Guys & Gals,

Here, belatedly, is my Christmas present to you.

I couldn't buy each of you a lunar map, so I did the next best thing. Below this letter you'll find a guide for observing each of the 100 lunar features on the A. L.'s Lunar Club observing list. My guide tells you what the features are, where they are located, what instrument (naked eyes, binoculars or telescope) will give you the best view of them and what you can expect to see when you find them.

It may or may not look like it, but this project involved a massive amount of work. In preparing it, I relied heavily on three resources:

*The lunar map I used to determine which quadrant of the Moon each feature resides in is the laminated *Sky & Telescope Lunar Map* – specifically, the one that shows the Moon as we see it naked-eye or in binoculars. (S&T also sells one with the features reversed to match the view in a refracting telescope for the same price.); and

*The text consists of information from (a) my own observing notes and (b) material in Ernest Cherrington's *Exploring the Moon Through Binoculars and Small Telescopes.* Both the map and Cherrington's book were door prizes at our Dec. Christmas party.

My goal, of course, is to get you interested in learning more about our nearest neighbor in space. The Moon is a fascinating and lovely place, and one that all too often is overlooked by amateur astronomers. But of all the objects in the night sky, the Moon is the most accessible and easiest to observe. No matter how large your telescope is, you'll never see the kind of detail in Jupiter, Saturn, Mars or anything else as clearly as you see the Moon. And best of all, it's not seasonal like the constellations, or a sporadic visitor like comets and meteors. The planets come and go, but the Moon is up there to be seen for at least ¾ of every month. Like Delta, the Moon is ready when you are. It's so bright that we schedule our Cox Field observing to avoid it. But its brightness means that you can observe it on hazy evenings that render galaxies, nebulas, etc., unobservable. The haze actually helps by reducing the Moon's bright glow.

If you can find the 100 features listed, you'll earn a Lunar Club pin. You don't even have to describe what you see – I've already done that for you – and you don't have to write down anything else but the date, time and instrument used, and check them off as you find them. You'll find a checklist on the A. L.'s Lunar Club link.

For the general features I listed first, just go to your computer, type in the feature and follow the links to one that shows a photo of "The Woman in the Moon," "The Old Moon in the New Moon's Arms," etc. Those 8 features and the 11 oceans and seas are best seen naked-eye (or in binoculars, in some cases) during the Full Moon.

As I've said many times, the Lunar Club pin is the easiest of all A. L. observing pins to earn. All you need is a pencil, a checklist, a lunar map, my lunar observing guide, and willingness to go out and look at the Moon. You don't have to be a seasoned observer. The Moon is easy to find, and its features are easy to find (they're numbered on the map) and easy to observe. And if you don't want to order the S&T map, you can go to your computer, type in "Virtual Moon Atlas" and make your own Moon map with the 100 features in my guide.

At any rate, I hope that this will inspire you to observe the Moon, and that my guide will help you along the way. That is, after all, why I wrote it.

Bill

LUNAR CLUB OBSERVATIONS

by Bill Warren

This guide to finding and observing the 100 lunar features contained in the A. L.'s Lunar Club observing program is based on *Sky & Telescope's Moon Map.* The version I have is oriented to match the Moon as it appears to the unaided eye or in binoculars. The numbers (in parentheses) after the objects' names indicate their number on this map.

Using that map, West is to the left, East is to the right, North is up and South is down. If your telescope is a reflector that shows a mirror-reverse image, the quadrants will not match what you're seeing. Just reverse the E-W quadrants – or you can buy a mirror-image S&T Moon map (#59201, or #5921X for the laminated version).

My text is organized into four sections: terms used in naming or describing the features; eight general features; 11 oceans and seas; and 81 other features consisting of: 60 craters; four mountains and mtn. ranges; four bays; three swamps or marshes; three promontories; three cliffs; one valley; one lake; one rille; and one lunar rays.

The 81 "other features" are grouped into five categories, depending on which quadrant of the Moon they can be found: NW; SW; Central (i.e., located near the center of the map from W-E); NE; and SE;

Terms

Crater. A bowl-shaped depression in the Moon's surface, the result of either meteorite impact or volcanic activity.

Craterlet. A small crater inside a larger crater.

Lacus. Lake.

Limb. A fancy term for "edge" (e.g., Mare Crisium is near the Moon's Western limb).

Maria (MAHR ee uh). Seas. Ancient observers thought the dark areas of the Moon were bodies of water; actually, they are large, mostly flat plains or basins. (Singular: **mare** [MAR a]).

Montes (MAHN tez). Mountains. (Singular: **mons).**

Oceanus (OH see ANN us). Ocean.

Palus. Swamp, or marsh. These areas looked rough, not smooth, to ancient naked-eye observers.

Promontorium. A promontory, or high point overlooking a plain, basin or valley.

Rima (REEM uh). A rille (i.e., fault or channel) in the Moon's surface.

Rupes (ROOP eez). A wall, cliff, or other steep incline.

Sinus. Bay.

Terracing. Crater walls resembling steps or terraces.

Vallis. Valley.

The Lunar List — Descriptions of Objects

1. "The Man in the Moon." With eyes (Maria Imbrium & Serenitatis), nose and mouth on display, these features combine to look somewhat like Gen. Douglas MacArthur in sunglasses. (Not shown well on the *S&T* map.) Best seen in binoculars.

2. "The Woman in the Moon." Far more clearly defined than the Man in the Moon, the Woman's profile (facing W) is immediately identifiable if you "look small" at the center of the Moon. Her hair, eyes, nose, lips and chin can be seen easily. (Not shown in *S&T* map.) Best seen in binoculars.

3. "The Rabbit in the Moon." Naked-eye, the rabbit looked like a running bison or buffalo; it took binoculars for me to see its long ears curling back behind it.

4. "The Cow Jumping Over the Moon." Immediately apparent via naked-eye, although it looks (to me, at least) more like a bucking bronco than a jumping cow.

5. "The Old Moon in the New Moon's Arms." Up to 3 days — 72 hrs. — after the New Moon, when the Moon is a very thin crescent, the darkened part of the Moon is dimly visible due to "earthshine," or reflected light from Earth. The outline was easier to see in binoculars.

6. Crescent Moon, Waxing. The period up to 2 days — 40 hrs., actually — after the New Moon when the Moon is revealed as a very thin arc, or crescent, of reflected sunlight.

7. "The New Moon in the Old Moon's Arms." This is the converse of #85, i.e., the period up to 3 days, or 72 hrs., before the New Moon when the Moon is a thin arc of crescent, reflected sunlight and the rest, shrouded in darkness, is seen dimly as the result of Earthshine.

8. Crescent Moon, Waning. This is the converse of #86, i.e., the period up to 2 days or 48 hrs. before the New Moon when the Moon's crescent is at its thinnest.

Oceans and Seas (visible to the naked-eye but best seen in binoculars or a telescope). These features are best seen during Full Moon.

9. Mare Crisium (Sea of Crises). Round, isolated, forms the pail of water carried by Jack in the nursery rhyme "Jack and Jill." Located in the NE quadrant, near the E limb.

10. Mare Serenitatis (Sea of Serenity). Tan in color, lighter than the grayish tint of Mare Tranquillitatis to the SE. Forms Jack's head (in profile, with his nose and the bill of his cap facing the E limb) in the NE quadrant.

11. Mare Tranquillitatis (Sea of Tranquility). Best known as the site where Neil Armstrong took "a giant leap for mankind" in the Apollo XI lunar landing in July, 1969, grayish Tranquillitatis forms Jack's torso in the NE quadrant. **A11** in orange print marks the site of "Tranquillity Base" where Armstrong, Aldrin and the Eagle landed on July 19, 1969.

12. Oceanus Procellarum (Ocean of Storms). Largest of the lunar seas (basins, actually), Oceanus Procellarum is grayish in color and located in the NW & SW quadrants, near the W limb.

13. Mare Fecunditatis (Sea of Fertility). Two dark, connected plains forming Jack's lead, walking leg in the SE quadrant, near the E limb.

14. Mare Nectaris (Sea of Nectar). A dark plain in the SE quadrant forming Jack's rear, walking leg. Or, located S of Mare Tranquillitatis and Sinus Asperitatis and SW of Mare Fecunditatis.

15. Mare Imbrium (Sea of Showers). Second to Oceanus Procellarum in size among lunar seas, Mare Imbrium is located in the NW quadrant and outlined by the large and prominent craters Plato, (#19 on the map), Archimedes (#42 on the map) and Eratosthenes (#72 on the map) and the Alps, Caucasus, Apennine, Carpathian and Jura mountain ranges.

16. Mare Humorum (Sea of Moisture). Roughly circular, dark, located W of Mare Nubium and S of Oceanus Procellarum in the SW quadrant.

17. Mare Nubium (Sea of Clouds). A dark, somewhat squarish basin in the SW quadrant, located E of Mare Humorum and SE of the smaller Mare Cogitum.

18. Mare Frigoris (the Frigid Sea). Located NW of Mare Imbrium near the Moon's N limb, Mare Frigoris is elongated E-W. 46.

19. Mare Vaporum (Sea of Vapors). A small basin forming a triangle with Maria Serenitatis and Imbrium in the NE quadrant. A circular area in the center is lighter in color than the thickly dark outer belt. Located W of Jack's head, Mare Vaporum appears to have been fractured into separate zones throughout, like farmlands.

Other Features (unless otherwise identified, all of the following are craters. Most of these features are best observed telescopically.

NW Quadrant

20. **Montes Appenines (Apennine Mtns).** A large, prominent mountain range arcing away to the SW from the W side of "Jack's head" (i.e., Mare Serenitatis). This range contains the highest mountains on the Moon, some of them reaching 16,000 ft. above the surrounding plain. Unlike, say, our Rocky Mtns. in the western U. S., Montes Apennines peaks are smooth and flat on top rather than jagged. Best seen telescopically.

21. **Lunar rays.** The 2 best examples, both of which show up best at full Moon in binoculars or telescopes, are those associated with the impact craters Tycho (#234 on the map in the SW quadrant) and Copernicus (#82 on the map in the NW quadrant).

22. **Sinus Iridium (Bay of Rainbows).** Forms a lovely and symmetrical "bay" at the NW edge of Mare Imbrium. Sinus Iridium is shaped by the Jura Mtns. An attractive area in the NW quadrant. Best seen in binoculars or telescope.

23. **Sinus Roris (Bay of Dew).** Forms a large basin between Mare Frigorum and Oceanus Procellarum near the NW limb. Uneven coloration, best seen in binoculars or telescope.

24. **Sinus Aestuum (Bay of Billows).** A "bay" located E of the prominent craters Copernicus (#82 on the map), SE of Eratosthenes (#72 on the map) and further shaped by the Apennine Mtns. to the N and a less prominent mtn. range to the E. The N portion of Sinus Aestuum appears smooth, and the S portion rough. Located in the NW quadrant, best seen in binoculars or telescope.

25. **Promontorium Heraclides.** The high "point", or promontory, at the SW end of Sinus Iridium in the NW quadrant, Promontorium Heraclides represents the end of a tiny arm of mountains or hills extending out onto (and above) the surrounding plains of Sinus Iridium. Not nearly as spectacular or beautiful as Promontorium Laplace at the other (NE) end of Sinus Iridium. Best seen in a telescope.

26. **Palus Putredinis (Marsh of Decay).** An area of nice color contrasts in the NW quadrant. Palus Putredinis is light against the darker tone of Mare Imbrium to the NW and darker still Mare Serenitatis to the E. Framed by the craters Archimedes (#42 on the map) to the NW, Autolycus (#44) to the N and the Apennines Mtns. to the S. Best seen in binoculars or a telescope.

27. **Vallis Alpes (Alps Valley).** A broad gouge cut SSW-NNE through the Alps Mtns. ESE of the dark, shadowy crater Plato (#19)in the Moon's NW quadrant. 100+ mi. long, 6 mi. wide. Easy to find and observe.

28. **Promontorium Laplace.** Lovely in shadows, located in the NW quadrant and NW of Promontorium Heraclides across the "bay" called Sinus Iridium. This high point, or promontory, is one of the prettiest areas of the Moon's visible side, and best seen in a telescope.

29. **J. Herschel (#11).** A large, oval crater in the NW quadrant, lying N of Mare Imbrium and on the other side of Mare Frigoris from the Jura Mtns. and Sinus Iridium. Has a nicely shaped central peak.

30. **Plato (#19).** A large (63 mi. in dia.), dark, prominent, slightly oval crater N of Mare Imbrium in the NW quadrant. Floor smooth, with several tiny craterlets, the largest near the center. This is my favorite lunar feature; to me, it looks like creamy peanut butter.

31. **Mons Pico (Mt. Pico, #24).** A solitary peak (ht.: 7,900 ft.) lying directly S of Plato (#19) in the N portion of Mare Imbrium in the NW quadrant. White in full light, prettier in shadow. Best seen telescopically.

32. **Mons Piton (Mt. Piton, #34).** Larger than Mt. Pico in area, Mt. Piton lies E of the midpoint of a line between the craters Plato (#19) and Archimedes (#42) in the NW portion of Mare Imbrium in the Moon's NW quadrant. The small unnumbered crater Piazzi Smyth lies a short distance away to the NW. Best seen in a telescope.

33. **Archimedes (#42).** A round, moderately large crater W of the gap between the Caucasus and Apennine Mountains in the NW quadrant. Archimedes has 2 breaks in its high crater walls along the S edge.

34. **Vallis Schroteri (Schroter's Valley, #56).** Located in the NW quadrant and NW of the crater Aristarchus (#57 on the map) along the E edge of Oceanus Procellarum, Vallis Schroteri is roughly U-shaped with a chink in the NE end. It contains uneven features and inconsistent coloration, appearing similar to aerial photos of the land near a river basin. Popularly known as the "Cobra's Head" because its features resemble the head and sinewy body of a snake.

35. **Aristarchus (#57).** A fairly small (28 mi. in dia.), very bright rayed crater set against the gray plain of Oceanus Procellarum in the NW quadrant. The rim of Aristarchus rises 9,000 ft. above the crater floor. Located SE of Schroter's Valley (#56 on the map), Aristarchus is one of the brightest craters on the Moon.

36. **Eratosthenes (#72).** An unusual crater with 3 mountain peaks inside it and mountains extending along and away from the S and SW rim in the NW quadrant. Located NE of Copernicus (#83 on the map), along the NW edge of Sinus Aestuum. Circular.

37. **Reiner Gamma (#79).** The crater Reiner ((#88, not to be confused with Reiner Gamma) is a smallish, round crater with a deep floor, a pretty central peak and virtually no raised walls in Oceanus Procellarum, low in the NW quadrant and NE of Hevelius (#102 on the map).

Reiner Gamma is a very bright surface marking a short distance W of the crater Reiner, and the reason for its brightness not fully understood.

38. **Kepler (#81).** A beautiful rayed crater, grayish in color, located W of Copernicus (#82) along the edge of Oceanus Procellarum and just NW of a line connecting Copernicus and Grimaldi (#113 on the map), in the NW quadrant. The rays of Kepler mingle with those of Copernicus. Kepler contains a small central peak.

39. **Copernicus (#82).** The 2nd brightest rayed crater on the Moon and the same size as Tycho (55 mi. in dia.), Copernicus is located NNW of Tycho (#234 on the map) on a line extended through and past Mare Nubium, in the NW quadrant. Copernicus contains high, terraced inner walls that reach up to 15,000 ft. above the crater floor, and a number of small central peaks.

SW Quadrant

40. **Palus Epidemiarum (Marsh of Epidemics).** This "swamp" forms the apex of a triangle of roughly circular maria with Mare Nubium and Mare Humorum to the N in the SW quadrant. Palus Epidemiarum is separated from Mare Nubium by 2 adjacent, nicely round, small craters, Campanus (#188 on the map) and Mercator (#189). Campanus is the larger of the two, but not as pretty. At the S edge, Capuanus (##206) is the largest crater in Palus Epidemiarum; nearby, little Ramsden crater (#205), round, contains nicely shaped walls reaching 6,000 ft. above its floor. Palus Epidemiarum is shown on the *S&T* map, but not named or numbered. Best seen in binoculars or telescope.

41. **Messier/Messier A (#111).** Two perfectly circular, brightly outlined adjacent craters in the SW quadrant, Messier lying slightly to the W of Messier A. They are not connected. The two craters are located NW of Langrenus (#140 on the map) in Mare Fecunditatis near the E limb. Messier A is deep and round except for an arc of secondary gouging of the lunar surface where the impact object's remains exited. Two prominent, searchlight-like rays extend from Messier A to the W edge of Mare Fecunditatis. Messier is a neatly oval gouge-mark E of Messier A.

42. **Grimaldi (#113).** A dark crater — actually, a small basin — located in the SW quadrant near the W limb, found by extending a line from Tycho (#234 on the map) through Mare Humorum and beyond.

43. **Fra Mauro (#115).** A fairly large crater in the SW quadrant. Located ENE of Ptolemaeus (#130), Fra Mauro contains uneven terrain and a variety of features ranging from craterlets, hills (esp. along the W edge and to the N), to a level central area and an opening in its E edge. Scarcely recognizable as a crater in direct light but lovely when shadows stipple its features, Fra Mauro lies directly N of (and adjacent to) the smaller and more prominent craters Bonpland (#126) and Parry (#127).

44. **Davy (#129).** A small, round crater in the SW quadrant, WSW of Ptolemaeus (#130) in the NE portion of Mare Nubium, Davy appears as a prominent but bent circle with a small central peak and a relatively large crater near its S edge.

45. **Billy (#143).** A small, darkish, oval crater in the SW quadrant, located SW of its companion Hansteen (#24, the same size but round) and 1/3 of the way from Gassendi to Grimaldi. Pretty walls.

46. **Gassendi (#156).** A large crater about the size of Copernicus (#82 on the map), round, with a rough floor, a cluster of 3 central peaks forming a straight line inside Gassendi, and a crater superimposed on the N edge. Neatly outlined in lighter material around the rim, located at the N end of Mare Humorum about 1/3 of the way from Grimaldi (#113 on the map) to Tycho (#234 on the map) in the SW quadrant.

47. **Bullialdus (#158).** Evidence of terracing on the W edge of this smallish, round crater located in the SW quadrant along the W edge of Mare Nubium. Contains a broad, prominent central peak. A small mountain range passes the SW rim of Bullialdus, accounting at least in part for walls that reach 11,000 ft. above the crater floor.

48. **Rupes Recta (the "Straight Wall," #160).** Located in the SW quadrant near the small but pretty unnumbered crater Birt in Mare Nubium. Rupes Recta (the "Straight Wall") is, along with the dark crater Plato (#19 on the map) my favorite lunar feature. The result of a fault in the Moon's surface, Rupes Recta is an 800-ft. wall sloping downward at a 40 degree angle and running NNW-SSE for 70 miles or more. Best seen telescopically, but not during Full Moon.

49. **Hippalus (#175).** A tiny, round crater SW of Bullialdus (#158) and SE of Gassendi (#156) in the SW quadrant. The walls of Hippalus rise 3,000 ft. above the crater's flat, level floor. Hippalus is situated along the crest of a long, snaking chain of hills and craters between Mare Humorum and Mare Nubium.

50. **Pitatus (#190).** A medium-sized, round, shallow crater located at the S end of Mare Nubium in the SW quadrant, Pitatus contains a small central peak and small craterlets outside its rim, esp. to the N.

51. **Schickard (#231).** One of the largest craters on the Moon. Darkish, oval, with high, prominent walls that resemble a mountain range on the E and W sides. Located near the Moon's SW limb, Schickard has a flat, level floor except for 6-8 craterlets along the S and SE rim. The much smaller unnumbered crater Lehmann shares a common wall with Schickard at the latter's NE rim.

52. **Tycho (#234).** The brightest rayed crater on the Moon, 55 mi. in dia. Located in the southern highlands region of the SW quadrant. Only moderately large, Tycho is known primarily for its extensive ray system, some of which extend almost 1/4 of the Moon's diameter. Its inner walls are terraced, and the crater contains a well-developed central peak.

53. **Longomontanus (#244).** A large, round crater in the SW quadrant, located W of a line between Tycho (#234) and Clavius (#261) and forming a fairly symmetrical diamond with those craters and Maginus (#245) to the E. The NW rim and floor of Longomontanus are heavily cratered, and the W edge also shows signs of terracing.

54. **Clavius (#261).** Located in the SW quadrant and one of the largest craters (140 mi. in dia.) on the Moon's visible side, Clavius is found by extending a line from Mare Nubium through and beyond Tycho (#234). Clavius and a nearby largeish crater to the SSE (Blancanus, #260) are so close as to virtually share a common wall between them. In the SW quadrant, only Bailly (#269) to the WSW and Schickard (#231) to the WNW are larger than Clavius. Two unnumbered craters, Rutherford and Porter, bisect the S and NE walls of Clavius.

55. **Clavius Craterlets. (#261)** Two large craters sit astride the S and NE edges of Clavius; inside the crater, a lovely arc of 5 craterlets of progressively smaller sizes curl westward, a lovely sight.

Central Area

56. **Montes Alpes (Alps Mtns).** A large, prominent mountain range located in the highlands region NE of Mare Imbrium between the Caucasus Mtns. and the crater Plato (#19 on the map). Best seen telescopically.

57. **Sinus Medii (Central Bay).** A smallish "cove" SE of Sinus Aestuum and S of Mare Vaporum, and separated from the latter by a small mtn. range and Rima Hyginus (the Hyginus Rille, #95 on the map) to the N, Sinus Medii is located almost directly in the center of the Moon. It appears relatively smooth throughout except for 3 small craters forming a long triangle. Best seen in binoculars or a telescope.

58. **Cassini (#35).** A round crater along the ENE edge of Mare Imbrium, S of the Alps Mtns. and fairly near the N limb in the NE quadrant. The E edge of Cassini's rim is more pronounced than the W side.

59. **Cassini A (#35).** A large, walled crater near the center of Cassini, larger and more pronounced than 2 other craters in Cassini. See finding instructions in #10 above.

60. **Aristillus (#43).** Located due N of Autolycus (#44 on the map) near the E end of Mare Imbrium, Aristillus is larger but less prominent. Contains a small central peak.

61. **Autolycus (#44).** A small but deep crater W of the gap between the Apennine and Caucasus mountain ranges at the E end of Mare Imbrium. Nicely round.

62-63. **Hipparchus/Albategnius (#119/#131).** Hipparchus (#119 on the map) is large and poorly formed, and contains numerous craters and craterlets, the largest being Halley along the S edge. Albategnius (#131) to the SW on the map, is equally battered. In addition to a central peak, Albategnius also contains one moderately sized and two large craterlets, one of which (Klein, not indicated on the map) bisects the SW edge of Albategnius. Hipparchus and Albategnius are fairly large and roughly the same size; they are located on the other side of craters Ptolemaeus (#130 on the map) and Alphonsus (#146 on the map) from Mare Nubium to the SW. (See #s 50-52 below.)

64-66. **Ptolemaeus/Alphonsus/Arzachel (#130/#146/#162).** Ptolemaeus is large, round, and very light-colored, with a relatively smooth floor and one small but prominent craterlet in its NE sector. Alphonsus features a high-walled rim, three dark spots on the W, S and E sides of its floor, and a floor pocked with 10 or more craterlets dissected by what looks like a small mountain chain or rille. (It's difficult to tell the difference at full Moon.) Arzachel lies S of Alphonsus (which in turn lies S of Ptolemaeus) and is smaller than either of them, nicely round, with high-walled rims suggesting inner terracing, a nicely formed central peak and nearby crater, and several other interior craterlets. All 3 craters — Ptolemaeus, Alphonsus and Arzachel — lie immediately E of Mare Nubium.

67. **Walter (#210).** A large crater beyond the SE edge of Mare Nubium in the Moon's SW quadrant, Walter is the last (and 2nd largest) of 6 craters in a line stretching S from Ptolemaeus (#130). Walter contains numerous craterlets along and inside its N, NW and S edges, and a small craterlet that adjoins what appears to be a severely malformed central peak that looks like a cauliflower near the N rim.

68. **Maginus (#245).** Slightly larger than Longomontanus (#244), about twice the size of Tycho (#234) to the NW, and maybe 60% as large as Clavius (#261) to the SW, Maginus is one of the most interesting craters on the Moon's visible side. While its floor contains a few nondescript craterlets, its rim to the N and W appear to have been literally blasted apart by impact craters. Very pretty.

NE Quadrant

69. **Lacus Mortis (Lake of Death).** A small, flat plain located halfway between the craters Atlas (#28 on the map)/Hercules (#27 on the map) and Eudoxus (#25 on the map) in the NE quadrant, and between the smaller craters Plana (not shown on the map) and Burg (#26 on the map) and arcing to the N around Burg. Best seen in binoculars or a telescope.

70. **Mons Hadley (Mt. Hadley).** A 13,600-ft. peak in the Apennine Mtns. near the point where Mare Serenitatis joins Mare Imbrium in the NE quadrant. Apollo 15 astronauts explored Hadley Rille, a valley at the base of Mons Hadley. (Red A15 on the *S&T* map marks the spot.) Best seen telescopically.

71. **Palus Somnii (Marsh of Sleep).** Located in the NE quadrant between Mare Crisium, Mare Serenitatis and Mare Tranquillitatis. A rough-looking area with craters, hills and ridges. Shown but not numbered or named. Best seen in binoculars or a telescope.

72. **Promontorium Agarum.** Located in the NE quadrant. A high point, or promontory, overlooking (and jutting out into) Mare Crisium along the latter's SE edge. Shown (but not numbered or named) to the lower right of the "M" in "Crisium." Best seen in a telescope.

73. **Rima Hyginus.** A rille, or fault, in the NE quadrant that meanders NE-SW in the S portion of Mare Vaporum (which in turn is located below the "V" formed by the Apennine and Haemus Mtns.). At the center of the rille (and straddling it) lies its namesake, the small crater Hyginus. Rima Hyginus contains a string of craterlets along its W arm. Another, less conspicuous rille, Rima Ariadaeus, lies nearby to the W of Rima Hyginus. Best seen telescopically.

74-75. **Eudoxus/Aristoteles (#s25/21).** The crater Eudoxus (#25) is rounder and more clearly defined than Aristoteles (#21) to the N. Eudoxus contains a high-walled rim and a central peak with its own crater, and another crater to the W within Eudoxus. Aristoteles is oval with 2 craters bisecting part of the N and S edges, the N crater being the larger of the two. Eudoxus and Aristoteles are located N of Mare Serenitatis in the NE quadrant.

76. **Mitchell (**shown, but unnumbered)**.** A small crater adjoining the E edge of Aristoteles (#21) in the NE quadrant. A hump along Aristoteles's wall at that point appears as if a meteor had burrowed through and exited in Aristoteles. (It didn't, but that's how it looks.)

77. **Endymion (#22).** A lovely, very dark crater located just below Marer Humboldtianum near the Moon's NE limb. Contains a high-walled rim.

78-79. **Atlas/Hercules (#28 & #27).** A lovely pair of craters lying directly on the line pointed by "Jack's cap" toward the NE limb in the NE quadrant. Atlas (#28 on the map, 55 mi. in dia.) is the larger of the two, but Hercules' rim is brighter. Atlas appears to have a very high wall above the surrounding plain, and contains rilles and dark spots on its floor. Hercules (#27 on the map) contains a bright central peak.

80. **Posidonius (#46).** A bright crater located along the NE rim of Mare Serenitatis in the NE quadrant. Posidonius has a central crater, numerous rilles and what appeared in my 3-1/2" refractor to be a partially terraced (secondary) rim on the E side.

81. **Cleomedes (#50).** Burckhardt (#51 on the map), a relatively small but prominent crater, straddles the N edge of Cleomedes, which looks like a child's free-hand drawing of a circle. Cleomedes also has a central peak and at least 2 other craters, one on the SW edge and another, irregularly shaped, next to Burckhardt. Cleomedes lies just NNW of Mare Crisium in the NE quadrant.

82. **Macrobius (#69).** A fairly large crater with high walls and a small central peak, located NW of Mare Crisium in the NE quadrant.

83. **Manilius (#73).** A small, round, deep crater with a central peak and a prominent rim, located SW of Mare Serenitatis and E of Mare Vaporum in the NE quadrant.

84. **Plinius (#75).** A small, round, deep crater containing a large central peak, located E of the Haemus Mtns. and between Mare Tranquillitatis and Mare Serenitatis) in the NE quadrant.

85. **Proclus (#77).** A small, deep, lovely circular crater located W of Mare Crisium in the NE quadrant, its rim very prominent during full Moon and a notable ray system extending outward in all directions except SW.

86. **Picard (#78).** A bright, round little crater appearing as a tiny island in Mare Crisium. Lovely with shadows on its floor. Located in the NE quadrant, near the E limb.

87. **Cyrillus (#150).** This crater is older than nearby Theophilus (#134 on the map), which partially overlaps it. Lighter in hue than Theophilus, Cyrillus contains an arc of 4 craterlets on its floor and a large craterlet bisecting its rim on the side opposite Theophilus. Located in the SE quadrant, W of Mare Nectaris.

SE Quadrant

88. **Rupes Altai.** The Altai Scarp, a long, snakelike wall or cliff in the SE quadrant connecting Catharina (#166) and Piccolomini (#198) to the SE below Mare Nectaris.

89. **Theophilus (#134).** Located in the SE quadrant along the NW edge of Mare Nectaris. Large (62 mi. in dia.), with a beautiful central craterlet, Theophilus partially overlies Cyrillus (#150 on the map) to the S. Crater floor contains 4-5 craterlets, otherwise appears level.

90. **Langrenus (#140).** A huge crater with a large, bright rim and a small peak at its center, located along the SE edge of Mare Fecunditatis in the SE quadrant. Contains terraced walls.

91. **Vendelinus (#152).** Located near the Moon's SE limb, Vendelinus is a large, prominent crater at the S tip of Mare Fecunditatis, partially overlain by the crater Lame (luh MAY, #153 on the map) along its NE edge. Oddly shaped.

92. **Catharina (#166).** Located in the SE quadrant in the same curving chain of craters as Cyrillus (#150) to the NNE and Theophilus (#134) to the NE, Catharina is slightly smaller than Theophilus and shows evidence of meteoric skipping before impact. Heavily pocked with craters on the SE side.

93. **Fracastorius (#168).** Located in the SE quadrant, S of Mare Nectaris and bisecting its edge. A large crater with a relatively large craterlet on its NW rim and an E side where the crater wall apparently filled with lava or debris and disappeared.

94. **Petavius (#183).** Lies below the S edge of Mare Fecunditatis near the Moon's SE limb. Large (110 mi. in dia.), rayed, with high walls and 2 central peaks. A rille runs through the W wall.

95. **Petavius Wall.** (See #79 above.) Steep, cliff-like, rising 10,900 ft. above the crater floor along the SW rim of Petavius. Lovely in shadows, the view is probably breathtaking from anywhere along the wall. Bisected in the W by a rille.

96. **Piccolomini (#198).** What a name!: sounds like a musician bully. Located in the SE quadrant, SSE of Fracastorius (#168 on the map). Contains a very pretty central peak.

97. **Gemma Frisius (#212).** Located in the SE quadrant between the craters Maurolycus (#223) and Pontanus (#195). Lovely in shadows, this crater contains high walls and is overlain along its NE rim by a smaller crater, Goodacre (shown but not numbered). Hills or ancient lava flow have filled part of the S rim.

98. **Furnerius (#216).** Located near the Moon's SE limb. A small, oval, rayed crater SE of Petavius (#183), Furnerius contains a large craterlet and an open end along the S wall.

99. **Maurolycus (#223).** Located in the SE quadrant, NW of Clavius (#261). Large (70 mi. in dia.), lovely in shadows, Maurolycus has been heavily damaged by impacts in the past, ergo, it's one of the older craters. Very rough terrain here: craters, hills, and what appears to be a double wall along the SW edge. Deepest crater on the Moon, sinking to 15,000 ft. below the rim.

100. **Fabricius (#239).** Located in the SE quadrant, Fabricius is a smallish crater SSE of Piccolomini (#198). It overlies the N wall of the large, prominent crater Janssen (#238). The walls of Fabricius rise 14,500 ft. above the crater floor.