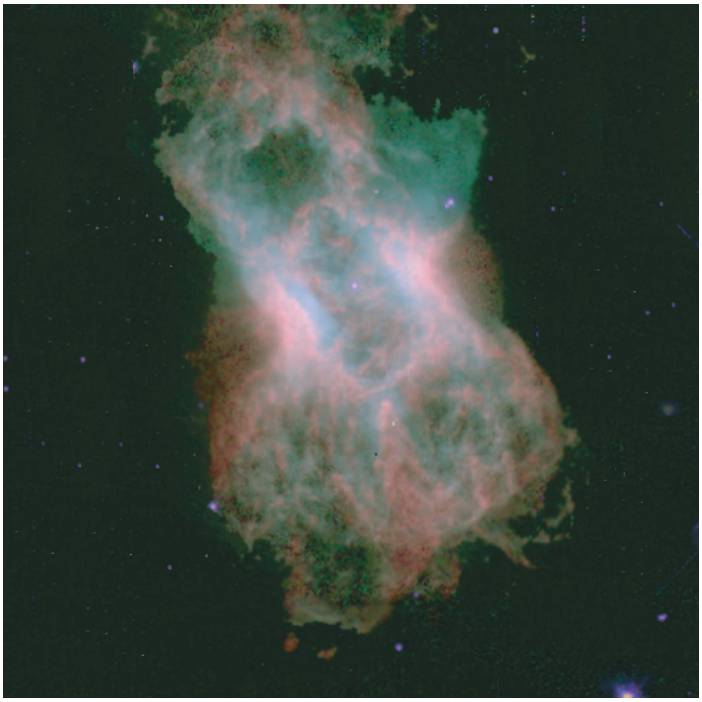

Figure 4 — Image of NGC 7026 from *Hubble Space Telescope* Wide Field Planetary Camera 2.

barely separated by a dark lane (the burger) that came and went with the seeing. The buns are actually an elongated toroidal region that forced much of the mass of this nebula to flow out between them, resulting in a bipolar shape (like M27) in professional telescopes.

The central star responsible for this nebula is now a Wolf-Rayet star, characterized by broad He, C, and O emission lines in its spectrum. It has a mass of 0.6 Suns, a magnitude of 14.2, and a temperature of 80,000 K. About 10% of planetary nebula central stars are Wolf-Rayet stars.

One of us had hoped to convince several observing friends to take a snack break after showing them this nebula, but to our stomach's dismay, the resemblance to a cheeseburger was apparently not good enough to invoke a food-craving response. We encourage you to find this nebula and see if you have better gastronomical luck.

Warren Finlay is the author of Concise Catalog of Deep-Sky Objects: Astrophysical Information for 500 Galaxies, Clusters and Nebulae *(Springer, 2003), and is a professor of Engineering at the University of Alberta. Doug Hube is a professional astronomer actively retired from the University of Alberta, and Associate Editor of this Journal.*

Through My Eyepiece

Starting Out: Sketching at the Eyepiece

by Geoff Gaherty, Toronto Centre (geoff@foxmead.ca)

On Saturday, 1957 October 5, I climbed the steps behind McGill's Molson Stadium and made my first visit to the Montreal Centre's observatory. The day before had been a momentous day in history: the Soviet Union had announced the launch of *Sputnik*, the first man-made satellite, and AVRO rolled out the prototype of the next generation of Canadian aircraft, the ill-fated Arrow. In retrospect, those events vanish in comparison to the universe of astronomy that opened to me that night.

Of all the astronomical techniques I learned over the next seven years in that building, the one that has proved to have the greatest long-term value was learning to make simple sketches of what I saw through the eyepiece. Not only do these sketches serve as an aid to my memory in recalling things I have observed, but the very act of committing subtle features to paper increases the power of the human eye to see detail at the limits of perception.

When the idea of trying to draw what I was looking at was first suggested to me by Isabel Williamson and George Wedge, I couldn't accept what they were asking me to do. I had never made a drawing in my life, and had absolutely no artistic talent. However, the way they presented astronomical drawing to me was that there was no artistic component whatsoever: I would merely be copying what I saw at the eyepiece as accurately as I could. I practiced at first by copying drawings of astronomical objects I found in books and magazines. I then tried sketching a picture of Mars on the far side of my bedroom. Finally, I tried doing the same thing at the eyepiece.

The tools I used were very simple. Ordinary paper, a softish pencil (2B works well), a good-quality eraser, and, most important of all, something called an "artist's stump." You can buy a stump at any art supply store for a dollar or two: it is a pencil-shaped roll of blotting paper sharpened to a point. This simple tool is the secret that allows an artistic incompetent like myself to produce realistic drawings.

Figure 1 is one of my earliest lunar drawings, made on 1959 May 18/19 with my 8-inch Cave Newtonian at 360×. One of the first things I learned was that most drawings of the Moon and planets were a race against time: your subjects are moving and rotating, with sunlight illuminating the surface at continuously changing angles. Capturing an image before it changes too much for a representative sketch can't take more than 15 or 20 minutes. You can't draw the whole Moon in

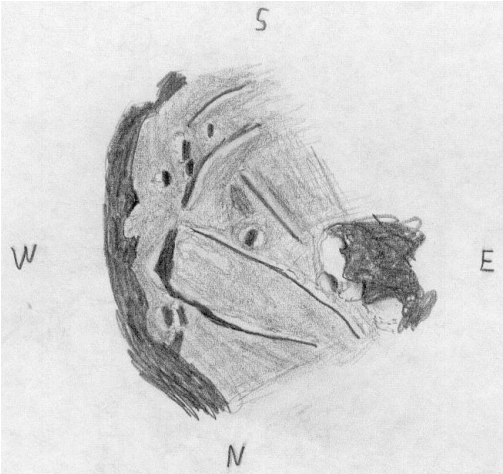

Figure 1

that time; you can't even draw a typical large crater. So I learned to draw the portions of a crater that interested me — in this case the hills and rilles between the central peak and eastern wall of Gassendi. I made no attempt to draw the central peak in detail, nor the eastern wall.

Do you notice anything peculiar about Figure 1? It was made with a Newtonian, so is an inverted image, but the eastern wall is labelled "W" for "west." The drawing was made in 1959, a decade before humans walked on the Moon. The convention at the time was to label directions on other bodies as they appeared in our sky, with east towards the Earth's eastern horizon and west towards our western horizon. Two years after this drawing was made, the IAU adopted the "astronautic convention," whereby directions on the Moon and planets were labelled as they would appear to someone standing on that object, not viewing it from the Earth.

If you look closely at this drawing, you may be able to identify the techniques that I used. First I copied the shadows, drawing them just as simple blocks of black. This provided a frame of reference for the rest of the drawing. Then I filled in the floor of the crater with light, even strokes of my 2B pencil. It looked an absolute mess! Then came the magic of the artist's stump. By lightly rubbing its tip over the shading, I smoothed out the pencil lines, blending them together to make a more or less even grey floor for the crater. Then, with a pointed eraser, I picked out the brighter spots, marking them in my drawing in their position relative to the dark shadows. I gradually added more shadows and took away more "floor" to make highlights, all the time copying only what I saw. Suddenly, the whole picture popped into three dimensions!

By concentrating on patterns of light and dark, and not paying much attention to the reality of mountains and craters, ridges and rilles, somehow they all became more realistic. I also noticed little wrinkles in the floor, darker patches, and highlights I would never have seen if I'd just been staring passively. Try it...it works!

Figure 2 is a more recent drawing of Mars, made on 2003 July 5 during the wonderfully close apparition of that year. I used my 11-inch Starmaster Newtonian with 300× eyepieces in a binoviewer. The image was drawn seven weeks before opposition on August 27, and so the planet shows a strongly gibbous disk. This was the first thing I drew, to get the proportions right. Once that was out of the way, the race against time began, as Mars rotates relentlessly from right to left in this image. The first surface feature drawn was the

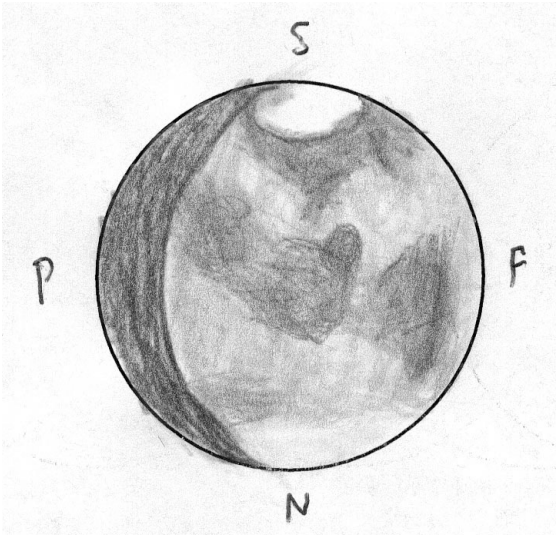

Figure 2

south polar cap, followed immediately by the north polar hood — the cloudy haze at the bottom of the disk — as both were little affected by Mars's rotation. I followed these two by sketching in the markings in the centre of the disk, recording the moment as the "official" time of the drawing. With these more obvious markings as a frame of reference, I then filled in the finer details — brief glimpses of dusky shadings at the very limits of perception — as the seeing permitted. Adding them to the sketch made them clearer in the eyepiece, and gradually a complete picture was assembled. All of this was done with light strokes of my 2B pencil.

At the very end, I went to work with my artist's stump, smoothing away the pencil lines and restoring the vagueness that I actually saw at the eyepiece. In all, I took about an hour to make this drawing, but the crucial details were laid down at 09:03 UT on July 5, and that's the time I used to calculate the central meridian (233°) for the drawing.

With some very simple tools (the only thing you'll probably have to buy is an artist's stump), a lot of practice on stationary objects to learn some simple techniques, and an ability to capture the essential detail quickly and accurately, just about anyone can learn to record the view at the eyepiece. Most important of all, more than anything else you may do in astronomy, drawing will teach you to *see*, and that's what it's all about.

Geoff Gaherty is currently celebrating his 50th anniversary as an amateur astronomer. Despite cold in the winter and mosquitoes in the summer, he still manages to pursue a variety of observations, particularly of Jupiter and variable stars. Though technically retired as a computer consultant, he's now getting paid to do astronomy, providing content and technical support for Starry Night Software.