the spectrum

MARCH 1966 THE BUFFALO ASTRONOMICAL ASSOCIATION B. COOK EDITOR

NEXT MEETING MARCH 11TH

The next meeting of the Buffalo Astronomical Association will be held in the Museum of Science at 8:00 on Friday March 11th.

There will be two speakers on the program. Leslie Stoklosa will speak on "Grinding a telescope mirror and will cover such items as: the history of the telescope, materials that go into grinding, and rough and fine grinding. His talk will be aimed primarily at the person who has had no experience in telescope making. Paul Redding will tell us about the search for Dr. Van Duzee's 13" refractor which was orighally in Buffalo and was at one time the largest refractor in the world.

The remainder of the program will be an information forum. Members are invited to submit questions on an aspect of astronomy. Here is your chance to get that long puzzling question answered.(We hope!) Who will make up the forum? The rest of the members present. We hope that what one deesn't know another will! Please make the questions specific. Broad, general questions would require too lengthy an answer and we want to try to answer as many questions as possible in the time available. Cards will be handed out at the beginning of the meeting for you to write your questions, but decide on your choice beforehand,if possible, so that you can state it well. This alone will help greatly in enabling the forum to answer your question.

Coffee, doughnuts and stimulating conversation will be available after the meeting.

ADVANCED STUDY SECTION

At the February meeting of the A. S.S. reports were given on Stellar Spectral Classes as follows:

Jerry Cook - W & O class stars
Paul & Jessie Shuart - B " "
Fred Gordon - F " "
Charles Bull - G " "
Thad Toporczyk - K " "
Margaret Rabe - M " "
Albert Kaupa - R & N " "

The next meeting will be held on March 28th at 7:30 P.M. in the Museum. The topic for discussion wil be "Stellar Magnitudes".

INSTRUMENT SECTION

The Instrument Section will meet on March 25th at the Observatory at Newstead, at 8:30 P.M.

NEW CURATOR

It is with pride that we announce the appointment of Paul Redding, our treasurer, as "Curator of Ikonography" (maps and photographs) at the Buffalo Historical Museum. We all wish Paul e every success in his new position.

RAFFLE

There will be another Raffle for the benefit of the B.A.A. which will be held at our next meeting, March 11th. The object to be raffled off is a moonwatch scope with an $1\frac{1}{4}$" eyepiece valued at about $17.00. Bring money, buy lots of chances. Who knows, you may be the lucky winner!

OBSERVERS WANTED

The B.A.A. has received a request for grazing observation of the 4.9 magnitude 139 Tauri cz900 star on March 28-29. Enclosed in this issue is a copy of a letter from Mr. David Laird providing all necessary information. Those who are interested may write to the following address:

Mr. David Laird
Cincinatti Country Day School
6905 Given Rd.
Cincinatti, Ohio 45243

OCULARS OR EYEPIECES

by Darwin P. Christy, Jr.

(Several years ago, in a series entitled Telescope Tips, Paul Redding wrote an article on eyepieces, pointing out a few of the most popular oculars and their uses. With this as a background, we feel our readers will welcome a series of articles on this subject. The author has done a lot of research and your editor thinks you will find these articles very informative.)

Why are there so many different kinds and types of oculars? Early models have been improved upon as the years went by; some have advantages where others have disadvantages; and and perhaps the cost or even the ease with which they can be made are factors.

Let's start with the easiest and probably the first one made. It is a single lens used as a field lens (fig. 1.) With a peephole as an eye lens spaced about three quarters of its focal length away, it gives us a simple ocular. It can be easily made from any one of three types of lenses, a Plano-convex, Double-convex, or Converging Meniscus, and it is inexpensive. There are, however, many disadvantages. It has poor eye relief, chromatic and spherical aberation, distortion, produces a curvature of field which will not allow a precise focus, and last, it has only 25 degrees of field.

The other simple ocular is that of

the Opera Glass or Galilean type (fig. #2). This has a negative focal point. It is made up of either a Plano-concave, Double-concave, or Diverging Meniscus and is as easy to make as the other ocular. This ocular gives an erect image as does a terrestial telescope with an erecting system but only gives a field of view of about 20 degrees and is only good at low powers.

Probably the most common of all oculars is the Huygenian (fig. #3) devised by Huygens and, independently, by Campani of Rome. This ocular is a compound eyepiece in that it contains two Plano-convex lenses. Both lenses have their convex surfaces facing outward toward the object. It has a field of view of about 40 degrees and is free of distortion. Because its focal (EFL) plane falls between the lenses it is known as a negative eyepiece. In order to find the equivalent focal length (EFL) of this ocular a formula has to be used. Being what is referred to as a 4-3-2- eyepiece, these values equaled 8 over 3, which concluded a EFL of 2 2/3 inches. At present this ocular is quite extensively used in microscopes. It does produce spherical aberation but not quite as much chromatic aberation. It also has excellent eye relief.

The Ramsden (fig. #4) is similar to the Huygenian. In its original design, 1-1-1, it is free of chromatic aberation and contains only slight apherical aberation. Both of these lenses have the same focal length and are spaced their focal length apart per the design figures. These lenses have their convex surfaces facing each other. The spacing of these lenses gives a disturbing factor in that the field lens plano surface is at the focal point and must be kept clean and free of all dust particles. In a later design these lenses were spaced closer so as to eliminate this, but in so doing picked up two defects: chromatic and spherical aberation although only to a slight degree.

To eliminate the boresome Chromatic aberation, Kellner devised an ocular like the Ramsden except that he put an achromat lens at the eye end (fig.#5). The field of view was also increased from 40 degrees in the Ramsden to about 45 or 50 Degrees. Again, though, we run into another defect: astigmatism and also increased curvature of field. Thus far the three oculars mentioned contain ghost images which can be eliminated by applying a fluoride coating.

From the simple lenses to achromats we now list a few of the other kinds and types and brief on them. Steinheil modified the Ramsden into an achromatic symetrical ocular (fig. #6) and from this came the long relief symetrical (fig. #7). These two oculars proved to be excellent in eliminating most defects, the only appreciable one being curvature of field, which does not hinder visual observations but produses a less clear image photographically. Another ocular credited to Steinheil is the triplet used in the orthoscopic

eyepiece (fig. #8). It is over corrected for color and has a beautifully flat, sharp and achromatic field of about 45 degrees. The eye lens is placed quite close to the field lens, thus eliminating the possibility of ghosts. Looking into the ocular at an angle a little distance away it takes on the appearance of an oblate spheroid mirror under the Foucault Test, a hill in the middle of a smoothe valley rising toward the edges (fig. #9). This ocular is a rather expensive item although well worth it: enough can NOT be sai said in its favor.

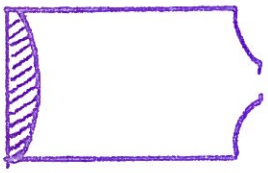


fig. 1

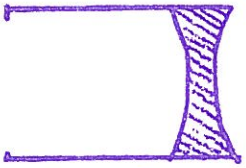


fig. 2

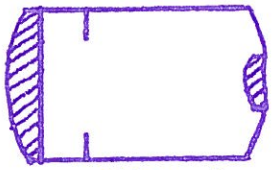


fig. 3

fig. 4

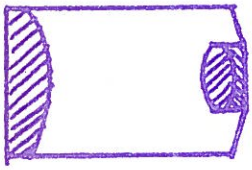


fig. 5

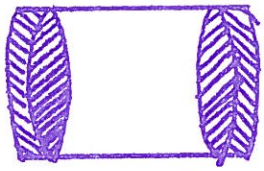


fig. 6

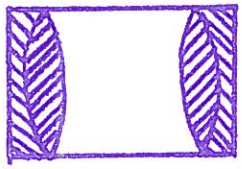


fig. 6

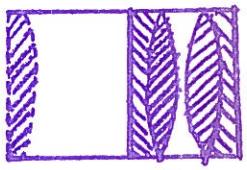


fig. 7

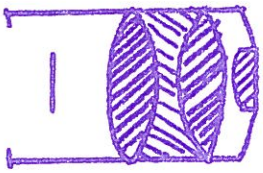


fig. 8

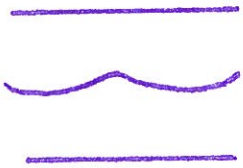
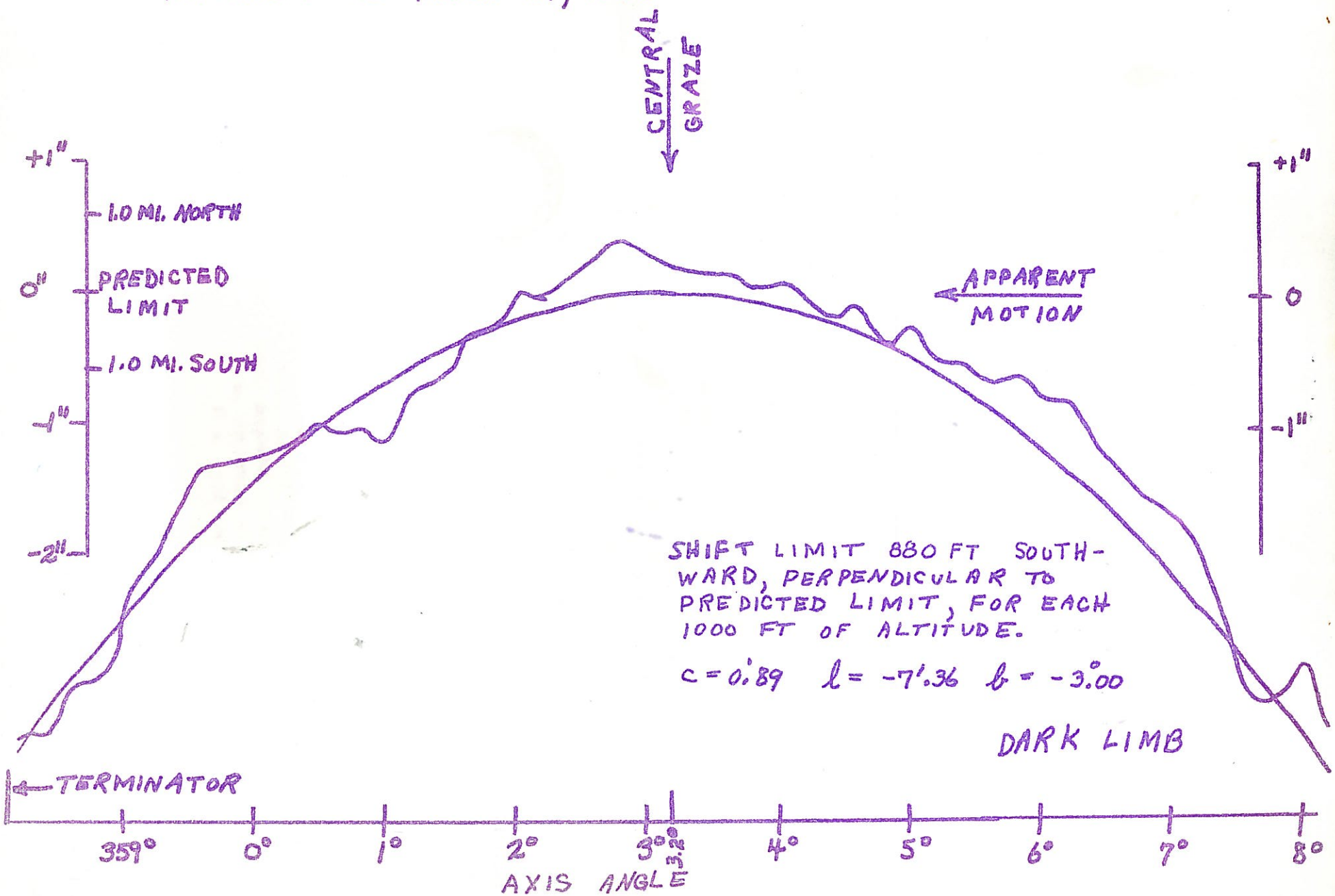


fig. 9

GRAZING OCCULTATION OF 139 TAURI, Z.C. No. 900

Northern Limit March 29, 1966



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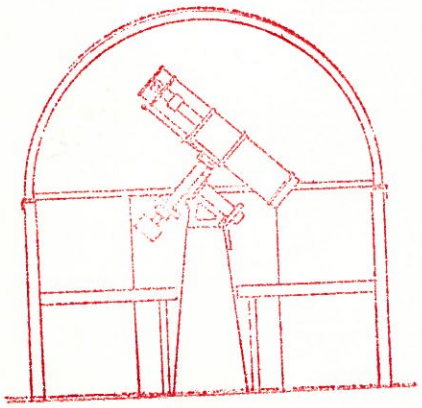
PRAY FOR PEACE



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