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THE PRAIRIE ASTRONOMER

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MASSIVE OBJECTS FOUND IN GALAXY: NEW CLOUDS DISCOVERED

Astronomers have found the most massive objects in the Milky Way galaxy-- about 5,000 gas clouds, each about 200 light years in diameter and each approximately as massive as 500,000 suns. Although a few of these clouds were known to exist, this is the first evidence that they are such an important part of the Milky Way.

The only other objects in our galaxy that approach the clouds in mass are some 200 globular clusters each about the mass of 100,000 suns. Globular clusters are symmetrical groupings of hundreds of thousands of stars which form a halo around the galaxy. The giant molecular clouds are composed of interstellar gas and small solid particles--dust--and are in the plane of the galaxy. These clouds, previously thought to be about 10 million years old, are calculated to be at least ten times that --about 100 million years of age. The clouds are the materials of which new stars are constantly being formed in the galaxy.

The observations show that the largest concentration of the clouds of molecules occurs in a ring located between 12,000 and 24,000 light years from the center of the galaxy. The sun, for comparison purposes, is about 30,000 light years from the center of the galaxy, which is about one hundred thousand light years in diameter.

NEW COMET IS DISCOVERED

A new comet, BRADFIELD 1979c, was discovered at 10th magnitude in Hydra on June 24 by William A. Bradfield at Dernancourt, Australia. Although fading, it is now circumpolar. The most recent magnitude estimate is by Donald E. Machholz: August 3.48, mag. 8.8, diameter 1.5' in his 10-inch.

Ephemerides by George East:

Date	RA	Dec	Mag
Aug 25	6h45.44m	52°22.1'	10.3
30	6 9.24	57 19.5	10.4
Sep 4	5 2.19	62 43.2	10.4
9	2 55.30	65 24.5	10.4
14	0 25.94	58 29.2	10.5

AUGUST P.A.C. MEETING IS SET

The August meeting of the Prairie Astronomy Club will be held at Hyde Observatory on Tuesday night, August 28, 7:30 p.m.

Program Chairman Rick Johnson will be demonstrating a computer program he has written that simulates the Perseid meteor shower. The meteor tracks are generated on a TV monitor which shows the radiant and constellations through which they pass.

THE BARLOW LENS -- PART 5 ... By Larry Stepp

This is the fifth installment in this series and the conclusion. In this part I will describe a couple more applications of Barlow lenses, and discuss some club projects which could be carried out to further investigate the subject.

Some telescope makers have used Barlow lenses as an integral part of the telescope to form a compound instrument analagous to a Cassagrain. There are two ways in which this is commonly done. One approach is to put a Barlow lens just ahead of the diagonal mirror in a Newtonian, that is between the objective and diagonal (see Figure 9). The Barlow is generally the same diameter as the diagonal, and of fairly long focal length, perhaps about equal to the diameter of the objective. With this design the Barlow extends the focal plane outside the tube. The diagonal is positioned farther from the objective than normal, and without the Barlow the light would come to a focus inside the telescope tube (dashed lines). This enables the designer to have a long focal length telescope in a short tube, with a small diagonal which does not degrade the image very much.

For example, with a 10-inch f/4 primary, a 1.52-inch minor axis diagonal, and a Barlow lens of the same diameter and focal length -10 inches, it is possible to have a 10-inch f/8 telescope with a fully illuminated field of .62 inches in a 44-inch long tube! The advantages of this design are somewhat offset by the disadvantages. The lens used generally needs to be larger diameter and longer focal length than most commercially available Barlow lenses, and the performance of the telescope will be directly affected by the design of the lens. For best results the lens should be custom designed for the specific optical system it is used in, but with trial and error, and a lot of luck, a good system should be possible using surplus lenses. If a slight amount of chromatic aberration is not important (as in a guide scope) a single element lens could probably be used with good results.

Another version of this same idea uses a Barlow positioned inside the base of the eyepiece holder, about even with the tube surface (see

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Figure 10). This design can use a Barlow lens of a standard commercial focal length, but the diagonal size cannot be reduced as much as in the other design. As an example, a 10 inch f/4 primary with a Barlow lens of -4 inch focal length can produce an f/8 image with a fully illuminated field of .62 inches, but only if the diagonal minor axis is 2.50 inches. Notice that in both of these designs the Barlow is used as an integral part of the telescope, not as an accessory.

A similar use is made of a Barlow by Edmund, but using the Barlow as an accessory. The Astroscan 2001 telescopes do not have enough focusing travel to be used for photography at prime focus. However, they sell a Barlow lens which brings the image out far enough to reach the film of the camera, and it works in exactly the same way as the design in Figure 10.

Before ending the article I would like to describe some investigations which would be interesting, to add more practical knowledge about Barlow lenses. Since Consumers Report does not report on Barlow lenses, amateur astronomers have to make their own performance comparisons. This type of study can best be accomplished as a club project, because an individual cannot afford to purchase all the different models available, but among all the club members many different models can be found.

I have several comparisons in mind. One study would be simply to compare each of the commercially available Barlows, using two or three good telescopes (richest field to Schmidt-Cassegrain), several different design (and focal length) eyepieces, and several "judges." I would also like to suggest a comparison of two Barlows used in series with a single Barlow using an extension tube, and with a single Barlow and a higher power eyepiece. It would be interesting to try all the different combinations of Barlow pairs to see if one particular brand (or combination of

(Continued on Page 4)

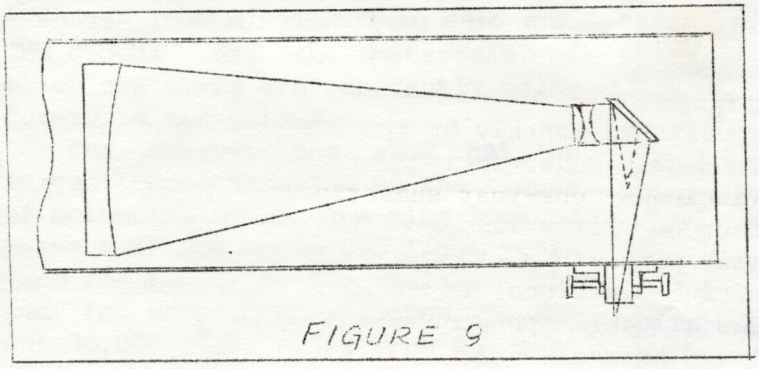
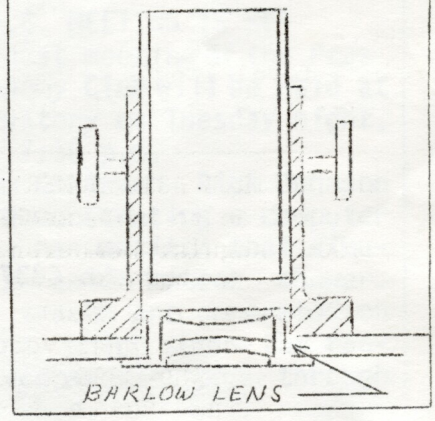


FIGURE 9

FIGURE 10



BARLOW LENS, Part 5 (Concluded)

brands) yields the best image. As another possibility, camera telextenders could be compared to ordinary commercial Barlow lenses, different models of telextenders could be compared to each other, and pairs of telextenders could be compared to pairs of Barlows, and to mixed Barlow-telextender pairs.

These kinds of tests would be hard for an individual to perform, but the equipment resources of the club should make them possible. The resulting information would be useful to club members, and if the relative performance ratings were carefully recorded, such a study would make a good future newsletter article.

SATELLITE FINDS HIGH VENUS PEAK

American sceintists are studying new material on Venus showing mountain ranges with peaks the size of Mount Everest.

Dr. Harold Masursky, a member of the U.S. Geological Survey based in Flagstaff, Ariz., told the International Astronomers Union Conference that images and elevations of Venus from the spacecraft Pioneer showed two-thirds of the planet as rolling lowlands.

"This material showed two-thirds of Venus is lowlands, with several big mountain ranges and continental-sized uplands", Masursky said.

"The highest peak measures 7.5 miles, almost 2 miles higher than Everest."

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Mr. Earl Moser
Hickman,
Nebraska 68372

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