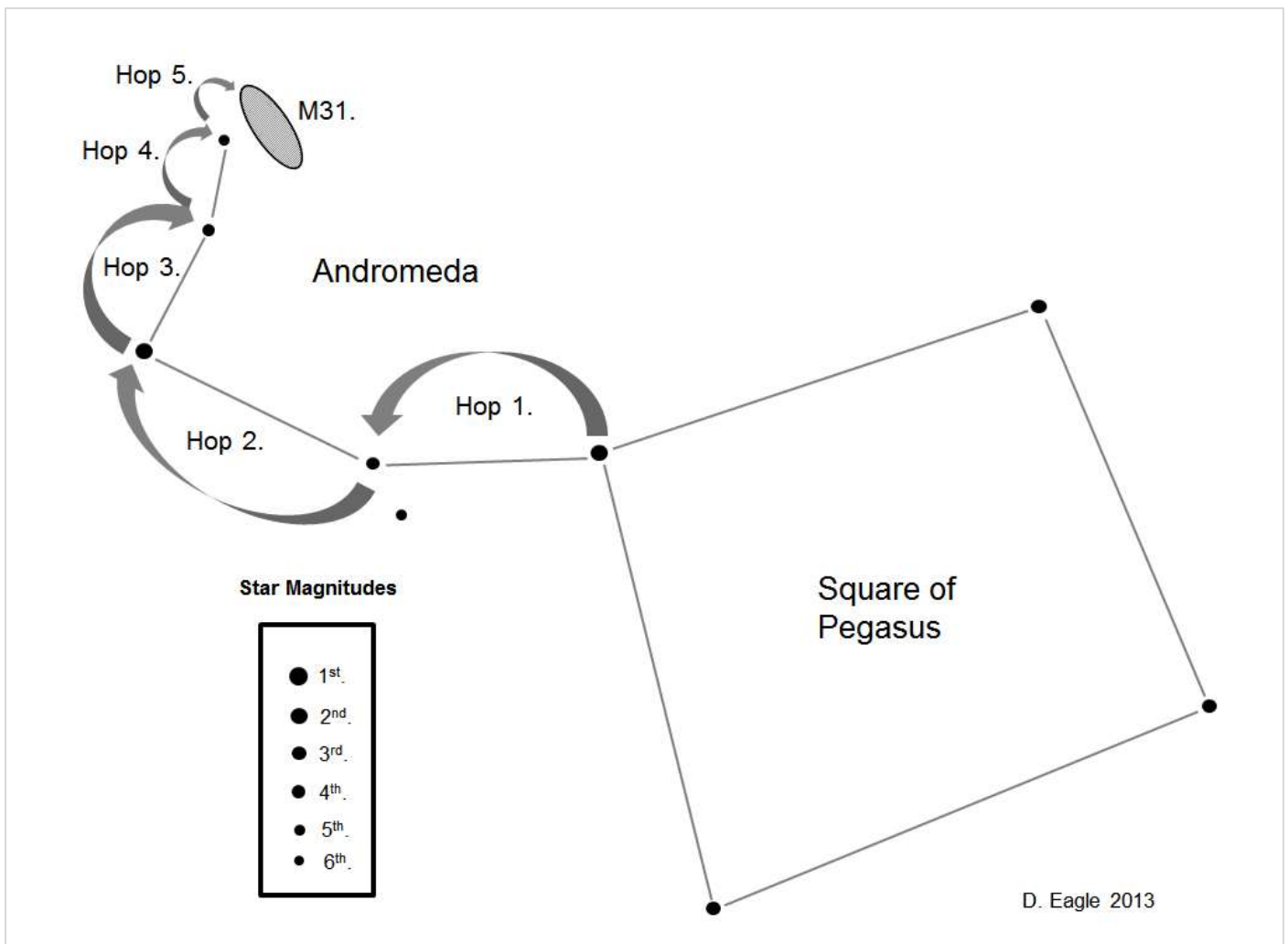


**Star hopping to M31, The Great Andromeda Galaxy.**

In the autumn sky in the northern hemisphere, the constellations of Perseus and Andromeda are very proudly on display, located on the meridian around midnight, and visible from most of the world. The Great Square of Pegasus is a distinct asterism of four stars. Using just your naked eye, find this square of stars. Incidentally, the top left star (all instructions are now as seen from the northern hemisphere) Sirrah, is now actually Alpha Andromedae.

From this square of stars take the top edge of the square and carry the line on towards the left (east) and up. Just under half the distance of the top of the square, you should come to another reasonably bright star. Slightly left and up again, taking a slightly longer journey, you will come to another star of similar brightness. This is Mirach or Beta Andromedae.

When you have found this star, turn 90 degrees to the right. You will then see two fairly bright stars leading away. Aim for the second star and gaze at this star. If your skies are reasonably dark, just above and to the right of the second star you should be able to see a faint smudge. This marks the location of M31, The Andromeda Galaxy. In five hops we have found our quarry.



**Figure 1 – Star hopping from Sirrah to The Andromeda Galaxy.**

This is the most distant object you can see with the naked eye and is almost 2.5 million light years away.

OK, so this is a fairly easy object to find, and very bright, easily visible in binoculars, if not the naked eye, but it does serve to show just how easy star-hopping can be. Finding much fainter objects using the same technique is really just as easy, but observing them once found could be much more of a challenge.

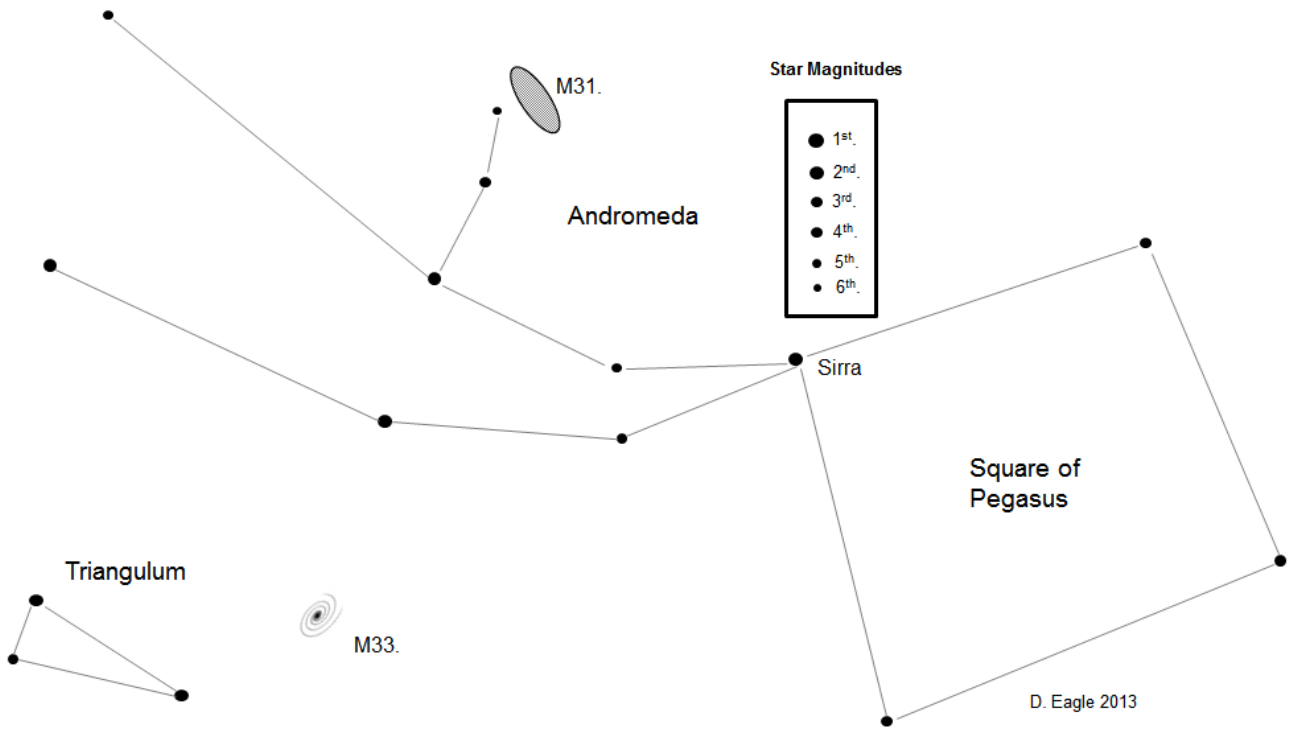


**Figure 2 – The Great Andromeda Galaxy.**

Another couple of galaxies that are supposed to be visible with the naked eye are the close by face-on spiral galaxy M33 in Triangulum and M81 in Ursa Major. So let us try and star-hop onto those.

**M33 The Triangulum Galaxy.**

Lying at a distance of 2.7 million light years, this large face-on spiral galaxy is certainly visible in binoculars, but is said to be visible with the naked eye. With a published magnitude of +5.7, it certainly seems to come above the usually accepted naked eye magnitude of +6.0. The galaxy lies almost midway between Andromeda and Triangulum itself. Try star-hopping from Sirrah in the top left-hand corner of Pegasus as before to find this galaxy.



**Figure 3. Locating M33**

The problem spotting the galaxy is that it is so big and the light is spread out over a wide area of 71 x 42 minutes of arc. So use averted vision to see if you can find it visually. This is the technique of looking slightly to one side of the object being sought, to use a part of the retina that is more sensitive to light. This galaxy is a little bit further away than the Andromeda Galaxy at 2.7 million light years.

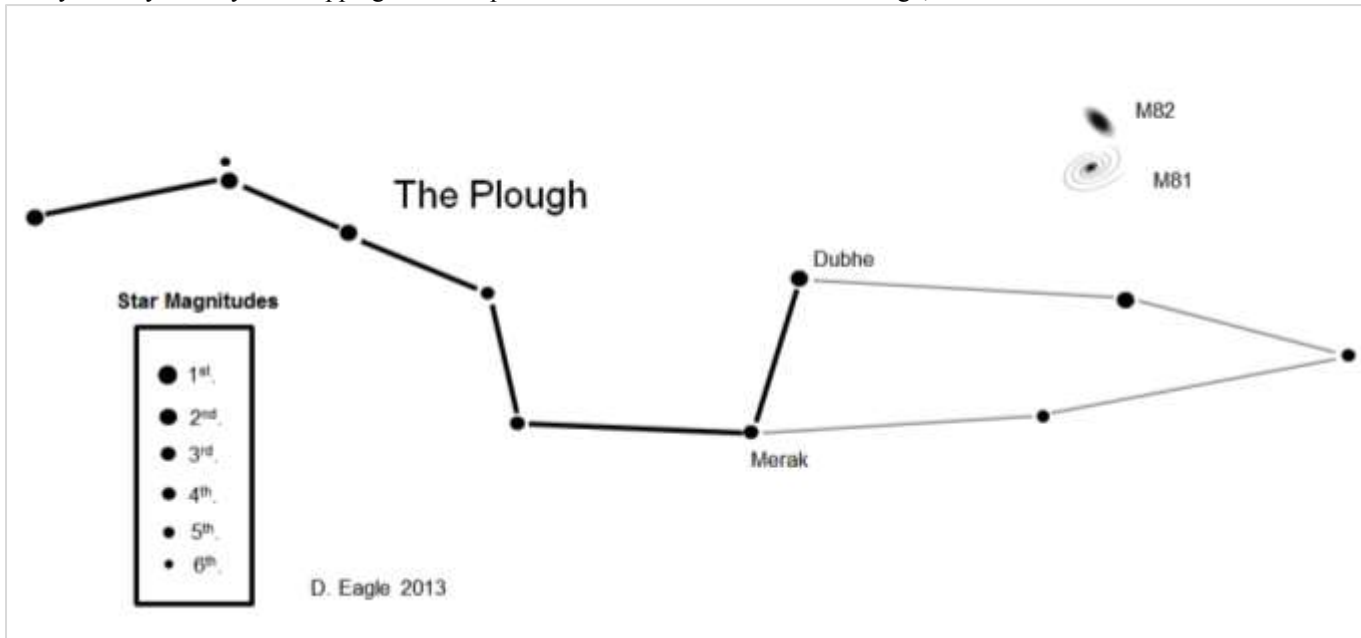


**Figure 4. M33, The Triangulum Galaxy.**

The next supposed naked-eye galaxy takes a huge leap way out into the darkness of inter-galactic space and will test really your observing capabilities.

**M81 - Bodes Galaxy in Ursa Major.**

This almost face-on galaxies lies about 11.8 million light years away. It shines at a magnitude 6.8, which is well below accepted naked eye visibility. So extremely dark skies are required in order to see this much more distant galaxy naked eye. It is located in Ursa Major, so from the mid-northern hemisphere is almost always available to view, being a circumpolar object.. It will be best viewed in the spring skies when it will be high overhead around midnight. Located not far from the Plough, it should be relatively easy to find just above the head of The Great Bear. Find your way here by star-hopping from the pointers Dubhe and Merak in the Plough,



**Figure 5 – Locating M81 from The Pointers Plough.**

Like M33 this galaxy has quite a large apparent size, 27 x 14 minutes of arc, and the light is very much spread out. The galaxy is easily visible in a pair of binoculars or finder scope. Along with its neighbor, the irregular galaxy M82, they make a fine view through a small telescope with their highly contrasting shapes. Use as wide a field of view as possible to get a wonderful image of the two as they drift together through your field of view.



Figure 6. Image of the galaxy pair M81 and M82. Dave Eagle.

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