244.62 −28.72	6 2 19 −36 7 12 90.58 −36.12	5 38 58 −34 50 24 84.74 −34.84	5 28 43 −41 4 48 82.18 −41.08	5 46 0 −42 26 24 86.50 −42.44	28.000	3.3 ± 0.9			
2U 0601+21 . . .	6 1 46 21 57 36 90.44 21.96	188.21 0.20	6 20 24 24 31 48 95.10 24.53	5 57 50 22 22 12 89.46 22.37	5 59 24 20 54 0 89.85 20.90	6 22 17 23 30 0 95.57 23.50	7.500	3.8 ± 0.6		IC 443 (SNR) 3C 157	
2U 0613+09 . . .	6 13 41 9 8 24 93.42 9.14	200.81 −3.52	6 14 29 9 15 36 93.62 9.26	6 13 12 9 9 0 93.30 9.15	6 13 17 9 3 0 93.32 9.05	6 14 38 9 9 36 93.66 9.16	0.036	63	5		
2U 0628−54 . . .	6 28 58 −54 54 0 97.24 −54.90	263.84 −24.90	6 32 24 −54 13 48 98.1 −54.23	6 22 48 −55 15 36 95.7 −55.26	6 25 12 −55 34 12 96.3 −55.57	6 34 24 −54 33 0 98.6 −54.55	0.750	3.7 ± 0.4			
2U 0757−53 . . .	7 57 26 −53 7 12 119.36 −53.12	267.07 −12.20	7 58 48 −52 55 12 119.7 −52.92	7 56 0 −53 15 0 119.0 −53.25	7 57 12 −53 24 0 119.3 −53.40	8 0 0 −53 4 48 120.0 −53.08	0.120	3.4 ± 0.6			

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	Location of Maximum Probability Density: l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Intensity: Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Comments and General Remarks: Previous X-Ray (5b)
2U 0757−26 . . .	$7^h57^m55^s$ −26°22′ 48″ 119.48 −26.38	244°.12 1°.78	$8^h\ 3^m48^s$ −25°27′ 36″ 120.95 −25.46	$7^h52^m29^s$ −26°54′ 36″ 118.12 −26.91	$7^h52^m29^s$ −27°16′ 48″ 118.12 −27.28	$8^h\ 3^m48^s$ −25°49′ 12″ 120.95 −25.82	0.930	3.0 ± 0.5			
2U 0821−42 . . .	8 21 26 −42 39 36 125.36 −42.66	260.36 −3.19	8 21 43 −42 31 12 125.43 −42.52	8 20 48 −42 39 0 125.20 −42.65	8 20 48 −42 51 0 125.20 −42.85	8 21 43 −42 43 12 125.43 −42.72	0.034	7.6 ± 0.7		Pup A	Vel XR-2 (1)? Pup A (2)
2U 0832−45 . . .	8 32 29 −45 7 12 128.12 −45.12	263.52 −3.02	8 33 19 −45 4 48 128.33 −45.08	8 32 24 −45 0 0 128.10 −45.00	8 31 36 −45 10 48 127.90 −45.18	8 32 0 −45 16 12 128.00 −45.27	0.037	10 ± 3		Vela X PSR 0833?	Vel XR-1 (1)? Vel XR-2 (1)? Vela X (2)
2U 0900−40 . . .	9 0 19 −40 22 48 135.08 −40.38	263.09 3.93	9 0 41 −40 23 24 135.17 −40.39	9 0 19 −40 19 12 135.08 −40.32	8 59 55 −40 21 0 134.98 −40.35	9 0 19 −40 25 12 135.08 −40.42	0.007	77	3		GX 263+3 (2) Vel XR-1 (1)? Vel 1 (3)
2U 1005−32 . . .	10 5 50 −32 24 0 151.46 −32.40	267.38 18.72	10 13 29 −33 13 48 153.37 −33.23	9 58 17 −31 6 0 149.57 −31.10	9 57 12 −31 18 0 149.30 −31.30	10 13 5 −33 39 36 153.27 −33.66	1.400	5.8 ± 0.7		NGC 3095? NGC 3087? NGC 3100?	
2U 1022−55 . . .	10 22 14 −55 28 48 155.56 −55.48	283.20 1.39	10 24 48 −55 36 0 156.20 −55.60	10 20 43 −55 12 36 155.18 −55.21	10 19 43 −55 21 36 154.93 −55.36	10 24 0 −55 45 0 156.00 −55.75	0.140	10.5 ± 0.7			
2U 1119−60 . . .	11 19 0 −60 19 12 169.75 −60.32	292.08 0.36	11 18 55 −60 16 12 169.73 −60.27	11 18 38 −60 18 36 169.66 −60.31	11 19 7 −60 22 12 169.78 −60.37	11 19 26 −60 19 48 169.86 −60.33	0.005	160	≥20	Pulses with 4ˢ.842 Period and has 2ᵈ.08712 period. (14)	Cen XR-3 (1, 2)? Cen X-3 (5, 14) Cen 3 (3)?

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

SOURCE NAME (1)	LOCATION OF MAXIMUM PROBABILITY DENSITY α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	ERROR REGION FOR 90 PERCENT CONFIDENCE 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	INTENSITY Average or Maximum (4a)	Max. Obs./ Min. Obs. (4b)	COMMENTS AND GENERAL REMARKS Counterparts (5a)	Previous X-Ray (5b)
2U 1134−61 . . .	11h34m26s −61°36′ 0″ 173.61 −61.60	294°26 −0°27	11h35m29s −61°43′ 12″ 173.87 −61.72	11h34m48s −61°30′ 36″ 173.70 −61.51	11h33m19s −61°32′ 24″ 173.33 −61.54	11h34m24s −61°43′ 12″ 173.60 −61.72	0.031	8.5 ± 1.1			
2U 1144+19 . . .	11 44 0 19 43 12 176.00 19.72	236.83 73.26	11 45 36 19 37 48 176.40 19.63	11 43 12 20 1 48 175.80 20.03	11 42 24 19 50 24 175.60 19.84	11 44 38 19 25 48 176.16 19.43	0.190	3.6 ± 0.3		NGC 3862 = 3C 264? Cluster: Abell 1367? Cluster: II Zw 1142.1+2126?	
2U 1146−61 . . .	11 46 10 −61 37 12 176.54 −61.62	295.61 0.08	11 46 29 −61 35 24 176.62 −61.59	11 45 53 −61 35 24 176.47 −61.59	11 45 53 −61 39 36 176.47 −61.66	11 46 29 −61 39 36 176.62 −61.66	0.005	72	5		
2U 1207+39 . . .	12 7 31 39 46 48 181.88 39.78	155.14 74.93	12 9 36 39 51 0 182.40 39.85	12 5 46 39 51 0 181.44 39.85	12 5 22 39 39 36 181.34 39.66	12 9 31 39 39 36 182.38 39.66	0.150	3.5 ± 0.4*		NGC 4151	NGC 4151 (10)
2U 1211−64 . . .	12 11 7 −64 33 36 182.78 −64.56	298.94 −2.26	12 11 46 −64 26 24 182.94 −64.44	12 10 19 −64 26 24 182.58 −64.44	12 10 19 −64 39 36 182.58 −64.66	12 11 46 −64 39 36 182.94 −64.66	0.034	6.0 ± 0.6			
2U 1223−62 . . .	12 23 41 −62 28 48 185.92 −62.48	300.08 −0.02	12 23 50 −62 21 0 185.96 −62.35	12 23 22 −62 21 0 185.84 −62.35	12 23 22 −62 37 48 185.84 −62.63	12 24 5 −62 37 48 186.02 −62.63	0.019	32	3	Very flat spectrum Star α Cru?	GX 301+0 (6)
2U 1224+02 . . .	12 24 58 2 18 0 186.24 2.30	289.07 64.25	12 26 53 2 26 24 186.72 2.44	12 22 48 2 22 12 185.70 2.37	12 22 53 2 9 36 185.72 2.16	12 26 58 2 14 24 186.74 2.24	0.210	4.2 ± 0.5*		3C 273	3C 273 (1, 2, 11)
2U 1228+12 . . .	12 28 5 12 42 0 187.02 12.70	283.56 74.51	12 28 34 12 45 0 187.14 12.75	12 27 36 12 45 0 186.90 12.75	12 27 36 12 39 36 186.90 12.66	12 28 34 12 39 36 187.14 12.66	0.021	21.7 ± 0.3		0°7 extent Virgo cluster M87 = Vir A	Vir XR-1 (1) M87 (2) (11)
2U 1231+07 . . .	12 31 22 7 9 36 187.84 7.16	290.52 69.33	12 36 0 6 54 0 189.0 6.9	12 24 48 7 48 0 186.2 7.8	12 24 48 7 36 0 186.2 7.6	12 36 0 6 36 0 189.0 6.6	0.690	6.8 ± 1.4		1C 3576?	

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

SOURCE NAME (1)	LOCATION OF MAXIMUM PROBABILITY DENSITY α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	ERROR REGION FOR 90 PERCENT CONFIDENCE 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	INTENSITY Average or Maximum (4a)	Max. Obs./ Min. Obs. (4b)	COMMENTS AND GENERAL REMARKS Counterparts (5a)	Previous X-Ray (5b)
2U 1247−41 ...	$12^h47^m12^s$ −41° 4′ 48″ 191.80 −41.08	302°.64 21°.52	$12^h50^m\ 0^s$ −41° 1′ 12″ 192.5 −41.02	$12^h44^m24^s$ −41° 1′ 12″ 191.1 −41.02	$12^h44^m24^s$ −41°10′ 48″ 191.1 −41.18	$12^h50^m\ 0^s$ −41°10′ 48″ 192.5 −41.18	0.170	5.9 ± 0.4		NGC 4696 = PKS 1245−41 Rich cluster in southern sky	
2U 1253−28 ...	12 53 46 −28 50 24 193.44 −28.84	304.25 33.75	12 56 24 −28 34 48 194.10 −28.58	12 50 36 −28 51 36 192.65 −28.86	12 50 48 −29 6 36 192.70 −29.11	12 56 53 −28 51 0 194.22 −28.85	0.360	4.7 ± 0.3			
2U 1254−69 ...	12 54 29 −69 1 12 193.62 −69.02	303.49 −6.43	12 54 48 −69 0 0 193.70 −69.00	12 54 10 −68 58 48 193.54 −68.98	12 54 0 −69 1 48 193.50 −69.03	12 54 38 −69 3 36 193.66 −69.06	0.004	25.3 ± 0.6			
2U 1257+28 ...	12 57 29 28 11 24 194.37 28.19	56.33 87.97	12 57 55 28 11 24 194.48 28.19	12 57 2 28 14 24 194.26 28.24	12 56 55 28 11 24 194.23 28.19	12 57 48 28 8 24 194.45 28.14	0.011	14.9 ± 0.3		0°.6 extent Coma cluster	Coma cluster (1) Coma X-1 (8)
2U 1258−61 ...	12 58 0 −61 20 24 194.50 −61.34	304.08 1.24	12 58 26 −61 24 36 194.61 −61.41	12 58 10 −61 13 12 194.54 −61.22	12 57 31 −61 18 36 194.38 −61.31	12 57 50 −61 30 0 194.46 −61.50	0.017	47	4	Very flat spectrum	GX 304−1 (6)
2U 1322−42 ...	13 22 48 −42 44 24 200.70 −42.74	309.57 19.43	13 24 19 −42 34 48 201.08 −42.58	13 21 50 −42 39 36 200.46 −42.66	13 21 12 −42 51 36 200.30 −42.86	13 24 5 −42 46 48 201.02 −42.78	0.092	7.4 ± 0.4*		Spectrum cutoff at 2.7 keV NGC 5128 = Cen A	NGC 5128 (11)
2U 1348+24 ...	13 48 58 24 26 24 207.24 24.44	23.98 76.21	14 0 48 25 42 0 210.2 25.7	13 39 12 25 48 0 204.8 25.8	13 41 12 22 48 0 205.3 22.8	14 2 0 23 12 0 210.5 23.2	13.000	3.8 ± 0.9		Clusters?	
2U 1420−02 ...	14 20 12 −2 54 0 215.05 −2.90	342.55 52.57	14 23 12 −2 36 36 215.80 −2.61	14 17 7 −2 44 24 214.28 −2.74	14 17 12 −3 10 12 214.30 −3.17	14 23 19 −3 2 24 215.83 −3.04	0.660	3.9 ± 0.6		NGC 5604? Cluster: I Zw 1417.5−0239?	

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 1440−39 . . .	14^h40^m 0^s −39° 9′ 36″ 220.00 −39.16	325°39 18°58	14^h40^m 0^s −38°30′ 0″ 220.0 −38.5	14^h36^m 0^s −39° 6′ 0″ 219.0 −39.1	14^h40^m 0^s −39°18′ 0″ 220.0 −39.3	$14^h42^m48^s$ −38°54′ 0″ 220.7 −38.9	0.530	3.2 ± 0.4			
2U 1443+43 . . .	14 43 2 43 2 24 220.76 43.04	74.66 62.16	14 44 48 43 12 0 221.2 43.2	14 41 12 43 12 0 220.3 43.2	14 41 12 42 54 0 220.3 42.9	14 44 48 42 54 0 221.2 42.9	0.200	3.0 ± 0.7		Cluster: III Zw 1445.0+4259?	
2U 1509−58 . . .	15 9 31 −58 51 36 227.38 −58.86	320.31 −1.05	15 10 24 −58 46 48 227.60 −58.78	15 8 7 −58 46 48 227.03 −58.78	15 8 36 −58 57 36 227.15 −58.96	15 10 50 −58 57 36 227.71 −58.96	0.053	6.8 ± 0.5		MSH 15−52A (SNR)? MSH 15−52B (SNR)?	
2U 1516−56 . . .	15 16 43 −56 58 48 229.18 −56.98	322.11 0.05	15 17 2 −56 57 0 229.26 −56.95	15 16 24 −56 57 0 229.10 −56.95	15 16 24 −57 1 48 229.10 −57.03	15 17 2 −57 1 48 229.26 −57.03	0.007	720	≥20	Large intensity changes in seconds	Lup XR-1 (1, 2)? Cir X-1 (9) Nor 2 (3)?
2U 1536−52 . . .	15 36 48 −52 10 48 234.20 −52.18	327.22 2.37	15 37 55 −52 7 48 234.48 −52.13	15 35 34 −52 7 48 233.89 −52.13	15 35 34 −52 15 0 233.89 −52.25	15 37 55 −52 15 0 234.48 −52.25	0.043	11.4 ± 0.8			Nor XR-2 (1)? Nor 2 (3)?
2U 1542−62 . . .	15 42 34 −62 25 12 235.64 −62.42	321.66 −6.27	15 43 17 −62 22 48 235.82 −62.38	15 41 41 −62 24 36 235.42 −62.41	15 41 41 −62 28 12 235.42 −62.47	15 43 17 −62 26 24 235.82 −62.44	0.011	35	2		
2U 1543−47 . . .	15 43 50 −47 33 36 235.96 −47.56	330.93 5.36	15 43 55 −47 34 48 235.98 −47.58	15 43 41 −47 31 48 235.92 −47.53	15 43 48 −47 32 24 235.95 −47.54	15 44 2 −47 35 24 236.01 −47.59	0.001	2000	2	Nova-like source first observed in 1971 August. Intensity decreased by ×2 as of 1971 November.	
2U 1544−75 . . .	15 44 19 −75 43 12 236.08 −75.72	313.28 −16.74	15 46 55 −75 32 24 236.73 −75.54	15 40 31 −75 40 12 235.13 −75.67	15 40 48 −75 55 48 235.20 −75.93	15 47 19 −75 47 24 236.83 −75.79	0.100	3.2 ± 0.3		NGC 5967?	

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

SOURCE NAME (1)	LOCATION OF MAXIMUM PROBABILITY DENSITY α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	ERROR REGION FOR 90 PERCENT CONFIDENCE 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	INTENSITY Average or Maximum (4a)	Max. Obs./ Min. Obs. (4b)	COMMENTS AND GENERAL REMARKS Counterparts (5a)	Previous X-Ray (5b)
2U 1556−60 . . .	15ʰ56ᵐ48ˢ −60°38′ 24″ 239.20 −60.64	324°.11 −5°.97	15ʰ57ᵐ36ˢ −60°35′ 24″ 239.40 −60.59	15ʰ56ᵐ 5ˢ −60°35′ 24″ 239.02 −60.59	15ʰ56ᵐ 5ˢ −60°40′ 48″ 239.02 −60.68	15ʰ57ᵐ36ˢ −60°40′ 48″ 239.40 −60.68	0.017	17.6 ± 1.0			Nor XR-2 (1, 2)? Nor 2 (3)?
2U 1617−15 . . .	16 17 10 −15 32 24 244.29 −15.54	359.09 23.76	16 17 16 −15 32 6 244.317 −15.535	16 17 1 −15 30 36 244.255 −15.510	16 17 1 −15 32 24 244.255 −15.540	16 17 16 −15 34 12 244.317 −15.570	0.002	17,000*	2.5	Blue star (Sco X-1) at α = 16ʰ17ᵐ4ˢ.3, δ = −15°31′13″	Sco X-1 (1, 2) Sco 1 (3)
2U 1624−49 . . .	16 24 19 −49 6 0 246.08 −49.10	334.91 −0.27	16 24 48 −49 7 48 246.20 −49.13	16 24 12 −49 2 24 246.05 −49.04	16 23 53 −49 4 12 245.97 −49.07	16 24 34 −49 9 36 246.14 −49.16	0.007	43.6 ± 1.4			Nor XR-1 (1, 2)? Nor 1 (3)?
2U 1626−67 . . .	16 26 29 −67 24 0 246.62 −67.40	321.70 −13.07	16 27 0 −67 19 12 246.75 −67.32	16 25 43 −67 23 24 246.43 −67.39	16 25 58 −67 28 48 246.49 −67.48	16 27 17 −67 24 36 246.82 −67.41	0.013	13.3 ± 0.8			
2U 1630−47 . . .	16 30 0 −47 15 36 247.50 −47.26	336.89 0.31	16 30 29 −47 16 48 247.62 −47.28	16 29 55 −47 12 36 247.48 −47.21	16 29 26 −47 12 36 247.36 −47.21	16 30 17 −47 19 12 247.57 −47.32	0.008	150	2		Nor XR-1 (1, 2)? Nor 1 (3)?
2U 1637−53 . . .	16 37 17 −53 40 48 249.32 −53.68	332.93 −4.87	16 37 36 −53 42 0 249.40 −53.70	16 37 2 −53 38 24 249.26 −53.64	16 36 48 −53 40 12 249.20 −53.67	16 37 24 −53 43 48 249.35 −53.73	0.005	256 ± 4			
2U 1639−62 . . .	16 39 2 −62 43 12 249.76 −62.72	326.19 −10.98	16 40 19 −62 35 24 250.08 −62.59	16 37 17 −62 41 24 249.32 −62.69	16 37 53 −62 51 0 249.47 −62.85	16 40 48 −62 45 36 250.20 −62.76	0.062	9.4 ± 2.3			
2U 1641−45 . . .	16 41 46 −45 28 48 250.44 −45.48	339.57 −0.00	16 42 26 −45 29 24 250.61 −45.49	16 41 22 −45 25 48 250.34 −45.43	16 41 0 −45 29 24 250.25 −45.49	16 42 5 −45 33 36 250.52 −45.56	0.016	400	2		GX 340+0 (12) Ara 1 (3)? (L3, GX 340−2) (1)?

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	Location of Maximum Probability Density: l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	Error Region for 90 Percent Confidence: 2 α δ (3b)	Error Region for 90 Percent Confidence: 3 α δ (3c)	Error Region for 90 Percent Confidence: 4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Intensity: Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Comments and General Remarks: Previous X-Ray (5b)
2U 1642+04 ...	$16^h42^m\ 5^s$ 4°14′ 24″ 250.52 4.24	21°30 29°98	$16^h49^m12^s$ 4°12′ 0″ 252.3 4.2	$16^h44^m24^s$ 4°54′ 0″ 251.1 4.9	$16^h39^m36^s$ 3°36′ 0″ 249.9 3.6	$16^h47^m36^s$ 2°42′ 0″ 251.9 2.7	2.900	6.7 ± 1.0			
2U 1658−46 ...	16 58 58 −46 42 0 254.74 −46.70	340.53 −3.08	16 59 55 −46 42 0 254.98 −46.70	16 58 19 −46 38 24 254.58 −46.64	16 58 10 −46 43 12 254.54 −46.72	16 59 43 −46 46 48 254.93 −46.78	0.024	42 ± 3			GX 340−2 (2) Ara 1 (3)? (L2, L3, M2) (1)?
2U 1700−37 ...	17 0 19 −37 48 0 255.08 −37.80	347.71 2.19	17 2 48 −37 18 0 255.7 −37.3	16 57 36 −37 18 0 254.4 −37.3	16 57 36 −38 0 0 254.4 −38.0	17 2 48 −38 0 0 255.7 −38.0	0.720	102	3		
2U 1701−31 ...	17 1 46 −31 50 24 255.44 −31.84	352.63 5.59	17 5 55 −32 12 0 256.48 −32.20	16 57 50 −31 9 0 254.46 −31.15	16 57 34 −31 24 0 254.39 −31.40	17 5 36 −32 20 24 256.40 −32.34	0.400	11.9 ± 1.5			L8 (1)?
2U 1702−36 ...	17 2 29 −36 21 36 255.62 −36.36	349.11 2.73	17 2 58 −36 22 12 255.74 −36.37	17 2 10 −36 18 36 255.54 −36.31	17 1 55 −36 20 24 255.48 −36.34	17 2 41 −36 24 36 255.67 −36.41	0.009	715	2		GX 349+2 (2) (Sco XR-2, L6, GX−10.7) (1, 2) Sco 2 (3)
2U 1704−42 ...	17 4 38 −42 51 36 256.16 −42.86	344.19 −1.54	17 5 10 −42 54 0 256.29 −42.90	17 4 22 −42 47 24 256.09 −42.79	17 4 2 −42 49 12 256.01 −42.82	17 4 53 −42 55 48 256.22 −42.93	0.011	108	4		Ara XR-1 (1)? GX−14.1 (2)?
2U 1705−44 ...	17 5 22 −44 2 24 256.34 −44.04	343.33 −2.35	17 5 50 −44 4 12 256.46 −44.07	17 5 26 −44 1 48 256.36 −44.03	17 5 12 −44 2 24 256.30 −44.04	17 5 36 −44 4 48 256.40 −44.08	0.002	280	3		
2U 1705−22 ...	17 5 22 −22 44 24 256.34 −22.74	0.49 10.36	17 6 53 −22 53 24 256.72 −22.89	17 4 7 −22 33 36 256.03 −22.56	17 3 58 −22 37 12 255.99 −22.62	17 6 43 −22 58 12 256.68 −22.97	0.057	42	6		Oph XR-2 (1) Oph 2 (3)

TABLE 1—*Continued*

UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 1705+34 ...	$17^h\ 5^m30^s$ 34°52′ 12″ 256.375 34.87	57°.91 35°.52	$17^h13^m19^s$ 34°33′ 0″ 258.33 34.55	$16^h57^m29^s$ 35°31′ 12″ 254.37 35.52	$16^h57^m17^s$ 35°15′ 0″ 254.32 35.25	$17^h13^m\ 7^s$ 34°18′ 0″ 258.28 34.30	0.880	100	≥6	Pulses with $1^s.238$ period and has $1^d.7000$ period. In Hercules (14)	
2U 1706+78 ...	17 6 24 78 38 24 256.60 78.64	110.94 31.80	17 4 0 79 6 0 256.0 79.10	16 59 36 78 59 24 254.9 78.99	17 8 48 78 8 24 257.2 78.14	17 12 0 78 22 12 258.0 78.37	0.220	2.9 ± 0.3		Cluster: IV Zw 1653.9+7856? Cluster: Abell 2256?	
2U 1718−39 ...	17 18 34 −39 3 36 259.64 −39.06	348.81 −1.43	17 19 55 −38 57 36 259.98 −38.96	17 17 2 −38 57 36 259.26 −38.96	17 17 2 −39 9 0 259.26 −39.15	17 19 55 −39 9 0 259.98 −39.15	0.110	16 ± 2			(Sco XR-2, L6, GX−10.7) (1)? (Sco XR-5) (1)? (Sco 2, Sco 5) (3)?
2U 1726−33 ...	17 26 5 −33 37 12 261.52 −33.62	354.15 0.39	17 26 50 −33 40 12 261.71 −33.67	17 25 34 −33 32 24 261.39 −33.54	17 25 22 −33 36 0 261.34 −33.60	17 26 43 −33 43 48 261.68 −33.73	0.021	73	3		GX 354+0 (13) (M4, GX 354−5) (1) GX−5.6 (1, 2)
2U 1728−24 ...	17 28 22 −24 39 36 262.09 −24.66	1.90 4.94	17 29 4 −24 41 49 262.269 −24.697	17 27 48 −24 34 30 261.948 −24.575	17 27 41 −24 37 30 261.920 −24.625	17 28 55 −24 45 18 262.230 −24.755	0.019	60 ± 3			GX 1+4 (15) Sgr 6 (3)?
2U 1728−16 ...	17 28 50 −16 57 0 262.21 −16.95	8.49 9.02	17 29 12 −16 58 12 262.300 −16.97	17 28 34 −16 54 36 262.140 −16.91	17 28 31 −16 55 48 262.130 −16.93	17 29 7 −16 59 24 262.280 −16.99	0.004	205 ± 3			GX 9+9 (1, 2) Oph 3 (3)
2U 1735−28 ...	17 35 24 −28 27 0 263.85 −28.45	359.57 1.56	17 35 36 −28 18 0 263.90 −28.30	17 34 48 −28 27 0 263.70 −28.45	17 35 12 −28 36 0 263.80 −28.60	17 36 0 −28 27 0 264.00 −28.45	0.040	565	≥10	Transient source observed in 1971 March	GX 359+2 (13)
2U 1735+43 ...	17 35 50 43 13 12 263.96 43.22	69.00 31.21	17 39 41 45 34 48 264.92 45.58	17 30 5 45 3 36 262.52 45.06	17 37 46 35 46 48 264.44 35.78	17 47 22 36 25 12 266.84 36.42	17.000	17.2 ± 2.4		NGC 6433? IC 1265? 3C 361?	

1972ApJ...178..281G

TABLE 1—*Continued*

UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./ Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 1743−29 ...	$17^h43^m36^s$ −29° 7′ 48″ 265.9 −29.13	359°95 −0°33	$17^h45^m12^s$ −29° 6′ 0″ 266.3 −29.1	$17^h43^m12^s$ −29° 0′ 0″ 265.8 −29.0	$17^h42^m24^s$ −29° 6′ 0″ 265.6 −29.1	$17^h43^m36^s$ −29°18′ 0″ 265.9 −29.3	0.092	40 ± 5		2° extent, contains Sgr A and infrared sources (KE 56, KE 55)? (SNR 1742−28, SNR 1741−29)?	GCX (13) Sgr 1 (3)? (L13, M1) (1)?
2U 1744−26 ...	17 44 38 −26 32 24 266.16 −26.54	2.28 0.83	17 45 2 −26 34 12 266.26 −26.57	17 44 26 −26 29 24 266.11 −26.49	17 44 17 −26 31 12 266.07 −26.52	17 44 58 −26 36 0 266.24 −26.60	0.006	460	3	GX 3+1 (GX+2.6, L14, Sgr XR-1) (1) GX 3+1 (2)	Sgr 6 (3)
2U 1757−33 ...	17 57 7 −33 56 24 269.28 −33.94	357.28 −5.26	17 59 34 −34 3 36 269.89 −34.06	17 55 5 −33 43 48 268.77 −33.73	17 55 0 −33 49 48 268.75 −33.83	17 59 10 −34 10 12 269.79 −34.17	0.110	18.7 ± 2.0			GX−2.5 (1) (2) Sco XR-6 (1)
2U 1757−25 ...	17 57 55 −25 4 48 269.48 −25.08	5.06 −0.99	17 58 18 −25 5 13 269.574 −25.087	17 57 48 −25 3 0 269.450 −25.050	17 57 44 −25 3 36 269.434 −25.060	17 58 0 −25 6 0 269.500 −25.100	0.003	1000	2	GX 5−1 (GX+5.2, L27, Sgr XR-3) (1) GX5−1 (2)	Sgr 5 (3)
2U 1758−20 ...	17 58 34 −20 31 48 269.64 −20.53	9.08 1.15	17 58 36 −20 32 6 269.650 −20.535	17 58 23 −20 30 29 269.596 −20.508	17 58 19 −20 31 30 269.578 −20.525	17 58 32 −20 33 18 269.635 −20.555	0.001	600	2		GX 9+1, (GX+9.1, L18, L19, M(3)) (1) Sgr 3 (3) GX 9+1 (2)
2U 1808+50 ...	18 8 48 50 24 0 272.20 50.40	78.24 26.96	18 2 0 51 17 24 270.5 51.29	18 0 24 50 54 0 270.1 50.90	18 24 0 48 43 12 276.0 48.72	18 20 0 49 27 36 275.0 49.46	1.400	5.6 ± 0.4		NGC 6582? 3C 367? Cluster: Abell 2298? Cluster: III Zw 1810.2+4949?	
2U 1811−17 ...	18 11 34 −17 10 48 272.89 −17.18	13.50 0.12	18 11 41 −17 9 47 272.920 −17.163	18 11 26 −17 9 47 272.860 −17.163	18 11 26 −17 11 46 272.860 −17.196	18 11 41 −17 11 46 272.920 −17.196	0.002	294 ± 4		SNR 1811−17?	(GX+13.5, L20 Sgr XR-2) (1) GX 13+1 (1) GX 13+1 (2) Sgr 2 (3)

TABLE 1—*Continued*

UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 1813−14 ...	18h13m 2s −14° 3′ 0″ 273.26 −14.05	16°.42 1°.31	18h13m10s −14° 2′ 35″ 273.292 −14.043	18h12m54s −14° 1′ 41″ 273.225 −14.028	18h12m53s −14° 3′ 32″ 273.220 −14.059	18h13m 9s −14° 4′ 30″ 273.287 −14.075	0.002	560	1.7	Coincides with weak variable radio source (16)	GX 17+2, (GX+16.7) (1, 2) (L21, Ser XR-2) (1)? Ser 2 (3)
2U 1813−12 ...	18 13 26 −12 15 36 273.36 −12.26	18.04 2.08	18 15 17 −12 15 36 273.82 −12.26	18 11 50 −11 58 12 272.96 −11.97	18 11 34 −12 14 24 272.89 −12.24	18 14 58 −12 34 48 273.74 −12.58	0.270	10 ± 3			Ser XR-2 (1)?
2U 1820−30 ...	18 20 10 −30 22 12 275.04 −30.37	2.77 −7.85	18 20 26 −30 21 54 275.110 −30.365	18 19 56 −30 21 0 274.985 −30.350	18 19 56 −30 22 41 274.982 −30.378	18 20 26 −30 23 42 275.107 −30.395	0.003	200 ± 8			Sgr XR-4 (1) Sgr 4 (3)
2U 1822+00 ...	18 22 19 0 3 36 275.58 0.06	29.97 5.95	18 23 43 −0 4 48 275.93 −0.08	18 21 12 0 15 36 275.30 0.26	18 20 55 0 11 24 275.23 0.19	18 23 31 −0 10 12 275.88 −0.17	0.072	40 ± 5			
2U 1822−37 ...	18 22 53 −37 8 24 275.72 −37.14	356.89 −11.38	18 25 7 −37 3 0 276.28 −37.05	18 20 48 −37 3 0 275.20 −37.05	18 20 48 −37 17 24 275.20 −37.29	18 25 7 −37 17 24 276.28 −37.29	0.210	15 ± 3			Sgr 7 (3) Sco XR-6 (1)?
2U 1828+81 ...	18 28 24 81 0 0 277.10 81.00	112.85 27.84	18 42 24 80 3 36 280.6 80.06	18 20 0 82 26 24 275.0 82.44	18 14 48 81 56 24 273.7 81.94	18 37 12 79 32 24 279.3 79.54	0.930	3.6 ± 0.4		3C 390.3? Cluster: IV Zw 1842.0+8104?	
2U 1833−05 ...	18 33 12 −5 22 48 278.30 −5.38	26.41 1.02	18 36 12 −5 31 48 279.05 −5.53	18 30 50 −5 1 48 277.71 −5.03	18 30 17 −5 13 12 277.57 −5.22	18 35 46 −5 44 24 278.94 −5.74	0.330	7.0 ± 1.3			
2U 1836+05 ...	18 36 29 5 2 24 279.12 5.04	36.05 5.09	18 36 51 5 2 24 279.213 5.040	18 35 34 5 5 6 278.892 5.085	18 35 34 5 3 0 278.892 5.050	18 36 48 4 59 24 279.200 4.990	0.014	179 ± 5			(GX+36.3, Ser XR-1) (1)? Ser XR-1 (2), Ser 1 (3)

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./ Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 1843+67 . . .	$18^h43^m26^s$ 67°30′ 0″ 280.86 67.50	97°88 25°68	$19^h18^m29^s$ 65° 4′ 48″ 289.62 65.08	$18^h44^m34^s$ 67°44′ 24″ 281.14 67.74	$18^h41^m31^s$ 67°19′ 12″ 280.38 67.32	$19^h16^m14^s$ 64°39′ 36″ 289.06 64.66	2.100	4.2 ± 0.6		Cluster: IV Zw 1844.0+6613? Cluster: IV Zw 1856.8+6616?	
2U 1849−77 . . .	18 49 0 −77 6 0 282.25 −77.10	317.47 −26.65	18 50 12 −76 36 0 282.55 −76.6	18 46 31 −77 0 0 281.63 −77.0	18 47 31 −77 36 0 281.88 −77.6	18 51 12 −77 12 0 282.80 −77.2	0.150	3.0 ± 0.5			
2U 1907+02 . . .	19 7 22 2 16 48 286.84 2.28	37.14 −3.02	18 56 0 3 49 12 284.00 3.82	18 54 48 3 49 12 283.70 3.82	19 7 36 2 2 24 286.90 2.04	19 10 24 2 2 24 287.60 2.04	0.890	42	2		
2U 1908+00 . . .	19 8 5 0 31 12 287.02 0.52	35.66 −3.99	19 8 31 0 30 36 287.13 0.51	19 7 55 0 33 0 286.98 0.55	19 7 50 0 30 0 286.96 0.50	19 8 19 0 28 12 287.08 0.47	0.007	200	4		Aql XR-1 (1) Aql 1 (3)
2U 1912−05 . . .	19 12 7 −5 7 12 288.03 −5.12	31.09 −7.48	19 18 19 −5 15 0 289.58 −5.25	19 6 31 −4 48 0 286.63 −4.80	19 6 19 −5 0 0 286.58 −5.00	19 18 7 −5 27 0 289.53 −5.45	0.610	19 ± 2			
2U 1926+43 . . .	19 26 34 43 44 24 291.64 43.74	76.14 12.33	19 28 48 44 9 0 292.2 44.15	19 25 36 43 41 24 291.4 43.69	19 24 24 43 18 0 291.1 43.30	19 30 48 43 42 0 292.7 43.70	0.390	8.0 ± 0.7			
2U 1954−68 . . .	19 54 43 −68 31 12 298.68 −68.52	327.28 −31.34	20 1 36 −69 26 24 300.4 −69.44	19 52 0 −67 21 36 298.0 −67.36	19 47 36 −67 39 36 296.9 −67.66	19 57 36 −69 44 24 299.4 −69.74	1.100	3.6 ± 0.5			
2U 1954+31 . . .	19 54 53 31 52 48 298.72 31.88	68.45 1.68	19 56 0 31 48 0 299.00 31.80	19 53 31 32 4 48 298.38 32.08	19 53 19 31 57 36 298.33 31.96	19 55 48 31 41 24 298.95 31.69	0.072	75	7		

TABLE 1—*Continued*

UHURU CATALOG OF X-RAY SOURCES

SOURCE NAME (1)	LOCATION OF MAXIMUM PROBABILITY DENSITY: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	ERROR REGION FOR 90 PERCENT CONFIDENCE: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	INTENSITY: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	COMMENTS AND GENERAL REMARKS: Counterparts (5a)	Previous X-Ray (5b)
2U 1956+35 . . .	$19^h56^m22^s$ 35° 3′ 36″ 299.092 35.060	71°.32 3°.08	$19^h56^m30^s$ 35° 3′ 58″ 299.124 35.066	$19^h56^m19^s$ 35° 5′ 10″ 299.078 35.086	$19^h56^m15^s$ 35° 3′ 14″ 299.064 35.054	$19^h56^m26^s$ 35° 2′ 2″ 299.109 35.034	0.001	1175	5	Intensity can vary by X2 in 1 second Coincides with weak variable radio source (9)	Cyg X-1 (1, 2) Cyg 1 (3)
2U 1957+40 . . .	19 57 12 40 36 0 299.30 40.60	76.14 5.85	19 59 19 40 32 24 299.83 40.54	19 55 34 40 58 48 298.89 40.98	19 54 55 40 42 0 298.73 40.70	19 58 31 40 13 12 299.63 40.22	0.270	5.1 ± 1.4		Cyg A	
2U 2006+59 . . .	20 6 53 59 49 12 301.72 59.82	93.70 14.42	19 32 48 65 30 0 293.2 65.5	19 20 48 65 30 0 290.2 65.5	20 3 12 59 12 0 300.8 59.2	20 11 12 60 6 0 302.8 60.1	8.400	8.8 ± 1.9		Cluster: I Zw 1951.5+6148? NGC 6825?	
2U 2012+62 . . .	20 12 5 62 39 36 303.02 62.66	96.56 15.32	20 20 48 61 36 0 305.2 61.6	19 54 24 65 42 0 298.6 65.7	19 51 12 65 24 0 297.8 65.4	20 17 36 61 18 0 304.4 61.3	2.300	7.7 ± 0.7			
2U 2030+40 . . .	20 30 29 40 47 24 307.62 40.79	79.83 0.72	20 30 28 40 49 34 307.618 40.826	20 30 17 40 48 18 307.573 40.805	20 30 24 40 45 36 307.602 40.760	20 30 40 40 45 36 307.665 40.760	0.003	133	2.5		Cyg X-3 (1, 2) Cyg 3 (3)
2U 2041+75 . . .	20 41 55 75 25 12 310.48 75.42	109.36 19.86	20 31 36 77 6 0 307.9 77.1	20 28 48 76 42 0 307.2 76.7	20 50 0 73 54 0 312.5 73.9	20 54 0 74 24 0 313.5 74.4	1.200	3.4 ± 0.7			
2U 2128+81 . . .	21 28 48 81 36 0 322.20 81.60	116.07 21.84	22 44 0 82 42 0 341.0 82.7	21 48 0 82 24 0 327.0 82.4	21 0 0 81 24 0 315.0 81.4	20 28 0 79 48 0 307.0 79.8	1.200	1.5 ± 0.3		Cluster: IV Zw 2227.0+8225? Cluster: IV Zw 2147.0+8155?	

TABLE 1—*Continued*

UHURU Catalog of X-Ray Sources

Source Name (1)	Location of Maximum Probability Density: α (1950) δ (1950) (2a)	l^{II} b^{II} (2b)	Error Region for 90 Percent Confidence: 1 α δ (3a)	2 α δ (3b)	3 α δ (3c)	4 α δ (3d)	Area (square degrees) (3e)	Intensity: Average or Maximum (4a)	Max. Obs./Min. Obs. (4b)	Comments and General Remarks: Counterparts (5a)	Previous X-Ray (5b)
2U 2130+47 ...	21h30m 5s 47° 2′ 24″ 322.52 47.04	91°62 −3°11	21h32m 0s 47° 1′ 12″ 323.00 47.02	21h28m58s 47°14′ 24″ 322.24 47.24	21h30m24s 47° 4′ 48″ 322.60 47.08	21h31m17s 46°52′ 12″ 322.82 46.87	0.039	11.8 ± 0.7			
2U 2134+11 ...	21 34 34 11 0 0 323.64 11.0	65.44 −29.24	21 38 48 12 18 0 324.7 12.3	21 16 48 12 18 0 319.2 12.3	21 16 48 9 36 0 319.2 9.6	21 38 48 9 36 0 324.7 9.6	15.000	3.2 ± 0.7		Clusters?	
2U 2142+38 ...	21 42 36 38 5 2 325.651 38.084	87.32 −11.32	21 42 45 38 6 29 325.686 38.108	21 42 42 38 4 55 325.676 38.082	21 42 28 38 3 29 325.616 38.058	21 42 30 38 4 55 325.625 38.082	0.001	420*	1.4	Blue Star (Cyg X-2) at $\alpha = 21^h42^m36^s.91$, $\delta = 38°5'27''.9$	Cyg X-2 (1, 2, 17)
2U 2208+54 ...	22 8 34 54 28 48 332.14 54.48	101.01 −1.14	22 9 26 54 43 48 332.36 54.73	22 7 17 54 34 12 331.82 54.57	22 7 29 54 15 0 331.87 54.25	22 9 58 54 25 12 332.49 54.42	0.110	5.1 ± 1.0			
2U 2321+58 ...	23 21 5 58 30 36 350.27 58.51	111.72 −2.16	23 21 31 58 31 12 350.38 58.52	23 21 19 58 34 48 350.33 58.58	23 20 36 58 30 36 350.15 58.51	23 20 48 58 27 0 350.20 58.45	0.008	53.4 ± 1.0		Cas A	Cas A (1, 2) Cas A (3)
2U 2346−32 ...	23 46 34 −32 1 12 356.64 −32.02	10.41 −75.69	23 59 2 −31 9 0 359.76 −31.15	23 44 24 −31 9 0 356.10 −31.15	23 44 24 −32 43 48 356.10 −32.73	23 59 2 −32 43 48 359.76 −32.73	4.900	4.6 ± 0.6		NGC 7793? NGC 7755?	
2U 2358−29 ...	23 58 43 −29 4 48 359.68 −29.08	21.42 −78.81	0 0 12 −29 0 0 0.05 −29.0	23 40 48 −27 54 0 355.20 −27.9	23 40 24 −28 18 0 355.10 −28.3	23 59 43 −29 24 0 359.93 −29.4	1.800	2.2 ± 0.3			

detector. In these cases the location of the maximum probability density will not be in the center of the error box. In figure 5 an illustrative example of the location and error-box determination is shown.

V. THE CATALOG

The 68 sets of data analyzed for the catalog result in sky coverage as indicated in figure 6. This figure (which is in galactic coordinates) shows the path of the center of the scan for each spin-axis orientation. We estimate about 50 percent coverage at galactic latitudes greater than 20° and essentially complete coverage along the galactic plane. This catalog lists 125 X-ray sources giving locations with 90 percent error boxes; intensity from 2 to 6 keV; and some comments on peculiar properties, previous X-ray observations, and possible identifications. The X-ray sky as seen by *Uhuru* is shown in galactic coordinates in figure 7. The X-ray sources are denoted by asterisks.

In table 1 the sources making up the catalog are listed with the following information.

a) The source designation is given as the right ascension and declination of the location of the maximum of the joint probability distribution truncated to minutes of right ascension and degrees of declination. The error-box corners at the 90 percent confidence level as described above, together with the area of this region, are also listed, as is the location of the maximum of the joint probability distribution. This location and the error-box corners are given in celestial coordinates, and the location is also given in galactic coordinates.

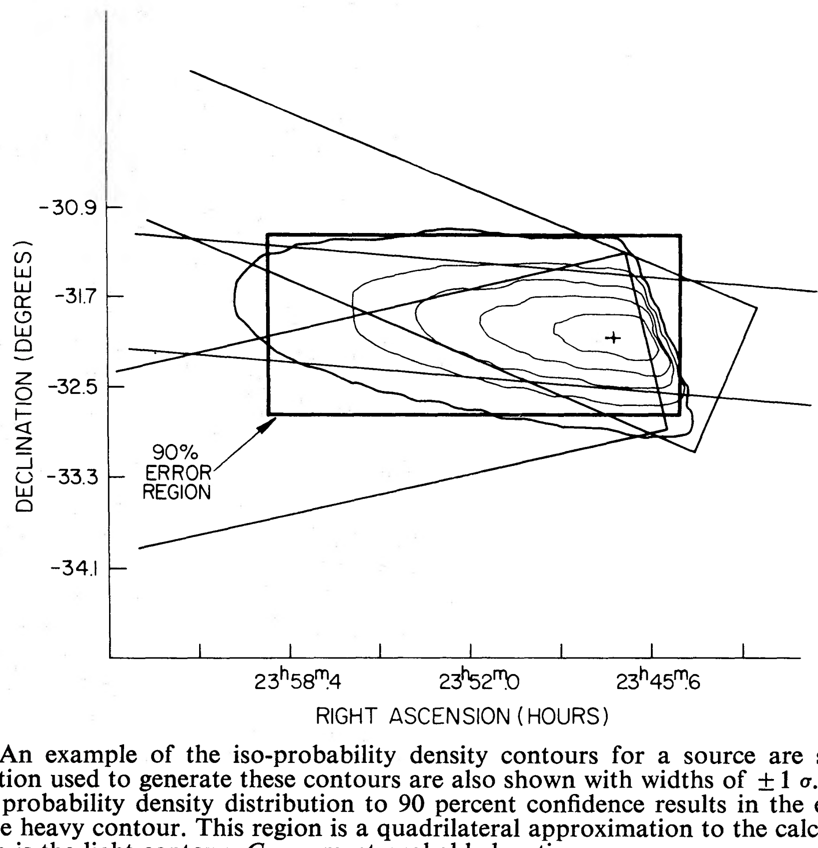

FIG. 5.—An example of the iso-probability density contours for a source are shown. The lines of position used to generate these contours are also shown with widths of $\pm 1\ \sigma$. Integration of the joint probability density distribution to 90 percent confidence results in the error region shown by the heavy contour. This region is a quadrilateral approximation to the calculated error region which is the light contour. *Cross*, most probable location.

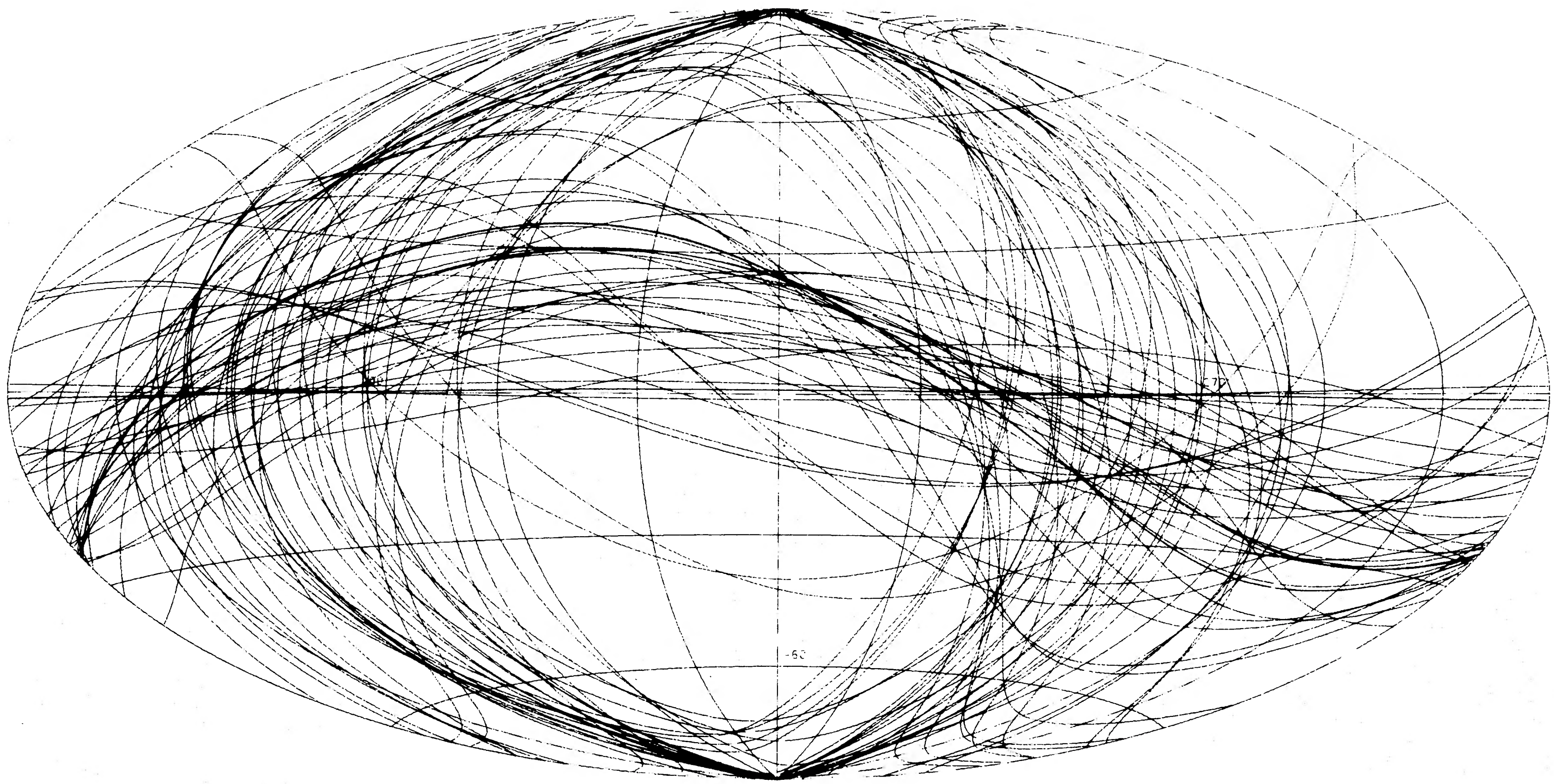

FIG. 6.—Coverage map on an equal area projection of the sky in galactic coordinates. The path of the center of the scan for each spin-axis orientation is shown. This does not indicate the nighttime exposure for each data set.

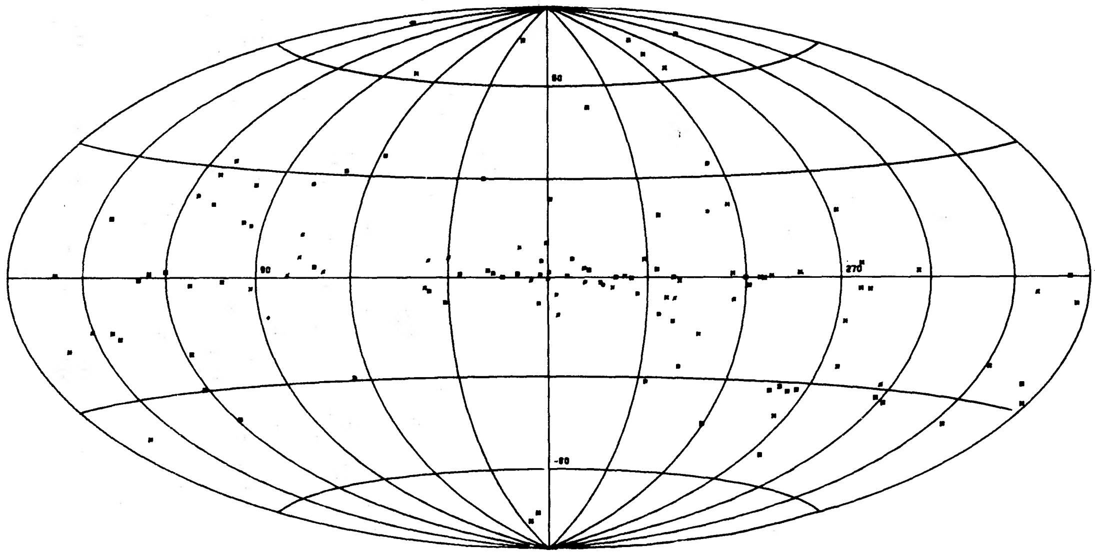

FIG. 7.—The X-ray sky as seen by *Uhuru*. Asterisks indicate X-ray source locations. The map is an equal-area projection in galactic coordinates.

b) For each source, an intensity is listed which is the counting rate measured with *Uhuru* from 2 to 6 keV corrected for elevation in the collimator field of view. For sources which are not observed to vary, the intensity given is the weighted average of the individual sightings, and for variable sources we list the maximum observed intensity and the range of observed variations. In the case of nonvarying sources, the uncertainty in intensity which is given is only the value derived from the individual uncertainties in each sighting as determined from the minimum χ^2 fit of the collimator response to the data. These uncertainties therefore approximately reflect the statistical significance of the sources. In addition to statistical uncertainties, the source intensities given in this catalog are subject to systematic uncertainties due to the elevation corrections which depend on source location. Thus, sources which are located with poor precision will be subject to large systematic uncertainties in intensity. Unless otherwise indicated by an asterisk, the intensities are corrected for elevation using the most probable source location. For those sources which have optical or radio counterparts, the intensities have been corrected for the known location of the accepted counterpart.

The intensities given in this catalog are observed counting rates from 2 to 6 keV. To facilitate comparison of intensities with other observations, these counting rates can be converted to counts $cm^{-2}\,s^{-1}$ by knowing the effective area of the *Uhuru* detectors. Measurements of this area were made by using available facilities prior to the *Uhuru* launch. However, due to the difficulty in obtaining a uniform, collimated beam of X-rays sufficiently broad to cover the detectors, a direct measurement of the effective area was not made. Therefore, the conversion of counts s^{-1} to counts $cm^{-2}\,s^{-1}$ using an effective area of 840 cm^2 will be subject to a systematic uncertainty which we estimate to be ± 10 percent. As a further aid in using the *Uhuru* intensity data we have calculated a typical conversion factor for transforming from counts s^{-1} (2–6 keV) to ergs $cm^{-2}\,s^{-1}$ (2–10 keV). Such a transformation depends on the particular spectrum of the source under consideration; however, for sources which have power-law or exponential type spectral shapes and are neither cut off at low energies nor exceptionally steep or flat, the conversion factor has only a weak

TABLE 2

A. CATALOGS AND LISTS OF INTERESTING OBJECTS

1. Abell, G. O. "Distribution of Rich Clusters of Galaxies" (*Ap. J. Suppl.*, **31**, 1958 May).
2. Arp, H. *Atlas of Peculiar Galaxies* (California Institute of Technology, Pasadena, 1966).
3. Bennett, A. S. 1962, *Mem. R.A.S.*, **68**, 163.
4. Burbidge, G. R., and Burbidge, E. M. "Redshifts of Quasi-stellar Objects and Related Extragalactic Systems" (*Nature*, **222**, 735, 1969).
5. Downes, D. "New Radio Results on Supernova Remnants" (*Ap. J.*, **76**, 1971, pp. 305–376).
6. Milne, D. K. "Nonthermal Galactic Radio Sources" (*Australian J. Phys.*, **23**, 1970, pp. 425–444).
7. Vaucouleurs, G. de, and Vaucouleurs, A. de. *Reference Catalog of Bright Galaxies* (Univ. of Texas Press, Austin, 1964).
8. Zwicky, F., Herzog, E., and Wild, P. *Galaxies and Clusters of Galaxies*, Vol. **1** (California Institute of Technology, Pasadena, 1960).
9. Zwicky, F., and Herzog, E. *Galaxies and Clusters of Galaxies*, Vol. **2** (California Institute of Technology, Pasadena, 1963).
10. Zwicky, F., and Herzog, E. *Galaxies and Clusters of Galaxies*, Vol. **3** (California Institute of Technology, Pasadena, 1966).
11. Zwicky, F., and Herzog, E. *Galaxies and Clusters of Galaxies*, Vol. **4** (California Institute of Technology, Pasadena, 1968).
12. Zwicky, F., Karpowicz, M., and Kowal, C. T. *Galaxies and Clusters of Galaxies*, Vol. **5** (California Institute of Technology, Pasadena, 1965).
13. Zwicky, F., and Kowal, C. T. *Galaxies and Clusters of Galaxies*, Vol. **6** (California Institute of Technology, Pasadena, 1968).

B. REFERENCES FOR TABLE 1

1. Oda, M., and Matsuoka, M. 1970, *Progress in Elementary Particle and Cosmic Ray Physics*, **10**, 305.
2. Kellogg, E. 1970, "A Catalog of Soft X-ray Sources" (American Science and Engineering, ASE-2536).
3. Seward, F. 1970, "An Illustrated Catalog of Cosmic X-ray Sources" (LRL Report UDID-15622).
4. Fritz, G., Davidson, A., Meekins, J., and Friedman, H. 1971, *Ap. J.* (*Letters*), **164**, L81.
5. Giacconi, R., Gursky, H., Kellogg, E., Schreier, E., and Tananbaum, H. 1971, *Ap. J.* (*Letters*), **167**, L67.
6. Lewin, W., McClintock, J., Ryckman, S., and Smith, W. 1971, *Ap. J.*, **166**, 169.
7. Leong, C., Kellogg, E., Gursky, H., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **170**, L67.
8. Gursky, H., Kellogg, E., Murray, S., Leong, C., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **167**, L81.
9. Schreier, E., Gursky, H., Kellogg, E., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **170**, L21.
10. Gursky, H., Kellogg, E., Leong, C., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **165**, L43.
11. Kellogg, E., Gursky, H., Leong, C., Schreier, E., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **165**, L49.
12. Bradt, H., Burnett, B., Mayer, W., Rappaport, S., and Schnopper, H. 1971, *Nature*, **229**, 96.
13. Kellogg, E., Gursky, H., Murray, S., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **169**, L99.
14. Schreier, E., Levinson, R., Gursky, H., Kellogg, E., Tananbaum, H., and Giacconi, R. 1972, *Ap. J.* (*Letters*), **172**, L79.
15. Lewin, W. H. G., Ricker, G. R., and McClintock, J. E. 1971, *Ap. J.* (*Letters*), **169**, L17.
16. Tananbaum, H., Gursky, H., Kellogg, E. and Giacconi, R. 1971, *Ap. J.*, **168**, 125.
17. Murray, S., Kellogg, E., Gursky, H., Tananbaum, H., and Giacconi, R. 1972 (to be published in *Ap. J.*).

dependence on the particular spectrum. For such sources, a value of 1.7×10^{-11} ergs cm^{-2} s^{-1} per count per second is useful. We expect no more than a ± 30 percent systematic uncertainty in this value due to the spectral shape and an additional ± 10 percent systematic uncertainty which is due to uncertainties in effective area. Future editions of the *Uhuru* catalog will contain more detailed spectral information which will eliminate the 30 percent uncertainty in converting counting rates to energy flux. The uncertainty in the effective area of the X-ray detectors may be reduced by the comparison of *Uhuru* data with other observations of nonvariable X-ray sources for which absolute intensities are measured with high precision.

The comments given for the sources consist of general comments which point out peculiar X-ray properties of a source such as spectrum or timescales of variability. There is also a "Counterparts" comment which is the result of searching several catalogs of objects such as bright galaxies or radio sources (the catalogs which were searched are listed in table 2). Counterparts followed by a question mark (?) are possible identifications. We have also searched some of the previous X-ray literature, and under the "Previous X-Ray" comment we list possible previous X-ray sources which may correspond to the *Uhuru* sources. Again, comments followed by question marks indicate possible correspondence. The search through X-ray literature was not intended to be complete but rather to aid in correlating the *Uhuru* results with past observations. The number enclosed in parentheses following the comments refer to the list of references in table 2.

We would like to thank R. Meravi, R. Cleaveland, C. Shih, and G. Martin for their assistance in computer programming and data processing. We also appreciate the efforts of B. Shatz and Drs. T. Matilsky and A. Solinger in compiling the catalog results and researching literature for counterparts and previous X-ray reports. We are indebted to the Goddard Space Flight Center for allowing us to use their computing facilities.

We would also like to acknowledge the contributions of Dr. W. Liller of the Harvard College Observatory with whom we have had several discussions regarding possible identifications for sources in this catalog.

This work was supported by the National Aeronautics and Space Administration under contract NAS5-11422.

REFERENCES

Giacconi, R., Gursky, H., Kellogg, E., Leong, C., Murray, S., Schreier, E., and Tananbaum, H. 1971*a*, *Catalog of X-Ray Sources Observed by the Uhuru Satellite* (ASE-2792, August 4).

Giacconi, R., Gursky, H., Kellogg, E., Murray, S., Schreier, E., and Tananbaum, H. 1971*b*, *The Uhuru Catalog of X-Ray Sources* (ASE-2855, November 29).

Giacconi, R., Kellogg, E., Gorenstein, P., Gursky, H., and Tananbaum, H. 1971*c*, *Ap. J.* (*Letters*), **165**, L27.

Leong, C., Kellogg, E., Gursky, H., Tananbaum, H., and Giacconi, R. 1971, *Ap. J.* (*Letters*), **170**, L67.