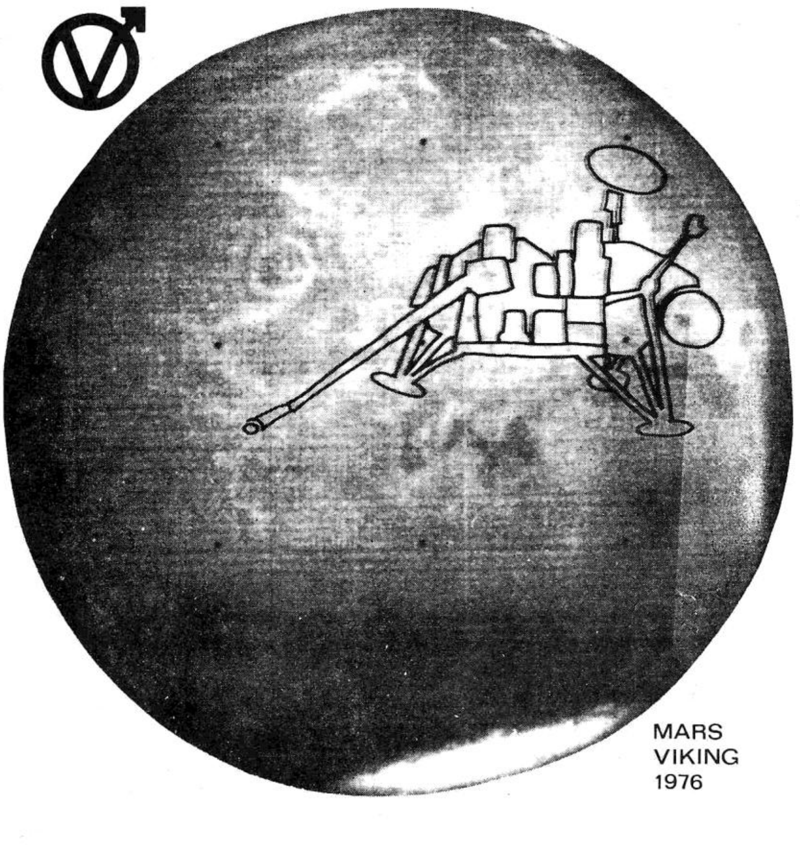
The WASP



JULY 1976

THE JOURNAL OF THE WARREN ASTRONOMICAL SOCIETY

THE WARREN ASTRONOMICAL SOCIETY PAPER (W.A.S.P.) IS PUBLISHED BY THE W.A.S., MONTHLY AS A PRIVILEGE OF MEMBERSHIP. THE W.A.S. IS ALSO A CAMPUS CLUB OF MACOMB COMMUNITY COLLEGE-SOUTH CAMPUS, WARREN MICH.

The Warren Astronomical Society (W.A.S.) is a local nonprofit organization of amateur astronomers. Membership is open to all interested persons. Annual dues are as follows: Student, K-12 $3.00, College $5.00, Senior Citizen $7.50, Individual $10.00 Family $15.00. Add $6.00 for a one year subscription to Sky & Telescope magazine.

Meetings are held on the first and third Thursday of every month.

Subscriptions and advertisements are free of charge to .all members. Non-member subscriptions and advertisements are available upon arrangement with the Editors of the W.A.S.P. Contributions of any kind are always welcome and should be submitted to the Editors before the first Thursday of the month.

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The Editors of the W.A.S.P. will exchange copies of this publication for other Astronomy club publications on an even exchange basis.

The Warren Astronomical Society maintains contact, sometimes intermittent, with the following Organizations:

The Adams Astronomical Society
The Astronomical League
The Detroit Astronomical Society
The Detroit Observational and Astrophotographic Assoc.
The Fort Wayne Astronomical Society
The Grand Rapids Amateur Astronomical Society
The Kalamazoo Astronomical Society
The M.S.U. Astronomy Club
The Miami Valley Astronomical Society
The Oglethorpe Astronomical Society
The Orange County Astronomers
The Peoria Astronomical Society
The Saint Joseph County Astronomical Society
The Sunset Astronomical Society

Other Amateur Astronomical Clubs are invited to join this exchange of publications.

CLUB NEWS

Attention All Members:

Mr. Richard Loyd, a member for many years of the Detroit Astronomical Society, will be the featured guest speaker at the July 16 general meeting of the W.A.S. His talk will be about the ancient observatories of the World, such as Stonehenge, Babylon and Egypt. Mr. Loyd has personal knowledge of the actual records of some of the oldest astronomical structures still standing in the World today.

THE 1776th ANNUAL SPLASH BASH & PICNIC & STARPARTY

June 26, 4pm.,until,?????

At Lou Faix Residence, 6088 Robinhill Rd.

For more Information call 781-3338

If you wish to attend, please coordinate one picnic dish with Lois Faix.

It was announced at the May 15, general meeting of the W.A.S. that the WASP has a new co-editor. You may have noticed a Change in the WASP. Well, it's the brain child of Roger Civic, your new co-editor. If you wish to contribute anything to the new WASP, please contact Gary Boyd or Roger Civic.

The W.A.S. now has a permanent address. A post office box in East Detroit, for all out of state mail and local delivery. The new address is on the back cover of your new WASP.

The W.A.S. has a new membership card design (we ran out of the old ones) for you new members and old ones who have lost yours or don't as yet have one, please contact Don Misson, our new Treasurer, he will be more than happy to fix you up with a fancy new one.

Several members of the W.A.S. went to the Dayton, Ohio convention last weekend and came away with several prize certificates and about 200 Lbs, of glass, (telescope mirror blanks) the best buy of the lot was made by Rik Hill who now is the proud owner of an 18" diameter mirror blank. Good luck Rik!!!

Minutes of the W.A.S. May 20, 1976

Discussion of the Galaxy Hunt planned for Memorial Day weekend was led by Louis Faix. Persons planning to attend the campout were advised to meet at Stargate at 2 P.M., Saturday, May 29.

Doug Tracy and Dave Dobrzelewski reported on the possibility of acquiring a 10” (f/6) from East Detroit High School. It was generally felt that more information was necessary before action was to be taken.

Ken Wilson brought up the possibility of a field trip to Oakland University for a star party and look through their telescope.

League elections were held in which the W.A.S. voted for the following people; President, Rollin P. VanZandt- V.P., Hollis Schmohe- Sec., James Fox- Treas., No vote was taken.

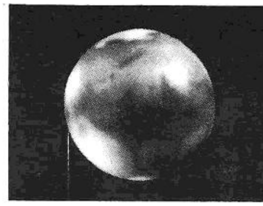
Carl Nobel expressed his appreciation on behalf of the club to the past officers of the W.A.S. He presented Jean Baldwin (treasurer) and Dianne McCullough with a plaque in appreciation of their many years of service to the club. Dianne also presented Jean with a beautiful corsage of flowers.

The W.A.S. then held it's elections after Carl Nobel reviewed the duties of each officer. The following persons were elected: President, Peter Kwentus- First V.P. Rik Hill-Second V. P. Roger Civic- Treas., Don Misson- Sec., Dolores Hill.

The night's program included a showing of slides of Comet West by Ken Wilson and the conjunction of Mars and Saturn by Doug Lanier. Rik Hill explained his proposed Supernova search program and also gave a talk on paper polishing pads, complete with samples. Minutes respectfully submitted by,

Dolores H. Hill

VIKING
Mission to Mars



DATE LINE ••J.P.L. ••Viking information center, June 15. Viking I will be 7 hours late going into orbit around Mars on June 19, it is now 650,000 mi. from Mars. Viking II is running smoothly on time and is 7½ million mi. from Mars. Color TV pictures have been taken by Viking I.

<u>Injection into orbit</u>

As the Viking spacecraft nears the planet Mars, it is maneuvered into the proper attitude for being placed in orbit. The engine will be fired for nearly an hour to place the combined orbiter and lander in a highly elliptical orbit of 930 mi. by 20,500 mi., a period of approximately 24 hours to match Mars' period of rotation.

The spacecraft will be tracked for at least 10 days after achieving orbit to obtain detailed information for a precise landing.

The lander is prepared for separation after confirmation of a landing site based on observational data from Mariner 9 as well as Viking observations. An ideal landing area would be relatively low, wet, safe and interesting.

The primary mission of the Viking lander is 60 days. The design lifetime is 90 days, but it may continue to transmit information for more than one year. Certain instruments will not be operable beyond the planned 60-day mission.

<u>Landing</u>

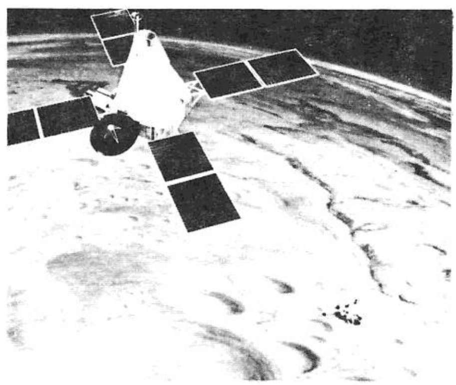
The lander instruments, weigh about 200 Lbs. Entry data will provide information on the composition of the upper atmosphere and on the pressure, temperature and density of the lower atmosphere.

When a landing area has been determined, the lander's power is turned on, and the lander within its aeroshell separates from the orbiter. The aeroshell shields the lander against the intense heat as it decelerates during the high-speed entry through the thin CO2 atmosphere.

A 50-foot parachute is deployed to further decelerate the lander at about 20,000 ft. above the surface. Shortly thereafter, the aeroshell is jettisoned. The parachute is jettisoned about one mi. above the surface as the terminal propulsion system begins firing its three engines. The engines, firing 5 to 10 minutes, slow the lander for a soft landing and shut down just as the foot pads touch the surface.

As soon as the lander is on the surface, all systems except those necessary for science operations are shut down to conserve power. The lander's computer immediately determines its attitude on the surface to provide information necessary for aligning the S-band transmitting/receiving antenna with Earth.

Scientific data and monitoring information are immediately relayed to Earth via the orbiter (the transmission time to Earth, one way is about 20 minutes).



<u>Lander camera</u>
The cameras will give scientists a vastly improved view, in color and stereo, of the Martian topography and surface structure, two facsimile cameras will substitute for man's eyes. They can be directed to look down at the ground nearby, or perform a 360-degree panoramic scan of the entire landscape.

The cameras will take pictures in high quality black-and-white and color, and in the near infra-red region of the spectrum. Pictures taken by the two cameras can also be combined to yield stereoscopic views of the areas.

The facsimile camera operates by using a small mirror which scans a vertical line and projects the image light intensity slowly onto a small detector. After that line is scanned, the camera is turned 0.1 degrees and another vertical line is scanned. This process is repeated many times to build up an image from many scan lines. The detector is a small photocell that converts the light in the picture image to an electronic signal which is then transmitted to Earth. The picture is obtained by reversing the process, converting the electronic signal to a light which is scanned over a film to prepare a negative for making the photograph.

Search for Life

If life exists on Mars, it is probably in the form of microorganisms. The biology instruments will examine three different soil samples, which will also be analyzed by the molecular analysis instruments for organic content and by the X-ray fluorescence spectrometer for chemical composition.

Photosynthetic analysis

Photosynthesis is the process by which organic compounds, such as carbohydrates, are formed by combining basic compounds like carbon dioxide, water and salts, using the Sun as a source of energy. It is a basic life-sustaining process; plant life on Earth consumes carbon dioxide during photosynthesis.

In the Viking experiment, a soil sample is inoculated with carbon dioxide gas that has been labeled with a radioactive tracer. The soil and gas are then allowed to incubate in simulated Martian sunlight for a period of time. Later all remaining gas is flushed out of the chamber and the sample is heated to 1100° F. A substantial quantity of labeled gas present in the chamber after heating would indicate that a photosynthetic process had taken place.

Metabolic analysis

It is possible that the organisms sustain life by obtaining nourishment from organic materials rather than through photosynthesis. A system will "feed" the sample of soil, if organisms are in the sample, and they can consume the food offered to them, they will discard-- as waste-- radioactive carbon labeled in the food, as carbon gases that can be measured. A sharp rise in the production of such metabolic gases would be strong evidence that life is present.

Respiration

As metabolism takes place, the composition of the gaseous environment is in a state of continuous change. For this analysis, which is closely related to the metabolic conversion analysis, already described, the sample is wet with a growth medium.

A sample of Martian atmosphere is pumped into the chamber headspace above the sample and monitored. Changes in the composition of the gases will again be evidence of the existence of life as a result of cellular respiration.

In the event of positive results from one or more of these experiments, a controlled sample will be prepared to further verify the evidence.

Molecular analysis
This investigation will perform a chemical analysis of the Martian atmosphere and sail. The chemistry is important in all scientific aspects of understanding the planet, but particularly so for biology. All known life is organic (composed of substances such as sugars, fats and proteins).

The soil analysis is more complex. The instrument contains several tiny ovens; each can receive a soil sample from the processor. The ovens are heated to 900° F. During heating the organic compounds are vaporized and analyzed. If a living system has not evolved on Mars the organic analysis may help explain and provide knowledge of pre-biological organic chemical evolution.

Physical and seismic characteristics
Geological measurements will be made of the physical and magnetic properties of the surface and of the internal seismic activity. Scientists do not know the level of motion within Mars, but will record for periods long enough to establish whether it is a very active planet or not.

A sensitive miniaturized seismometer is mounted on the lander. The seismic background and the larger events, such as Mars quakes or meteorid impacts, are measured with a three-axis device capable of detecting ground motion transmitted through the lander legs.

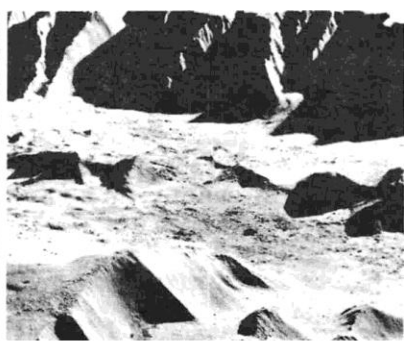
The magnetic properties of the planet are measured by small but powerful magnets mounted on the lander soil sampler. These magnets will come into contact with the surface during soil sample acquisition, and then will be maneuvered in sight of the Viking cameras to be viewed with and without a 4-X magnifying mirror. Pictures of clinging particles will be evidence of magnetic material in the soil.

The cameras will also photograph the footprints of the lander and the trough made by the sampler, enabling scientists to study the cohesive properties of the soil, its porosity, hardness and particle size.

Orbiter

While experiments are proceeding on the surface, the Viking orbiters will be circling overhead, (the design lifetime of the orbiters is 140 days each, but they may continue to operate for as long as two years and then sometime after 50 years, the orbiters will be dragged into the atmosphere of Mars by gravity and burn up or impact the surface), observing the landing sites, so that local measurements made by the landers may be correlated with overall surface effects. The orbiters will look for conditions such as buildup of dust storms, cloud formations, variations in temperature and humidity, and the passage of the seasonal wave of darkening.

The Viking orbiters each carry about 152 lbs. of instruments, consisting of two high-resolution television cameras, an infrared spectrometer and an infrared radiometer. These instruments will be employed to survey landing sites both before and after lander deployment in order to provide data on surface temperature, atmospheric water concentration, the presence of clouds and dust storms and their movement, the topography and color of the terrain.



Imaging system

Viking will extend our knowledge of Mars by examining unique sites at a higher resolution than previously obtained. The Viking visual imaging system on the orbiter will obtain pictures with a resolution of 130 ft. wide per television line at an altitude of 930 mi., permitting one to distinguish objects about the size of a football field.

The orbiter system consists of two identical cameras, each composed of a telescope, filters, TV tube and appropriate electronics.

Picture 1 is taken by camera 1 and stored in the tape recorders. Picture 2 is then taken by camera 2 and, while it is being put in the tape recorder, camera 1 is prepared for taking Picture 3 by erasing the previous picture from the TV tube. This process is repeated until the required pictures are obtained.

Water detection

The Mars atmospheric water detector on the Viking orbiter can detect very small amounts of water vapor with a high resolution.

The water detector is an infrared spectrometer which operates on the following principle: if water vapor is in the atmosphere, it will absorb a particular part of the infrared light that is produced by the Sun in much the same manner that ozone in our atmosphere absorbs the ultraviolet light, or a yellow filter absorbs all colors except yellow. The infrared spectrometer can determine that the particular part of the infrared light has been absorbed and how much has been absorbed. This in turn tells the scientists that there is water vapor in the atmosphere and how much.

Communications

Both the orbiter and the lander are capable of communicating with Earth. The lander system is limited by power and thermal constraints to transmission periods of several hours daily. The orbiter can transmit at high data rates continuously and can be used as a relay station for data transmitted from the lander. Both the lander and the orbiter have data storage systems which collect data at rates higher than the transmission rates to Earth, and both can be commanded over these communicative systems from Earth.

Comment

The findings from Viking should be another giant leap for mankind. There is life somewhere in the vast reaches of space, maybe closer than we think.

Editor, Roger Civic

A.T.M. Make your own . . .

MOUNTain! Carl L. Noble

A mountain has the characteristic of being very stable! A mountain is unmovable! This is the one characteristic that the amateur astronomer strives for, if not demands from his or her mount. It was in this vein that I sought to either buy or make a sturdy mount for my 8 in. f/7 'scope.

I did check into commercial mounts, and I found some fairly good ones. However, I felt that for the price one could be made that was even better. I therefore decided to construct a mount from scratch. But, what did I know about machining, designing, and the like? To my surprise I noticed an interesting design by Ralph Nye in "Sky and Telescope", April 1975. Mr. Nye designed and built a 14¼" Newtonian with a mammoth 2/3 ton mount. Mr. Nye used a system designed around tapered bearings. This intrigued me into thinking if I could make a design similar to Mr. Nye's. I knew 3 inch shafts would be too much for my 8 inch, and 1½" shafts and bearings are hard to come by, so I chose a system centered around 1¼ " Timken tapered roller bearings.

I began with gathering the parts. The 1¼" bearings were given to me by Cary White (It's nice to have friends in the same hobby!). I then had to decide to use steel elements or aluminum elements. Aluminum is nice, but it costs almost as much as gold. I was very fortunate when to my delight under the Christmas tree I found aluminum tubes, etc. I was ready to go to work.

The design called for the bearings to be held apart at a distance of 10 inches. I felt this would give a lot of stability to the entire system. The polar and declination axis are independently held together by 1¼" bolts (the shafts were threaded to produce this}. This allows a very tight fit for the tapered bearings.

End covers were made out of 3½ in. solid stock aluminum and "O-rings" prevent dust and dirt from getting into the bearings.

Machining is a problem! The cost is unbelievable! My good friend, Chris Maresco, machined all the parts for me. Without him, the mount [couldn't happen[1]]. Each machined part has a

[1] Bracketed text added by transcriber as it was missing in the original.

tolerance of only .002" (the mount is nicknamed the "Maresco Mount"). The remaining smaller things which must be done I will do personally on my stepfathers lathe.

The old Stargate clock drive is doing very well folks! It is powered by a D.O.A.A. variable speed drive system. The cradle and saddle is a very interesting innovation. The saddle is constructed by 1/8" aluminum plating. The cradle was made by Steve Maresco for a shop project at his high school. It is made out of high grade maple, and it has 5 wooden dowels to support the ends of the cradle. This is one of the most impressive parts of the entire mount.

In general, the mount is very sturdy. It is perched atop a "U-Optics" pier. The entire weight is approximately 100 - 150 lbs. I had some problems at first with its stability, but "Dr." Lou Faix fixed her up. I am happy to report that it now functions right on the money, and tracks as smooth as silk. There are a few minor adjustments which lie ahead, but I am proud of the way she turned out. I'm anxiously awaiting the time I can pursue some astrophotography with my new system. For the time, effort, and money I put into the system, I feel it is equal if not better than commercial mounts.

I have left a lot of details out of this short explanation, and if you would like some more information, please call me, or drop me a line. Any amateur can build a telescope or mount. I don't feel any deep knowledge is needed in the area of engineering - of course this is something which really is an asset! I learned a lot about making parts just by asking those who know.

So my MOUNTain is just about done. I think I'll enjoy even more the hobby of Astronomy!

OBSERVATORY SCHEDULE

Lectures for the coming month are listed below.

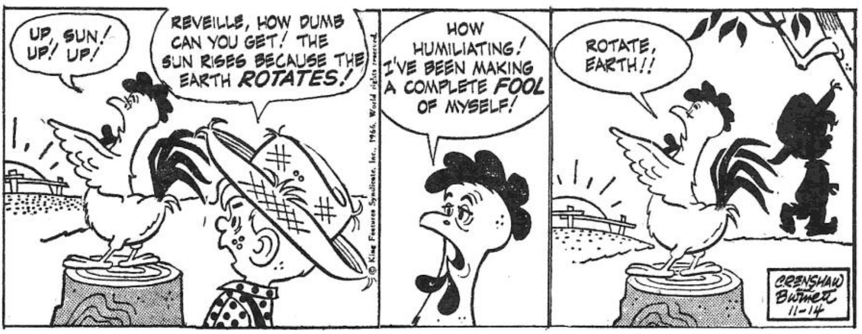
June 18/19 •• Frank McCullough ••791-8752
June 25/26 •• Gary Boyd •••••••••839-0973
July 2/3 •••••Roger Civic ••••••••775-6634
July 9/10 ••••Ray Bullock •••••••879-9458
July 16/17 •••Diane McCullough•• 791-8752
July 23/24 •••Kim Dyer ••••••••• 835-0993
July 30/31 •••Dave Harrington ••• 87'9-6765
The lecturer may select either the Friday or Saturday depending on the weather and their personal schedule. W.A.S. members wishing to be instructed on the operation of observatory and telescope controls should contact the lecturers directly. Additional lecturers and assistants are needed to lessen the load on these faithful old time members. Thank you.

Observatory Report: Roger Civic, Observatory Chairman.

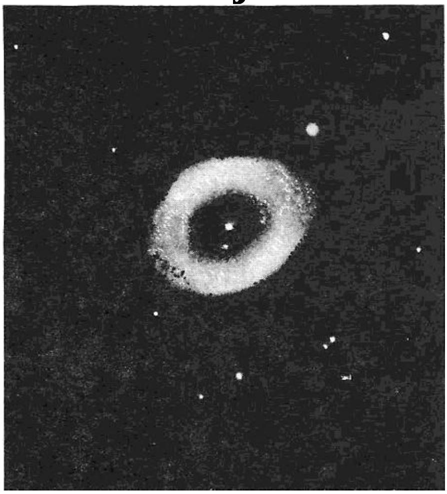
Spring clean-up at Stargate is going on at this point in time. The Building has been cleared of all non-usable material and a wall cabinet with three shelves for useful items like, books, charts, spare light bulbs, fuses and some telescope accessories has been installed on the east wall. The floor of the building is now clean of all debris.

The roof leaks seem to have been stopped. The ceiling now seems to be ready for some new tile and paint. The material for the proposed new raised wooden floor is still being gathered together.

It has been suggested that the old door locks be replaced, the west door cannot be opened from the outside and the east door lock is in marginal condition.



Messier Objects~

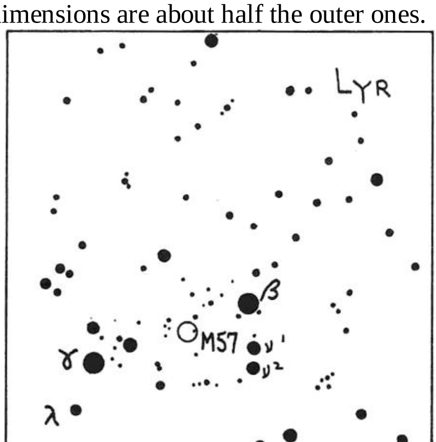


M57 NGC 6720 $18^h51^m.7$ +32° 58’

Planetary Nebula in Lyra

Basic data. The famous Ring nebula was discovered not by Messier but by Antoine Darquier of Toulouse in 1779. It is easily located between Beta and Gamma Lyrae as a patch of light about 1’ in diameter, about as bright as a 9^{th}-magnitude star.

The Ring is elliptical, its longest and shortest diameters being 74" and 62", according to visual measurements by Carl Wirtz. On photographs the major axis appears enlarged. The Ring nebula's inner dimensions are about half the outer ones.



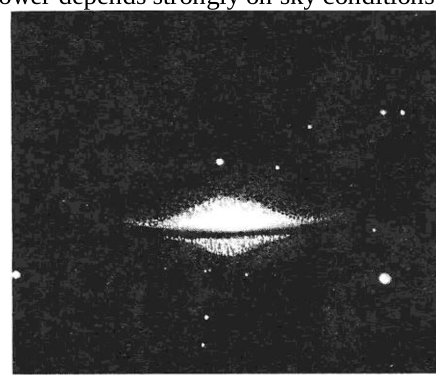
It is known from its spectrum lines that M57 is slowly expanding, but astronomers differ as to whether the expansion has also been detected by measuring photographs taken many years apart.

The central star is a difficult object visually, and magnitude estimates disagree.

E. E. Barnard found 14.1 and H. D. Curtis 15.4. Photographically it is about magnitude 14. The distance of the Ring nebula is still quite uncertain, but is usually estimated in the range from 2,000 to 3,000 light-years.

NGC description. A magnificent object. Annular nebula, bright, pretty large, considerably extended, in Lyra.

Visual appearance. The Ring nebula is a challenge to the observer. This small object bears magnification well, but the most suitable power depends strongly on sky conditions.



Ml04 NGC4594 12^h $37^m.3$ -11° 21'

Galaxy in Virgo

Basic data. As bright as magnitude 8 and as large as 6' by 2', MI04 is easy for amateur telescopes. It is widely known as the Sombrero galaxy because of its large central bulge and dark rim of obscuring dust,

NGC description. Remarkable, very bright. and large, extremely extended in position angle 92°, very suddenly much brighter toward a central nucleus.

Visual appearance. This is a beautiful object for the well-trained eye. Until the observer has gained enough experience, however, it may look as feature less as the great Andromeda galaxy.

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For your own FREE ad to buy, sell, or trade anything astronomical, contact the Editors of the W.A.S.P.

6" R.F.T. Reflector Telescope, tube only. Coulter mirror, Parks fiberglass tube, diagonal holder by Novak, spiral focus eyepiece holder. Only 100.00, FIRM. Contact: Bill Whitney 588-1073.

Complete set of .965" eyepieces & accessories. For use with any refractor. Excellent condition: 25mm-12.5mm-9mm-6mm-4mm, 2X Barlow, star diagonal, erecting prism, adaptor for 1¼" eye piece holder. Cost new, $86 only $36.00, firm. Contact: Roger Civic, 775-6634.

The L.F .K. Astrophotographic guide. Special price to all club members, $1.00. Other guides not as complete are priced at $4.00 & $6.00. Contact: Larry Kalinowski, 776-9720.

Superb quality Dakin 3X Barlow by Vernonscope. 1¼" Dia. W/case. Only $30.00. Firm. 3X barlows are no longer being manufactured, they are hard to find. Contact: Larry Kalinowski, 776-9720.

For sale: Beautifully sculptured full relief models of the Moon's central section, 30° square. Full color plaster castings- 4" X 4" X ½" thick. Great for framing. Special price for all club members, $6.00, Contact: Roger Civic, 775-6634.

K-Mart Spotting scope, 20X to 60X Zoom. 60mm Obj. Alt-azimuth table top tripod with slow motion controls. A steal at $20.00, contact Ken Wilson, 268-9337.

Solar filter: Full aperture solar filter for a Celestron 8. Only 6 months old, with case. 25% off at $150.00. Contact: Rik Hill, 517-635-5548.

Camera lens- perfect condition, like new-55mm f/1.7 Rexatar automatic, straw coated lens, Pentax threads. Only $40.00. Contact: Roger Civic -775-6634.

Wanted: Rack & pinion eyepiece holder. Under $10.00 for a 6" f/10 Refl., also need a tube at least 60" long for the same telescope. Contact: Joe Tocco, 573-8547.