

DETROIT ASTRONOMICAL SOCIETY

Volume 4 No. 9

Newsletter

JANUARY 1968

9900 EAST JEFFERSON

DETROIT, MICHIGAN 48214

Sunday Meeting JANUARY 14 at U.of D. Science Bldg.

In past years it was a D.A.S. tradition that the program for the January Meeting was supplied by the Junior Section of the Society. It was one of the most popular programs of the year, Most of those who attended commented on what an entertaining and inspiring experience it had been.

After a lapse of three years, it was decided to revive this custom. First, because many had expressed disappointment it had been dropped, & Second, because we are blessed with a rather exceptional group of young people this year (six will receive Awards from the Astronomical League at the meeting). If you have not attended one of these affairs in the past, be sure to be with us at 3:15 p.m. Sunday, January 14 at U. of D. You will hear talks on Astronomy and will most likely be thrilled and inspired by the excellence of this new generation, Invite your friends, especially the young ones.

SOLAR ACTIVITIES

by Charles Morris

Near the end of November the sun stayed fairly active having a group of 10 spots on the 24th. The total number of sunspots that day was 17. The giant sunspot mentioned last month was just rounding the west limb on the 24th. This spot and its group reappeared on Dec. 15. It should be interesting to see how long it lasts. On Nov. 30 the sun had 3 small groups - 12 spots in all.

During Dec. Sunspot numbers moved upward to this year's new high. Weather on the 4th made it possible to record only the sun's eastern half (I would say there were few spots). The 13th brought 16 spots, all but three were in a fairly major group in the southern hemisphere. On the 16th that group contained 20 spots - the sun had 23. On this day a spot on the western limb showed the Wilson effect. My latest observation was on Dec. 19 but the weather interfered quite a bit. On this day I was able to record only 23 spots, less than half the real number. I would put the number in the 60's. The two major groups were the ones mentioned above,

An effect where the portion of the penumbra (outer shading) of a sunspot nearest the center of the disk seems to disappear when the spot is on the limb of the sun.

WANT TO JOIN THE SWIM ? ?

SWIM !! At this time of the year?

Well - - maybe not a real swim, We mean a swim in the, current of Society affairs. The current is getting stronger and faster and there is plenty of room in the water.

You ask, 'What current are you talking about? I already know about the Sunday meetings and Friday at Sylvia Allen Center, What more is there?'

There's lots more. However, up until now only a relatively small number of members are in on it, They are the ones 'in the swim' and they are having lots more fun than those who stand on the bank or just 'dip in' on Sunday or Friday.

Sure - - those behind the scenes, or in the swim, are putting in some time - - and some work - - but their reward and satisfaction far exceeds their efforts. But - - just what do they do? Well - let's see.

There is the Newsletter. Do you have an idea that you would enjoy writing? If so, Linda Lloyd will be delighted to welcome you,

We'll even give you a title - - Reporter, Correspondent or maybe elevate you to Assistant Editor.

Sylvia Allen also offers opportunities , lots of them. Are you a pretty good mechanic? How about helping guide others through the steps of telescope making? But -- you say—you don't know enough about it. Neither did anyone else to begin - but you can learn. There's also a title here -- Professor or Assistant Professor.

We could also use a few Professors to help with the Junior Classes, And that's the real way to learn - just teach someone else, Sylvia also could stand a few Hosts or Hostesses, just people who like people -- to welcome visitors, guide them around, and make them feel at home.

Miss Allen (Sylvia that is) has openings for a few Film Producers, really adults to help out with the astrophotographic group as soon as our darkroom is finished.

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JANUARY Program of Events at Sylvia Allen Center

Friday, January 12, 1968

8:30 p.m. - Astrophotography
'Eyepiece Projection Demonstration'

Color movie Jan. 19 will be narrated by the
Producer, D.A.S, member Don Campbell

Friday, January 26, 1968

8:30 p.m. - Beginner's Class
Using the Observer's Handbook and
Maryland Chart

Friday, February 2, 1968

8:30 p.m. - 'The Sun's Shadow'
(Lunar and Solar Eclipses)

★ Sunday, January 12, Monthly Meeting (see page 1)

Friday, January 19, 1968

8:30 p.m. - Beginner's Class
'Guide to Winter Constellations'
★ Movie - 'Northwest Ontario'

EXPOSURE GUIDE FOR FIRST OR LAST QUARTER MOON PHOTOS compiled by Larry F. Kalinowski

f NO.	Exposure Time In Seconds							
	32 ASA	64 ASA	125 ASA	250 ASA	500 ASA	1000 ASA	2000 ASA	4000 ASA
1.4	1-500	1-1000	1-2000					
2.0	1-250	1-500	1-1000	1-2000				
2.8	1-100	1-250	1-500	1-1000	1-2000			
4.0	1-50	1-100	1-250	1-500	1-1000	1-2000		
5.6	1-25	1-50	1-100	1-250	1-500	1-1000	1-2000	
8.0	1-10	1-25	1-50	1-100	1-250	1-500	1-1000	1-2000
11.0	1-4	1-10	1-25	1-50	1-100	1-250	1-500	1-1000
16.0	1-2	1-4	1-10	1-25	1-50	1-100	1-250	1-500
22.0	1	1-2	1-4	1-10	1-25	1-50	1-100	1-250
32.0	2	1	1-2	1-4	1-10	1-25	1-50	1-100
45.0	4	2	1	1-2	1-4	1-10	1-25	1-50
64.0	8	4	2	1	1-2	1-4	1-10	1-25
90.0	16	8	4	2	1	1-2	1-4	1-10
128.0	32	16	8	4	2	1	1-2	1-4
180.0	64	32	16	8	4	2	1	1-2
256.0	128	64	32	16	8	4	2	1

The moon chart shown at the left is designed to provide proper exposures for any camera or camera and telescope combination. It doesn't matter whether you're using black and white or color film as long as the film speed is in the range of the eight speeds listed on the chart. Find the equivalent 'f' ratio of the camera or camera and telescope combination you are using in the far left-hand column. Move to the right until you reach the column that is headed with a film A.S.A. that closely matches your own. The proper shutter speed will be shown at the intersection. For example, at f8 and an A.S.A. rating of 125, the proper exposure is 1/50 of a second. For full moon pictures simply move up the same A.S.A. column two positions. In our example the proper shutter speed would be 1/250 of a second.

WARNING !!

DO NOT GO BEYOND THIS POINT BEFORE READING: 'WANT TO JOIN THE SWIM?' (page 1) NOW,

if you have even a faint suspicion that you might enjoy some of these activities, *Read on.*

interested in on the form below and send it in. There is no commitment or obligation at this time. We will get more information to you, discuss it with you and then - *you decide.*

Check off the area or areas you might be

I might be interested in the areas I have checked:

- Writing for the Newsletter
 Telescope making instructor
 Helping with Junior Classes
 Host or Hostess at Sylvia Allen
 Working with photographic group
 Operating movie projector
 Assisting at the snack bar
 I will bring my 'scope to star shows.
 I have no 'scope, but I
 I could help at exhibits
 It is a ___ inch reflector/refractor
 could help at star shows
 Observatory work would be fine
 Other ideas I have to help: _____

Name _____ Phone _____

Street Address _____ City _____ Zip _____

Please return to: C. D. Marshall

17396 Westmoreland
Detroit, Michigan 48219

Remember - No obligation yet !!

Nova in Delphinus

NOVA DELPHINI began its rise in magnitude about June 12 according to Sky & Telescope.

It was on July 8 when Mr. Alcock discovered it at magnitude 5.8. Since then the nova has been very surprising.

I first observed the nova on Aug. 3 when its magnitude was 5.5. The nova rose slowly during the month until in early Sept. it was at magnitude 4.8. It varied slowly during the next month. An example of the way it varied: Sept. 22d, 4.8; 24h, 4.9; 25h, 5.9; Oct. 1st, 4.7; 2nd, 4.9. Ch Nov 5 it rose to 4.6 and then began declining until on Nov. 15 Nova Delphini was at magnitude 5.4. This was its lowest since August. It raced up from there to mag. 3.9 on Dec. 13. My latest observation of the nova was on the 19th and at that time the magnitude was 4.2.

Nova Delphini has been at its height for almost 200 days and doesn't seem ready to decline. This opens the door for the beginning of an observing program as it is easy to find, and any low power instrument can be used.

Charles Morris

*Ed. Note: Mr. Morris has used a nearby comparison star of magnitude 4.8 to determine the visual estimates cited in his report.

ASTRONOMERS, PLEASE NOTE

Work performed nearly 30 years ago on how stars burned (specifically the sun) earned Dr. Hans Bethe (Professor of Theoretical Physics, Cornell University) the 1967 Nobel Prize.

MARYLAND ACADEMY CHARTS

A limited number of the Graphic Time Table of the Heavens in the large chart form are available at Allen Center at \$1.75 each.

FROM DECEMBER

Your D.A.S. Officers (one year term) and Directors (three year terms) elected:

Dr. Gerhard Blass, President; C. D. Marshall, Vice-President; F. Nelson Lewis, Secretary; Richard Lloyd, Treasurer; Harvey Johnson and R. Lester Spitzley, Directors.

From comments, the taped lecture 'Star of Christmas' was a successful innovation.

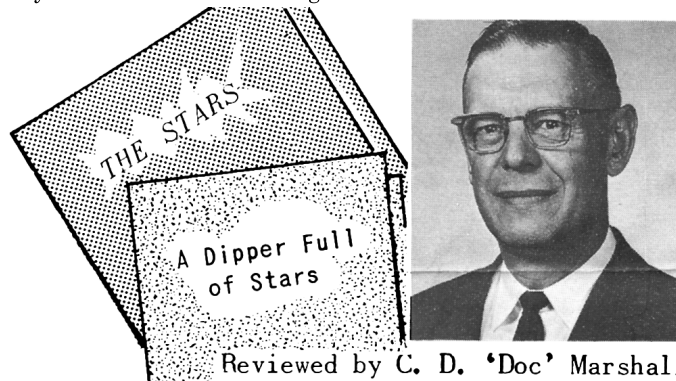
An exceptional opportunity to obtain 'Moon Pak' (set of 4 moon maps for \$3.00) was announced - to order, 'phone Doc Marshall at 393-6631 days or 535-7117 evenings or see Linda Lloyd at Sylvia Allen Center on Friday. Order deadline is Friday, January 19.

Those who ordered Observer's Handbooks or Messier Catalogues can obtain them at the Sunday Meeting or Friday Workshop.

The BOOK CORNER

This column will not be concerned with literary style or skill but will look at books from the standpoint of interest to our members.

If you know of a particularly good book you think should be included, call Doc Marshall at 393-6631 days or 535-7117 evenings.



Reviewed by C. D. 'Doc' Marshall

This month we will give you a double-barreled review -- two books, both in the Society Library.

A DIPPER FULL OF STARS

by Lou Williams Page

214 pages. Printed 1944, Updated and reprinted 1959.

THE STARS, A New Way to See Them

by H. A. Rey

150 pages. Printed 1952, Updated and reprinted 1962.

Both books are excellent guides to constellations identification, are well written and illustrated. Each, of course, has its own strong points.

A Dipper Full of Stars presents both the traditional outlines of mythological figures for the constellations and the 'matchstick' type constellation drawings. Rey's book on the other hand, uses only the 'matchstick' figures which make recognition very easy.

A Dipper Full of Stars includes much of the interesting mythology of the constellations. It also discusses the planets, asteroids, comets, meteors, sun, moon, origin of the solar system, telling time by the stars, satellites and space travel in some detail.

Rey's book, *The Stars*, explains celestial coordinates, and sidereal time, the planets, the seasons, precession of the equinoxes, the moon, island universes and life outside the earth.

Both volumes include sky maps for all seasons. They are free from mathematics and, while they naturally duplicate some material, are well worthwhile reading for anyone.

Eclipse Report



"Vi" Love

'The Unscientific Side of the South American Eclipse'

Chapter VII - CUZCO and NEARBY RUINS

(continued)

by V. E. 'Vi' Love

Cuzco is 700 miles from Lima, midway on the Central Highway leading from Lima to Bolivia. Its population is 69,700.

This city is the oldest continuously in-habited city on the entire American continent. The name means 'the navel', so-called because it was the political capital of the Inca Empire. It was founded in the 11th century, became the capital about 1100 A.D., was rebuilt in 1440 after war with the jungle tribes, taken by Pizarro in 1533 and enjoyed a Golden Age of Spanish rule during the 16th and 17th centuries,

Since the Incas had no written language, much of our knowledge of the empire has been gained from the Spanish. The earliest and most authentic history of these people was written by Pedro de Cieza de Leon, a soldier. His works still furnish background material for modern writers on Inca life. In my research for this chapter, I found so much interesting material that I decided to digress from the story of the expedition and describe some of the outstanding qualities of the Incas.

They were skilled engineers but had no knowledge of the wheel. Nevertheless, they dared build miles of roads, tunnels through rocky mountains, suspension bridges, intricate irrigation systems, developed a fantastic method of moving stones weighing tons and fitting them together without mortar so precisely that a knife blade cannot be inserted between them.

More than half of the foods that the world eats today were developed by these farmers: 20 varieties of corn, 40 varieties of potatoes, peanuts, cashews, tomatoes, beans, peppers, chocolate, pineapples, papayas, strawberries, to name a few., Since the amount of flat land was limited, and the Andean valleys were deep and narrow, terracing and irrigation

were the mainstay of agriculture, In some large projects, architects were sent out from Cuzco to plan them. Terraces on the heights above the Urubamba River still stand after 5 centuries. Earth was sometimes carried for miles from other areas, carefully selected for the composition and fertility of the soil. Irrigation techniques were highly developed immense reservoirs, stone conduits by which water was brought to the top of terraces and allowed to flow down stone troughs from one terrace step to another.

Most of the 100,000 inhabitants of ancient Cuzco lived in houses of sunbaked mud painted red or yellow and thatched with thick straw, Houses of the upper class and temples, constructed by professional architects, were of elaborately cut stone fitted with a precision which has never been duplicated. Their construction was so efficient that the walls have withstood countless earthquakes, wars and fires. The exteriors were seldom decorated, but the more important buildings were sheathed with heavy gold plate, each sheet weighing from 4 to 10 pounds. The most fabulous edifice was the 'Golden Enclosure' adjoining the Temple of the Sun. The outside of the Temple was covered with heavy gold plate, the roof was thickly thatched with grass intermingled with straws of actual gold. In the 'Enclosure' was a field of maize, the clods of earth were pieces of fine gold, the corn stalks, stems, leaves, cobs were wrought of gold, In addition, grazing on gold grass were more than 20 llamas with their young, They were watched over by life-size shepherds of gold. Rumors of all this treasure reached Pizarro in Panama and he set forth to acquire it for Spain. When the conquistadors conquered Cuzco, most of this wealth was sent to Spain and melted into ingots.

Since the Incas ruled an empire extending from Present day Ecuador to Argentina and Chile, it was necessary to have a good system of roads to the various provinces, The roads, traveled only by those Oh foot and llama herds ranged from sea level to 17,160 feet (the highest road known). The Royal Road in the Andes (3250 miles long) varied from 8 ft. to 36 ft, in width, was unsurfaced except in cities, laid with stone in wet country and built in steps when climbing mountains. The Coastal Road (2520 miles long) was 24 feet wide along the entire distance, not surfaced, had 3 ft, walls of stone or adobe along the sides to keep travelers from wandering into the desert and to keep out the drifting sands. There was a complex relay system of runners, each man running at top speed for the 2 miles between stations, They were so efficient that messages could be sent from Quito to Cuzco (1250 miles) in 5 days at an altitude

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ranging from 6000 to 17,000 ft, Fresh fish was brought daily to Cuzco from the sea, 130 miles away, The Spanish maintained this system until 1824.

Bridges were known as 'little brothers of the road'. Probably the most famous one was the Huaca-Chaca bridge across the Apurimnac River on the Royal Road from Cuzco to Lima, This suspension bridge was 148 ft, long and 138 ft, above the river. It was finished about 1350 A.D. and served as a highway for foot, llama and mule traffic for 500 years. It is the longest continuously used bridge in the Americas (1350 to 1890). The cables, thick as a man's body, were plaited and twisted of plant fiber at the site. Every two years they had to be restrung, the last time that this was done was in 1879. Although still hanging in 1890, it was no longer used because the cables were slowly decaying, This bridge was the inspiration for Thornton Wilder's masterpiece 'The Bridge of San Luis Rey'. The Incas were also expert in constructing cantilever and pontoon type bridges.

In Nov. 1533, Francisco Pizarro and his conquistadors invaded Cuzco. They destroyed the temples and palaces but used the walls as foundations for their own buildings, These were the structures that collapsed in the earthquake of 1950 which damaged 90% of the buildings, but the old Inca walls remained unshaken.

SIGHTSEEING IN CUZCO AND SURROUNDING COUNTRY

After lunch on the day of our arrival, we drove into the mountains. Since we were given no itinerary, we had no idea what we were about to see, but we began to pass extensive ruins which our guide assured us we would examine on the return trip.

Our first stop, at 12000 ft. and 5 miles from Cuzco, was Tampo Machai. This was an outpost or resting place for Incas. Some of the stone walls are still standing and water in the fountain still flows from some unknown source, There were a number of women and children, obviously of Incan ancestry, gathered here in native dress - for the benefit of our picture taking, no doubt, The women wore flat, pancake-type black hats decorated on top with an embroidery pattern much like a maltese cross and red braid around the edge, They wore white blouses with a fully gathered skirt reaching almost to the ankles. Some were of patterned material, but most were black with 2 red bands around the bottom, For additional warmth there was a red waist-length jacket

bordered in black, Babies were carried in a blanket sling draped across the back (even little girls carried baby dolls in such fashion). All wore their hair in braids and were barefooted, They were constantly spinning yarn by means of spindles held in one hand and wool held in the other.

Next we visited Kkenko, the ruins of a temple for the dead, Mysterious carved stones have been found here which still challenge archeologists.

After descending a few more miles, we stopped at an 18 ft. statue of Christ. The money for this statue was donated by Christian Arabs, but construction was done by local artists, It was finished in 1945. From here, the view of the city was spectacular.

About half a mile away was Sacsahuaman. This was a fortress built on a hill 800 ft. above the city after the war with the jungle tribes in 1440. There were 3 parallel tiers of stone walls forming a solid barricade over 1500 ft, in length. The level of the ground was built up so the soldiers could discharge arrows from 3 different levels. It was still imposing, although the Spanish had looted the stone for their own buildings in the city, Nothing remains of the two great towers, each of which held a thousand men, The fortress rises to a height of 60 ft. It is constructed of square cut limestone boulders, some as heavy as 60 tons. Single stones up to 25 ft. in height and 12 ft, thick can be found, At the top level, in the center of the structure, was a circular area which was the base of a tower that served as a 50,000 gal. reservoir. Stone troughs carried the water to all parts of the fortress, Water is believed to have been siphoned underground from a nearby lake, Records show that there were underground passages, a palace for the Inca, storage places for food and arms, and living quarters for soldiers and other persons, The procurement and placement of the huge boulders must have been a herculean task, They used wood and stone rollers, tree trunks as levers, sledges for dragging, Thirty thousand Indians toiled for 70 years to bring this project to completion,

The last fortress that we visited was Puca Pucara (red fortress). It dominates two valleys which have tunnel entrances said to connect Sacsahuaman and Cuzco's Temple of the Sun. This may have been the main defense of the city before Sacsahuaman was built.

Because of our intense interest in the ruins, our tour of the city was sharply cur-tailed. The Cathe-

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1966 Eclipse Report

..cont. from page 5

dral was closed for the day, but we did visit El Templo de San Blas and the Temple of Santo Domingo (the old Temple of the Sun). Damages caused by the earthquake of 1950 are still evident in the latter church. They estimate that it will be another ten years before repair work is completed.

The Cathedral is on the Plaza de Armas. Although we could not view its treasures, Edgar and I were delighted to see an old friend standing in the center of the plaza. I was born and raised in a small town on the banks of the Allegheny River about 5 miles north of Pittsburgh. In colonial days, this land belonged to the Seneca Indians with Guyasuta as their chief. Their summer hunting grounds were near our small town. Many years ago the citizens had erected, at an intersection on the Main Street, a handsome bronze statue 10 ft. tall in honor of this memorable Indian. I really felt quite friendly toward

him, passing by on my way to and from school four times a day. Edgar, who lived in a neighboring town, became acquainted with him on his way to the YMCA. It was with much nostalgia that we saw this same statue in the Plaza de Armas in Cuzco. It seems that a U.S. firm had been commissioned to cast a statue of the Inca Atahualpa. At the same time they were casting a statue of an Apache Indian destined for Mexico City. When the orders were shipped, the Apache went to Cuzco and the Inca to Mexico. Evidently this company used the same mold for all North American Indians, because the Apache was our Guyasuta.

We returned to our hotel for dinner and explored the little shops nearby. Ponchos, llama slippers and hats, silver jewelry were most popular for our souvenir hunters.

(Next Month: Machu Picchu)

'JOIN THE SWIM'

...cont. from page 1

Then there are movies to be shown both on Fridays and on Sunday. A splendid chance for some D.A.S.A.C.E.'s (Detroit Astronomical Society Accredited Camera Experts) -- a wonderful title. Too - a few Dieticians could be kept busy at the snack bar.

Sometimes the Society puts on star shows. Here we need people with portable telescopes 2, 3 or 4 times a year to let the public view the heavens. How would you like to be one of these Astronomers Royal?

For each Astronomer Royal we should have at least one other person without a 'scope to help keep the crowd going - to explain what's going on, etc. He (or she) is a Research Assistant.

Occasionally, we are asked to prepare a booth at some exhibit. People here tell about the Society -- hand out literature -- answer questions -- or just look knowledgeable (the men) or decorative (the women). These folks usually wear badges of rank -- Exhibitor.

Finally there is the good old Observatory out at Rattle Run. Plenty of openings here for Engineers, men from 16 up who have both strong backs and strong minds.

If you think you might enjoy participating in any of these areas, just let us know by filling out page 2 and sending it in.

'Doc' Marshall

The Detroit Astronomical Society
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