



# The Deep Sky

## On Film

An Astrophoto Album

By

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## Introduction

For more than 250 years the wonders of the deep sky, star clusters, nebula and galaxies, have fascinated observers. Formal compilation of these objects started with Charles Messier's list of 110 objects, then William Herschel's 2477 object list, culminating with John L. E. Dreyer's New General Catalog of 7840 objects. All these objects were discovered visually with telescopes 2 to 72 inches in diameter. Subsequent discovery of new objects have been made possible almost exclusively through the use of photography.

Photography is a superb tool for astronomy, providing a permanent record for continuing study and observation. For any given telescope, photography can capture significantly more detail at dimmer magnitudes than can be observed visually through the same telescope; photography can make a telescope function like it was 3.5 times bigger. Finally these photographs can be spectacularly beautiful works of art.

## Personal History

I took my first deep sky photograph in May 1976 with black and white negative film. I had decided to 'do it all' - take the photograph, develop the film and enlarge/make final prints. After about a decade I decided the investment in time, materials and money was not worth the few good prints that I was getting. In fact, only two of those prints remain, now hanging in my office as a testament to that effort.

I switched to color positive slide film which had a number of advantages, the most important being that after development by the processing lab, the resulting slide was ready for projection to show family and friends. No additional work was needed. Eventually color positive film was used for all my astrophotography - until the coming of digital cameras. In October 2004, I took my last deep sky

photograph on film. One month later I purchased a Canon 20D digital single lens reflex camera and I have never used film for any photography since obtaining that camera.

## About the Images

All the album's images were obtained with a Canon FTbN single lens reflex camera and various Canon FD lenses attached piggyback to either a Cave 12.5-inch equatorial Newtonian reflector (Images 16 and 22) or a polar aligned Celestron 8-inch Schmidt-Cassegrain (all other images). A number of different black & white and color films were utilized.

Exposures were obtained using a basic 'hat trick' method. A black card was held in front of the camera lens. The camera shutter was opened and locked with a lockable cable release. After shutter-induced vibrations stopped (about 5 seconds), the black card was removed to begin the exposure and a timer started. At the end of the exposure, the black card was again held in front of the lens and then the shutter was closed.

With the advent of digital imaging, all the negatives and slides were scanned and converted to digital files with a Nikon LS2000 film/slide scanner at 2700dpi. The digital images were processed on an iMac G5 PowerPC computer with Adobe Photoshop CS2. For many images, multiple individual frames were stacked to reduce the appearance of film grain in the final image. The primary image adjustments and optimization used Levels and Curves. Any resulting vignetting in background sky intensity was 'neutralized' using a technique similar to one described in "Fixing Vignetting in Astrophotos", Sean Walker, Sky & Telescope, September 2001. Little or no sharpening of the final image was performed because it tended to exaggerate the film grain in the image. Using the Clone Stamp tool some of the more obvious film flaws, scratches and dust marks were removed but minor flaws were not removed because it was too time consuming.

An appendix at the end of the album provides details for each image in the album.



*1 Auriga Clusters*



*2 Cygnus Region*



*3 Double Cluster*

A wide-field photograph of a star cluster, likely the Hyades in Taurus. The image shows a vast field of stars against a dark background. A prominent feature is a cluster of blue stars located in the lower-central region. Other stars of various colors, including yellow, orange, and red, are scattered throughout the field. The overall appearance is that of a rich, multi-colored stellar population.

*4 Hyades*



*5 Leo Trio*



*6 Messier 8 Region*



*7 Messier 13*

A wide-field photograph of a star cluster, likely Messier 27. The image shows a vast field of stars of various colors, including blue, white, yellow, and red. A prominent reddish star is visible near the center. The stars are densely packed, creating a rich, multi-colored stellar population.

*8 Messier 27*



*9 Messier 27*



*10 Messier 31*



*11 Messier 35*



*12 Messier 42*



*13 Messier 42 Region*



*14 Messier 44*



*15 Messier 44*



*16 Messier 45*



*17 Messier 45*



*18 Messier 45*



*19 Messier 57*

A wide-field photograph of a star cluster, showing a dense population of stars. The stars exhibit a variety of colors, including bright blue, red, and white, set against a dark, grainy background. The distribution of stars is somewhat irregular, with some brighter stars standing out more prominently than others.

*20 Messier 57*



*21 Messier 67*

A photograph of a starry night sky. The background is a deep, dark black, densely populated with stars of various magnitudes. In the center of the frame, there is a prominent cluster of stars, some of which are significantly brighter than the surrounding field. The stars are scattered across the entire field of view, creating a rich, multi-pointed pattern.

*22 Melotte 111*

*23 North America Nebula*





*24 Sagitta & Coathanger*



*25 Sagitta*

## Appendix

### Deep Sky Image Details

#### Camera

Canon FTbN single lens reflex camera with FD mount

#### Lenses

Canon FD 50mm f/1.8

Canon FD 135mm f/2.5

Canon FD 200mm f/2.8

Canon FD 300mm f/4

Canon FD 135mm + 2X Telextender (270mm f/5)

#### Film

KEC400: Kodak Ektachrome 400, ASA 400

KTX400: Kodak Tri-X, ASA 400

STC400: 3M ScotchChrome 400, ASA 400

#### Piggyback Setups

Images 16 and 22 were obtained with camera piggyback on a Cave 12.5-inch Newtonian reflector

All other images were obtained with camera piggyback on an Celestron 8-inch Schmidt-Cassegrain

Image	Object	FL(mm)	f/Stop	Stack	Exp	Film
1	Auriga Clusters	200	2.8	1	5m	STC400
2	Cygnus Region	50	1.8	5	5m(2) 10m(2) 15m	KEC400
3	Double Cluster	300	4	1	5m	STC400
4	Hyades	135	2.5	2	5m 10m	STC400
5	Leo Trio	200	2.8	2	5m 10m	KEC400
6	M8 Region	200	2.8	3	5m 10m(2)	KEC400
7	M13	135	2.5	2	5m 10m	KEC400
8	M27	200	2.8	2	5m 10m	KEC400
9	M27	300	4	2	5m 10m	STC400
10	M31	300	4	2	5m 10m	STC400
11	M35	135	2.5	2	5m 10m	KEC400
12	M42	300	4	2	5m 10m	KEC400
13	M42 Region	135	2.5	2	5m 10m	STC400
14	M44	270	5	2	3.5m 5m	KEC400
15	M44	135	2.5	2	5m 10m	KEC400
16	M45	135	2.5	1	1m	KTX400
17	M45	135	2.5	2	5m 10m	STC400
18	M45	300	4	1	5m	STC400
19	M57	200	2.8	2	5m 10m	KEC400
20	M57	300	4	2	5m 10m	STC400
21	M67	135	2.5	2	5m 10m	KEC400
22	Melotte 111	135	2.5	1	1m	KTX400
23	North America Nebula	300	4	1	10m	STC400
24	Sagitta & Coathanger	135	2.5	2	5m 10m	KEC400
25	Sagitta	200	2.8	4	5m(2) 10m(2)	KEC400

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