

The Fall Sky

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Fixed Stars

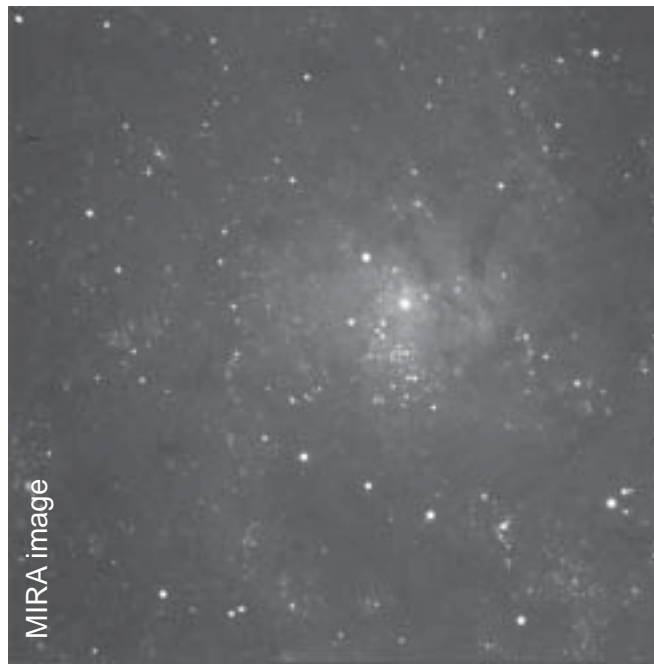
During the fall the Milky Way arches over the evening sky so that there is not much room for galaxies, except for some in the southern galactic hemisphere. The brightest of these, visible to us poor folk in the northern hemisphere, is the Great Andromeda Galaxy, Messier 31. This and the Milky Way are the dominant members of the Local Group, a rather modest group of galaxies which, on a larger scale, is a sort of distant outlier of the Virgo Cluster. The third member, in size, of the Local Group is Messier 33 in Triangulum. This galaxy and the nearby M31 pass close to the zenith during the fall evening hours.

Messier 33 appears quite large, but it is not a very prominent object in the night sky, just as is its host constellation, Triangulum. In fact, it is hard to imagine any three stars which, together, could not form a constellation with this name. M33 can be found about half way between the bright stars Mirach and Hamal. A small telescope is sufficient (after all, Messier could find it), but a dark sky is required because it is an exceedingly diffuse object.

In fact, M33 is quite small, as galaxies go. It is typical of the so-called late type spirals, in which the spiral arms show a loosely wound pattern which is rather disorganized. In this case, two well defined inner arms branch out to form as many as ten arm-like structures in the outer part. To further complicate matters, the inner and outer parts are thought to lie in planes tilted with respect to one another. This is not unusual, even for more regular spiral galaxies. M31 and M51 both show this effect. Its cause is not yet fully understood.

Despite what they are called, the late type spirals are galaxies in an early stage of evolution. (This is what happens when you start giving things descriptive names before you know what they are.) These galaxies are relatively rich in gas because there has not been time to convert much of it into stars. This leads to a high rate of star formation, and we can

see this in M33 where there are a large number of very bright (and thus very young) stars. These often are found in large clusters which usually contain lots of ionized hydrogen. We might call these super-clusters. The brightest of these has even made it into the NGC, where it is listed as NGC604. With a moderate sized telescope and under good conditions, it should be possible to see some of these clusters as bright knots in the otherwise not very prominent spiral arms.



A short (30 seconds) exposure of the central portion of M33 with the MIRA 36-inch telescope.

As such a galaxy ages, the gas will be converted into stars and the star formation rate will decrease. If this is all that happens, then the galaxy will turn into a typical dwarf irregular and will fade into relative obscurity. If it encounters other small galaxies, it may accrete them and become more massive, adding mainly older stars which will end up in the halo or the central bulge. This will increase the gravitational force, which will cause the whole galaxy to rotate more rapidly and the spiral arms to take on a more orderly and more tightly wound pattern. In other words, as it ages it will become an earlier type galaxy. If, on the other hand, it

should have the misfortune to encounter a larger galaxy, like M31, it will be entirely gobbled up, and we will have to remove it from our observing lists.

Whatever the fate of M33, we can be sure that it will not last long in its present state, so interested observers are urged to get out their telescopes and observe it while it is still a fine example of a late type spiral.

Planets

Our first opportunity to observe Mercury during the fall quarter will be a brief and unfavorable one around the middle of October, when it can be seen low in the southwestern evening sky. It will then pass in front of the sun on November 8, when we will have a rare opportunity to observe a transit. These occur, on the average, only once every $7\frac{1}{2}$ years, and in this case we will be able to observe the whole transit from our

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area. It will begin at 1:12 pm PST and end at 4:10 pm. The usual precautions pertain when observing the sun. The safest method is to look at a projected image. Following this event we will have the best opportunity for observing Mercury in the usual way when it reaches western elongation on November 25. It will then be visible in the east southeastern morning sky. Mercury will remain visible in the morning sky until the middle of December, with a conjunction with Mars on December 9 and with Jupiter on December 10. All three planets will be within one degree of one another. Such a grouping will not occur again until the year 2050.

Venus will not become visible until the beginning of December, when it will appear low in the southwest evening sky.

Mars is in conjunction with the sun on October 23 and will remain out of sight until its conjunction with Mercury and Jupiter in early December. It will then become more easily observable in the east southeastern morning sky as the year ends.

Jupiter will disappear in the evening twilight early in October and is in conjunction with the sun on November 21. It will reappear in the morning sky in early December, when it is in conjunction with Mercury and Mars, and it will remain low in the southeastern morning sky for the rest of the month.

Saturn is visible in the eastern sky after midnight in October. It rises earlier as the quarter progresses and is stationary on December 6, when it will be visible for most of the night. On December 10 Saturn will be occulted by the moon, the first of a series of occultations. This one will be visible mainly from the North Atlantic.

The series of occultations of Uranus continues, but still none is visible from our region.

Meteor Showers

The fall quarter, which is known for its wealth of meteor showers, gets off to a bad start with the Draconids on October 9 coinciding with the full moon.

The Orionids, on the other hand, peak on October 21, just before new moon, and thus should be well observable. They can be seen for most of the night. In addition to the main peak, there is talk of a secondary peak two or three days earlier.

The Southern Taurids on November 5 will also coincide with the full moon, but the Northern Taurids around November 12 will be free from moonlight, at least in the evening hours.

The Leonids, strongly concentrated around November 17, are free from interference from the moon. After the impres-

sive displays of a few years ago, this shower seems to have returned to its normal level. There are still, however, predictions of outbursts with possible zenith hourly rates of up to 100 or more. The Leonids are best observed after midnight.

The alpha-Monocerotids are usually a weak shower, but there have been occasional brief but very intense outbursts, as in 1995. The peak is expected on November 21, close to new moon, and this shower is best observed in the morning hours.

The Geminids, one of the year's best showers, will not be much troubled by moonlight this year. It is quite concentrated, peaking on December 14. It can be observed all night, but there will be some moonlight after midnight.

The Ursids, which peak briefly on December 22, is a poorly observed shower generally lacking in bright meteors. It does, however, produce an occasional outburst. The moon is favorable and the best time for observation is in the morning hours.

Comets

Bright comets seldom announce their arrival long in advance, so those which we can predict usually are not spectacular. Among the fall comets, the brightest is C/2006 M4 (SWAN). This comet reaches seventh magnitude in October, but it will be passing through Bootis, where it will be observable only with the greatest difficulty in the morning or evening twilight. By December it will be in Aquilla where it will be a little more accessible in the evening sky, but it will have faded to tenth magnitude.

Comet 4P/Faye will be much more accessible and observable during the whole night, remaining in or near Piscus for the whole quarter and retaining nearly its maximum brightness of ninth magnitude.

Comet 177P/2006 M3 (Barnard 2) is also very well placed for observation, moving from Cepheus through Cassiopeia during the quarter but fading from tenth magnitude in October to sixteenth in December.

Another comet well placed for observation is P/2006 HR30 (Siding Spring) which will spend the whole quarter in Cygnus and will thus be visible until at least midnight. It is predicted to be eleventh magnitude, but this is uncertain and it may turn out to be considerably fainter.

A much more difficult object is C/2006 L2 (McNaught), which moves from Virgo into Serpens Caput during October and is thus only just visible in the evening sky. Its magnitude should be about thirteen.

Eclipses

There will be no more eclipses during 2006.