

**WASHINGTON OBSERVATIONS FOR
1871. - APPENDIX III. CATALOGUE OF
STARS OBSERVED AT THE UNITED
STATES NAVAL OBSERVATORY DURING
THE YEARS 1845 TO 1871, PP. 1-265**

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M. YARNALL & B. F. SANDS

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CATALOGUE OF STARS

OBSERVED AT THE

UNITED STATES NAVAL OBSERVATORY

DURING

THE YEARS 1845 TO 1871,

AND PREPARED FOR PUBLICATION BY

PROFESSOR M. VARNALL, U. S. N.,

BY ORDER OF

REAR-ADMIRAL B. F. SANDS, U. S. N.,

SUPERINTENDENT.

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1873.

CATALOGUE OF STARS

OBSERVED LISTING

THE YEARS 1845 TO 1871, INCLUSIVE.

UNITED STATES NAVAL OBSERVATORY,

Washington, April 25, 1873.

ADMIRAL: In the latter part of the year 1858, finding the results of nearly six years of my labor with the Mural Circle reduced and nearly ready for the press, it occurred to me to endeavor to complete the observations by observing the Right Ascensions, and, after they should have been observed and reduced, to have them published in the form of a Catalogue. With this view I procured from Captain Maury, then Superintendent of the Observatory, permission to observe with Professor Major on his alternate nights with the Transit Instrument; and Professor A. W. Lawrence, who had been Professor Major's assistant, was transferred to the Mural Circle as my assistant. By continuing to observe in this way, we began rapidly to accumulate observations in Right Ascension, as well as to add to those in Declination until 1859, when, Professor Major having resigned his commission in the Navy, I came into full possession of the Transit Instrument, with Professor T. J. Robinson as my assistant from May, 1860, to July, 1861. These observations were all reduced by me, as published in Appendix II of the present volume.

The stars consisted mainly of stars used in the Army surveys for observations with the zenith telescope, many stars in the lists of the Coast Survey, and many of Lacaille's stars which had mostly been observed by Lacaille only, and for observing which our Observatory was favorably situated. During all these years, Mr. James Ferguson, who so faithfully labored for so many years with the Equatorial, was making constant demands upon me for observations of comparison stars for the objects observed by him; and this will account for the great number of small stars in the Catalogue.

The Right Ascensions at this time, and subsequently, were observed by the chronographic method, and in the manner described in several of our volumes; the Declinations were observed with the telescope micrometer in precisely the same manner as described in any of our volumes after that for 1847.

When the time came for putting these observations in the form of a Catalogue, the number of stars having greatly increased, I concluded to extend its limit so as to include all the stars of which Right Ascensions and Declinations had been published in our volumes; and this, with a few exceptions, has been done.

The idea of forming a General Catalogue of our observations had occurred to Mr. Ferguson; and he, assisted by Professors Hall and Eastman, collected on sheets the observations made from 1845 to 1850, inclusive; and the observations of 1845 having been reduced by Professor Hall to 1850, the collection was transferred to me for further reduction. The stars transferred to me were those of all the instruments, and the places of the stars were united into one for each co-ordinate.

The work of the Meridian Circle was well known to be inferior to that of the Transit Instrument, the Mural Circle, and the Prime Vertical Transit Instrument, and I did not think it well to give it equal weight. I therefore revised the list, separating the observations under the heads of the various instruments, and adding some stars observed with one co-ordinate only, and for that reason not published in the Catalogue for 1845.

RIGHT ASCENSIONS.

The stars whose places are given in this Catalogue were observed for Right Ascension with the Transit Instrument and the old Meridian Circle, the number with the Transit being much the more numerous; those with the Prime Vertical Instrument being entirely rejected. Equal weight was given to all the observations with the Transit Instrument, and half weight to those with the Meridian Circle. The observations, extending over a period of twenty-seven years, were originally reduced with very different data, and the most important step in forming the Catalogue has been to reduce them to a uniform standard. The observations, as published, were reduced to 1845 and 1850, epoch of the sun's mean longitude 281° , and to 1860 and 1870, epoch of the sun's mean longitude 286° .

The epoch adopted for the present Catalogue, to which I have reduced all the observations, is the Besselian epoch 1860.0, when the sun's mean longitude was 286° ; and the Right Ascensions for that epoch are found in Dr. Gould's "Standard Places of Fundamental Stars, United States Coast Survey," first edition, which was issued from the Coast Survey Office September 13, 1862, although Dr. Gould had previously furnished the Observatory with a copy in the first part of 1862.

Our star places of time stars are identical with those of Dr. Gould, as published in 1862, and they were afterward published in the American Ephemeris for 1865. This list has been further corrected by some corrections published in the volume of the American Ephemeris for 1869; but, for the sake of consistency, I have thrown out as nearly as possible these corrections from the small number of places used in 1870 and 1871. This list not being quite as large as we desired, Professor Newcomb added some other stars whose places were quite well known, for compiling which he compared the Greenwich, Paris, and Washington observations.

Having so many different epochs and different star-lists, the first step was to reduce all the separate results for Right Ascension, given in the several volumes, to what they

SUPPLEMENTARY NOTE.

The Right Ascensions of the following Catalogue may be reduced to Newcomb's standard, as defined in section 7 of his paper on the Right Ascensions of the Equatorial Fundamental Stars, (Appendix III to the Washington Observations for 1870,) by the application of the following corrections:

1. Proper motion from the mean year of observation to 1860.
2. Systematic correction depending on the Right Ascension and given by the formula,

$$\Delta\alpha = +0''.021 + 0''.014 \cos \alpha - 0''.025 \sin \alpha$$

the value of which may be taken from the following table:

R. A.	$\Delta\alpha$	R. A.	$\Delta\alpha$
0	+	11	0
1	+	12	+
2	+	13	+
3	+	14	+
4	+	15	+
5	+	16	+
6	+	17	+
7	+	18	+
8	+	19	+
9	+	20	+
10	+	21	+
11	+	22	+
12	+	23	+
		24	+

would have been had the same star-places been adopted in the reductions, and had the stars been all reduced to the epoch 1860.0 without any correction for proper motion. For this purpose I have formed, as a standard for reference, the following Table I, in which are given the names of all the clock-stars used, and their Right Ascensions for 1845.0, 1850.0, 1860.0, and 1870.0. These places were formed from the Annual and Secular Variations of the Star-Tables of the American Ephemeris and Nautical Almanac, where available; and for those stars not in the American Ephemeris the values of the Precession and Aberration Constants of those Tables were used; and the proper motions used were those published by the Reverend R. Main in Volume XIX of the Journal of the Royal Astronomical Society.