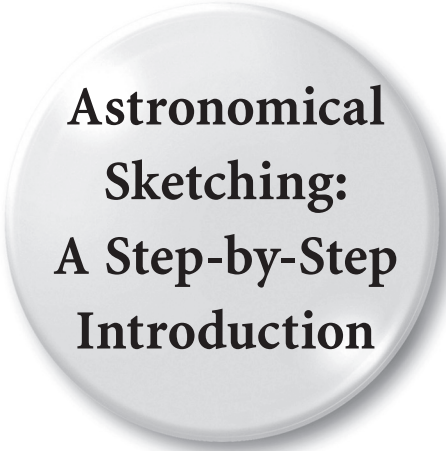
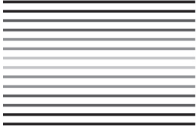


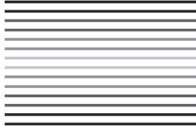
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**Astronomical
Sketching:
A Step-by-Step
Introduction**



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David B. Moody
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 Springer

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To the memory of my father, and to my dear friend, Henry L. Kline.
Special thanks to Professors Robert Chiarito, Patricia Pepper, and Dr
Joseph Wampler of UCSC. Your encouragement has kept me sketching
and observing over the course of the decades.

—Richard H. Handy

To my wife and the memory of my grandmother, who both gave their
unwavering support in all my writings and other endeavors.

—David B. Moody

For Amanda, Giselle, and Harrison. Thank you for your support and
inspiration.

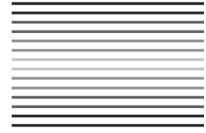
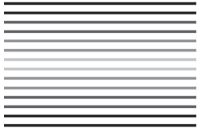
—Jeremy Perez

To my husband, Paul, for his endless love and support.

—Erika Rix

To Crystal and James, with their love and support all things are possible.

—Sol Robbins



Preface

From its very inception, this book was intended as an easy-to-follow introduction to sketching celestial objects. Every chapter presents several step-by-step tutorials with detailed sequential photographs and text. I believe it also reflects some of the wide diversity of media and techniques used to render astronomical objects. Bringing together four talented sketch artists was an expression of my desire that it sample the work of a community of astronomical sketchers, rather than being a compendium of an individual's sketches. Each co-author has a unique mastery of the media and brings a wealth of knowledge with a strong desire to share tips and techniques with the novice. Astronomical sketching is not only a powerful means for recording your visual observations—it is an exciting, personal relationship with the cosmos, a path of discovery, challenge, and experimentation. It is our fervent hope that you follow that path.

—Richard Handy



Acknowledgments

Richard Handy Working with such a talented group of astronomical sketchers has been a wonderful experience. I would like to thank Erika, Jeremy, Sol, and David for contributing so much time, energy, and devotion to every aspect of this unique collaboration. I am thankful for the relationships we have developed and the laughter that we share. To the broader community of amateur astronomical sketchers, your sketches are an inspiration and an endless source of delight.

Erika Rix There are so many amateur astronomers that have been an inspiration to me, willing to share their techniques, advice, and encouragement. I am very thankful for the opportunity to become a better observer and sketcher with their assistance. A special thank you is for Michael Rosolina, whose excellent sketches and reports laid the foundation of my fascination with Ol' Sol as well as Lady Luna. A personal thank you goes to John Crilly and Scott Kroeppler for their friendship and encouragement, as well the use of their books and equipment during my past studies of the Sun. Rich, Sol, Jeremy, and David, the four of you are amazing and it has been a joy to work so closely with you during the course of this book. Thank you Rich for allowing me to be a part of this experience.

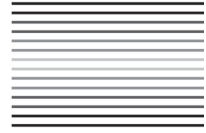
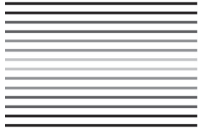
Sol Robbins I would like to especially thank all other planetary sketchers who have selflessly shared with me their insights and talents through the Internet. Another personal thank you is also in order to Valery Deryuzhin, Al Misiuk, and Bill Burgess. Their optical knowledge and expertise enhanced my observing in helping me to turn my telescopes into great optical performers.

Jeremy Perez I would like to acknowledge Bill Ferris, whose advocacy and passion for astronomical sketching put me hot on the trail of this enjoyable facet of amateur astronomy. I also want to recognize the masterful work of Eric Graff, whose astronomical renderings taught me that deep sky sketches truly can reflect the beauty and detail visible through the eyepiece. To my fellow co-authors: it has been a rewarding and educational experience to collaborate with all of you in this effort.

David B. Moody People do not do things alone, even when they think they do. I have heard it said that “. . . behind every great man is a woman rolling her eyes.” This is true in my case and I thank Beth more than she knows for rolling her eyes at just the right time and supporting me in this writing. I also have to thank Avery and Jones for their constant editorial attention and Bic Parker for his role as muse. It has been especially fun working with the talented authors in this book and I appreciate their allowing me to be part of this, especially Rich for inviting me, sight unseen. We often take the dark night skies for granted and I do not want to forget my appreciation for them. They are the ultimate inspiration for much of what you may read in this book.

Along the way, we have all received much inspiration from the fantastic community at CloudyNights.com where the discussion of all aspects of astronomical sketching finds a stimulating and enlightening home.

Finally, we all want to thank John Watson, Harry Blom, and Christopher Coughlin for their excellent advice and guidance. Without your support this book would not have been possible.



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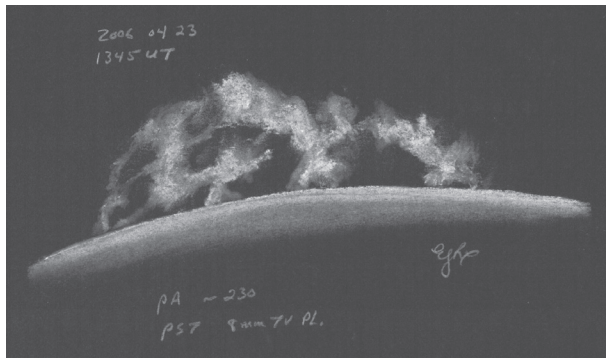
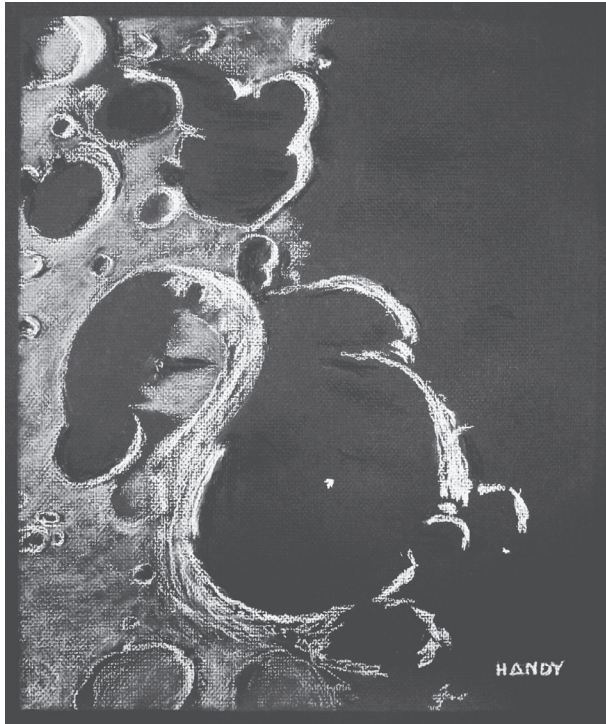
Introduction

Astronomical sketching has a long history in astronomy. Farmers before antiquity were sketching star patterns in stone, trying to determine the best time to plant their seeds. Galileo's first sketches of Jupiter showed the world how its moons made their orbits. Lord Rosse's sketches fired the imagination of Van Gogh. Barnard, known for his early photographs of the Milky Way, made volumes of sketches of the night sky for his research.

Why should we sketch the skies, especially in modern times? It might seem anachronistic when we have such incredible imaging tools at our disposal, capable of capturing such astonishing details. However, when you are involved in astronomical imaging with all of the required equipment, you will often find yourself immersed in an orchestra pit of computers, displays, and data. You will also spend much time aligning your equipment and calibrating your shots—all while a beautiful clear night sky rolls over your head in quiet majesty.

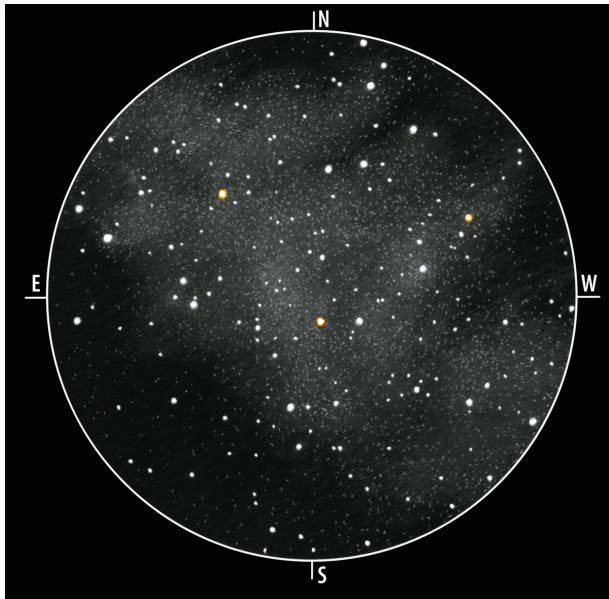
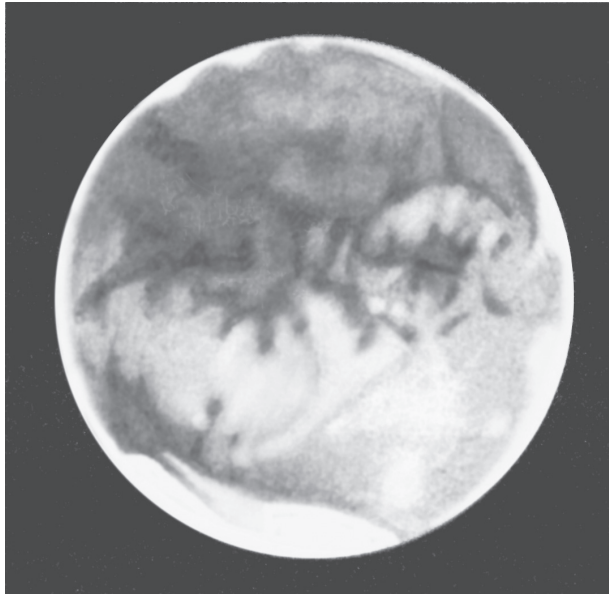
Some of you might simply want to look up and capture what your eyes see. Sketching allows you to capture what your eyes behold. There is some romance about seeing a planet or galaxy “live” and coming away with a piece of paper marked with evidence of what you saw. When you look back on these sketches months and years later, the marks you made on those sheets of paper will call to mind vivid memories of the celestial wonders you observed.

However, sketching does more than just create a memory book. It brings a number of advantages to the table for any observer. Sketching will train your eye to detect the features that an object possesses, especially the more elusive ones. We believe it is one of the best ways to help to develop and maintain an increased visual sensitivity. This higher acuity will help you to perceive subtle details at



your threshold of vision. As you progress, you will undoubtedly feel a great sense of personal satisfaction. Whether or not you decide to share them with others, your sketches will serve as valuable records of your observations.

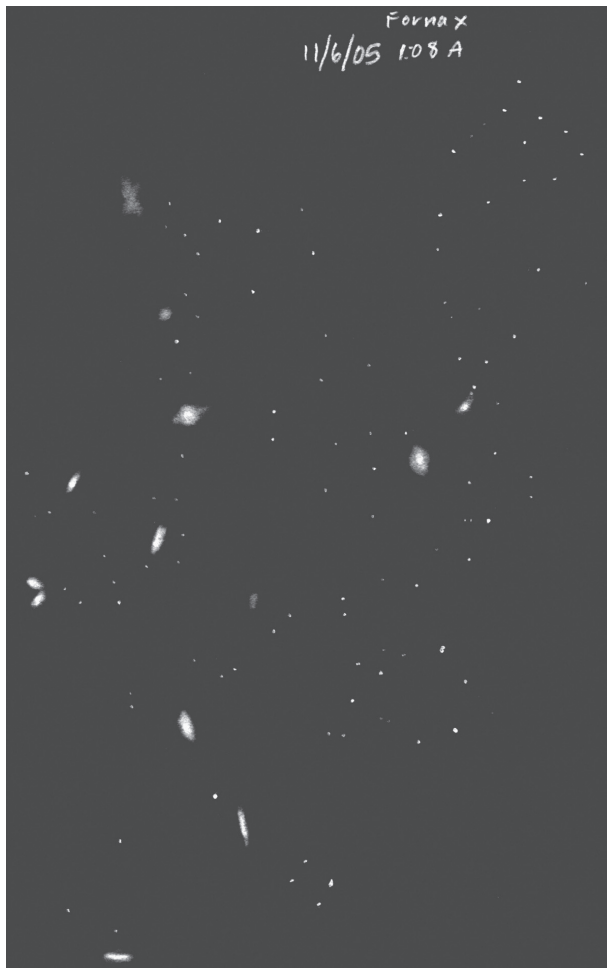
There have been arguments for and against sketching astronomical objects versus imaging them. Often, this debate hinges on the concern that there is undue subjectivity on the part of a visual observer. However, visual observing and imaging need not be mutually exclusive approaches. Instead, these methods can readily complement each other. The imager who sketches can see his images in



a context that he might not otherwise have without looking through the eyepiece. The sketcher who images can identify details in his images that he might have overlooked otherwise. Because these two ways of recording details can support and promote each other, we should not have to choose one to the exclusion of the other.

Another thing to consider when sketching is that it is more important to record what was observed as faithfully as possible rather than trying to produce an artistic masterpiece. In time, you will notice that your drawings will improve and that the amount of detail you record becomes greater. Practice and persistence are the keys to becoming a better, self-trained observer.

An observer's personal quirks always add a unique character and personality to the sketches. Some of these quirks, however, might get in the way of a reasonably accurate record of the object being sketched. For example, one might have a tendency to draw belts upon Jupiter or Saturn too high or low or to crowd star patterns around a nebula and spread them too far apart in a cluster. In order to minimize any of these discrepancies, some standard techniques, drawing templates, and tips will be provided to you in each of the following tutorials. Use these tools and continue practicing your efforts, both at and away from the eyepiece. Given time, the details you record in your sketch will become very reliable.



The tutorials presented in this volume are meant to serve as a guide to get you started in this rewarding facet of amateur astronomy. You will be introduced to some of the media most commonly used to represent astronomical objects. Pencils, papers, ink, pastels, and charcoals are all discussed. Your choice of sketching medium and the technique you use might be based on the type of celestial object that you find the most intriguing or it might simply be a matter of personal preference. Feel free to experiment, try new approaches, and see what works for you. As you explore these techniques, keep in mind that just as each of the contributing authors has developed a unique style of sketching, so will you. In the end, it is all about an education of the eye, hand, and brain.

It is our hope that this work will inspire you to become not only a proficient sketcher but also a better observer.

CHAPTER ONE



Sketching the Moon

If you have had the opportunity to observe the Earth's sister world through a small telescope or even a pair of binoculars, you probably already understand several aspects that make sketching her a delight. One of the most compelling is the excitement of creating a personal record of the astonishingly wide variety of terrains you observe. The Moon's face reveals a gold mine of impact- and volcanic-related processes: vast, basaltic lava-flooded basins, collapsed lava tubes snaking across its surface, long semicircular scarps that trace the shock from some of the most energetic collisions with ancient impactors, lofty mountain ranges that surround these basins, prominent isolated massifs, bright rays of pulverized rock that are flung hundreds of miles across the surface, and rugged highlands pitted by craters of all sizes. These are among some of the many treasures awaiting your discovery, and sketching these features is not only an education in observation, but it may also be a deeply rewarding personal record of the experience.

The intensely dramatic terminator—that imaginary line that traces the limits of the glancing rays of either the waxing or waning phase of the Moon—is perhaps the most challenging region to sketch. The light changes rapidly, making it difficult to render these transitory scenes; however its stark contrasts make forms stand out prominently, creating very alluring vistas. To make things easier to start though, you will probably want to try your hand at sketching features that are at least five degrees in lunar longitude from the terminator. The less tangent the light across the feature, the less obvious the changes will be during your sketching session. As your sketching skills improve, you will find that you can draw terminator features quickly and accurately.

Techniques Using Various Media

The first tutorial deals with drawing using graphite pencils, and then we will try our hand at sketching with charcoal. Following that, we will create a rendering using felt tip pen and end the chapter with an unconventional white chalk on black paper approach.

1.1 Graphite Pencil Sketching

Suggested art supplies

- Graphite pencils (I recommend using an H, B, 2B, and 4B to cover the typical range of lunar tones.)
- Erasers (Pink Pearl, Staedtler Mars plastic, Sanford Magic Rub, Art Gum or similar rubber or plastic erasers)
- Eraser shield
- Assorted blending stumps or tortillons
- Paper (I recommend 60–80-lb. acid-free Strathmore or Canson paper in 6" × 9" wire-bound pads.)

Preparation Graphite pencil sketches are generally done on white paper. You must be able to develop the gray tones over the entire area of the sketch quickly. Due to rapid changes in the angle of the Sun on lunar features, it is often best not to exceed 4" × 5" in sketching size. This size is ideal in fitting your sketch on a clipboard or to work from a small pad. In this tutorial, you can see the pad with a 4" × 4" outline that I have drawn. Next to it, I have indicated the pertinent data: date, sketch start and end times, lunar phase, seeing conditions (see the Glossary for a description of the Antoniadi scale), telescope type, focal length and aperture, eyepiece type and focal length, Barlow lens or diagonal (if used), Rukl Atlas page (or other lunar atlas pages), and, finally, a brief note of the name of the feature(s) that I am sketching.

I have selected a range of graphite pencils from hard lead "H", which produces a light shade of gray, to intermediate "B" and "2B" that produce gray tones, and the soft "4B" that can produce the darkest tones. You may find it possible to create very light to dark tones using a particular pencil (say a 2B) just by varying the pressure or angle of your stroke. Light pressure creates a lighter tone and a heavier pressure creates a darker one. I recommend practicing the widest possible range of gray tones on spare sheets of paper, using each pencil prior to your first graphite pencil lunar sketch.

Remember to use a comfortable observing chair and wear warm clothing if appropriate. Using a small flashlight helps to keep your sketchpad lit. If you are using a clipboard, you can purchase a battery-powered book light or an LED headlamp to illuminate your paper while you draw. The following steps require concentration and constant reference to the scene you view at the eyepiece. You can expect to spend anywhere from half an hour to an hour or more at the scope for each lunar sketch you make. Remember to indicate the start time before you begin your sketch.

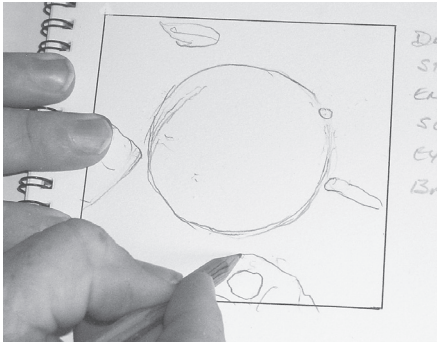


Figure 1.1.1

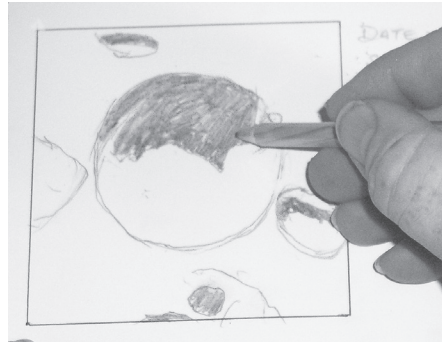


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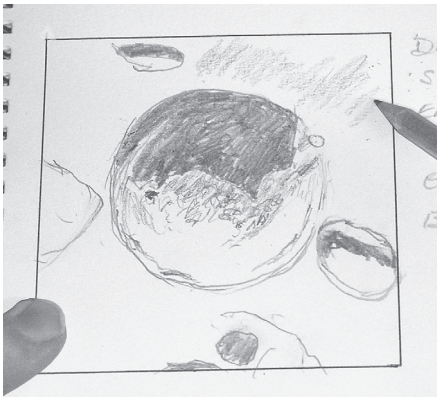


Figure 1.1.3

Step 1 Use the H pencil to create a light outline of the main features. Note that you do not need to be exact at this point, just delineate the size of main features to be included in the sketch and place them accurately in relation to each other. If you start with the largest crater, you can use it as a reference for the sizes and positions for the rest of the features. (Figure 1.1.1)

Step 2 Because the light changes rather quickly, it is a good idea to “rough in” the most prominent shadows at the beginning of the sketch

using the 4B pencil. Do not worry about getting the precise shade yet, as you can establish the exact tone at a later stage in the sketch. Just indicate their positions and extent. (Figure 1.1.2)

Step 3 This is where the sketch starts to become really interesting. First, start adding detail to the crater rims and central peaks with the B pencil. Then, laying the pencil at a very shallow angle against the paper, use rapid, light, back-and-forth motions of the pencil to create a series of strokes on the page. The idea is to generate a light tone of gray that surrounds this group of craters. (Figure 1.1.3)

Step 4 Using the blending stump with moderate pressure, vigorously rub the marks, made in Step 3, somewhat randomly. Immediately you will see how this action softens the strokes, creating a uniformly even tone. At some point, the pencil strokes will disappear almost completely. If the tone is not quite dark enough, simply add similar strokes of the B or 2B pencil and continue blending.

If it is too dark, erase to lightly remove excess graphite and then blend again. (Figure 1.1.4)

Step 5 Notice that the brightest areas of the sketch have been left untouched. This is something you will need to keep in mind as you add more tones to the sketch. By leaving the whitest tones free of graphite, you can effectively make use of the whiteness of the untouched paper to represent the brightest features, such as the crater rims and walls in this drawing. If you make a mistake, do not fret; use your eraser shield as shown to remove any undesired marks. (Figure 1.1.5)

Step 6 For the light gray tones on the crater floors, retrieve the H pencil and create tangent strokes as in Step 3, blending them as in Step 4. Be careful not to use the same stump or tortillon that you utilized for the darker areas unless you clean it with sand paper first, otherwise the result could be darker than you want. (Figure 1.1.6)

Step 7 Now you are reaching the point in the sketch where you can shift your attention to the shadows again, deepening them by applying strokes of the 4B pencil and then blending with the stump. As you do this, you can clearly see the obvious intensification of contrast in the drawing. (Figure 1.1.7)

Step 8 The sketch is nearly complete at this point. Make your final comparisons of the drawing to the image in your scope. Blend the areas to match your view through the eyepiece, adding any small details you may have overlooked. (Figure 1.1.8)

Step 9 Inevitably, your sketch will have smudges of graphite extending beyond the borders as this drawing clearly displays. Use your eraser shield

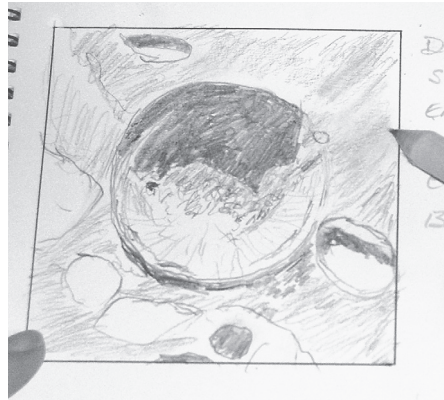


Figure 1.1.4



Figure 1.1.5

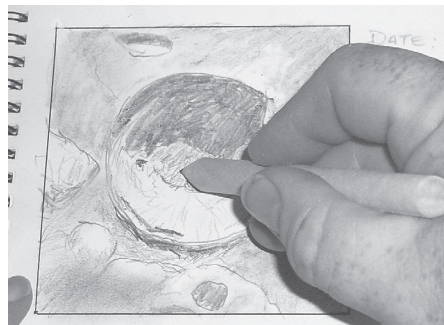


Figure 1.1.6

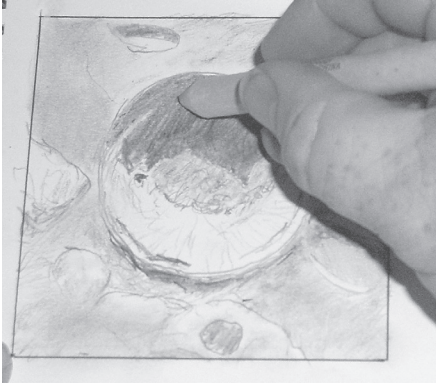


Figure 1.1.7

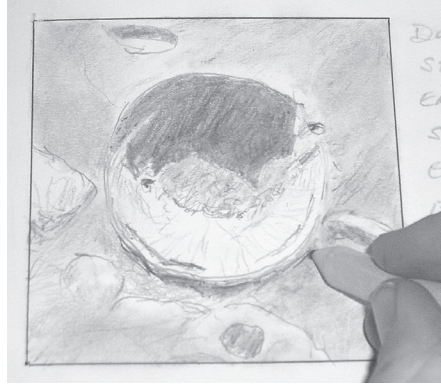


Figure 1.1.8



Figure 1.1.9

to mask the drawing from accidental erasure and cleanly remove the smudges with an eraser. At this point, the sketch is complete. Remember to record the ending time and any changes in seeing conditions that you noted during your session. (Figure 1.1.9)

I would strongly recommend spraying the sketch with an acrylic fixative such as Krylon Clear Matte Finish no.7120. This will protect it from smearing or rubbing off on adjoining pages of your sketchpad. This is true for all the sketches presented in this chapter.

1.2 Charcoal Sketching (by E. Rix)

The whole concept behind this tutorial is sketching in layers. Charcoal is a wonderful medium, as it can portray the soft airy features as well as the most dramatic darker ones. Rarely will you require the use of erasers with this technique because if a mistake is made, it is easy to rub lighter or simply continue sketching over it. Highlighted areas have little or no charcoal and appear as the darker areas of the sketch take form.

Suggested art supplies

- 8 $\frac{1}{2}$ " \times 11" sheet of sketching paper (I like the "Rite in the Rain" paper for nighttime sketching, as it is finely textured and has enough tooth to support the charcoal. Also, this type of paper is durable and weatherproof to withstand the effects that humid weather and dew have on regular paper, allowing you to continue sketching with little or no risk of your paper ripping apart due to dampness.)
- Two sizes of blending stumps
- Thick stick of charcoal
- Charcoal pencil in a wooden holder
- Sandpaper to sharpen your blending stumps
- Exacto Knife to sharpen your charcoal pencil
- Terry cloth rag to wipe your hands

Step 1 Study the feature closely and lightly sketch the outline of the crater with a sharpened charcoal pencil. Work in small strokes so adjustments can be made quickly if the shape is inaccurate. Shadow detail is immediately added for two reasons: (1) Shadows will change dramatically over a short period of time. By capturing the shadows immediately, their shapes will not be lost as the sketch progresses. (2) Placement of the features within the crater will be easier with the shadows assisting orientation. (Figure 1.2.1)

Step 2 Outlines of the interior wall of the crater can now be added with your charcoal pencil. This will be the foundation of the sketch. You will notice that a few smaller craters have been added outside of the main crater in Figure 1.2.2. Adding these now will help dramatically with the placement of other features later in the sketching process.

Step 3 Using a small blending stump that has been sharpened and cleaned with sandpaper, apply softer shadowing within the crater walls. Rub your blend-