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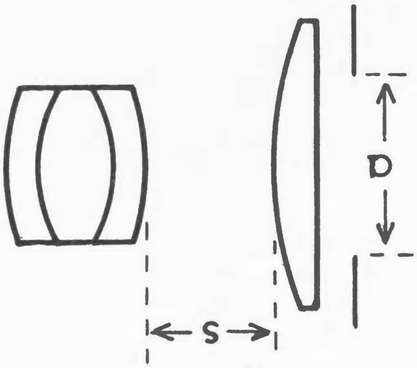
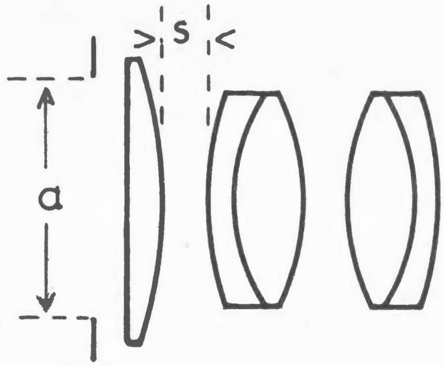


Fig. 1. Refer to A. J. Thompson's article in this issue.



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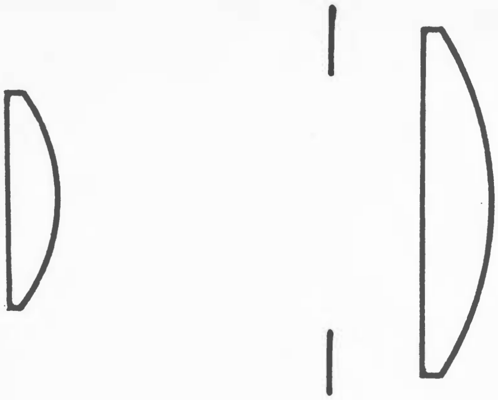


Fig. 3. Refer to A. J. Thompson's article in this issue.

Fig. 4. Lunar Crater Atlas. T. Cragg. 12-inch refr. 985X. August 30, 1950. 11^h0^m, U.T. Colongitude = 119°.3

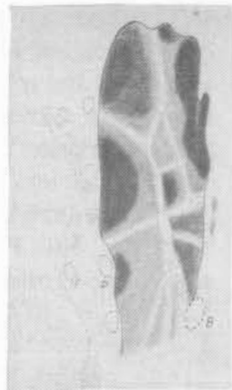


Fig. 5. Lunar Walled Plain Grimaldi. E. J. Reese. 4-inch refl. 60X. May 13, 1949. 4^h 15^m, U.T. Colongitude = 94°.5

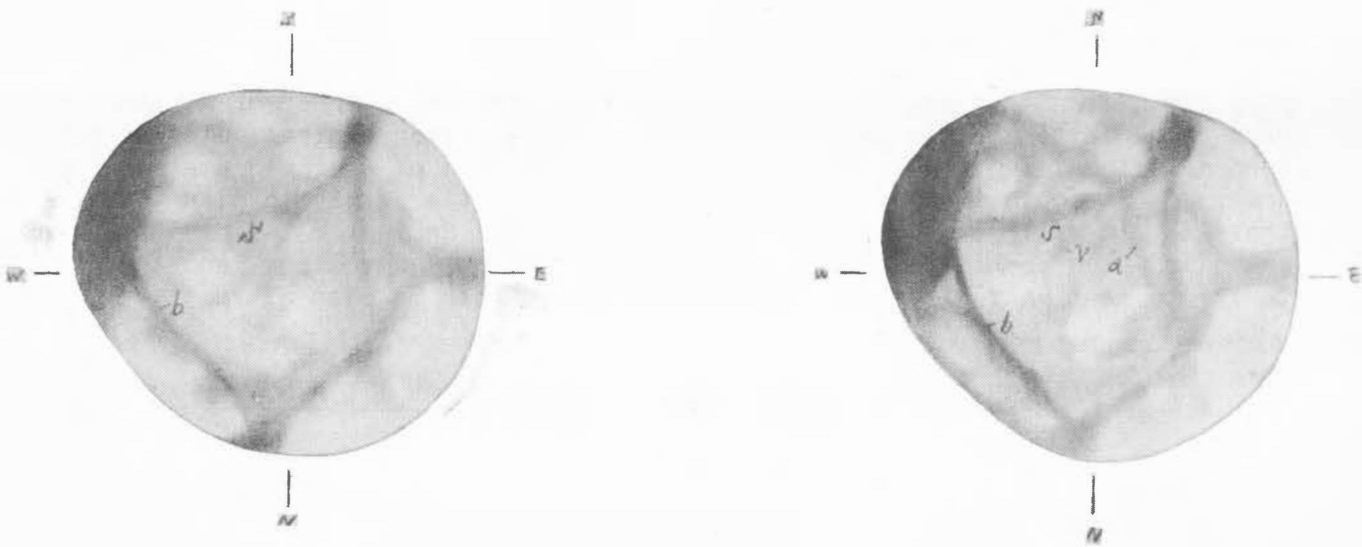


Fig. 6. Lunar Crater Conon. S. Ebisawa. 13-inch refl. 250X. August 23, 1950. 12^h 15^m, U.T. Colongitude = 34°.6

THE COMING 1951 NATIONAL CONVENTION OF THE ASTRONOMICAL LEAGUE

It has been decided that this year's National Convention of the Astronomical League will be held at Chapel Hill, North Carolina, on September 1-3. Two outstanding features of the Convention will be an annular eclipse of the sun visible from Chapel Hill and a demonstration of the Zeiss Planetarium on the campus of the University of North Carolina. Details about the Convention will appear in Sky and Telescope as plans mature.

The League has very kindly invited the Association of Lunar and Planetary Observers to have papers and exhibits at this Convention. It is by no means too early for us to start making plans. The papers may be on any subject of astronomical interest. They may deal with observational programs, with techniques to improve observing, with optical design, or with other matters.

Section Recorders please note! - Many of our members have ideas that would surely be of interest to their fellow-amateurs. We hence hope that they will organize these ideas into papers and present them at Chapel Hill. If you have a pet astronomical project, let's hear about it.

The exhibits are under the charge of the Convention Chairman, Mr. G. R. Wright, 830 Hemlock Court, N. W., Washington 12, D. C. Mr. Wright in personal conversations with the editor last December expressed his extreme interest in having an effective A.L.P.O. exhibit. It should be so planned as to give helpful instructions in our observing programs. It was once thought that instructions could best be given by personal supervision during a Convention right at the telescope, but this procedure was rather ineffective in practice. There will be the great advantage during the 1951 Convention of the availability of the planetarium for instructional purposes. Mr. Wright and the editor would be glad to receive ideas and suggestions from A.L.P.O. members about how our exhibit can be made most effective and informative for the general amateur. Since objects currently observable are likely to command greatest interest, it might be noted that at the time of the Convention Jupiter will be well placed in the evening sky and Venus will be approaching inferior conjunction. (As is customary at solar eclipses, the moon will be new.)

Finally, it is greatly desired that a substantial number of A.L.P.O. members should attend this Convention. To be sure, geographical distances have been a serious handicap to the effective organization of American amateur astronomers. Although it is also true that it is a little early to plan September travels, it will do no harm to encircle the dates September 1-3, 1951, on your calendar - the combination of a planetarium, an annular eclipse, and the opportunity to meet many of your fellow-astronomers should be most attractive!

A SIMPLE AND IMPORTANT OBSERVATIONAL PROGRAM FOR A.L.P.O. MEMBERS

by Walter H. Haas

The amateur observer is often asking, "What can I do with my telescope that if of scientific value?" Other amateurs frequently inquire, "How may our observations be coordinated with the researches of the professional astronomers?" I have often been asked both questions by A.L.P.O. members, and I suspect that I have not always given satisfying answers! This article will describe, however, a specific observational project for the next few months which is so simple as to require no more equipment than binoculars or field-glasses but is at the same time of definite worth to our professional colleagues. The article is in part the outgrowth of an enjoyable personal conversation with Dr. Joseph Ashbrook of the Yale University Observatory in December, 1950; he has further contributed much of the information here presented.

Dr. W. Becker opened a new field in planetary observing by amateurs through his discovery that all the outer planets undergo slow year-to-year changes in brightness. Readers interested in details should consult "The Meteorology of Other Planets", by Joseph Ashbrook, in The Scientific Monthly, Vol. LXIX, No. 4, October, 1949. With the simple and inexpensive equipment available to most amateurs these changes are most easily observable with Uranus and Neptune. In fact, simple visual estimates of the brightness of these two planets are of considerable scientific value. The brightness of Uranus, after allowance is made for its changing distance from the sun and from the earth, varies periodically by nearly half a magnitude in an 8-year cycle. Although the range in brightness is thus small, the changes are clearly shown when annual means of the observed mangitudes of the planet are taken. The cause of this variation is wholly unexplained. It is very desirable that observations of the brightness of Uranus should be continued in order to provide the light-curve of this planet.

I urge A.L.P.O. members to observe Uranus according to the following plan: Use binoculars, for the planet has a visual magnitude between five and six. Actually, binoculars will be much better than any other instrument during the balance of the current 1950-51 apparition; for the comparison stars that must be used are as much as five degrees distant from the planet, and hence not even a finder will have a large enough field of view to allow accurate comparisons of brightness. After locating Uranus, select some two of the comparison stars from the list given below, one star being a little brighter than the planet and the other a little fainter. Then estimate the brightness of Uranus on a scale of zero to ten, where zero represents the brightness of the brighter comparison star and ten that of the fainter one. It should be noted that this plan is neither the Argelaender step-estimate nor the A.A.V.S.O. procedure. However, it is easy enough to follow. It is important that all participating observers should use this scale for their estimates so that all the work will be uniform enough for an easy and meaningful reduction. As an example, if a and b are the brighter and the fainter comparison star respectively, then an estimate of a 5 Uranus 5 b would mean that the brightness of the planet was exactly midway between those of a and b. The estimate a 1 Uranus 9 b would mean that Uranus was very slightly fainter than a, a 10 Uranus 0 b would indicate equality with b; etc. It is not in the least necessary, and perhaps it is not even desirable, to know the stellar magnitudes of the comparison stars used. On each night of observation compare Uranus with several different pairs of stars, if possible, in the manner described above. It will be very satisfactory if each observer undertaking this work will estimate the light of the planet on about eight or ten nights in all.

We give an ephemeris of Uranus:

Date	Right Ascension (1950)	Declination (1950)
1951, February 1	6^h $26^m.8$	+ 23° 38'
February 15	6 25.0	+ 23 39
March 1	6 24.0	+ 23 40
March 15	6 23.6	+ 23 40
April 1	6 24.2	+ 23 39
April 15	6 25.5	+ 23 38
May 1	6 27.8	+ 23 37
May 15	6 30.5	+ 23 35

Comparison stars used must be selected from the following list:

Star	Right Ascension 1950	Declination 1950	Approximate Visual Magnitude
a = 49 Aurigae	6^h $32^m.1$	28° 1'	5
b = 53 Aurigae	6 35.2	29 1	5½
c	6 49.0	23 36	5½
d	6 22.5	23 30	6
e = 9 Geminorum	6 14.0	23 45	6
f	6 35.4	24 38	6½

As remarked above, the observer does not need to know exact stellar magnitudes.

We think that the information in the two tables above will be sufficient for this study and hence omit any chart of the planet's path and its field of stars. Presumably our readers have access to Star Atlases such as those of Norton and Webb. It might be a great convenience, however, to sketch in the path of Uranus in your Atlas from the data listed above and to mark thereon the six comparison stars.

We cordially invite the cooperation of the American Association of Variable Star Observers in this study of Uranus. What we are describing is, after all, variable-star technique. A number of our members are also active in the A.A.V.S.O. The simple project here outlined could certainly easily be included in the course of an evening of variable-star work.

The brightness of Neptune can be studied in the fashion here described for Uranus, but finders and very small apertures may be preferable to binoculars on

DRAWINGS OF JUPITER BY A.L.P.O. MEMBERS
IN 1950

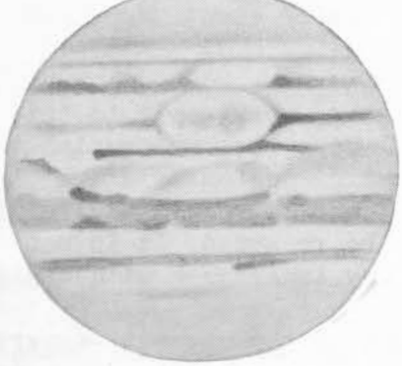


Fig. 1. S. Murayama.
8-inch refl. 183X.
October 8. 12^h18^m, U.T.
C.M.$_1$= 228°.-C.M.$_2$ = 247°.

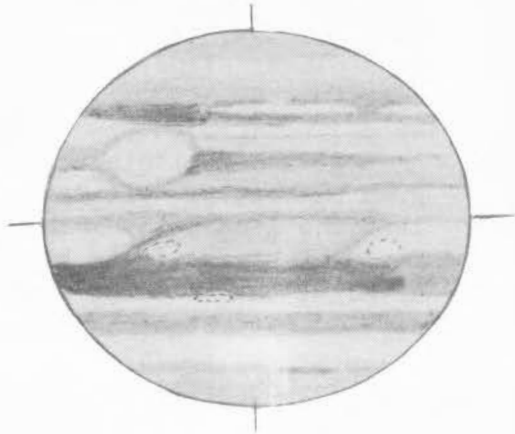


Fig. 2. R. Missert
8-inch refr. 360X.
September 7. 2^h40^m, U.T.
C.M.$_1$ = 20°.C.M.$_2$ = 279°.

Fig. 3. E. Epstein.
6-inch refl. 188X.
September 23. 6^h25^m, U.T.
C.M.$_1$ = 161°. C.M.$_2$ = 296°.

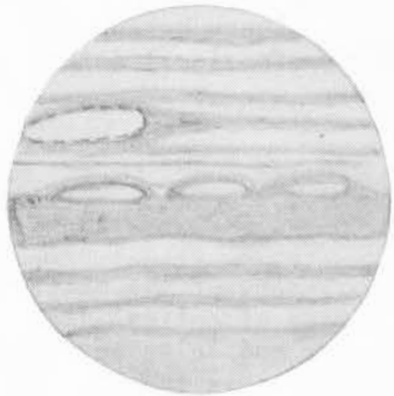


Fig. 4. P. J. Nemecek.
13-inch refl. 200X.
September 11. 4^h 5^m, U.T.
C.M.$_1$ = 203°. C.M.$_2$ = 68°.

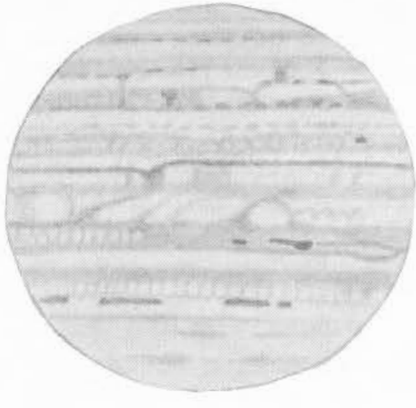


Fig. 5. E. E. Hare
12-inch refl. 200X,300X.
August 17. 5^h 10^m, U.T.
C.M.$_1$ = 32°. C.M.$_2$ = 90°.

this dimmer planet. We may carry an article specifically about Neptune in the near future.

All the principles and techniques of variable star work apply to this program on Uranus. In making the observations it will be a wise precaution to see that the line joining the eyes preserves a constant direction relative to the field of stars. It is best to avoid observing when there is moonlight, twilight, or haze; but if these conditions exist, they should be recorded. It is not anticipated that atmospheric seeing-effects will be of any importance with binoculars.

The observations are to be reported at the end of the current apparition (thus in May or June, 1951) to Walter H. Haas, 167 W. Lucero St., Las Cruces, New Mexico, on a form which I shall supply. There will be no charge for this form; it is desired only that it should be used. If interested, write me today for your copy of the form. Arrangements have been made for the reduction and discussion of these observations of the brightness of Uranus by Dr. Joseph Ashbrook, Yale University Observatory, New Haven 11, Connecticut. He will be very glad to furnish additional information to those requesting it of him.

We have here a simple, easy, and worthwhile project and also one of interest to professional astronomers. Let us all do something about it!

SOME SUGGESTIONS ABOUT EYEPIECES

by Allyn J. Thompson

Some of the military-instrument eyepieces used in the late war were masterpieces of optical design, and it has been the fortunate lot of the amateur astronomer and telescope-maker to fall heir to the surplus supply. One of the best of these is the "M-1", consisting of two identical achromats, with an equivalent focal length of about 0.765" and an apparent field of about 50°. Its only disadvantage, from the astronomer's standpoint, is its great eye relief, or exit pupil distance. Its wide field makes it an excellent eyepiece for use with a Barlow lens; but as use of the latter further extends the eye distance so that prolonged observing eventually descends to a sparring match between the eye and an elusive exit pupil invisibly hovering in spatial darkness (with the eye usually being worsted), the writer sought to do something about it. The solution finally arrived at consisted of the addition of a plano-convex field lens of 2" focal length, placed 1/8" ahead of the achromatic pair (see Fig. 1 on pg. 1). The original spacing of the M-1 elements was maintained. The e.f.l. of the new combination is 0.7", and its apparent field of 55° takes in the same width of field as the unaltered M-1. Save for a mild increase in distortion, there is little to distinguish the definition of the new arrangement from that of an orthoscopic. The eye distance is considerably shortened, perhaps a trifle too much for most comfortable use at the Newtonian focus, but is made comfortably convenient when used with a Barlow lens, as was the actuating motive for the experiment.

Newcomers on the telescope-making scene may be too late to avail themselves of the fast-depleting supplies of wartime eyepieces and will have to break in, as did their elder brethren in pre-war days, on conventional Ramsden eyepieces. These, of course, suffer badly in one way or another when compared to the modern orthoscopic, achromatic, Kellner, modified Kellner, and Erfle types. With a thought, then, to the amateur's future chances of acquiring an eyepiece comparable to one of the fancier kinds named, experiments combining such lenses as one is able at any time to obtain were made. Probably the best combination met with consists of a Hastings triplet for the eye lens and a plano-convex field lens (See Fig. 2 on pg. 1). The triplet is a magnifier known as a triple aplanat, designed by Charles S. Hastings and manufactured in this country by Bausch & Lomb Optical Company. It is obtainable at shops dealing in optical merchandise and currently can also be obtained, unmounted and in a one-inch focal length, from a dealer in war-surplus optical goods.* By itself, the triplet makes a splendid ocular; but its field, about 30°, is on the scanty side. In the particular instance illustrated the focal lengths of the field lens and the triplet eye lens are $1\frac{1}{2}$" and 1" respectively; the separation $\underline{s}$ is 7/16". The e.f.l. of the combination is 0.8", and the apparent field is 44°.

Because of field curvature, neither of these oculars (which we may call "mongrels") works well at low focal ratios. This should not, of course, be construed as a reflection on their virtues; for it is not easy to find an eyepiece of any lineage, and of such wide field, that will. But at F/8 and above, little cause for criticism can be found. The addition of the uncorrected and uncorrected-for plano-convex elements theoretically upsets the achromatism; and in the case of the altered M-1 this situation is borne out in fact, for a very slight amount of color shows up in the outer parts of the field. The field of the altered Hastings, however, is apparently colorless out to the edge. Curvature of field in this eyepiece becomes innocuous at high ratios so that when it is used either in a Cassegrainian telescope or at the Barlow focus in a Newtonian, definition at the edge is practically as sharp as at the center. While one may be inclined then to rate this eyepiece better than the modified M-1, in fairness to the latter it should be remembered that its working field is much larger.

For use at the Barlow focus, a Huygenian eyepiece is nearly as good as either of the above and is less expensive to make. A particular instance of the writer's is one in which the focal length ratio of field and eye lenses is two to one. The field lens, purchased for 35 cents, has a focal length of 2" and was originally wider and thicker than it needed to be for the purpose. Reduction was made by grinding away on the plane side until the lens was suitably thinned. In the operation, the lens was held under the fingers, the grinding being evenly distributed all over the surface of a 6-inch flat disk. It was necessary, of course, to be clinically fastidious about keeping abrasive from between the fingers and the convex lens surface; and this was successfully accomplished with no scratches occurring. Grinding and polishing (to straight interference bands when tested against an optical flat) were done in a single evening. The lens was then pitched to the end of a piece of tubing in the lathe, was optically centered, and was edged to the desired diameter. The eye lens of 1" focal length cost 15 cents. The apparent field of the eyepiece is about 50°, and at high focal ratios it is practically without color. The definition in general, out to the edge, is hardly inferior to that of far more expensive types.

Properly constructed, a field stop should be placed in the focal plane of all eyepieces. In the case of the positive types this stop is in advance of the field lens. For the eyepieces of Figs. 1 and 2 the field stop apertures (a) are 11/16" and 5/8" respectively. In the Huygens or negative type the stop is placed between the lenses, in the focal plane of the eye lens. Its aperture, in the case of Fig. 3 on pg. 1, is 0.885". Where eyepieces are to be used in conjunction with a Barlow lens the clear aperture of the eye-lens should be opened up more than is ordinarily called for if the full field is to be realized.

* Edmund Salvage Company, Barrington, N. J.; price, $3.75.

Note by Editor. Mr. Allyn J. Thompson will already be well known to many of our readers as a telescope-maker and a writer on optics. His address is 1628 Mayflower Ave., New York 61, New York. On behalf of our readers, we thank Mr. Thompson very much for his valuable suggestions about improving one element of the optical train of the telescope.

DIALYTICAL TITBITS

by E. L. Pfannenschmidt

Response to our publications on the Brachymedial has been rather gratifying, and a number of advanced amateurs have expressed great interest in the instrument's promising design. Attempts are being made to construct experimental Brachys.

Digging further into the problem, the author has succeeded in contacting both Prof. E. Staus and Mr. Anton Kutter in Germany, who are the only living friends of the late Ludwig Schupmann. They have both spent some 15 to 20 years on Medial research and are the trustees of Schupmann's work, being in possession of his original notes, manuscripts, and publications. A number of fine Brachys have come from their drawing boards which were made by Paul Zschokke. The author is indebted to them for much valuable information on the subject. We hope to be able to publish a major contribution by Mr. Kutter soon.

The construction of a Brachymedial is definitely not a job for the novice in amateur optics. If you haven't figured at least 5 precision surfaces to 1/10th wavelength of sodium light and aren't firm in dioptrics, don't attempt to make one yet. It is true that only spherical surfaces are involved; but, being 4 to 5 in number, they demand strict figuring tolerances if nearly perfect definition is to be the result. Figuring the crown glass object lens to 1/8th wave will do, but the elements of the compensating unit should be 1/10th or better. Advanced amateurs will, however, encounter no serious difficulties.

Some of the instrument's advantages are: the compactness of its elements, reduced weight and easy handling, the closed tube, the use of glasses with normal indices, the small diameter of the flint component, the omni-spherical lens surfaces, its improved chromatic correction, its nearly perfect definition, and the comparative cheapness of construction. Its main disadvantages are: the number of lens surfaces involved, strict figuring tolerances, the exceedingly close mechanical alinement of its optical elements, the necessity to coat all air-glass surfaces, and its comparatively small field of view.

A few notes on theory and design may be of value. In the July and October, 1950, issues our drawings show a plano-convex crown glass object lens. This is not the best type of lens form to choose; a better lens is a crown glass positive meniscus, for this lens form comes nearest to meeting the Sine-requirements. Convince yourself by studying C. A. Steinheil's and E. Abbe's work or by inspecting a photographic Aplanat. The radii of an object lens of approx. F/10 are not too short, the R2 being the longer. All spherical surfaces in an eq. F/12 or F/15 Brachymedial may be called superficial rather than deep, which adds greatly to the convenience of grinding, etc. The crown glass lens need not be thick; 1/2 to 1 inch at the edge will do for diameters up to 16 inches.

However, it can be shown that the Sine and Gauss requirements cannot be met 100% in a Brachymedial. The best compromise is achieved in a design employing an s-value of 2.00. If the chromatic difference of magnification (a higher order aberration) is also to be eliminated - as it must, if perfect achromatization is to be achieved in a refractor - then special color compensating eyepieces are required. This deplorable disadvantage increases in magnitude and in proportion to any further increase in s beyond 2.00 and is the reason why Schupmann later designed yet another type of Medial, which we shall discuss here in future issues.

An F/15 Brachymedial of s = 2.00, properly made but without color compensating eyepieces, should show less secondary spectrum that even the best F/15 refractor of the same size, which is important in bigger apertures. The instrument's color correction could be improved by either calculating and constructing special eyepieces or by employing compensating microscope eyepieces available on the market. Even in the latter, less advantageous, solution chromatic differences of magnification may be lessened to approx. 30% of the amount shown in any good F/15 refractor. The Brachy's refraction curve will then be approx. equal to that of the well known Carl Zeiss 3-element apochromatic B-Type object glass.

Zeiss color compensating microscope eyepieces have a negative dispersion value of 0.60. Other products on the market have similar values ranging from 0.30 to 0.90. The latter should be employed if available since the higher values naturally give better results in an s = 2.00 Brachy.

Testing the optical surfaces in the type of Brachy described here is easy. There are 5 spherical and 1 plane surface (that of the deflecting flat) to be figured. Of these, 4 are concave and may be tested according to Foucault or Ronchi. The convex front surface (R1) of the meniscus should be tested according to King prior to the grinding of its inner, concave surface. The flat can be tested with any of the properly figured concave lenses.

Both the object lens and the compensating unit should have carefully made mechanical alinement facilities, and the eyepiece holder is best mounted on a horizontal sled.

What about the results of all these troubles? Well, Mr. Kutter made a 5-inch F/15, eq. F/20 Brachymedial with an s-value of 2.00. Its tube length is 50 inches. The chromatic differences of magnification aren't eliminated completely because he was forced to use compensating microscope eyepieces with a negative dispersion value of only 0.90. Definition is superb, and he affirms that not even a trained and color sensitive eye is able to detect any trace of secondary spectrum. Planetary views are wonderful. The telescope was originally designed for an F/12 seven inch objective but had to be altered because of difficulties in procuring glass during the war. Eight inch F/15 Brachys of s = 2.00 will perform equally well with the compensating eyepiece mentioned, provided that they are properly calculated and figured. The Brachy is your apochromatic OG for advanced planetary research work, and we hope that many of you will try making one.

Postscript by Editor. Mr. E. L. Pfannenschmidt is Director of the Planet Section of the Bund der Sternfreunde in western Germany; and his address is (20b) Einbeck-Hannover, Grimsehl Strasse 18, British Zone, Germany. His two previous papers in The Strolling Astronomer (in July and October, 1950) on the optical design of the Medial Telescope aroused much interest among A.L.P.O. members, and we think that his third paper here will help answer some of the questions raised. In particular, note the optical tolerances demanded in making a Medial. We thank our German colleague for another very interesting contribution.

THE METEORITE OF THE CAMPO DEL CIELO, ARGENTINA

by Lorenzo Orestes Giacomelli
(translated from Spanish into English)

[Foreword by Editor. Soon after Mr. Lorenzo Orestes Giacomelli, Santa Fe 4124, Buenos Aires, Republica Argentina joined the A.L.P.O. last year, Dr. Lincoln La Paz of the University of New Mexico and the editor requested of him any information that he might be kind enough to furnish concerning a meteoritic fall in the Campo del Cielo ("Field of Heaven") region of Argentina. Mr. Giacomelli's response was indeed more than generous! At obviously vast expenditure of time and effort he compiled a voluminous 130-page report on the Campo del Cielo meteorites; this "book" (surely it deserves to be so called!) includes a large amount of original source material, sketches of the craters in the region, a bibliography of publications, a comparative outline of evidence for the reality of the Meson de Fierro ("Table of Iron"), etc. We regret that it is impossible to publish such a quantity of material in The Strolling Astronomer, though we do want to present some extracts from it in future issues. (It may be published, at least in part, in larger magazines.) Here we merely give a translation of a letter from Mr. Giacomelli to the editor dated October 28, 1950. Dr. La Paz and the editor express their very sincere thanks to Mr. Giacomelli for his extensive and very cooperative work. But let our Argentine friend tell his own story; we think that you, good reader, will find it a fascinating one.]

Replying to your welcome request and that of Dr. Lincoln La Paz, I have the pleasure to send you under separate cover a transcription as complete as possible of all the references collected concerning the craters and the meteorite of the Campo del Cielo.

I must tell you, Mr. Haas, that I am a modest subscriber, very much interested especially with all that relates to the astronomical sciences. I have the pleasure to be admitted as a member of the A.L.P.O., of which you are the Director; also I am an associate of the Société Astronomique de France. My aim has been to gather all the literature I could about the meteorite of the Gran Chaco with the result that, besides publications at present completely out of print for sale to the public and in addition to data found in my private Library, I had recourse for the great majority of references to the publications of the Argentine Museum of Natural History of Buenos Aires, the Argentine Scientific Society, the Directory of Mines and Geology of Buenos Aires, etc., and have consulted important newspapers of this Capital and others from the interior of the country, finding in all these sources, personally, the material which I described. In this manner I have come to group the studies relating to the meteorite, as well as what I have written about it. The works carried out by different scientific personalities I transcribed separately with a corresponding index for better reading. In continuing, permit me to make a small resumé (besides the one which I sent you separately in an expanded form with full particulars) of what was known up to the year 1929 - and also the latest information gathered by me - concerning:

THE METEORITE OF THE CAMPO DEL CIELO

During the period in which it was an inhospitable region of dangerous animals, where the silence was interrupted only by the courageous honey-seekers ("Meleros"), the only beings who shut themselves up in that hot, savage, and densely entangled region in search of honey, the savage Indians already knew that vast table-land of "Otumpa", which they designated by the native name of "Pilguen Nonralta" or Campo del Cielo because they believed that the "stones" which they encountered in that soil were a message from the sky. This name was known from the 18th century on; and the site was definitely so called, thus this great extension of Argentine land. This region is located on the boundary of the province of Santiago del Estero with the Gran Chaco in the zone located between the 27th and 28th degrees of south latitude and between the 61st and 62nd degrees of longitude west of Greenwich (27° 30' 58"54 S. and 61° 44' 26"05 W.), which forms part of a unity that can be termed "llanura chaco-bonaerense".

The successive discoveries of great blocks of iron cause us to ponder on the privilege of this part of the planet which we inhabit for attracting these meteoritic rocks, especially if we wish to refer to the one which was supposed to have fallen in the pre-Columbian period. We do not have, however, exact information upon the period in which there fell the meteorite of the Gran Chaco, called various things but chiefly known by the common name of Meson de Fierro, given apparently by its configuration, but the records found in the Archive of the Indias at Seville lead us to believe that this stone fell before the discovery of America.

Various expeditions left Santiago del Estero to search for it.

In the year 1576 Hernán Mexía de Miraval made an expedition to the Gran Chaco in search of a large mass of iron, which the Indians had told about and which was thought to be a stone fallen from the sky. On his return he declared, before eyewitnesses, that he had discovered a mass of iron, of which he showed some fragments. De Miraval's is considered the first expedition to the desert in search of the stone of iron. Later, in the year 1774, Bartolomé Francisco de Maguna, knowing of a silver mine in the Chaco, resolved to search for it and found in the desert a slab of metal; its analysis, carried out in Madrid, showed the presence of silver and iron of much purity. In 1776 de Maguna made another journey to the Chaco and extracted various fragments from this large slab; he drew a map showing its location and shape. When the mineral was examined in the year 1778, it was discovered to lack the silver that it was believed to contain, turning out to consist solely of iron.

Later, in the year 1779, Francisco de Ibarra was sent to the Chaco with orders to remove whatever quantity of iron he could. This expedition arrived at the iron slab(Fierro) situated in the great table-land of the desert of"Otumpa", and there they carried out the measurement of the meteorite and cut off some fragments with chisels,with great difficulty because of the hardness of meteoritic iron. These fragments were then analyzed chemically for the first time in 1779 by Miguel O'Gorman (Argentina), and they proved to contain some iron of excellent quality.

There now comes the last expedition which arrived at the Meson de Fierro; and it was led in the year 1783 by Miguel Rubín de Celis, who was sent by the then viceroy of Buenos Aires. This expedition reached the Meson; and as a consequent of the lack of belief in the sidereal origin of meteoritic stones (which disbelief flourished in the epoch prior to the studies of Chladni in 1795) and his supposition that this stone had "roots", de Celis proceeded to dig a deep hole around it and lifted the meteorite out with poles. There was this discovered what he called the "bed" in which the piece of iron was buried, this deeper soil being similar to that on top. However, because of this upturning nothing is known of the depth to which the meteorite penetrated in the hole that it opened,which it is supposed with the passing of time must have become covered with earth and grass along with the meteorite itself. Rubín de Celis made a sketch of the Meson, cutting off fragments from it, and drew a map of its geographical location, presenting in 1786 a paper about it to the Royal Society of London. The fragments he removed were analyzed by J. L. Proust in 1788, then by E. Howard, L. N. Vauquelin, and M. E. Klaproth, who classified it as a nickel-iron alloy.

There followed other expeditions in search of this stone. One of them, in 1803, carried out by Diego Bravo de Rueda, Jerónimo Castellanos, and Fernando Rojas, found, without reaching the Meson a large block of iron weighing about a ton, which the chemical analysis of the period classified as pure meteoritic iron. Some saddletrée pistols were made from part of this block at the Arsenal of War of Buenos Aires, under the direction of Esteban de Luca, one of which was presented in 1816 to President A. Jackson of the United States by the Director, J. M. Pueyrredón; another piece was presented in 1823 to the English Consul, Goodbine Parish, and he in turn sent it to the celebrated physicist, Humphrey Davy, who catalogued it among the 400 meteorites of the British Museum. Esteban de Luca made an analytic study of this piece, but some of his conceptions were subsequently discredited. This fragment was analyzed by E. Howard (London); and his results were made known in the Argentine by the chemist, Manuel Moreno, in 1822 confirming that this iron came from a meteorite. In 1895 Jose J. J. Kyle (Argentina) classified it as meteoritic iron; in the year 1898 the chemist O. Sjöstrõn made a complete analysis of this fragment.

In 1804 an expedition was carried out by Fernando Rojas, about which no concrete facts are known. Finally, other expeditions, both civilian and military, were made between the years 1849 and 1883, none of which attained its principal objective of discovering the great meteorite. It is necessary to point out that all these expeditions were certainly not made with ease; all the members suffered in their turn many and great difficulties; the dense forests, the terrible heat, the bloodthirsty animals and the poisonous ones, the awful solitude in that region filled with barbarity, and above all the lack of water made enormously difficult the labor of the explorers.

We come now to the most recent period, to the year 1913, in which Manuel Santillan Suarez discovered in the region called "Lake of the Paila" various meteoritical pieces, which were analyzed in the Argentine by the chemists Walter Schiller, Hercules Corti, and Enrique Herrero Duclous, who attributed them to a meteoritic origin. In his turn in the year 1923 Francisco Retamar announced the finding of a large block of iron weighing more than four tons, which was given to the Natural History Museum of Buenos Aires and was designated "El Toba". The chemist Auguste Helman Gauna (Argentina) made the first chemical study of this stone and observed the Widmanstaetten Figures, though these were not revealed in a later analysis. Two more meteoritic pieces were discovered and were transferred in their turn to the Museum of Buenos Aires, one being named "El Mocovi." The chemist E. Herrero Duclous made analytical studies of both "El Toba" and "El Mocovi" in the year 1925 and 1929. His studies revealed in the constitution of "El Toba" ten dominant chemical elements: iron, nickel, cobalt, carbon (as graphite), tin sulphur, phosphorus, chronium, manganese, and silicon, indicating for the pieces analyzed a meteoritic origin.

The pieces discovered during the present century have all been found in the environs of the Estación Gancedo, Chaco Nacional (situated at 27° 30' 08" south latitude and 61° 42' 23" west longitude) within the bounds of the Campo del Cielo. Other fragments from the Campo del Cielo, not precisely located and of small weight, were donated at the beginning of this century to the Museum of Buenos Aires by the learned Argentine Florentino Ameghino and by Santiago Roth, Antenor Alvarez, and Enrique de Carles, being analyzed by E. Herro Ducloux.

In addition to the pieces mentioned as present in the Museum of Natural History of Buenos Aires, there also exist other pieces in the Museum of La Plata, the Museum of Natural History of Paris, the Field Museum of Chicago, and the Ward Coonley Collection of Chicago; and others are in private collections.

In the year 1923 the Argentine geologist Juan Jose Nágera went to the Chaco to make a geological study of the region of the Campo del Cielo, of the craters and the meteorite, contributing to the clarification of the origin of the iron masses in this region. He studied the craters, believing that one of them, which was called "Rubín de Celis" and was the most ancient and the deepest of all, could be of the pre-Spanish period, and giving rise to the thought that the fall of the meteorite of the Gran Chaco took place before the discovery of America. He was of the opinion, however, that these craters might be of human construction, being of different ages. As regards the iron fragments that he discovered in the "Crater Rubín de Celis", after studying them he referred to the analyses made by O. Sjöströn and those performed by H. Corti to suggest in addition the meteoritic origin of the pieces discovered - if indeed they were not able to obtain the Widmanstaetten Figures.

The Argentine geologist Enrique de Carles, who brought about the removal of the meteorite afterwards called "El Toba" to the Museum of Buenos Aires, in 1924, studied this meteorite at its place of origin.

Other persons have occupied themselves with the meteorites of the Chaco in one way or another; among them are A. J. Carranza, A. Gancedo, J. de la Serna, C. Onelli, M. Doello Jurado, E. Sparn, and M. Kantor of Argentina and G. T. Prior, M. Hey, and A. L. Coulsen of England.

The study as well as the value of the metal, the geographic location, and the hypothetical ownership of the great meteorite gave studious Argentinians motives to put forth their points of view on scientific controversies and also in order to clarify equivocations, since some did not believe in the existence of the pieces and others attributed them to a volcanic origin; there were also those who took for granted their rights over the great stone in the event that they should find it.

Now, Mr. Haas, this information covers up to 1929, as I told you before, the facts which I have been able to gather from various sources. In order to complete the information which I want to send to you, it remains only to report the latest news about the matter. You asked me to make a personal visit, if possible, to the Campo del Cielo with the object of gathering information upon it. I know something of the region because I have made trips to the province of Entre Rios; and it has been my desire to make this visit and to take some photographs and get a firsthand idea of the area, but it has not been possible for two reasons: first, because of the impossibility of my reaching the point in question, a distance of some 1,200 kilometers from this Capital, and second, because I would not be able right now to give you adequate scientific information in the light of what has already been done. Also, it would have been necessary to organize a scientific expedition and to explore in an inconclusive manner the great area known as the Campo del Cielo, examining the ground in all directions with an electromagnetic meteorite detector like the one constructed by Dr. Lincoln La Paz.

But since I believe that these circumstances now hindering me are not at cross purposes with the interest which one can have in all that pertains to science, I have wanted to obtain all recent information about the present state of the investigations of the meteorite of Gran Chaco in order to be able to give you the most complete information possible about such an interesting matter. With the object of trying to augment the data already acquired and brought to light and having obtained what I wanted up to the year 1942, I consulted the "Bibliography of the Geology of Argentine" by Enrique Sparn in which there are mentioned the publications which I have listed. From this date forward I did not find any reference to publications about the meteorite of Chaco. I have gone to the Library of the Directory of Mines and Geology of Buenos Aires, finding no information upon new publications nor upon a single new discovery about the great stone. I have visited, and had the pleasure of talking with, the geologist Dr. Juan José Nágera who told me that he knew of no more publications or recent information on it, confirming for me that nothing is now being found out about the famous Meson de Fierro, and repeating what he had written about it when he had an opportunity: That according to the study which he had made of the craters of the Campo del Cielo, they presented visible signs of being of human construction, and that if thecraters of the "Black Lake" and "Rubín de Celis" could be the results of meteoritic impacts, this hypothesis had no confirmation from him.

Dr. Romeo Croce of the Geological Section of the National Museum of Natural History of Buenos Aires has had the kindness to inform me that at the present time they know nothing new concerning the Meson de Fierro, and in the library of this Museum they made available to me all the literature which they had relating to this stone. From publications in my private Library I have transcribed some extracts which relate to the Campo del Cielo and which prove what vague and inaccurate concepts have been published with respect to that zone of the Chaco.

I consider that I have not gone to the sources of information most important for the object I desired.

The illustrations of the sketches of the stone and of "El Toba" which I am sending you are photo copies which I have had made from the work of A. Alvarez, "El Meteorito del Chaco". It was not possible for me to get a small fragment of the meteorite "El Toba" to send to you as a sample, as would have been my desire. In my visits to the Museum of Buenos Aires I have often seen this meteorite, "El Toba", which is displayed in a special place at the entrance to the Museum.

As regards the giant, principal meteoritic stone of the Campo del Cielo, the one known down through time as the Meson de Fierro, we can say with certainty that nothing is known of it since up to now it has not been possible to locate it, although there are found possibilities of its existence in accord with a discreet judgment of the matter in the darkness of uncertainty.

I hope and desire with this, Mr. Haas, to have fulfilled your welcome request; and I think that you will be able to inform yourself duly about the meteorite of the Campo del Cielo with this work which I send you, compilations and observations made by me with the best will and interest and the desire that they will be of value for the gratuitous goals which the esteemed Association is pursuing.

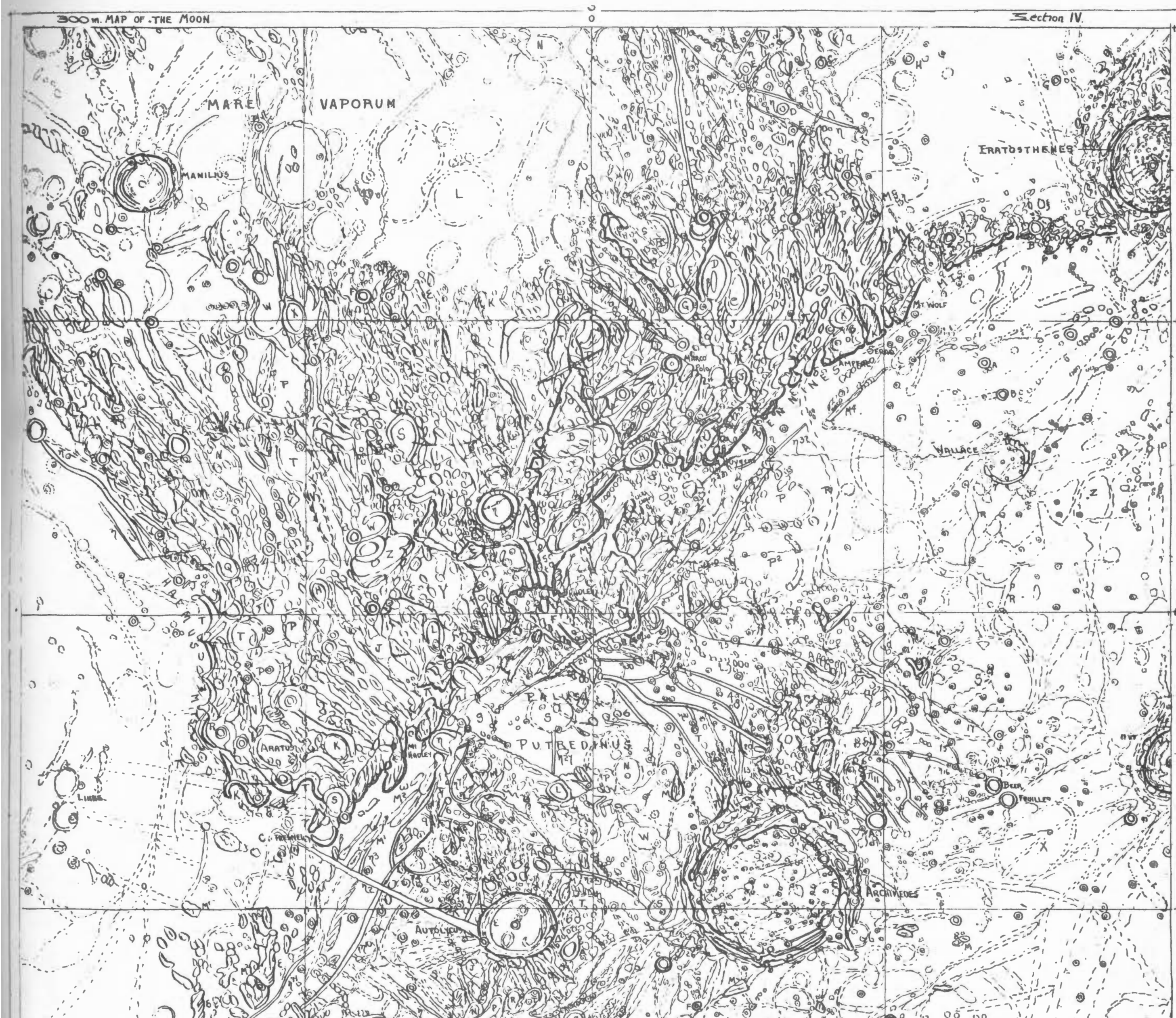
[On November 5, 1950, Mr. Giacomelli wrote that the Geological Division of the Museum of Natural History of B,enos Aires was preparing to send an expedition to the Gran Chaco to search for the Meson. The date of departure of the expedition was not then known. Dr. Romeo Croce invited Mr. Giacomelli to join this expedition, but our contributor was obliged to decline with regret. This expedition may well uncover significant new information about the meteoritic fall herein discussed. - Editor]

OBSERVATIONS AND COMMENTS

We have been very pleased to note the keen interest of many of our readers in Dr. Bartlett's article called "Maedler's Square" in our December, 1950, issue. In his article our Baltimore colleague presented strong evidence for a major topographical change in a large lunar formation. H. G. Allen, C. M. Cyrus, and a few other A.L.P.O. members have made recent observations of the region of Maedler's Square and have found its present appearance to be substantially in accord with Dr. Bartlett's descriptions. The remarkable features and artificial-looking aspect noted by Maedler, Webb, and Neison have been lacking. Of course, these recent observations shed no direct light on the problem of a major topographical change in the past. The editor has sent out several inquiries in attempts to obtain evidence on this point, including photographic evidence. When the replies have been received, they will be discussed in a future issue. A photograph taken by L. M. Rutherford in 1870 (and kindly shown to the editor at the Harvard College Observatory on December 19, 1950, by Dr. Dorrit Hoffliet) reveals that the modern appearance of the Square already existed in that year. Therefore, any change that occurred must have occurred before 1870.

In several of our 1950 issues we recorded a number of observations of curious objects seen crossing the sun or the moon. Speaking of such objects, Mr. H. G. Allen wrote in part as follows on December 10: "I have never seen anything crossing the sun or moon that I wasn't sure I could identify. Many birds and one airplane were observed crossing the moon. Besides them I have also seen a number of black specks, especially at times when I accidentally jarred the tube of the telescope while observing. At first this puzzled me until I jarred the tube purposely, and a few more would slide past. They were undoubtedly due to dust, probably on the field-lens of the eyepiece. They were usually in fairly good focus [i.e., apparently sharply defined - Editor.] Perhaps this reason may explain some of the curious objects." Mr. Allen's telescope is a 3.5-inch reflector.

We have on hand a single observation of Saturn during its current apparition, one made by L. T. Johnson with his 10-inch reflector on December 9, 1950. (As is usual in The Strolling Astronomer, all dates are by Universal Time). The rings were very dull. Cassini's Division was seen at the ansae, but the Crape Ring was not definitely seen. The rings and their shadow were clearly resolved near the limbs of the planet but not at the central meridian (C.M.). Two or more dark spots were strongly suspected in a broad North Temperate Belt. The South Equatorial Belt was more narrow and less conspicuous than the North Temperate Belt. The glove of Saturn was dusky both north of the N.T.B. and south of the S.E.B.; it was bright between these two belts.



SECTION IV

OF

H.P. WILKINS 300-INCH MAP OF THE MOON

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