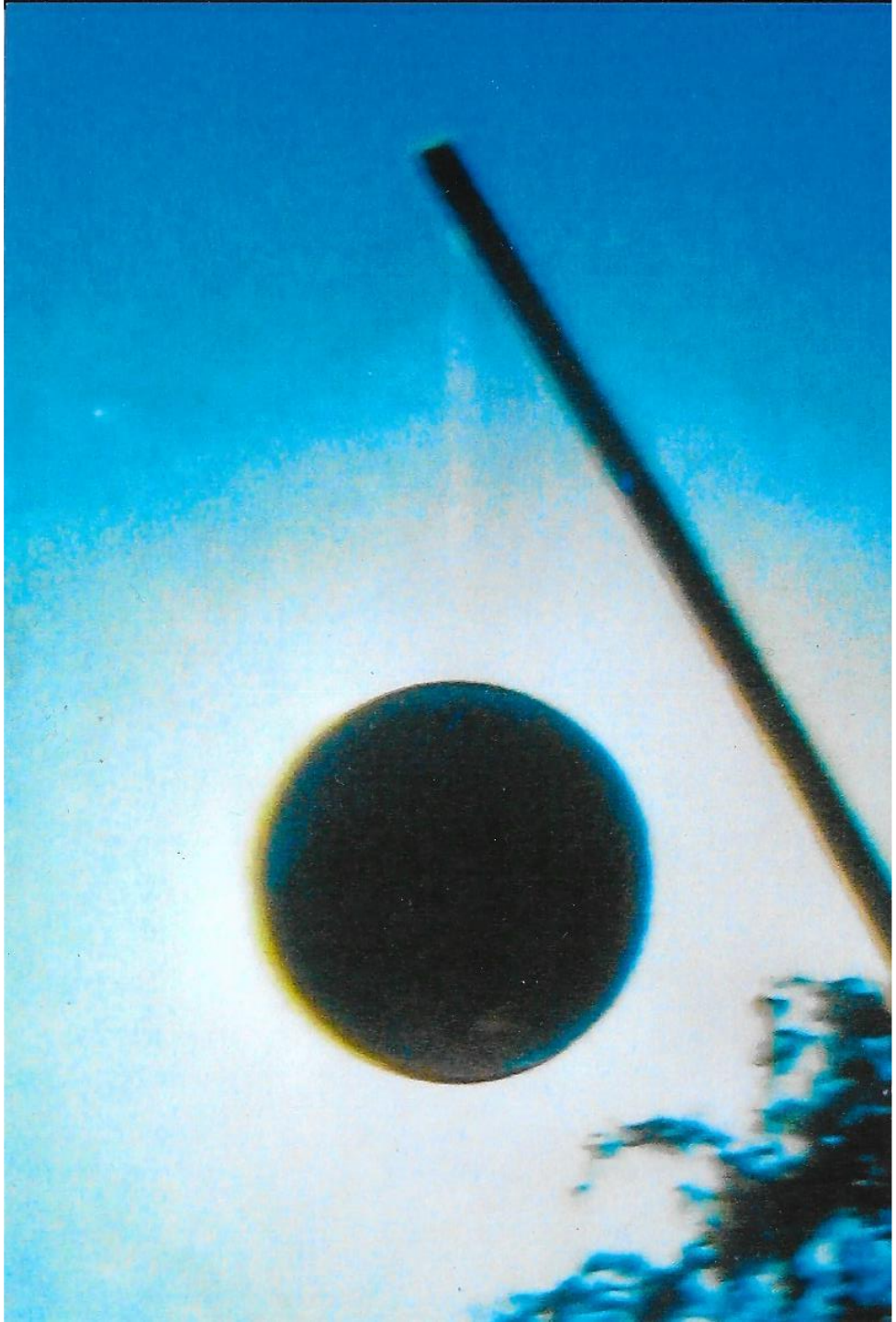
STAR GAZING

MY 73 YEARS IN ASTRONOMY

PRESENTED BY

HERMAN M. HEYN



SUBJECTS	Quarter	Quarter Marks	Term Marks	CONDUCT: Cooperation	Obedience	Courtesy	Self-Control	Dependability	WORK HABITS: Effort	Accuracy	Neatness	Homework
English	1	P								U		
	2	F	P									
Reading	1											
	2											
Latin / Spanish	1											
	2											
French / German	1											
	2											
Mathematics	1	G										
Ac.-Gen.-Com.	2	F	F									
Geography	1	G										
	2	F	F						U	U		
History	1	F										
Civics	2	P	F									
General	1	E							E			
Science	2	E	E	←							U	
Hygiene	1	F							U			
	2	G	F									
Physical Education	1	F										
	2	G	F									
Art	1	F										
	2	F	F									
Music	1											
	2											
Typewriting	1											
	2											
Jr. Business Training	1											
	2											

EXPLANATION OF TRAITS

Cooperation: Works well with others Effort: Tries to the best of his ability

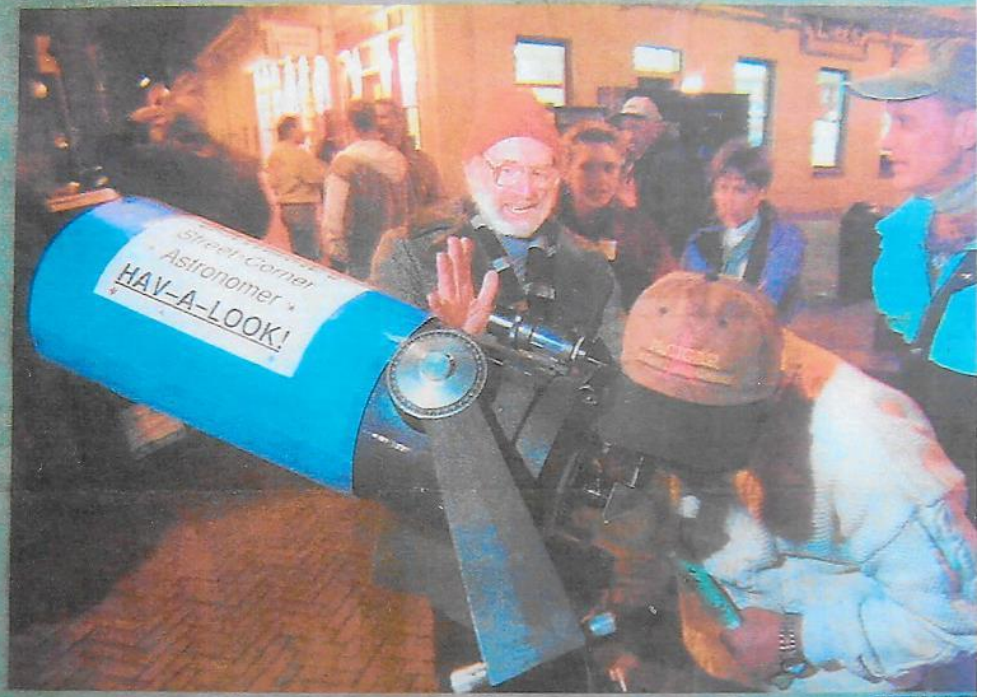
SUBJECTS	Quarter	Quarter Marks	Term Marks	CONDUCT: Cooperation	Obedience	Courtesy	Self-Control	Dependability	WORK: Effort	Accuracy
Electrical Shop	1	G								
	2	G	G							
Machine Shop	1									
	2									
Printing Shop	1									
	2									
Metal Shop	1									
	2									
Wood Shop	1									
	2									
Mechanical Drawing	1									
	2									
Clothing and Textiles	1									
	2									
Foods	1									
	2									
Home Management	1									
	2									
Guidance	1									
	2									
	1									
	2									
	1									
	2									

SUMMARY
Ratings by Homeroom Teacher or Office

		SCHOLARSHIP		CONDUCT		W
			TERM		TERM	
General Average	1		F	E	E	
	2			E		

PROMOTED ✓ ..... PROMOTED ON TRIAL ..... NOT PROMO

Star Gazer



Star search: *Herman Heyn (center) encourages Stephan Shin and Roger Milam (right) to have a look at Comet Hale-Bopp or any other astronomical wonder.*

Comet Hale-Bopp brings a bonanza for Herman Heyn, who has been peddling the night sky for years.

By Janice D'Arcy
CONTRIBUTING WRITER

The Sunday sky is deepening into dark blue; the breeze is turning bitter. A crowd a dozen thick and growing is huddled around the eastern corner of Thames and Broadway. In the middle is a man in drooping corduroys, black Reeboks and a tattered sweater. Herman Heyn is in his glory.

The self-named Street Corner Astronomer, a neighborhood fixture in Fells Point since he first set up his 8-inch Meade Schmidt-Cassegrain telescope a decade ago, is basking in the hype of Hale-Bopp, one of the brightest comets to streak through the sky in recent history. On this particular evening, it is a mere 123 million miles from Earth — the closest it will come. And it's coinciding with a separate celestial phenomenon, a lunar eclipse.

But Hale-Bopp is the star of the night: a tight bright ball with a fan-shaped tail, looking exactly as one imagines a comet to look. It has become a media darling, receiving saturation coverage in newspapers and on television.

"It's like my own billion-dollar publicity campaign," says Heyn, who suggests a contribution of $1 for a look through his prized possession.

Sometimes he and his telescope stand outside, idle for hours, usually he has to sell himself by calling out his trademark "Have a look!" But tonight Heyn barely has time to assemble his telescope before potential stargazers form a line, fishing for singles their wallets. Public interest in Hale-Bop is translating to a boom in business.

Everyone, it seems, wants a piece of t heavens.

"It's something I can tell friends parties or like playing trivia. I saw the co et," says Alex McNamee, a Fells Point rev er waiting for his peek through the te scope.

In the two hours that the sky is dark a clear, scores of strollers, conventione partyers and many Heyn devotees glimp the decade's most talked about comet. A with every stargazer come question "What's the tail made of?" (gas and du "Why's it wavy?" (the rippling is caused the rotation of the nucleus) "How fast i going?" (40,000 mph) "Isn't (See Heyn, 1

"Ohhh look at that beautiful moon." Later he takes every chance he can to steal looks at the comet himself. That love of the stars was first inspired by an assignment to find the Big Dipper in Ms. Wicker's 8th-grade science class at Garrison Junior High. As the Street Corner Astronomer, he not only earns a little cash, but gets to introduce others to the marvels of Ms. Wicker's science class.

"I'd say I do it 50-50. Half for the money, and half to share the stars. ... But if somebody were to come

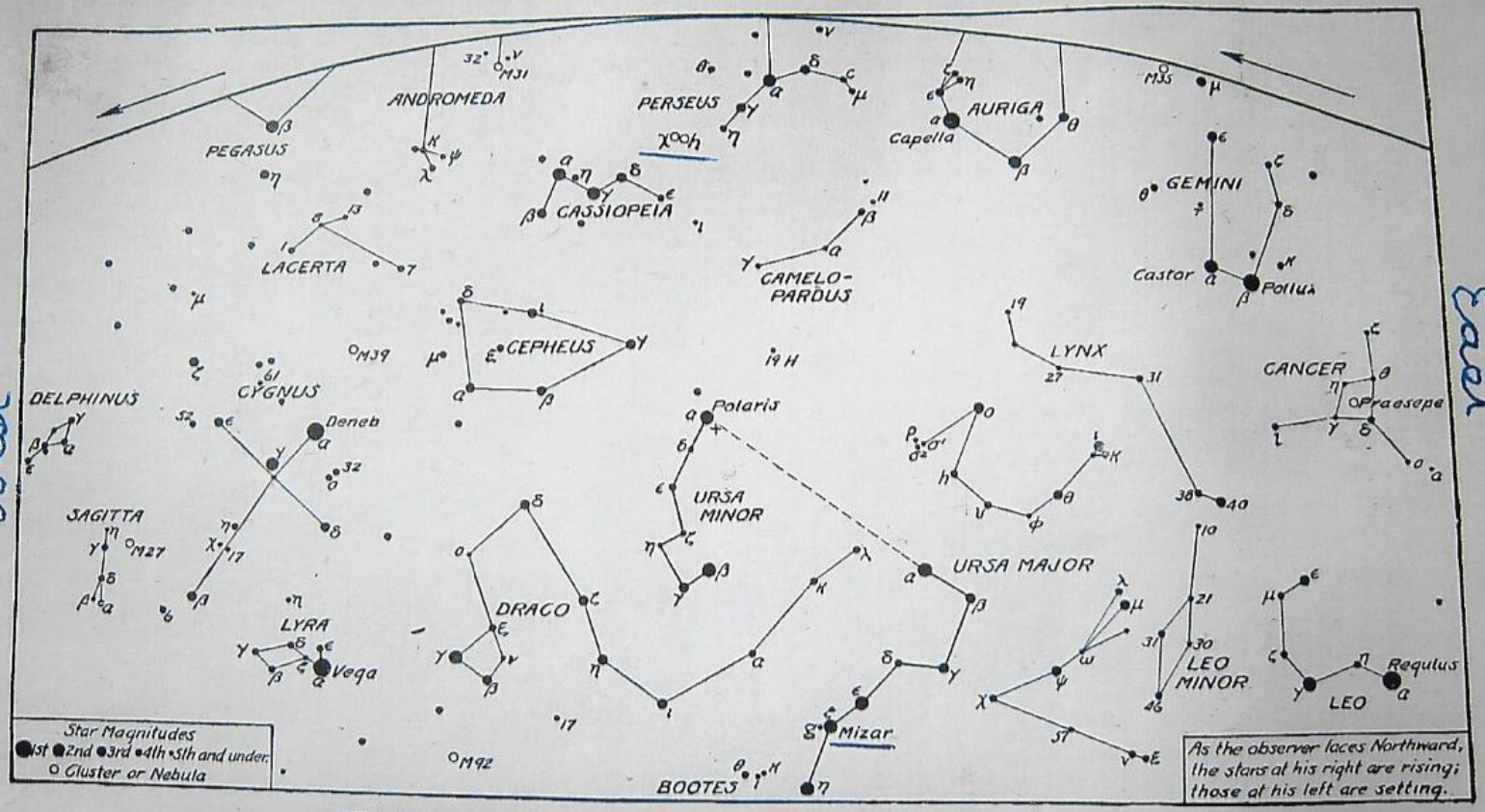
SHOWING MISS WICKER THE REPORT CARD ON WHICH SHE GAVE ME ALL "E"s. It was in her general science class (1945-46) at Garrison JHS where my astronomy interest began. One afternoon she drew the Big Dipper on the blackboard and told us to find it that night. I found it, thought it was the most beautiful thing I'd ever seen and was instantly hooked. It was the first time all year I had done my homework!

A Beginner's Star-Book

by

Kelvin McKready

An Easy Guide to the Stars and to the Astronomical Uses of the Opera Glass the Field Glass and the Telescope



KEY-MAP TO THE SKY AS THE OBSERVER FACES NORTH.

JAN. 1, 8 P.M., DEC. 15, 9 P.M., DEC. 1, 10 P.M., NOV. 15, 11 P.M., NOV. 1, 12 P.M.

FOR NIGHT-CHART TO THIS MAP SEE OPPOSITE PAGE.
FOR THE SKY AS THE OBSERVER FACES SOUTH, SEE PP. 40, 41.
For the sky at other Dates and Hours see Time Schedule, p. 35.

The Telescopic Objects. For the Constellations See the Page Opposite.

Numbers in brackets [ ] refer

JAN. 1, 8 P.M.. DEC. 15, 9 P.M.;

FOR NIGHT-CHART TO THIS MAP SEE OPPOSITE PAGE.
FOR THE SKY AS THE OBSERVER FACES NORTH, SEE PP. 38, 39.
For the sky at other Dates and Hours see Time Schedule, p. 35.

The Telescopic Objects. For the Constellations See the Page Opposite.

Numbers in brackets [ ] refer to corresponding numbered notes in Observer's Catalogue, p. 116.

I. WITH OPERA-GLASS OR FIELD-GLASS examine the two star-clusters in TAURUS, the PLEIADES [382] and the HYADES [383]. The glass will greatly increase the charm and the interest of both groups; see p. 18. Near ALDEBARAN note the pretty doubles Theta (θ) and Sigma (σ) [386, 389], and below ORION another will be found in the Gamma (γ) of LEPUS [242].

A field-glass and sometimes even an opera-glass will reveal as a faint cloud of light, or misty radiance, the great nebula of ORION [294]. It enfolds the little star Theta (θ), just below ORION's belt. The existence of the star-cluster in CANIS MAJOR marked M 41 [67] and of that in GEMINI marked M 35 [188] can also be discerned, though here also a telescope is necessary for a really satisfactory view. To sweep with opera-glass or field-glass, however low its power, through this whole region of sky, especially through CANIS MAJOR, ORION, and TAURUS will bring rich returns of interest and pleasure. Except with optical aid the star MIRA [113] in CETUS is often quite invisible. It is strangely variable. See p. 14.

II. WITH A TWO-INCH TELESCOPE all the preceding objects are available, and the clusters mentioned take on new beauty. Using the eye-piece of lowest power, note the general aspect of the Orion nebula at the star Theta (θ) [294]. Then with a higher power, 65 or 70, study carefully the star itself. It is a quadruple, two of the components being reddish in color, one a pale lilac, and one white. Easy doubles will also be found in Delta (δ) [293], the top star of the belt, and in *m* [295] just above. Sigma (σ) [299] just below the lowest star of the belt will appear as a triple.

In GEMINI the most impressive double star is CASTOR [186], but Zeta (ζ) [193] and Delta (δ) [190] are also worthy of note. The latter may prove a little difficult for the beginnner. In TAURUS interesting objects will be found in Tau (τ) [387], and in Eta (η) [384], the brightest star of the PLEIADES; but these are high for present observation. There is also an easy double quite near the star marked (*10*) [388]. In MONOCEROS note the pretty triple star marked Beta (β) [271] called by Sir William Herschel "one of the most beautiful objects in the heavens." The beginner may be able to see only two of the components. Try Epsilon (ε) [272] in the same constellation and the star *w* (not ω) in ERIDANUS [176]. Easier doubles will be found in the Lambda (λ) [31] and Gamma (γ) [32] of ARIES, both stars being of special importance.

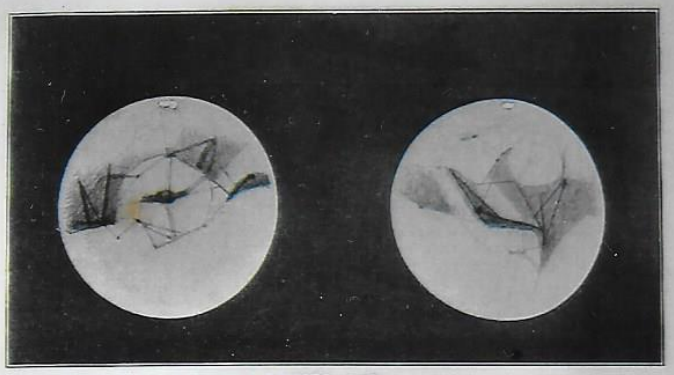
III. WITH A THREE-INCH TELESCOPE first try the objects mentioned for the two-inch, using a low-power eye-piece and giving special attention to the great nebula in ORION [294] and the star-clusters already specified.

In ORION try Lambda (λ) [300], just above and to the right of BETELGEUZE; two stars [297] below Theta (θ); and Zeta (ζ) [296], the lowest star of the belt. The latter is a triple but the beginner may not at first see more than two of the components. RIGEL [292] is a superb double, the small blue companion being an exacting test even under fine atmospheric conditions. Easier objects for a three-inch instrument are the Kappa (κ) [189], Epsilon (ε) [191] and Nu (ν) [194] of GEMINI. In PISCES, a fine double star will be found in Alpha (α) [321]; and a fainter but pretty object in Psi (ψ) [323].

A low-power eye-piece will show the small blue companion to Alpha (α) [111] in CETUS; and, with an eye-piece of higher power, other interesting doubles in CETUS will be found in the stars Gamma (γ) [112]; *66* [116] and Zeta (ζ) [114]. Farther to the west, in AQUARIUS, note another Zeta (ζ) [17], the star at the centre of the little Y which marks the mouth of the water-jar. It is an extremely pretty double, the components being almost equal in magnitude.

In this map the track of the planets lies through the constellations AQUARIUS, PISCES, ARIES, TAURUS, and GEMINI. The approximate positions of the planets as they move through the stars may be easily found for any month, from the tables on pp. 84, 86, etc.

and then from week to week draw a line through them corresponding to the movement of the planet. While some of the more conspicuous markings of the surface are visible in a small telescope the so-called "canals" cannot be seen except in large instruments under favorable conditions. Mars is nevertheless a beautiful telescopic object even for the



MARS, 1909

Drawing by Dr. Percival Lowell, Flagstaff, Arizona

beginner,—its clearly defined image and its ruddy light giving a peculiar fascination to such faint details as do appear. Among these are the "hour-glass" marking, so named from its peculiar shape, and the cap of polar snow—though the question as to whether its composition is really that of frozen water is not decided. No object in our night skies, except the moon and one of the small asteroids, comes so near the Earth as does Mars at the time of a favorable "opposition." The planet then shows in a telescope, with a power of 75, a disk as large as that presented by the moon to the unaided eye. At such times its magnitude on a stellar scale is —2.8, the planet then having three times the brightness of Sirius.

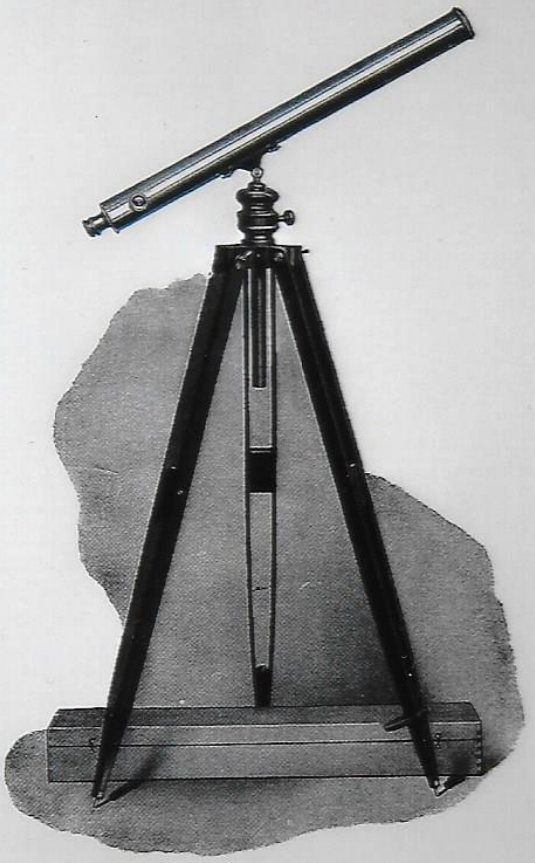
Problems as to the habitability of Mars lie wholly outside the limits of this volume. I may say, however, that the question as to "life in other worlds" is not dependent upon the solution of the problems which arise from the planet Mars. We know that all the millions of the fixed stars are suns, many of them greater than our own. We cannot *prove* that these are accompanied by planets—as is our Sun—for no instrument we could devise could ever reveal their presence—the suns themselves being at such great distances from us. But most astronomers are agreed that the existence of such planetary systems is altogether possible.

Nor can we *prove* that on any one of these planets there certainly exists what we call "life." We can only remember that life upon our own planet has persisted and developed under conditions of great difficulty; and that *persistent* phenomena are not likely to be isolated factors in the universe. We find no isolated laws—gravitation is apparently as active at the very verge of "the darkness beyond the stars" as it is upon our Earth. The principles of mechanical action and reaction hold there as here. The spectroscope no sooner reveals "new" elements in the chemistry of the Sun and in the nebulæ of the sky, than we begin to discover the same elements in the composition of our own minerals. Astronomy has revealed the vastness of the universe,—but it is now revealing the *unity* of the universe with evidence as clear in its significance and as cumulative in its force.

SPIRAL NEBULA IN URSA MAJOR, KNOWN AS MESSIER 101

From photograph by G. W. Ritchey at Mt. Wilson Observatory

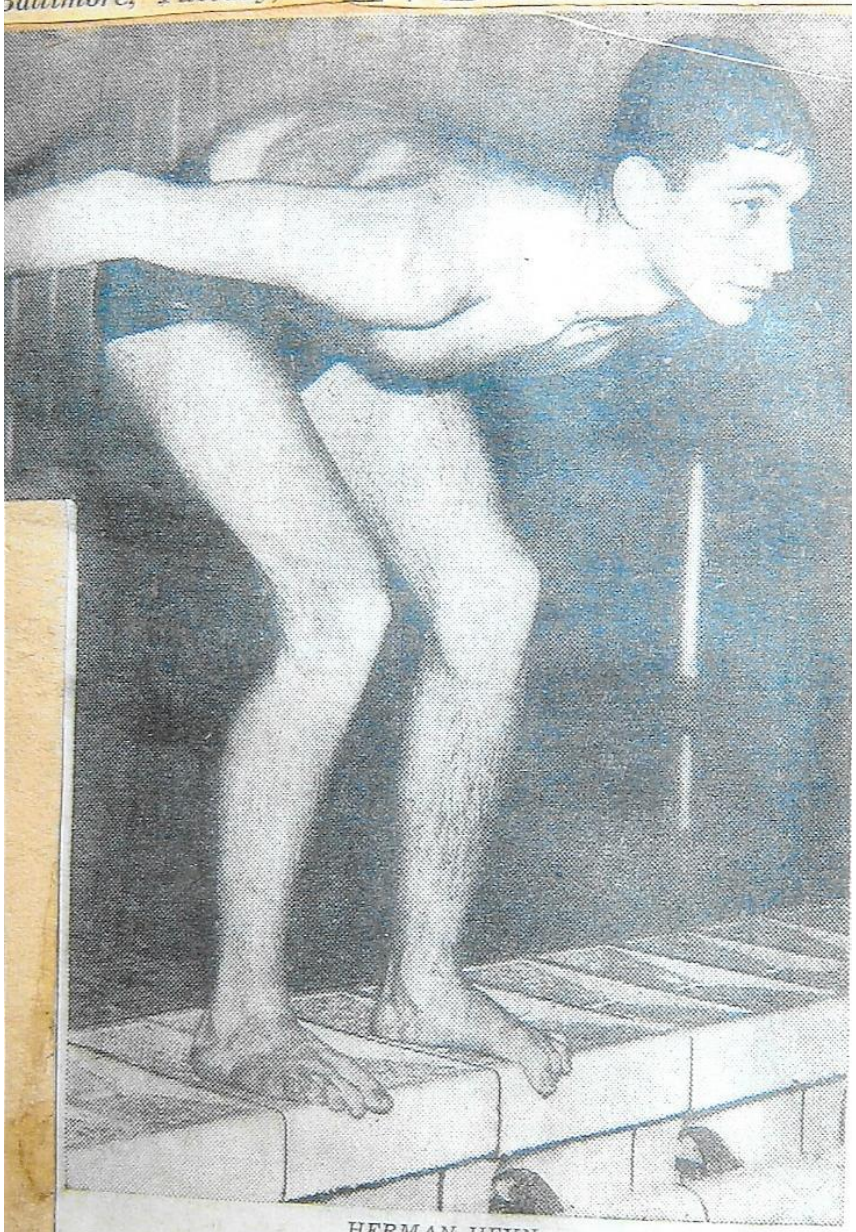
cited. In a number of cases I should have suggested, for the *lowest* power, eyepieces even lower than the ones indicated, but it is not always easy to secure them. The manufacturers have been under such continuous and general pressure for high powers, and an uninstructed public has been so prone to test every telescope by its mere ability to carry high magnifications, that the makers have not been wholly to blame. But powers for each instrument as low as the lowest prescribed above may usually be obtained, and are fairly satisfactory. The optical limit of lowest power is, of course, fixed by the light-receiving capacity of the eye. The diameter of the average pupil being ⅛ of an inch, as we have seen, we must employ a magnifying power of at least 5 for every inch of aperture. The low-limit of power for a 3-inch telescope would therefore be 15×. This is the theoretic limit. Practically, however, there are few eyes that can well utilize so large an amount of light. There is also a high-power limit. Astronomers have frequently placed this at 100 for every inch of aperture. Upon this basis an eyepiece magnifying 300 times may be used on a 3-inch telescope and a power of 200 on a 2-inch. Formal tables showing, upon this basis, the double stars that different telescopes will divide have actually been published in reputable books. Nothing could be more misleading, especially to the beginner. "Indeed" says Newcomb, "it is doubtful if any real advantage is gained beyond 60 to the inch."* As the context shows, Newcomb has special reference to a large telescope, 24 inches in aperture, and, as he hastens to declare, his "remarks apply to the most perfect telescopes used under the most favorable circumstances." He then proceeds, in terms too technical for quotation here, to describe some of the inevitable limitations of the telescope. We will deal below, in showing the advantages of low powers, with some of the simpler of these difficulties. It should also be said that the beginner does not have, with the astronomer, the advantages of training,—the trained eye and mind and hand. In the light, therefore, of these considerations it should be clear that the average amateur observer,



TELESCOPE—MODEL B
Alt-Azimuth Mounting

* *Popular Astronomy*, by Simon Newcomb, LL.D.; New York, American Book Co., p. 144.

Baltimore, Tuesday, EVENING SUN



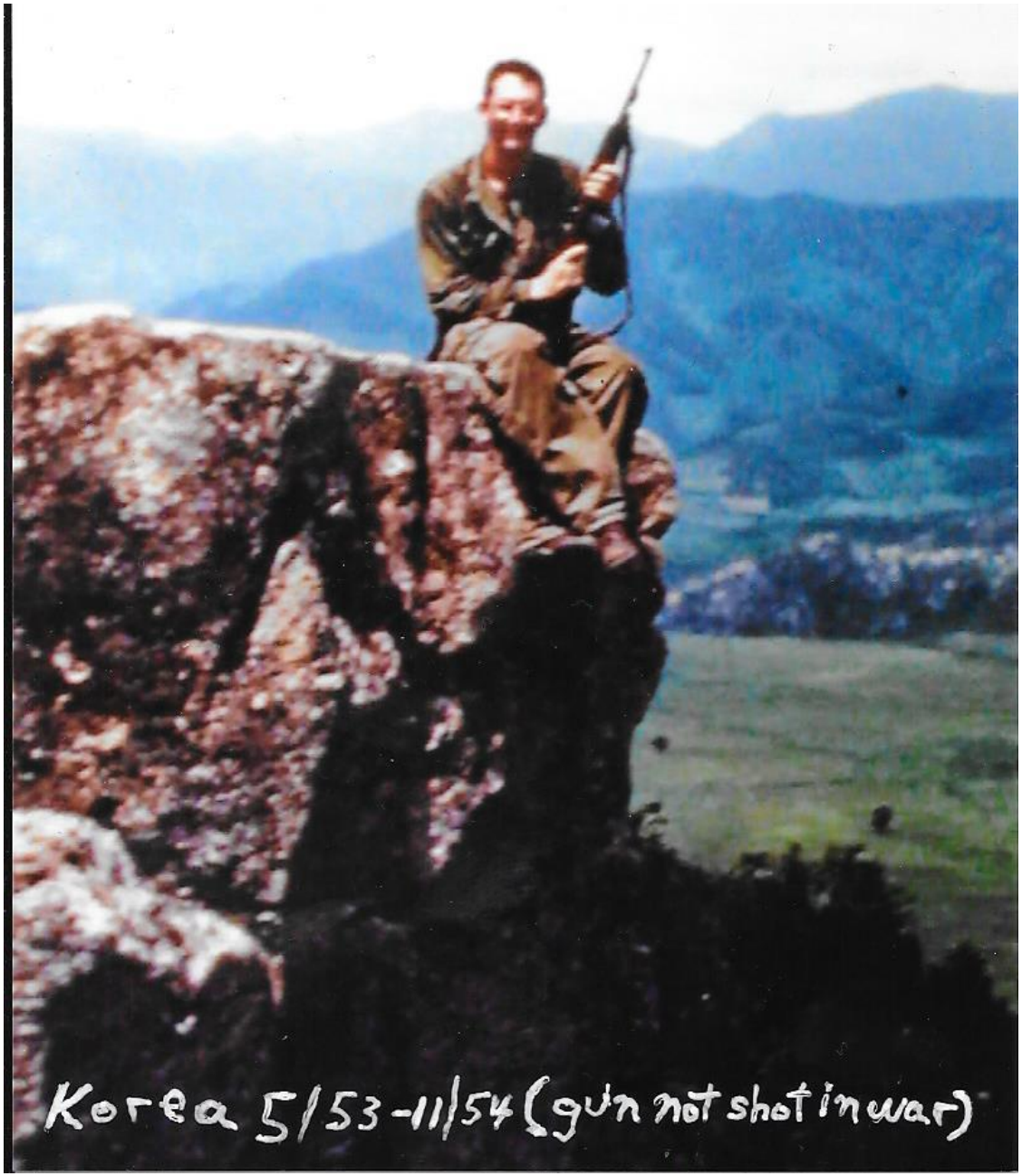
HERMAN HEYN

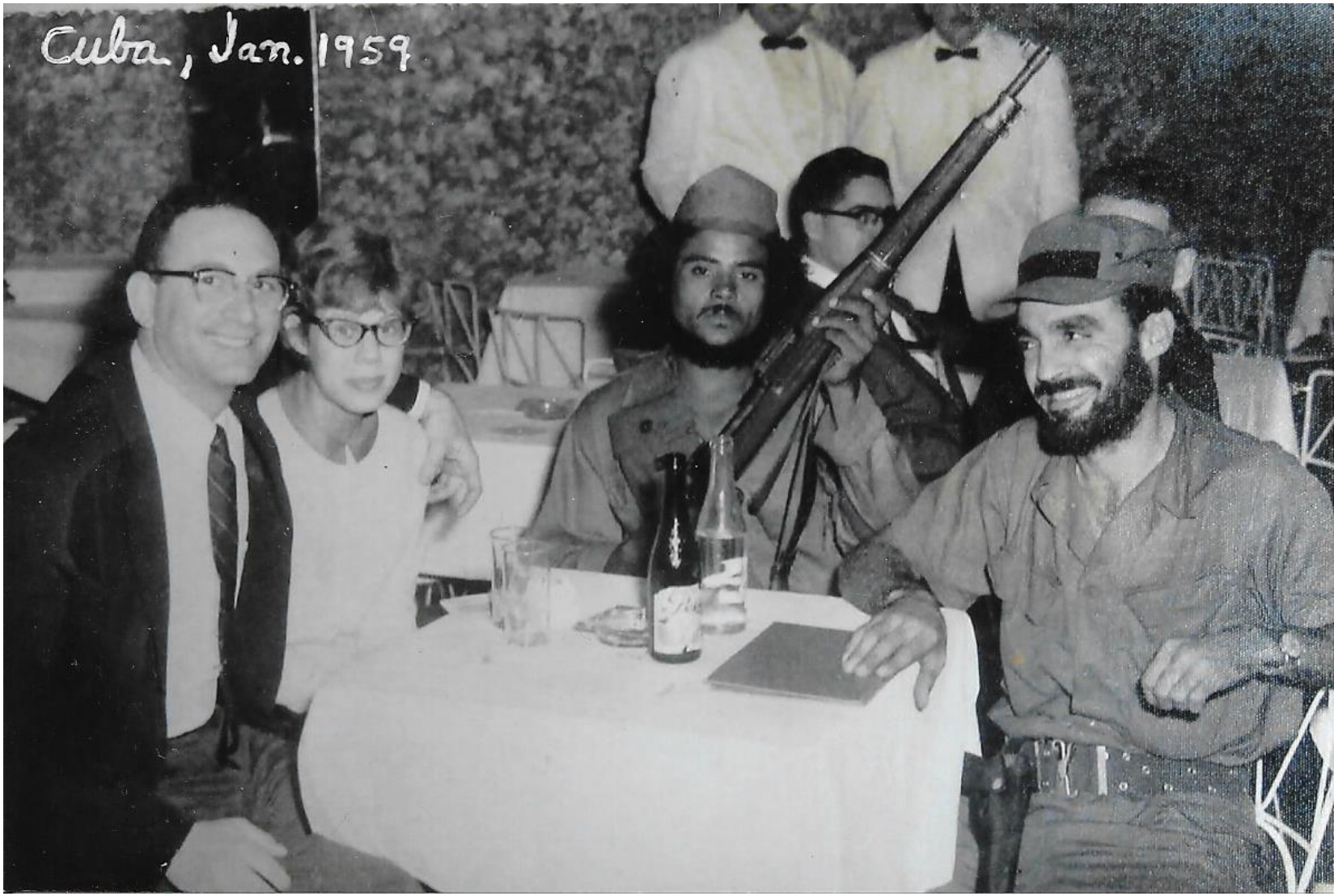
Freestyler, 220-yard prep champ last year, picks up points for City

HIATUS

1950 - 1966

Swim Team ↓ 1950


Korea 5/53-11/54 (gun not shot in war)


Cuba, Jan. 1959


FRANK
EVE
KENNY

NOVEMBER 17th

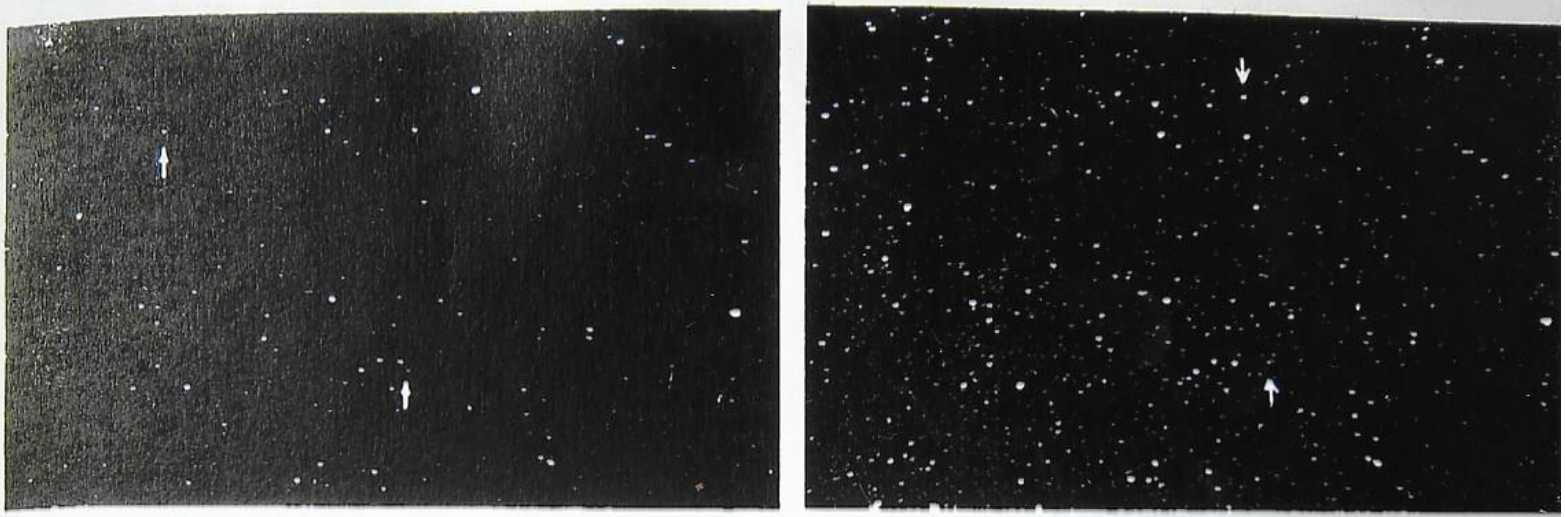
1966

Return to Astronomy!

My first astrophoto. Taken the night of the Leonid meteors, Nov. 1966. No meteors captured, but star trails.

inspired me to keep at it. Camera leaning against a tree. /Herman

MY FIRST PHOTOGRAPHS IN SKY & TELESCOPE MAGAZINE



Herman M. Heyn's photographs, taken on May 1st (left) and 31st with a 35-mm. camera and no clock drive, reveal the motion of Vesta (indicated by arrows at the top). The other arrows point to Neptune. During May, Vesta was 6th magnitude and about 110 million miles from the earth; Neptune was 8th magnitude and 2.7 billion miles. The brightest star is 2.6-magnitude Beta Librae. about $\frac{1}{8}$ inch from top (north), $1\frac{1}{8}$ inches from the right.

a planet by the moon, the second such event that I have predicted, and the first one involving Venus."

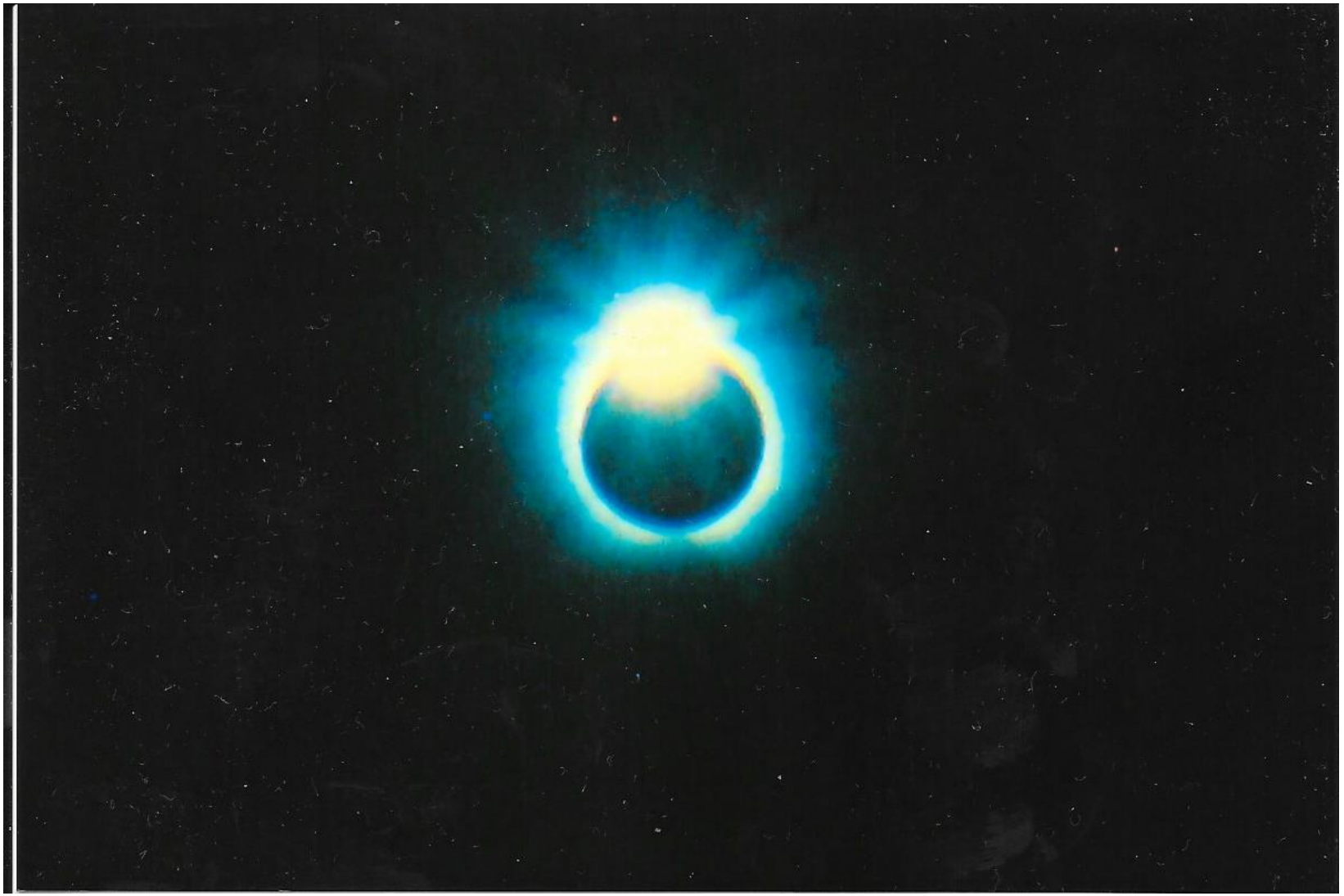
Vesta photographed. In May this minor planet was a 6th-magnitude object moving westward in the constellation Libra. The two pairs of photographs here show Vesta's motion during one day and during one month.

With an f/6 Aero-Ektar lens of 24 inch

(megacycles per second) on June 6th between 9:30 and 11:00 Universal time. Only normal meteor activity was recorded. When a meteor occurs, its ionized trail in the atmosphere reflects the continuous-wave radio signals broadcast by the amateurs.

Virginia amateur B. Douglas Smith watched the sky on June 6th from 0:45 to 1:30 UT and from 8:30 to 9:15, noting


Seattle
Helena
Minneapolis
Quebec
Boston
Chicago
New York
Nantucke
San Francisco
Denver
St. Louis
Columbus
Atlanta
San Diego
Phoenix
Ft. Worth
Houston
New Orleans
Tampa
PATH OF TOTAL ECLIPSE
Dark portion in each figure represents the moon. Light area, the sun.



First Sky & telescope published article.

Amateur Astronomers

Stars Behind Bars

I WENT TO the Maryland State Penitentiary last July, not as an inmate, but as an invited lecturer. An information specialist in the institution's library asked me to give a talk about astronomy, for I have given such slide shows to schoolchildren and clubs since the time of Comet Kohoutek.

Announcements in the prison stated, "Count-out limited to 30 persons only," and that is exactly how many came. The room was not the best for a slide show. At 1 p.m., the starting time, it was 93° Fahrenheit, relieved only by three buzzing electric fans. Two had to be turned off for my narration to be audible. Window shades made from maps and miscellaneous drapes cut out only part of the daylight. This kept the pointer light from being of much use, and dim background stars in constellation slides were blotted out.

Despite this, the show seemed to interest its viewers. There was a lot of discussion, especially about how star colors indicate temperatures, and how temperatures can be measured over immense distances. I used a Hertzsprung-Russell diagram copied with permission from the *World Book*.

Questions were asked throughout the lecture, and only one was astrological rather than scientific. At the end, one inmate said he wished he could have seen the show before his recent physical science course. I offered to return before the next such course.

Star maps to keep were handed out, and I showed constellation photographs and told how to locate several bright groups. To clarify the directions, I used local landmarks — such as how to look for Orion over Madison Street on January evenings. This turned out to be useless, however, as I was later informed that the men must be in their cells by dark and that the cells have no windows. A good reading list would be more practical.

The Maryland State Penitentiary in Baltimore. Photograph by H. Heyn.

Between the slides and the discussion, the session lasted nearly two hours. Only one other outside speaker, an anthropologist, had stimulated that much interest. Educational programs can do much for the men there, whose monotonous and crowded life is a severe ordeal.

Telescope making might be a possible activity. The Maryland prison system, for example, grinds eyeglass lenses at its Jessup facility, so optical work would not be entirely new to some inmates. A project to produce telescopes for public schools in the state might be effective. Astronomy clubs could sponsor such ATM projects in prisons where permission could be obtained.

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SUBSCRIPTION NOTICE

Recent sharp rises in the cost of paper, printing, and distributing Sky and Telescope necessitate increasing the subscription rates. New prices have already gone into effect for subscribers in Europe, Africa, and West Asia (expedited delivery by air freight).

All other subscriptions will increase January, 1978. Until then, orders may be placed at the rates given at the foot of page 259 of this issue.

U.S.A. and Possessions	1 year $12.00 2 years $22.50
Canada, Mexico, and all other foreign countries	1 year $15.00 2 years $28.50

(Three-year subscriptions will not be accepted after December 31, 1977.)

SKY PUBLISHING CORPORATION
Cambridge, Massachusetts 02138

Sky and TELESCOPE

In This Issue:

★

Vol. 44, No. 3

SEPTEMBER, 1972

75 cents

★

Total Eclipse July 10, 1972

Beginning at left, this hour-long sequence is centered on totality. It was obtained at Stanhope Beach, Prince Edw... by Herman M. Heyn of Baltimore, Maryland. Passing clouds affected some of the images. Partial phase exposures ... color film were 1/250 second at f/8 with a No. 5 neutral-density filter; totality was at f/4 for 1/5 second.

three solar radii and seemed globular in form rather than elongated with the streamers seen in photographs, according to a number of observers with Mr. Vallely.

On an isolated sand dune overlooking a wooded area, Mike Day of Champaign, Illinois, made these notes: "In the final few minutes before totality we witnessed birds landing on the shore in apparent confusion. We heard birds and crickets in the field below, and the mosquitoes came out and began to bite. The most interesting animals of all were the human beings: swimmers came out of the water, traffic stopped on the highway, and a great roar of approval came from the beach as totality began."

Dalvay Beach. A few miles east of Stanhope Beach, at the university's second observing area, many amateurs set up equipment on the Dalvay House golf course. Henry W. Kendall, Massachusetts Institute of Technology, used the same battery of telescopes that was pictured in SKY AND TELESCOPE for April, 1970, page 213. Despite much cirrus cloud during totality, he photographed Baily's beads and prominences with his 8-inch reflector.

Also at this station, Marguerite Krupp noted that the general illumination during totality was brighter than on Nantucket Island at the March 7, 1970, eclipse. This time she did not need a flashlight to read instrument dials. Stars were seen at totality by C. Fischer of Toronto and others, according C. E. Spratt of that city, who conducted photographic and meteorological observations.

Blooming Point. John Bortle, Stormville, New York, observed from a bluff five miles northeast of the central line and a few miles east of this village. Here clouds did not interfere until 90 seconds after totality began.

He photographed the approach and recession of the moon's shadow with an all-sky camera that consisted of an f/1.9 Miranda camera suspended over a large silvered globe. With the unaided eye, the shadow was first suspected 1½ minutes before totality and became definite 2½ minutes later.

"The coronal structure was very beautiful indeed," writes Mr. Bortle. "In many ways it reminded me of Howard Russell Butler's famous painting of the January 24, 1925, eclipse. On the west side of the sun a great streamer (shown double on photographs) extended for three solar radii. A narrow ray reached toward the northeast, a broad one to the southeast. The overall appearance of the corona was an atrophical pointing westward, with the black lunar disk superimposed on its center."

After examining the corona in his 10 x 50 binoculars, Mr. Bortle looked at the moon's disk, which resembled flat black paint with mottlings. At the time, he thought he could recognize Mare Imbrium, Mare Serenitatis, and Oceanus Procellarum. But after the eclipse, when examination of his photographs indicated the presence of some haze around the sun and across the moon, Mr. Bortle reclassified the observation as doubtful.

At the same site were Charles F. Scovil

Trees in a churchyard at Arisaig, Nova Scotia, framed the eclipsed sun for Hugh C. Hazelrigg of Bloomington, Indiana. This black-and-white reproduction is from a one-second exposure on Kodachrome II film. The lens of his Konica camera was set at f/4.

Westport, Connecticut; R... Hodgson, Stamford Center... topher Cox, Darien, Conn... He mentioned noted Venus ... the naked eye, but no star ... planets. The moon's disk see... gray rather than black. Mr. ... ated a 3½-inch Questar ... reflector, 8-mm. movie camera, ... AV-3400 video camera.

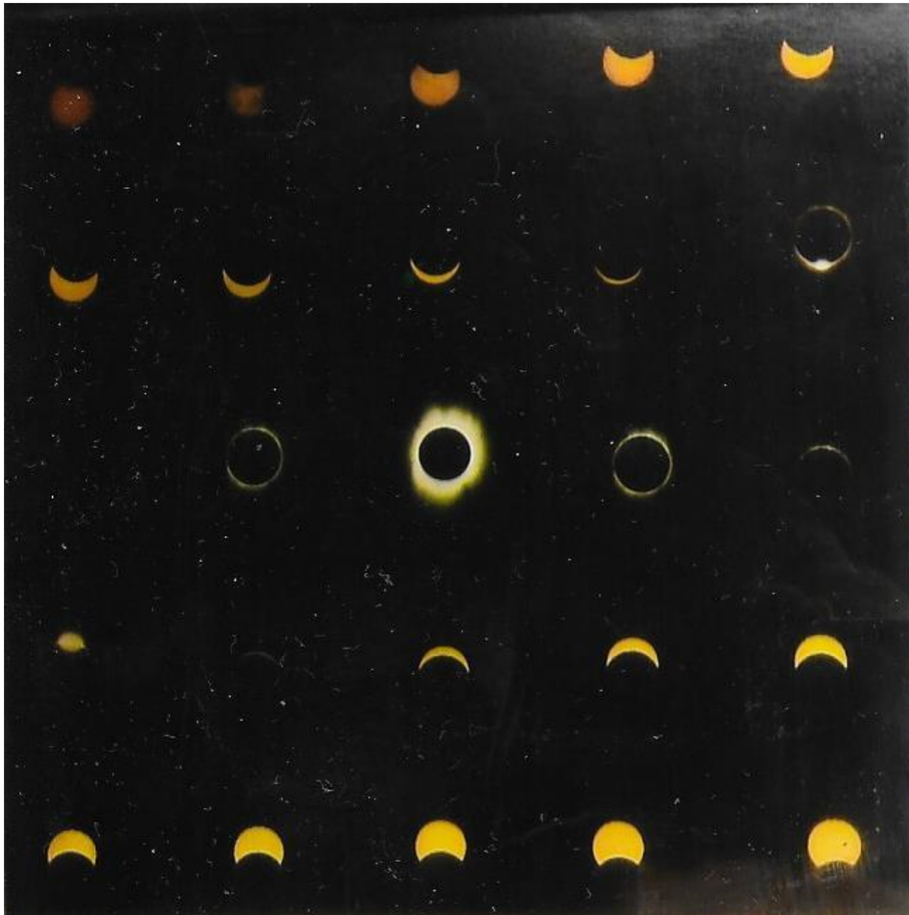
A few miles farther south, at ... Cross, Bill Nigg of Lawton, ... obtained color photographs ... Aero Ektar lens of 24 inches focal ...

Charlottetown. Many amateurs ... located in the neighborhood of the ... ince's capital city. A Princeton Uni... geologist, Robert H. Hamman, ... from a field adjacent to the airport ... fore, during, and after totality ... of cloud covered the sun, but hardly ... pered visual observations with 7 x 50 ... oculars. He had hoped to photograph ... shadow bands on a freshly painted ... surface, but none were seen either bef... or after totality.

Conrad Kissner and three others f... in a small private plane from Birmin... ham, Alabama, to the Gaspé Peninsul... Because of the bad weather there, the... took off again for Charlottetown, where they arrived just two hours before the eclipse. A successful photographic program was conducted, mainly with a 3½-inch Questar and 35-mm. Bessler Topcon Super D reflex camera, electrically driven by a small motorcycle battery and inverter. Mrs. C. C. Brummett of this party looked in vain for shadow bands.

Nearly 100 members of the American Association of Variable Star Observers went to various parts of Prince Edward Island to view the eclipse. That evening they convened in Charlottetown for a lobster dinner and to compare impressions. R. Newton Mayall of Cambridge, Massachusetts, reports that Baily's beads seemed to linger longer than at any of the other five total eclipses he has witnessed.

Murray River. This small town in the southeastern corner of the island enjoyed relatively favorable weather — slight haze as the eclipse began and relatively clear skies at totality. There were about two dozen amateurs here, including Norman Sperling's expedition from Princeton, New Jersey, Mary Ashman from Cambridge, and Roger W. Sinnott from Belmont, Massachusetts. Authorities had treated adjoining dirt roads with calcium chloride



Aboard the *Cunard Adventurer* (seen at St. Thomas, Virgin Islands, in George Lovi's picture below), Herman Heyn obtained this unique picture of the entire eclipse on a single $2\frac{1}{4}$-by-$2\frac{1}{4}$ frame of High Speed Ektachrome film, with a 250-mm. lens on a Mamiya C220 camera. The record begins at top left, and has north in the sky to the left.

from the disappearance of the last bit of photospheric light to the reappearance of the first bit.

Cunard Adventurer. Since the motion of a ship would not allow the usual fixed-camera eclipse sequence, in which the diurnal motion shifts the images (as on page 147), passenger Herman M. Heyn of Baltimore, Maryland, adopted the ar-

for the partial phases, 1/250 second at f/11. The diamond rings, without filter, were 1/250 at f/10; prominences at second and third contact, 1/250 at f/14; inner corona, 1/125 at f/7; and middle corona, $\frac{1}{4}$ second at f/6.3. Mr. Heyn at first expected to put the total phase in the center

of a field of partials. "But I decided that the four-minute totality would allow including a number of aspects of totality. Incidentally, this plan permits using a lens of much longer focal length than is possible for a fixed-camera sequence. Hence, the individual images are larger."

Sky and TELESCOPE

In This Issue:

- High-Resolution Mars Albedo Maps
- Violent Changes in Comet 1973b
- The Great Solar Eclipse
- The Recovery of Apollo
- Plans for Mars Landings
- X-Ray Studies of the Crab Nebula Occultations, 1974-75

★

Vol. 46, No. 3

SEPTEMBER, 1973

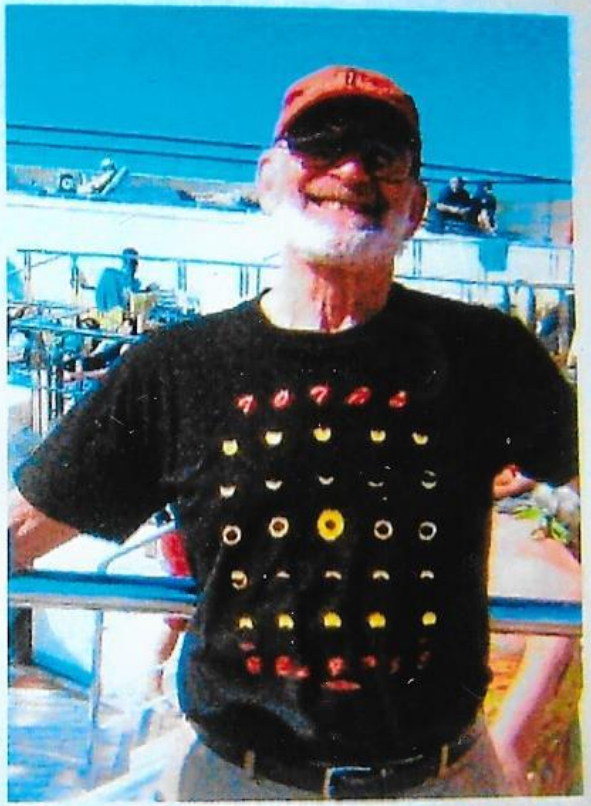
90 cents

★

... for its rendezvous with the

HH and "Tour Z" friends on hike up Martinique's Mt. Pelee during the Cunard Adventurer eclipse cruise. HH leaning on shoulder of Apollo 9 astronaut Russel "Rusty" Schweickart. Met Arthur C. Clarke on cruise

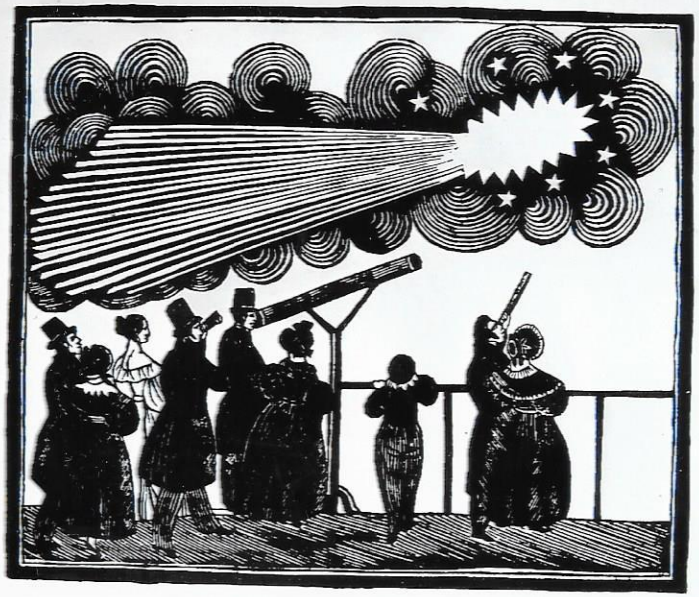
June, 1973



Mollie Witow saw the 1973 eclipse aboard the HMS *Canberra* in the Atlantic. On the MV *Discovery* for the 2005 eclipse, she told me the shirt was made later by Herman Heyn of the Baltimore Astronomy Society; seven lines of images for a seven-minute eclipse. On board the *Costa Fortuna* for the 2006 eclipse, Herman Heyn was wearing a later edition of the same shirt. Herman's design, a composite of his photographs, was published in *Sky & Telescope* in September 1973.


COMET HALLEY T-SHIRTS
ONCE EVERY 76 YEA
COMET HALLEY
198-1986
MARK TWAIN
SESQUICENTENNIAL

THE COMET HALLEY HANDBOOK



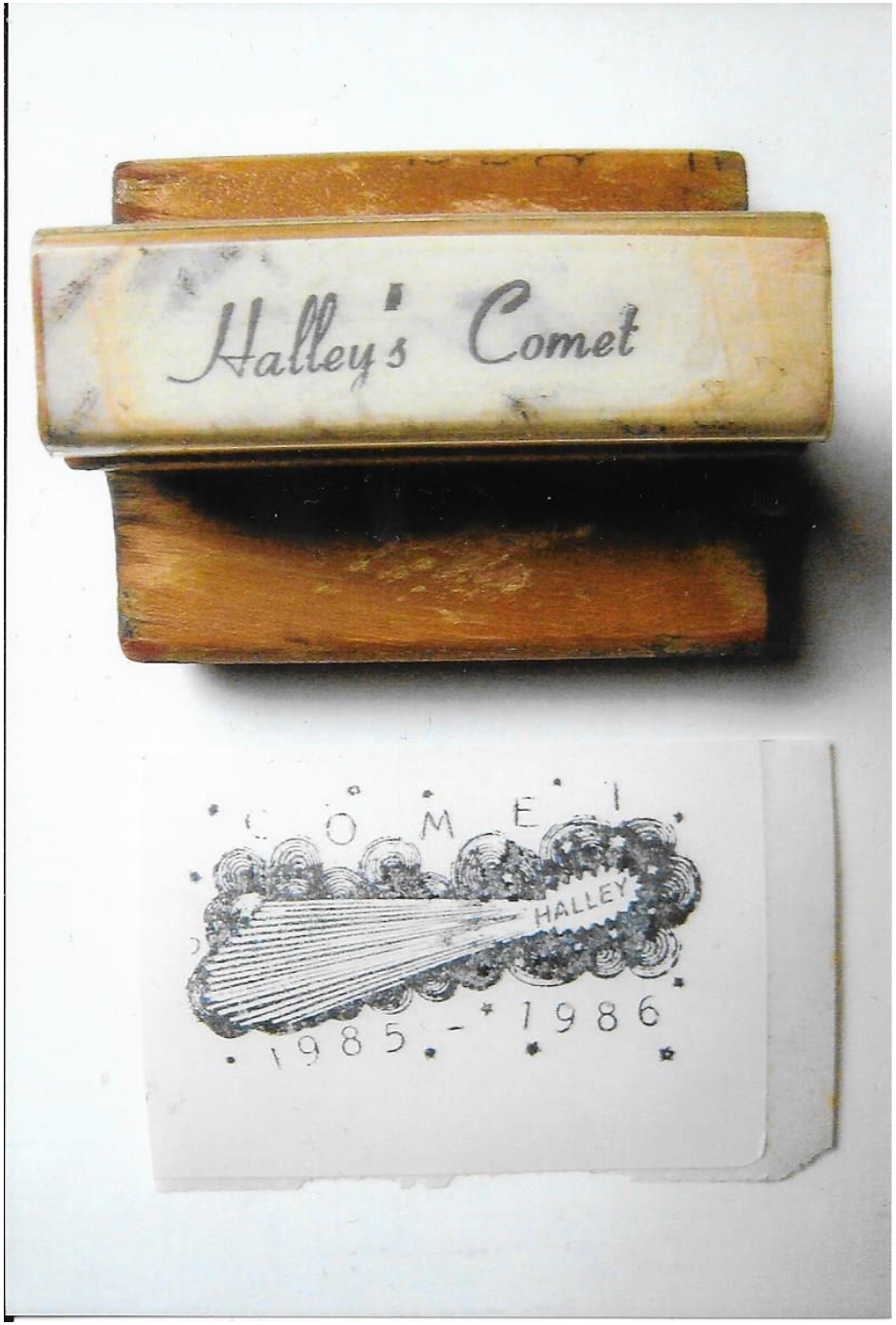
AN OBSERVER'S GUIDE

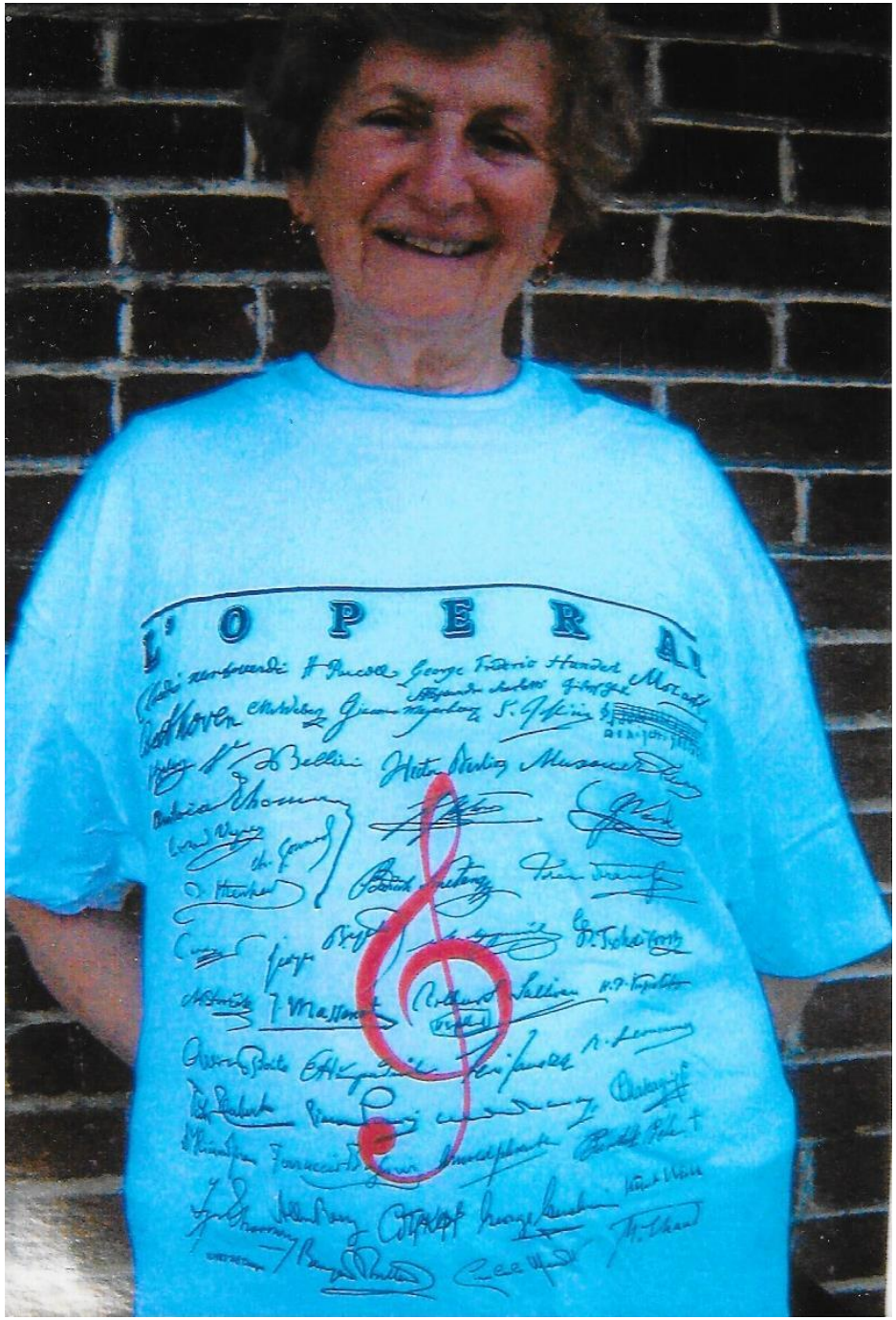
CREATED FOR THE INTERNATIONAL HALLEY WATCH
BY
DONALD K. YEOMANS

JANUARY 15, 1981

NASA
National Aeronautics and
Space Administration
Jet Propulsion Laboratory


COMET
HALLEY
1985 - 1986
COMET
HALLEY
1985 - 1986


Halley's Comet
COMET
HALLEY
1985 - 1986


L'OPERA

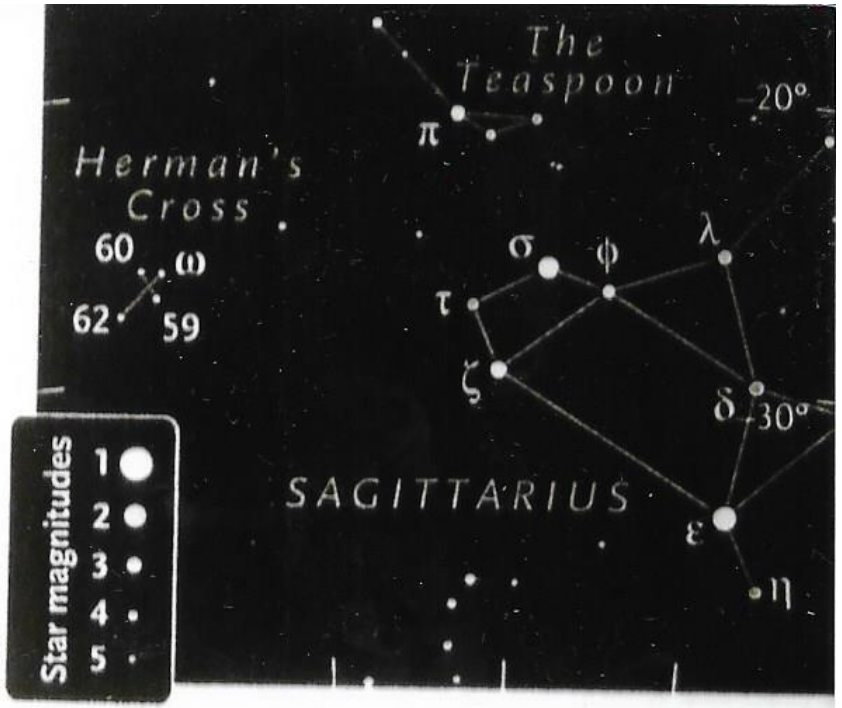
both glare and protect me from the Sun. So I took a big golfer's umbrella made of ripstop nylon and cut a hole in it to fit around the scope. I also used Velcro straps to attach the umbrella shaft to the optical tube. As you can see from the photo, my upper body is thus shaded quite nicely.

Jim Hamilton
Redondo Beach, California

Eponymic Astronomy

On the July 2013 issue's cover, adjacent to the date, there is a small, four-star asterism. The stars, which to my eye are arrayed in a Latin cross, are all 4th-magnitude, and the shape spans about 2° lengthwise in eastern Sagittarius. In comparison, Crux stretches across roughly 6°.

The asterism caught my eye because I have a long-standing friendship



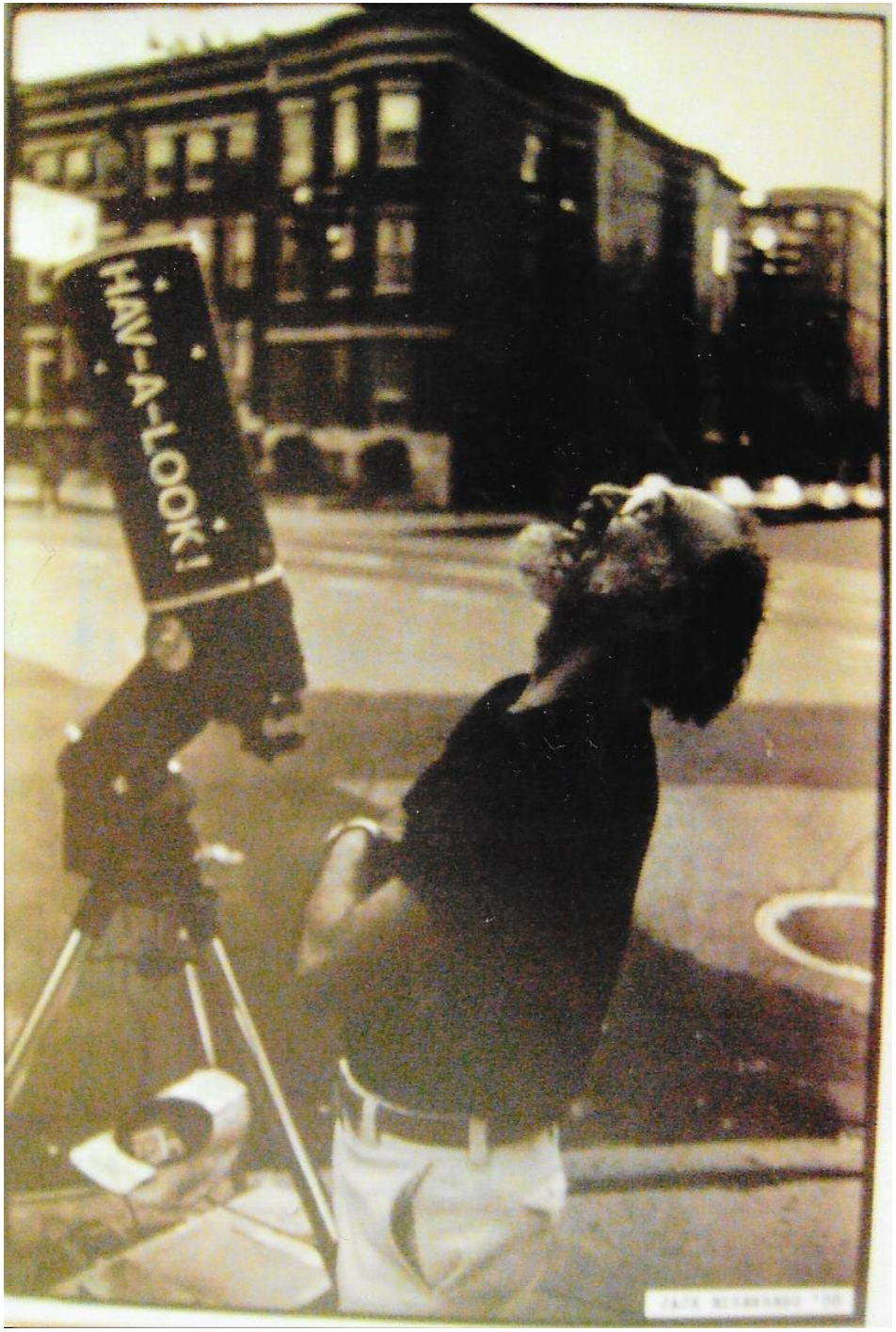
is a red giant) are a good, mid-evening binocular asterism in late summer and autumn for Northern Hemisphere mid-latitude observers.

Herman M. Heyn
Baltimore, Maryland


RICORNUS
π
ξ
μ
M22
λ
σ
τ
φ
δ
ζ
SAGITTARIUS
MICROSCOPIUM
ε
η
α
β
CORONA
AUSTRALIS
α
β
TELESCO

NOVEMBER 13, 1987

A FATEFUL DATE!


HAV-A-LOOK!

Mileage

"SIDEWALK" TELESCOPE LOG - I

1) 11/13/87 Fells Pt.(Fri) Jupiter with Myra $11.05

11/14/87 " " (Sat) Jupiter $45.70

12/12/87 " " (Sat) Jupiter $13.60

4) 12/30/87 " " (Wed) 10-day moon + Jupiter $11.27(may have had +/-$10 stolen?) Temperature was 26°F at midnight, when I packed-up. RH 74%. Was probably set-up from about 9:30 to 11:45pm. Eyepiece was quite adequate, especially w/o glasses (ie., the 25mm ortho.). A wider field will probably help glasses wearers, at bit. Am thinking that a battery pack might be more useful now than another eyepiece, as it would be great to simply be able to talk to people and not have to check scope all the time. M-42 was discernable, even through thin clouds.(Want to try it again with perfect sky before buying nebular filter.) Image of moon was reversed in E and W but normal N and S.

5) 1/24/88 Fells Pt.(Sunday) 6-day moon with Jupiter almost directly beneath it-about 2° away! A great duo! Could move scope back and forth between them very easily, so everybody who wanted could get to see both! Was on square from about 5:45pm till 9:15pm. Nancy Standish visited. A friend of her's, Dan, who works in Bertha's, brought out alot of customers. Total collection was $38.73. Moon looked fine through 25mm orth..real bright and crisp--despite some thin clouds. Jupiter looked ok, too(4 moon visible). Tried out just purchased 2X Barlow, but I was not happy with view--moon dimmed alot and crowded field. Jupiter looked fuzzy--althought seeing was not real great. Also, field of view was quite narrowed. Am thinking that if I need to use Barlow for Saturn/Mars, I should stick with a 20-25mm lens and try to increase size of field.....and/or get a battery pack. Looks like, at least tonight, Sunday is ok at Fells Pt., up till about 9pm. OR, just get a slightly higher power, wide field ocular and let it go at that. I do want a nice, birght picture, however, and I am wondering if 160X will ever give it--with whatever ocular. What? Erfle 20mm? Plossl 20? (20mm = 100X)((If, with 25mmx45° orth I have to move scope every 3 viewers, with Barlow need to do it

Maryland

FIRST NEWSPAPER COVERAGE

D

SUNDAY
MARCH 6, 1988

'Telescope Man' hustles stars from street corners

Loose change buys peek at the heavens

By Rafael Alvarez

Call this guy the Telescope Man.

For some loose change, the chance to make small talk about big dreams and the sheer and simple thrill of it, Herman Heyn will give you a peek at the heavens.

In this land of sidewalk opportunity there glows a galaxy of ways to persuade pedestrians to drop money in a hat.

Some guys whine Bob Dylan songs, strumming a battered six-string and croaking their hearts out about the many things that "God said to Abraham. . . ."

Some guys juggle cabbages, some paint their faces and pretend they can't talk and others shove fire down their throats.

But Herman Heyn — 57, part-time math teacher, affable astronomer for the common man, and chaser of many an eccentric hustle — has been averaging $28.48 a night by setting up an 8-inch Meade telescope on Baltimore street corners, pointing it at the sky, and giving passers-by the chance to see a crater on the moon.

Or Jupiter with a six-day moon

See **STARS**, 6B, Col. 1

Herman Heyn sights in his telescope for stargazers at the corner of 31st and St. Paul streets.

THE SUN/WALTER M. MCCARDELL JR

STARS, from 1B

beneath it: maybe an anonymous shooting star as it passes through town; the Pleiades and red-giant Be-

Point, enthusiastic attempts to "have another source of income and teach people about the stars."

The good:

On Jan. 30, 1988, [illegible]

the atmosphere was "great, it's not cold, not windy, and the sky is crystal clear."

Ellen L. Edwards, a 39-year-old

learned them in those early books."

After graduating from City College, however, he sold his telescope for $180 to finance a trip to Calif-

FIRST CITY PAPER ARTICLE

City Paper

BALTIMORE'S FREE WEEKLY VOL. 12 NO. 19 MAY 6-MAY 12, 1988

HEAVENS ABOVE

A Streetcorner Astronomer's Guide to the Galaxy

By Linda Turbyville

By Linda Turbyville

THE CHILDREN WO
remember for the rest of their li
august solemnity with which their
devastated by his prolonged vigil
the wrath of his imagination, reme
discovery to them: "The earth is
like an orange."
Gabriel Garcia Marquez, One Hu
Years of Solitude

On the 29th of February, I st
out of the local drugstore on m
home from work in Baltimore, a
surprised to see a man on the co
31st and St. Paul Sts. fussing
impressive telescope which h
mounted on a tripod. One leg
tripod dipped precariously off th
and steadied itself in the stree
inches from a parked car while th
scope leaned precipitously in the
site direction. It was angled
into the western sky, its view
neled between two large apa
buildings to a point just south o
Hopkins University, more or less
ly above the Baltimore Museum

The man bobbed around th
scope excitedly, shoving his ha
and out of the pockets of his co
repeatedly adjusted the viewer, f
the lens, checked the angle of th
— catering, right down to the s
detail of observation, toward
member of his astonished planet-
public, which was now a fluid g
ing of four or five. He was smili
bearded, a little on the lean
thought, and the deep glint in h
suggested to me that a certain m
— or even madness — underl
entire operation. A worn tweed
coat was open and swung loosel
his shoulders as he darted abo
long sleek instrument.

He was courteous. "Would y
to take a look? Tonight we're loo
Jupiter and Venus."

I stopped and stared. It w
unexpected sight and instincti
began to examine the intrusion i
customary evening rounds. But
reminded myself, why not? It wa
ruary 29th — a day that doesn't
exist, a correction to our calen
reckoning with the solar system.

Under the tripod a straw ha
carefully placed and I saw that i
tained coins and bills. The brig
covered with the tiny foil stars
remember grade school teachers
to reward their pupils' best efforts
little stars gleamed darkly —
blue, silver, gold and green — an
in combination with the telescop
its wizened owner's intense conce
tion and quick movements, mome
ily conjured up the image of a wiz
a Dr. Faustus, who, after studyin
heavens and convening secretly
key members of the animal king
had armed himself with colorful,
bersome instruments and obl
intellectual formulae, and was
ently leading an odd gathering int
eerie dawn of science.

I felt the lone dollar bill in my po
— the next day's bus fare — s
familiar resistance to transactions
volving money began to pull me sl
away from the intriguing street co
activities. "Come back soon," he c
after me, sensing quite accurately
my curiosity was aroused. "I'll be
for another hour and a half."

Walking home, I considered
unwillingness to stay for a look thro
the telescope. I reasoned, with a to

THE SUN/AMY DAVIS

"The moth-kid from Mars," otherwise known as David Markland, 7, looks in vain as cloudy skies block his search for relatives way out there.

Gray skies fail to dampen Fells Point party for Mars


HARBORPLACE
I Saw...
SATURN!
BALTIMORE, MARYLAND
I Saw....
JUPITER
FELL'S POINT
BALTIMORE, MARYLAND
I Saw...
Comet
HALE-BOPP
March/April, 1997
Baltimore, Maryland
JULY 16-22, 1994
I SURVIVED THE COLLISION OF COMET P/SHOEMAKER-LEVY 9 WITH JUPITER!
FELLS POINT
BALTIMORE, MD.
FELL'S POINT
I Saw..
SATURN!
BALTIMORE, MARYLAND
HARBORPLACE
I Saw...
SATURN!
1995-96
(rings edge-on)
Baltimore, Maryland
I Saw...
SATURN!
from
the Rotunda
HARBORPLACE
I Saw...
URANUS!
IT LOOKS LIKE A LITTLE GREEN DOT.
Baltimore, Maryland
MARS PARTY
2003
AUGUST-SEPTEMBER
BALTIMORE, MD.
Comet
March/Apri
Baltimore, M

3M Commercial Office Supply Division

3M Center
St. Paul, MN 55144-1000
612/733 1110

December 13, 1991

Mr. Herman M. Heyn
Baltimore's Street Corner Astronomer
721 E. 36th Street
Baltimore, MD 21218

Dear Mr. Heyn:

Thank you for taking the time to write to us regarding your imaginative use of "Post-it" brand notes. We are always excited to hear how many different uses people like you find for Post-it brand notes.

To show how much we appreciate you taking the time to write I have enclosed several dozen complimentary packs of Post-it brand notes, #656 in various colors use in January with your "I Saw...JUPITER AND ITS MOONS" stamp.

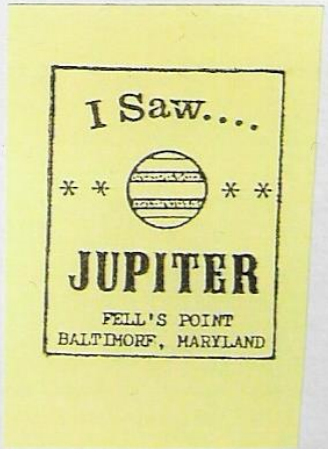
Good luck and thank you for supporting Post-it brand notes.

Sincerely,

Bob Holler

Bob Holler
Marketing Coordinator

Enclosures



SCIENCE NEWS

ORION NEBULA

Lick Observatory Photograph

Seeking Colorful Double Stars

Suspend disbelief for an evening and just trust your eyes as you hunt out this collection of vividly tinted star pairs. | By Mike Inglis

EVERY CONFIRMED SKYWATCHER knows the fiery orange-red tint of Betelgeuse and Antares, the pale, delicate yellow-orange of Arcturus, and the icy blue-white of Sirius. But star colors are subtle, and only the brightest stars show any perceptible color at all to the naked eye. Telescopic double stars, however, are another story. They present the most varied tints you'll see anywhere in the sky.

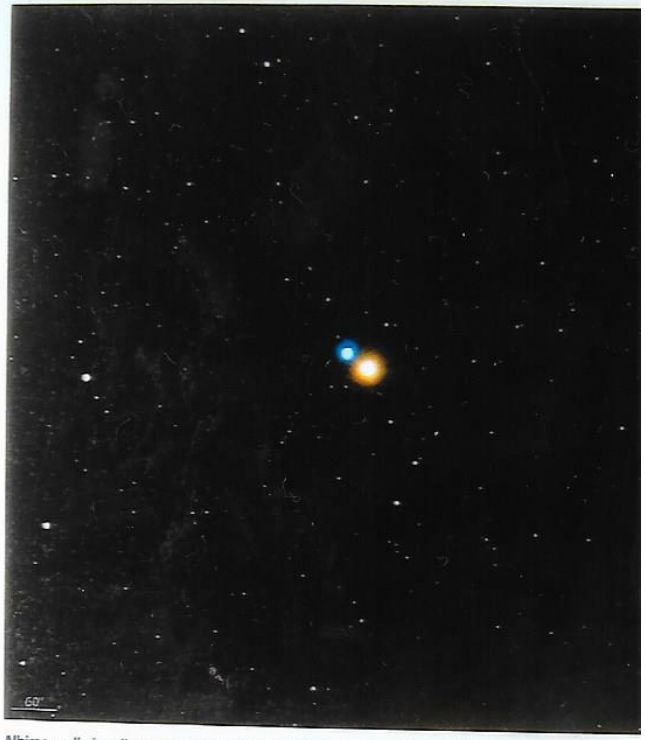
Or so it seems. In reality, stars in binaries are no more strongly colored than stars anywhere else. However, when two points with slightly different tints are seen close together, the eye beautifully exaggerates the color difference between them. And when the two stars also differ in brightness, the eye and brain often perceive strong colors that are not there at all, especially in the fainter of the two. Knowing that the colors are often illusory, however, hardly makes them any less attractive.

ine ›
t expert tips on
p-sky observing?
ll find plenty at
andTelescope.com/
nto/visualobserving

For instance, the fainter of the two stars in **Eta** (η) **Cassiopeiae** appears distinctly purple to many observers, even though it is a type-M0 dwarf that is actually orange. The companions of **Gamma** (γ) **Andromedae** and **Alpha** (α) **Herculis** appear to me most definitely green, a color that no star actually possesses.

But what is meant by the color of a star, really? Spectral types and measured color indices seem to fade into irrelevance when one is alone under a dark sky observing these pairs of telescopic jewels. Even among single stars, what one observer sees as blue another may call white; what one sees as orange another calls pinkish. You may notice that star colors change when you see the stars at different brightnesses using different-size telescopes. Atmospheric conditions certainly have a role to play; a blue star seen at low altitude will shift toward yellow.

Among telescopic doubles you may discern purple tints, or blue, violet, crimson, lemon, and the ever elusive green. A look through the observing guides of a century or more ago, when such colors were taken to be real, shows that star color was a hot topic. Flowery descriptions such as amethyst, ruby, cinnerous (ashy), jacinth (pellucid orange), and smalt (deep blue) cropped up frequently. So set aside what you know about modern astrophysics and blackbody radiation and just believe your eyes for a night.



Albireo really is yellow and blue, as shown in this image by Johannes Schedler of Austria. The colors we see in many other double stars, however, are at least partly illusions. Schedler used a Canon EOS D60 digital camera for this 30-second exposure at ISO 800 through a Celestron 11-inch f/10 Schmidt-Cassegrain telescope. North is up and east is to the left.

The Washington Post TUESDAY, SEPTEMBER 21, 2010

HISTORY OF SCIENCE

"Beside curiosity, one of science's most important tools is singleminded concentration. Roemer had both!" HH

He saw the light before anyone else did

Danish astronomer was first to gauge its speed

BY MARK WESTON

The man who first measured the speed of light died 300 years ago this week. That's right, 300 years. By the time Einstein published his Special Theory of Relativity in 1905, the speed of light — that's the C in $E=MC^2$ — was old news.

A Danish astronomer, Ole Romer, figured out how to calculate it in 1676, using just a telescope and a clock.

In the 1630s, Galileo had tried and failed to measure the speed of light as it traveled from one mountain to another. Light took less than 1/20,000th of a second to move between the two peaks that he chose, and no clock was even remotely accurate enough to measure that tiny duration. Galileo was baffled. Light seemed to have no speed at all, but to be instant.

Forty years later, Romer was invited to France to work at the Royal Academy of Science, where he taught physics to the eldest son of King Louis XIV. Soon after he arrived, French astronomers perceived that the position of Mars in Paris's night sky was slightly different from the position of Mars in the night sky of French Guiana, on the northern coast of South America. Using this information, they triangulated the distance between Paris, French Guiana and Mars. Astronomers had studied the orbits of the planets for decades and knew the ratios of the distances between them. Once they knew the distance from Earth to Mars, they could calculate the distances to other planets. They also estimated the distance between Earth and the sun, which today we know to be nearly 93 million miles.

PHOTO RESEARCHERS/ALAMY

Ole Romer used only a telescope and a clock to make his estimate.

Roemer

Meanwhile Romer, with the king's financial help, built a telescope 10 feet long. He liked to watch Jupiter, with its brown and white stripes, and Io, the fastest of its four large moons. He saw that Io orbits Jupiter four times a week, but soon observed something puzzling. The time Io seemed to take to move around Jupiter varied by a few seconds from one orbit to the next.

Romer found that every month, for six consecutive months, Io seemed to take an extra 3½ minutes to move around Jupiter, so that after half a year Io seemed to take 22 minutes longer to orbit Jupiter than it had taken before.

Then Io appeared to regain speed. Every month, for six straight months, Io appeared to take about 3½ minutes *less* to orbit Jupiter, so that after half a year, Io's orbit seemed to have shortened by 22 minutes. The amount of time Io took to orbit Jupiter now seemed the same as it had been a year before.

Romer doubted that Io was actually changing its speed, and he wondered what caused this illusion. Then it hit him. Io appeared to speed up and slow down not because of anything that was happening near Jupiter or Io every six months, but because of the changing distance between Earth and Jupiter as both planets orbited the sun. When Jupiter and Earth were on opposite sides of the sun, light from Jupiter — and its moons — needed more time to reach Earth. When Io seemed to take 22 minutes longer to orbit Jupiter, it was because light was traveling the extra distance to Romer's telescope.

Romer knew that Earth was roughly 90 million miles from the sun, making its orbit about 180 million miles in diameter. That was the extra distance the light had to travel when Earth and Jupiter were on opposite sides of the sun. When the Royal Academy published Romer's findings in December 1676, it divided this distance by 22 minutes, and estimated the speed of light to be 130,000 miles a second, an inconceivably high velocity.

In fact, light travels even faster than Romer thought.

Within 30 years of Romer's discovery, astronomers with better telescopes determined that light crosses Earth's orbit in only 16½ minutes, not 22, at a speed of more than 186,000 miles a second. They didn't change Romer's method of calculation; they just had better data to feed into it.

Romer returned home to Copenhagen to marry, to be his country's chief astronomer and to help a German glassblower, Daniel Fahrenheit, invent a better thermometer. On Sept. 19, 1710, he died at age 65.

health-science@washpost.com

Weston's most recent book is "Prophets and Princes: Saudi Arabia from Muhammad to the Present."

May 31, 1997 THE SUN Section B

SATURDAY

Tildon is appointed as first chairman of new school board

J. Tyson Tildon (above) has been named as the first chairman of the new Baltimore Board of School Commissioners. The award-winning scientist and professor of pediatrics at the University of Maryland medical school will serve a two-year term. [Page 2B]

In the Region

A new slant on the city's streets

Original surveyor tilted grid away from true north

By FRANK D. ROYLANCE
SUN STAFF

Baltimore's streets are cockeyed.

Scientists at the American Geophysical Union meeting were told yesterday

City's street grid is askew, amateur astronomer discovers

[Streets, from Page 1B]

original piece of research to a respected scientific meeting — and win acceptance.

Heyn, 66, is best known to Fells Point and Harborplace visitors as the "Street-Corner Astronomer" who has given many of them their first telescopic look at a planet, the moon or an eclipse.

Trained at Coppin State College to be a high school science teacher, he spent his working life as a laboratory technician, an office manager and a salesman. Now retired, he supplements his income with his street-corner astronomy and, most recently, with sales of his photographs of comets Hyakutake and Hale-Bopp.

Ron Zwickl, a physicist and chairman of the American Geophysical Union meeting, said it was unusual for a nonscientist to submit a paper to the union for review. But "an amateur, if he's do-

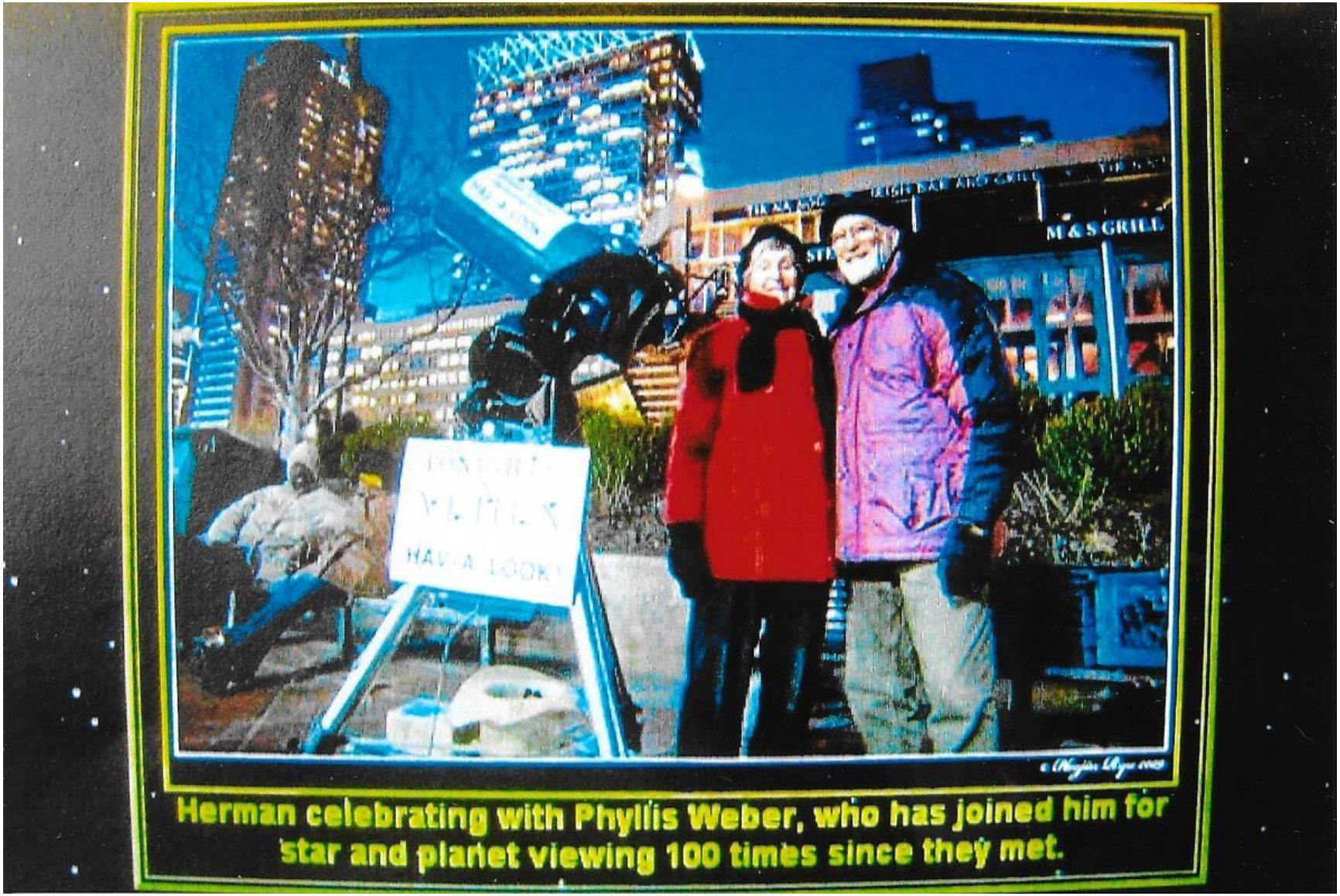
County records show that Jones drove his first locust-wood stake just north of today's Pratt Street and east of Charles Street. From there, he measured out the arrowhead-shaped town. Its boundary stretched east around the harbor shore (which then reached to Water Street) to just east of what is now Holliday Street.

From there, it ran north roughly to Lexington Street and west as far as Hopkins Place.

But it was Jones' primary north-south line, an eastern boundary that parallels Holliday, that began the westward tilt, Heyn said.

True north

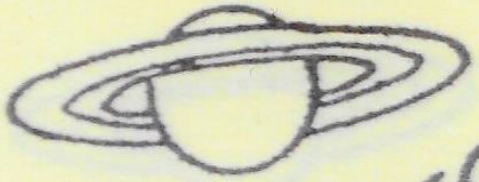
Navigators since Christopher Columbus have learned that their magnetic needles don't point to the North Pole. Instead, they point to the north magnetic pole, the spot where the Earth's mag-



Herman celebrating with Phyllis Weber, who has joined him for star and planet viewing 100 times since they met.


Oct. '10 At the Prime Meridian, Greenwich, England

¡Yo vi...



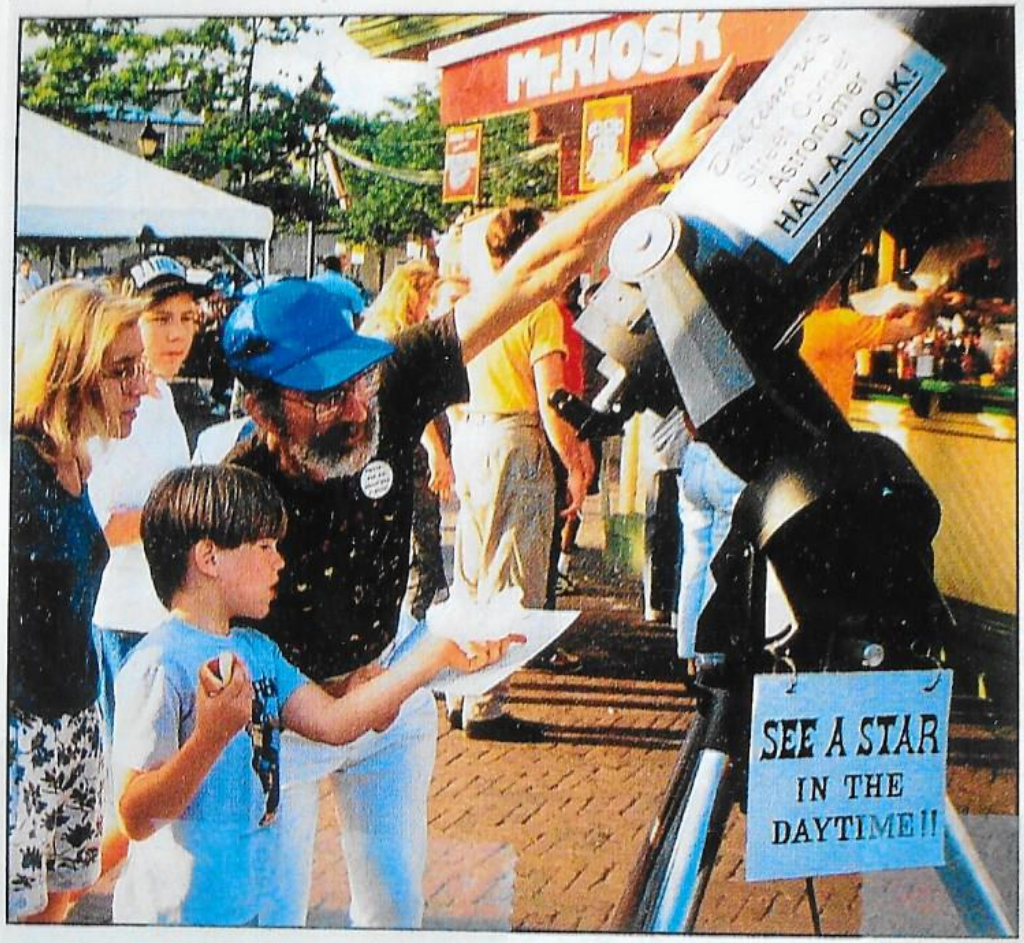
SATURNO

desde

CUBA!


مقدم میهمانان عزیز را به مراسم افتتاحیه اولین گردهمائی گروههای غیر حرفه ای نجوم ایران راگر
روابط عمومی سازمان رفاهی تفریحی شهرداری اصفهان
ME THE DEAR GUESTS TO THE OPENING CEREMONY OF THE FIRST GATHERING
AMATEUR ASTRONOMY GROUPS PUBLIC RELATION PT AMENIT CREATION ANIZATION.


TONIGHT
JUPITER
HAV-A-LOOK!

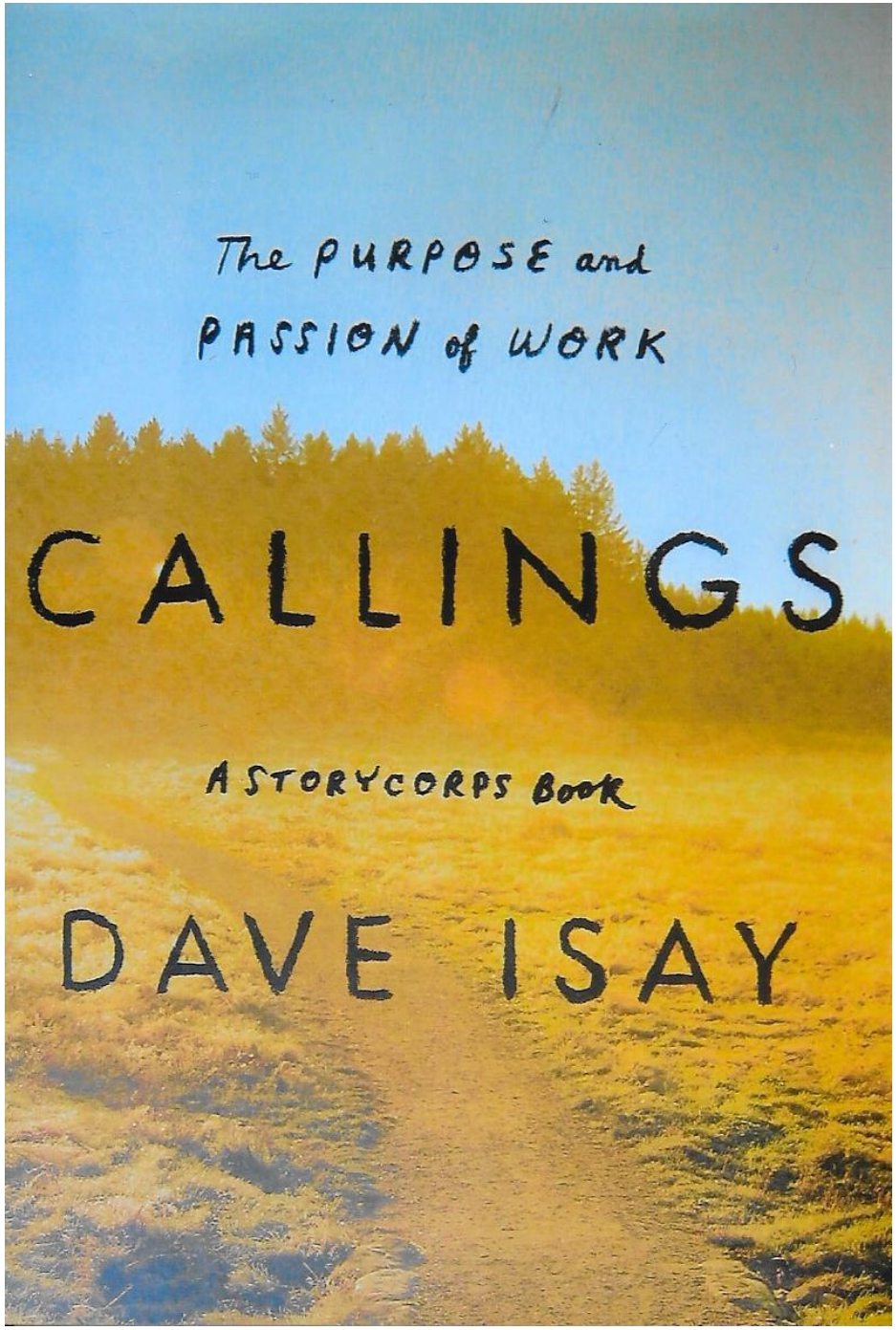


Baltimore's Street Corner astronomer Herman M. Heyn (wearing blue cap), shows passersby Arcturus in the daytime. Photograph by Isabel Beichl.

Canada's *Observer's Handbook* (available from Sky Publishing for $12).

ly dims the sky to reveal any 1st-magnitude star 40° above the horizon or high-


ONE WAY


The PURPOSE and
PASSION of WORK
CALLINGS
A STORYCORPS BOOK
DAVE ISAY

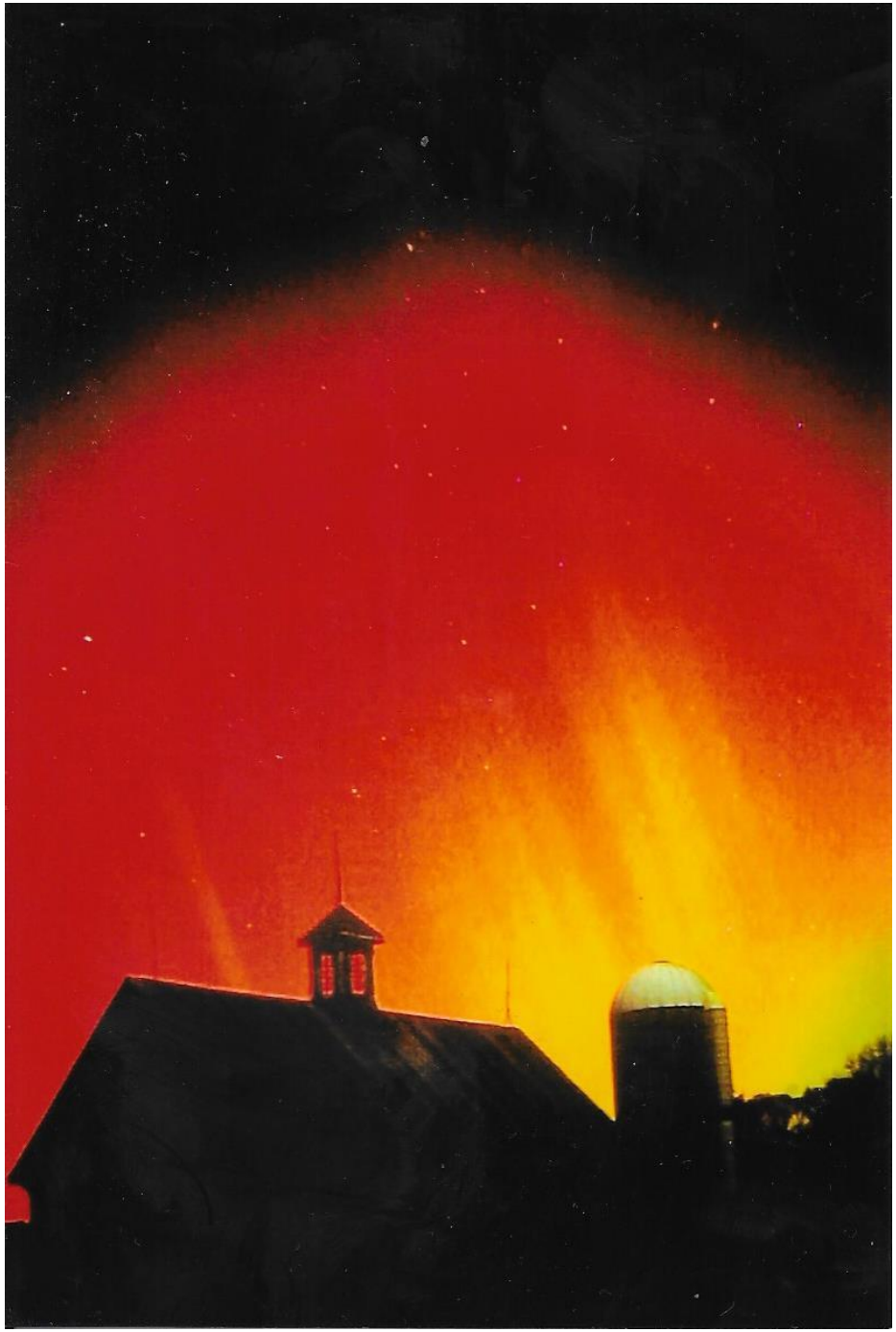
JOHN HEYN, 56, TALKS WITH HIS UNCLE HERMAN HEYN, 83, A STREET-CORNER ASTRONOMER.

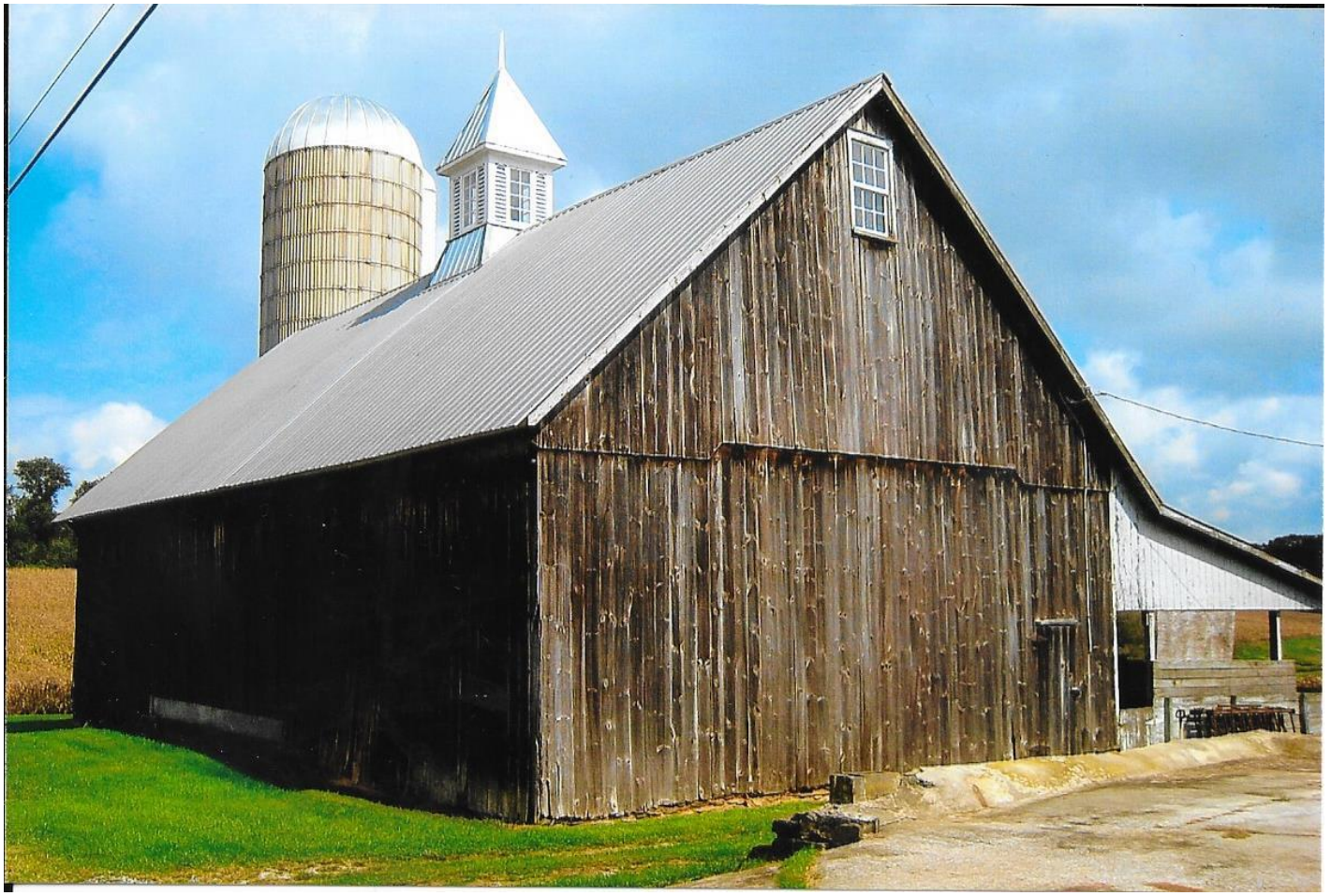
John Heyn: Uncle Herman, what did you think you were going to be when you grew up?

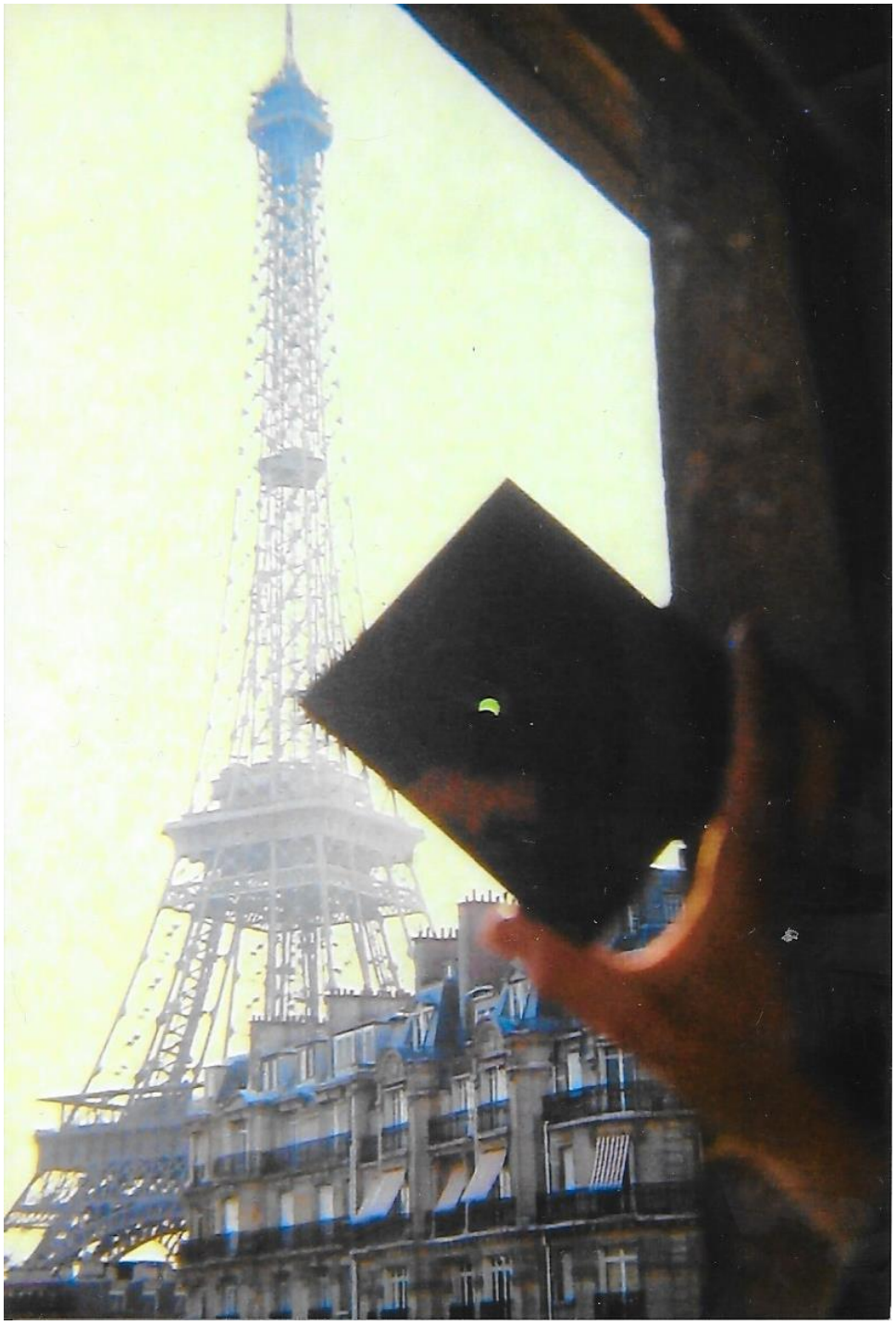
Herman Heyn: Well, I wanted to be a scientist, but I had learning disabilities. I have a bad memory for lists of words; I couldn't remember rules of English grammar, or spelling lists and vocabulary lists. . . . I just wasn't a good learner.

But when I was in the eighth grade, my science teacher, Miss Wicker, drew the Big Dipper on the blackboard one day and said, "Go find it tonight." So I went out and found it that night and thought it was totally beautiful. I got hooked on astronomy from that very moment.

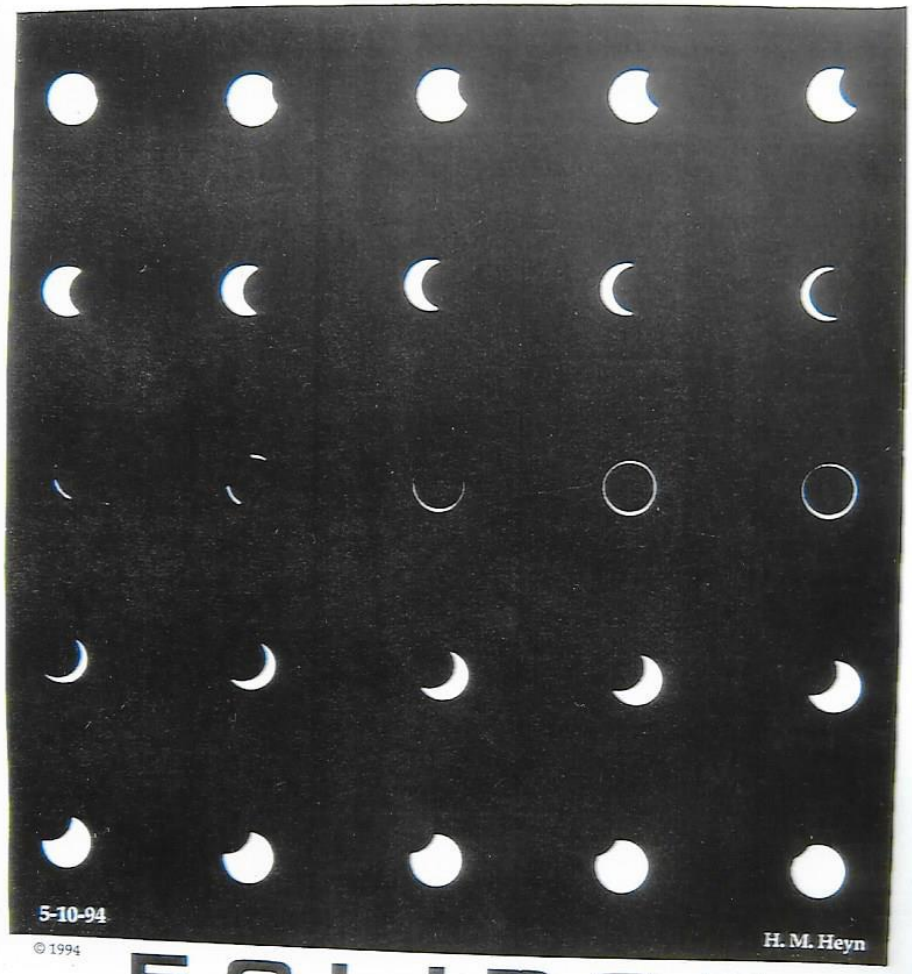
My mother used to say, "You can spell Andromeda, but you can't spell anything they want you to in school. What's wrong here?" *[Laughs.]* But stuff I really wanted to learn for







SOLAR



ECLIPSE

THE GREAT SOLAR ECLIPSE OF MAY 10, 1994 was the last central solar eclipse for the continental United States until 2012 A.D. "Central" means that the Moon passes directly in front of the Sun and hides it either totally or annularly. Other solar eclipses are partial. The May 10th eclipse was an annular or "ring" eclipse, its 143 mile wide path of annularity stretching from southeast of the Hawaiian Islands to Morocco. It crossed the United States diagonally from Arizona to Maine. An annular eclipse occurs when the Moon is too far from Earth to fully hide the Sun's disc. On May 10th the Moon was approximately 250,400 miles from Earth. During an annular eclipse, the Sun's corona, which becomes visible during a total eclipse, remains invisible because of the brilliant ring or annulus of sunlight surrounding the dark body of the Moon.

The remarkable eclipse photograph above was taken by Herman M. Heyn of Baltimore, Maryland, from a location near the front entrance of the Cleveland (Ohio) Museum of Natural History. The first image (top left) was taken at 11:37 A.M., the central image at 1:17 P.M., and the final image (lower right) at 2:47 P.M. EDT. This photograph is not a composite but consists of 25 images on a single frame of Kodak Pro 400 MC 2 1/4" x 2 1/4 " color print film. The camera was a Mamiya C220 twin-lens reflex outfitted with twin 250mm telephoto lenses and solar filters. A section of graph paper with 25 squares cut out was taped to the camera's ground glass [illegible] the Sun was photograph[illegible]


Mediterranean Eclipse
29 MARCH 2006


1999

HERMAN HEYN, BALTIMORE, USA

CEES BASSA, BEESD, NETHERLANDS

TOM SCHUMM/AARON THUL, USA

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S&T 8/18

Diamond Ring Effect

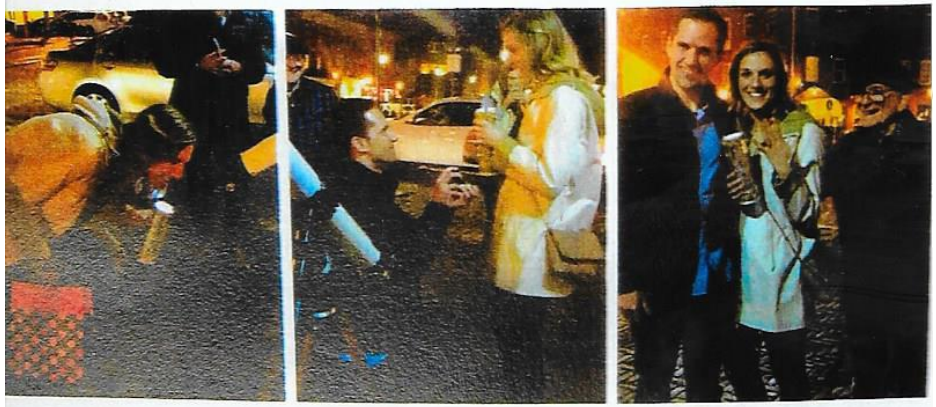
I've been doing street-corner astronomy in downtown Baltimore for 30 years. Thousands of passersby have peered through my 8-inch Meade telescope at the Moon, Jupiter, Saturn, and more. I've recruited dozens to the hobby and, I hope, at least a few to the science. But on April 6th I had a first: I presided over the marriage proposal of Morgan Ritter to Elizabeth ("Libby") Nichols.

The two of them had looked at Jupiter through my scope on their first date — an event significant enough for Morgan that he wanted to propose at my scope, and he had a plan.

As he envisioned it, Libby would look for Jupiter through the scope (in this case my 3-inch refractor) and see nothing. Then I would lean into the eyepiece and say, "You don't see it? It's very bright." She'd look again and still see nothing (because I'd leave the lens cap on). At this point Morgan would hand her a little telescope he had fashioned so that when she looked through it she would see a screen on which was printed "Will You Marry Me?"

Long story short, Morgan's plan worked perfectly, including winning a big "YES!" from Libby.

Herman M. Heyn • Baltimore, Maryland



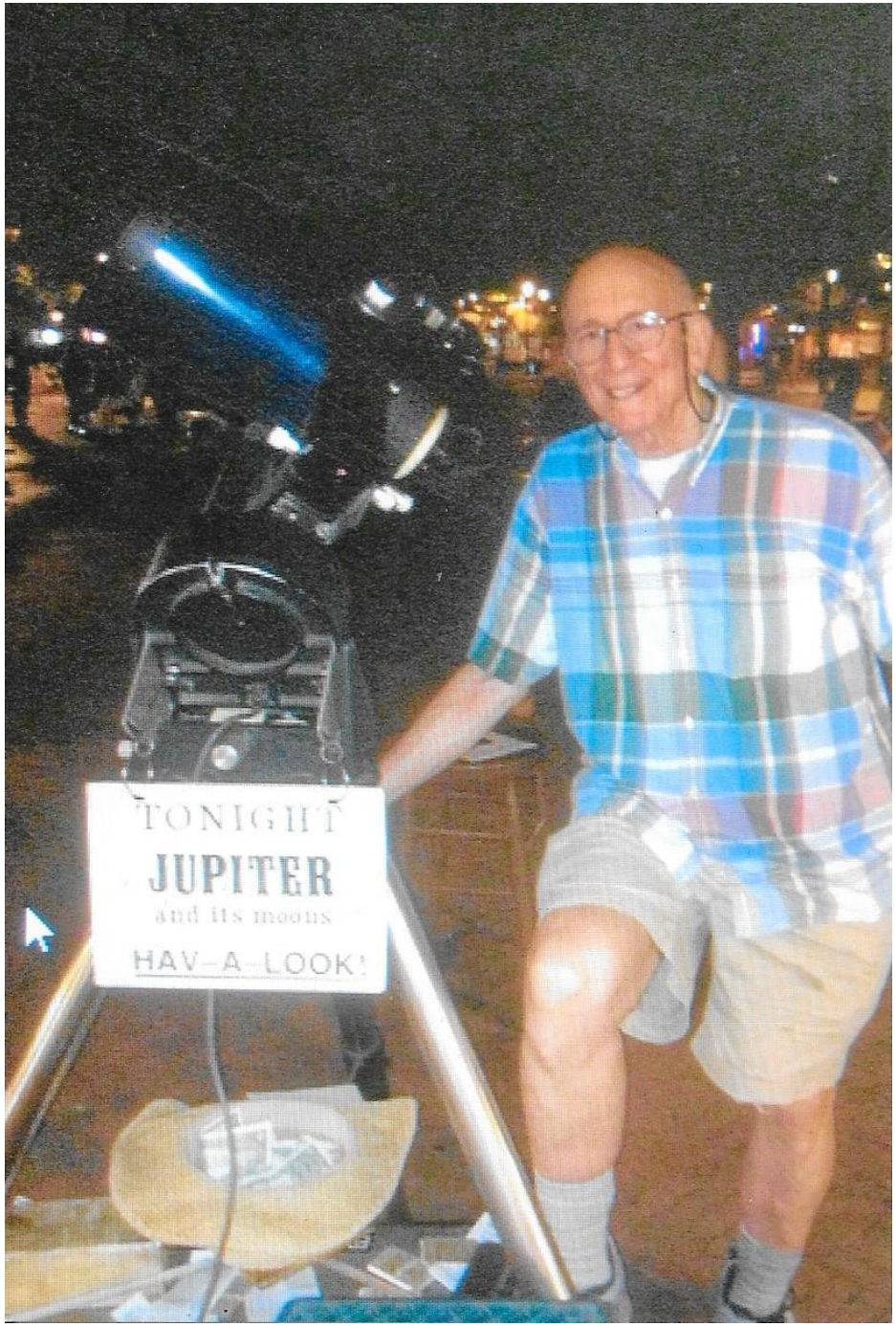
▲ A relative of Morgan Ritter and Libby Nichols captured this example of a sidewalk astronomer practicing a little "street-corner engagement."

Going Through a Phase

Jerry Oltion's "Big, Bold, Bright, and Beautiful" (*S&T*: May 2018, p. 22) was

Cosmic Recipe

In "The Dark Energy Enigma" (*S&T*: May 2018, p. 14), a graphic shows the actual


TONIGHT
JUPITER
and its moons
HAV-A-LOOK!


The end