

INTERACTING GALAXIES IN THE SOUTHERN SKY

by Leo Cavagnaro

The observation of galaxies, specifically compact groups, chains and interacting galaxies are one of the most enjoyable and exciting activities for those amateur astronomers who carry out detailed observations.

There are some well known catalogues which list these kinds of deep-sky objects. The Vorontsov-Velyaminov Catalogue of Interacting Galaxies, the Atlas of Peculiar Galaxies of H. Arp and the Shakhbazian Catalogue are some examples. Most of the galaxies included in them are only visible using telescopes with big apertures (18" or more).

Working at my desk, using software and articles I have in my computer, I was studying the southern sky centered in Right Ascension 22 hours and found some interesting groups and chains of galaxies mostly situated in constellation Grus and also in constellations Pisces Austrinus (the southern fish), Sculptor, Phoenix, Sagittarius, Indus, Telescopium and Pavo. I was reading the paper written by Arp & Madore "**A Catalogue of Southern Peculiar Galaxies and Associations**", where galaxies from the South Celestial Pole to a declination of -22 degrees are catalogued in different categories according to the type of interactions.



This photograph was taken by Jan Keiski at Paramillos, an observing site around 9,000 feet high where I went to finish my observations. The picture shows constellations Grus, Indus, Tucana and Pavo, the zone where the galaxies in this article are situated. You can see Venus (lower right) and also the glow from Santiago, Chile, situated about 106 miles away in a straight line (lower center).

Continued on Page 6

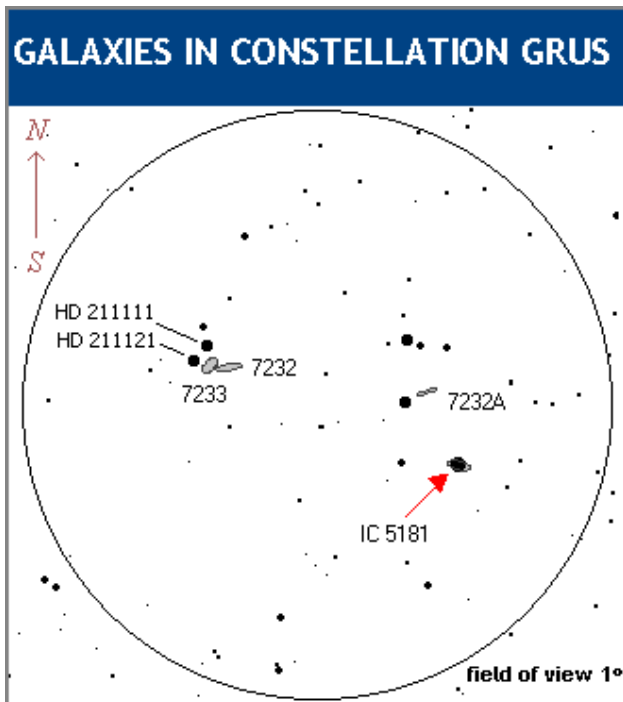
Southern Interacting Galaxies (Continued from page 5)

I made an observing program which includes a sample of galaxies that are visible in the spring southern sky. In this article I have included my comments and reports about the observations of some of those galaxies through my 8" telescope.

On Saturday, December 20, I had a chance to set up my telescope in a nearby observing site (Canota) to begin the program. The Summer Solstice for those who live here in the Southern Hemisphere occurred on Sunday, December 21 at 12:04am UT, so that made for a short night for observing. The astronomical twilight (Sun is 18 degrees below horizon) occurred at 10:26pm local time. This night was clear but very warm even at the mountains. A hot wind and turbulent air in the atmosphere did not help much to get good seeing, so I think I could get even better views of the faint associations and interacting galaxies I saw that night if I observe them under a more steady sky. One week later, on Saturday, December 27, I went to Paramillos 9,000 feet above sea level to finish the observations. From this last place I observed the Pavo Group and a group of three galaxies in Grus. Both nights the region of the sky where these galaxies are situated was at low altitude because of the time of the year. I could not observe that region earlier this year because of bad weather during some New Moon weekends.

The Pair NGC 7232 / NGC 7233 and the Galaxy IC 5181 in Constellation Grus

Not so far from the bright star Al Nair in the southern constellation Grus, are found galaxies that are visible in the same 1 degree field of view.

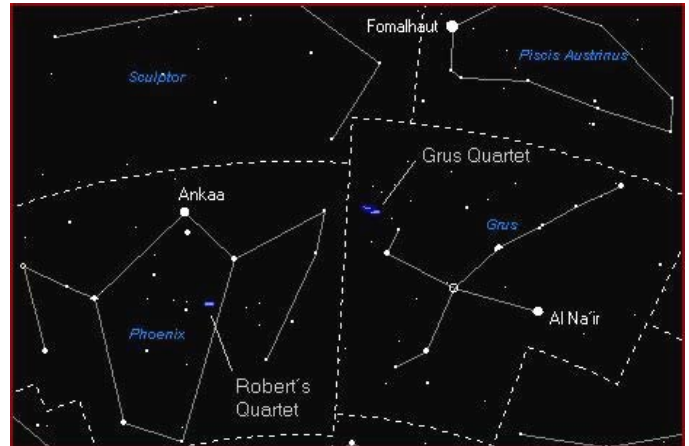


I began the observation at 11:20pm local time with the zone at about 28 degrees of altitude toward the west. The first attempt to observe these galaxies was using low power (42x). At that magnification you can see an interesting star field with some stars forming interesting shapes like the pair of stars HD 211111 and HD 211121 (see picture lower left on this page) that is useful to use as a guide to find and see the galactic pair close to them (NGC 7232 & NGC 7233). At this magnification IC 5181, a lenticular galaxy (S0), is the only galaxy I could see, and it looked very small. At 78x I could improve the view. Now IC 5181 is visible showing an elongated shape and a very small and brighter core, as it appears in the DSS image. Where the galactic pair lies, very close to the pair of stars of magnitude between 8 and 9, a very faint and little elongated hazy patch is visible using averted vision. The view was very difficult and it was impossible to discern the galaxies.

At higher magnification (106x) the galaxy IC 5181 looks interesting, with its bright core showing better. The view of NGC 7232 & NGC 7233 is similar to the one I got with the lower

A Couple of Southern Quartets

magnification. NGC 7232A, the faintest of the four galaxies



was not visible through my 8-inch telescope.

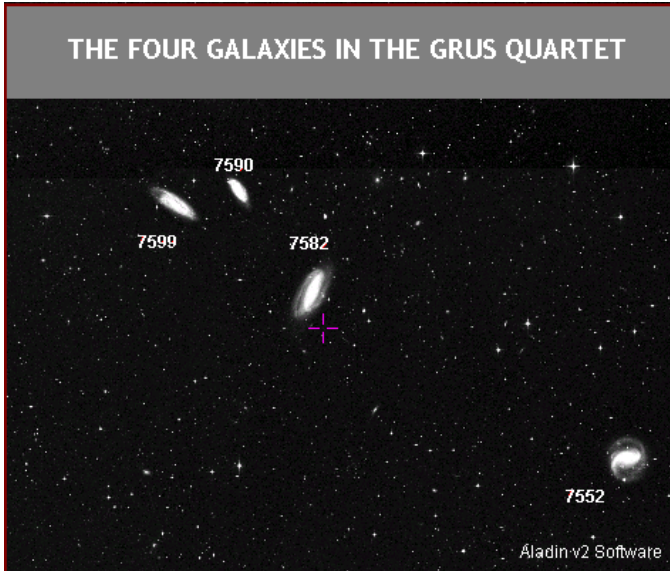
The Grus Quartet

In constellation Phoenix, R.A. 23h 18m 53s Dec -42.3 degrees, resides a small group of four galaxies. This is a good example of a galaxy quartet in the southern hemisphere. The brightness of its members makes it possible to observe them properly with a small telescope like 8-inch dobsonian. The first observation of this object was at local Midnight, when the group was 30 degrees high in the western sky. Using low magnification (42x) the galaxies are very well detected in the same field of view. All the galaxies show a smooth appearance and are elongated. Three galaxies are very close to each other. Some minutes apart you can see NGC 7552 that also looks smooth and not so elongated.

(Continued on page 7)

Southern Interacting Galaxies (Continued from page 6)

Using a little higher magnification (53x) and observing in detail the group of three galaxies, NGC 7582, 7590 and 7599 (see picture below that I made using Aladin v2 software). You can see that NGC 7582, a SBab galaxy according to the Revised NGC Data by Wolfgang Steinicke, is the brightest member, and starburst activity is observed in this galaxy and also in NGC 7552. A very few faint foreground stars are visible superimposed on the galaxy NGC 7590.



On the other hand, NGC 7552, situated at aboutarc minutes from the interacting triple, looks more round in shape and with a brighter core. At 106x the view of this galaxy is excellent. You can clearly see its bright and small core and also its elongated and smooth disk. The core is better viewed at 156x. Again at 106x, a 12.9 magnitude star is visible just on the border of NGC 7590, the smaller galaxy of the quartet. Some bright spots seem to be present in the elongated galaxy NGC 7582 when you observe it using averted vision. The galaxy NGC 7599 looks a little bigger and with more smooth brightness.

The Robert's Quartet. A Challenging Compact Galaxy Group

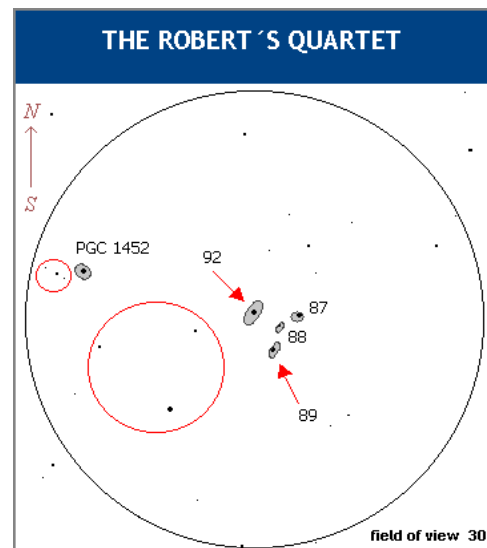
At the center of the constellation Phoenix (R.A 00h 22m 00s Dec -48.5 degrees), resides a small and faint group of four galaxies (NGC 87, NGC 88, NGC 89, NGC 92) discovered by John Herschel in 1830s and nicknamed "Robert's Quartet" after the astronomer Robert Freedman who generated many of the updated positions of galaxies in the Arp & Madore Catalogue. It is about 160 million light years from Earth. It is a group of four galaxies included in the NGC catalogue, NGC 87, NGC 88, NGC 89 and NGC 92.

It is classified as a category 4 "Interacting Quartets" in the **Catalogue of Southern Peculiar Galaxies and Associations** by H. Arp, B. Madore and W. Robertson (Cambridge University Press). I used a bigger telescope to observe this group, a 16-inch telescope observing at 72x.



To find this group was not easy because the galaxies are very small and faint. As shown in the eyepiece field picture (see below) I used some stars to recognize the zone where this small group lies. The triangle of stars, with magnitudes between 10.7 and 12.5, indicated with a red circle in the eyepiece field, is easy to identify and it is useful to use as a guide. Also the chain of three faint stars to the left in the field (also indicated with a red circle) was useful to find the extremely faint PGC galaxy.

Some members of the quartet are visible, NGC 89 and NGC 92, the brightest members with magnitudes 13.3 and 12.9. They look faint even in telescope of this size, like round and fuzzy clouds with smooth brightness. Being not a member of the group, the faint galaxy PGC 1452 is barely visible with averted vision like an irregular and smooth patch.



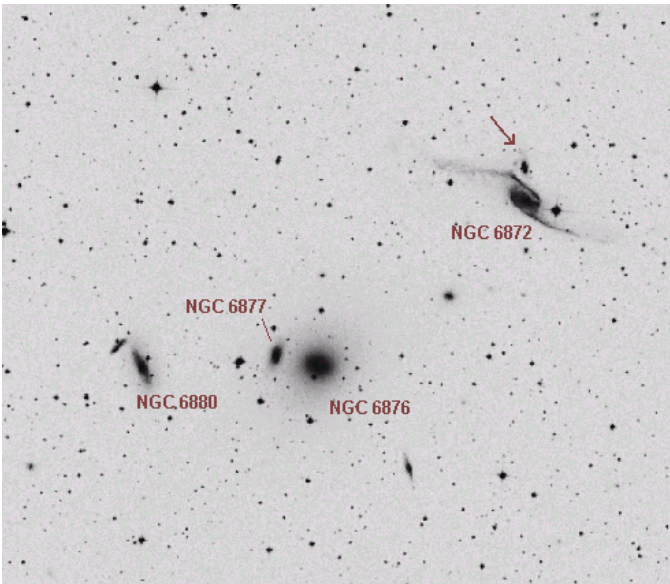
(Continued on page 8)

Two Superb Cases in Constellation Pavo



NGC 6769/NGC 6770 is a good example of an interacting triple, with three galaxies of any type which appear disturbed. This group is very low in the southwest sky from here in December so I will observe it in detail in coming months and will include it in the second survey of this zone of the sky next year.

The Pavo Group



- NGC 6876 E3 Galaxy Magnitude 10.7
- NGC 6877 E6 Galaxy Magnitude 12.2
- NGC 6880 SB0-a Galaxy Magnitude 12.3
- NGC 6872 SAB(rs)c Galaxy Magnitude 11.7

In the eastern part of the southern constellation Pavo, about 180 million light years, you can find an interesting group of

galaxies named the Pavo Group. NGC 6876, an E3 galaxy, and NGC 6872 are the dominant members of this moderately massive and dynamically young group (see the paper: “A Multi-wavelength View of Star Formation in Interacting Galaxies in the Pavo Group” by M. Machacek et. al. published in The Cornell University e-library on October 20, 2008).

Observing this group with an 8-inch reflector working at low power (42x) the most prominent galaxy is the elliptical NGC 6876. Situated in a relatively rich starry field, it looks small and shows an increasing brightness toward its center. At this magnification, the galaxies NGC 6872 and NGC 6880 are very hard to see. They are barely visible using averted vision, like small and fuzzy patches.

Using higher magnification (78x), NGC 6876 looks a little elongated and may have an irregular shape. To the east, NGC 6880 is better viewed with a smooth brightness. NGC 6872, a gas-rich spiral galaxy which forms a tidally interacting pair with the spheroidal companion IC 4970 (indicated with an arrow in the picture above) and visible only in bigger telescopes. This pair is the VV 297 object (Vorontsov-Velyaminov). NGC 6872 is seen very close to the star of magnitude 10.4 TYC 9311-418-1. This faint galaxy also shows a smooth appearance.

I observed in detail the main galaxy NGC 6876 using higher magnification (148x). On its southeast border a star is clearly visible. This galaxy shows a little brighter inner part. Observing with averted vision, a star-like brightness much smaller than that shown in the picture to the left is visible for brief moments inside the most prominent part of the galaxy. The star-like brightness and the star on its border are indicated with arrows.

At first glance, the small galaxy NGC 6877 (to the left in the picture) was not visible. However, a more accurate observation made possible a glimpse of a very small, round (in spite of its classification as E6 galaxy) and faint cloud.



(Continued on page 9)

Another Galaxy Group in Grus

There exists a group of galaxies in the southern constellation Grus, not too far from the pair NGC 7232/NGC 7233. That group is listed in the paper “**Dynamics of the Pavo-Indus and Grus Clouds of Galaxies**” by P. Fouqué et. al. The brighter members of the group are NGC 7162, NGC 7162A and NGC 7166. However, they are too faint to be observed through an 8-inch mirror working at low magnification.

To find the field where these galaxies lie was easy because you can see an asterism of four stars (red circle in the picture to the right). They are actually the brighter stars in an eyepiece field poor in stars. Once in the correct field, NGC 7166 is found without a problem using the line of three stars indicated with the red line. Working at low magnification (42x) this galaxy is seen as very small and faint.

Using the same eyepiece and a barlow lens, thus reaching

higher magnification (83x), NGC 7166 is easily seen, appearing more elongated and with a bright stellar-shape core. NGC 7162 is barely visible but it is there if you use averted vision.

