



The Spectrum

Buffalo Astronomical
Association, Inc.

Darwin Christy, Editor

MARCH - APRIL 1980

March meeting:-----The next regular meeting will be held on March 14, 1980 at the Buffalo Museum of Science, Humboldt Pkwy., Buffalo, N. Y. at 8:00 P.M. Our speaker for the evening will be Phil Cizdiel, one of our student members. He will be talking on "Arizona Astronomical Observatories." Let us welcome Phil with a large turnout.

?????????QUIZ?????????

- #1- What are Kepler's three laws of planetary motion????
- #2- What is Einstein's theory of relativity????
- #3- The law of gravity was discovered from the observation of an apple falling from a tree by this scientist; who was he????

April meeting:-----The April meeting will be held jointly with the Lockport Astronomy Association on the 11th at the Museum of Science at 8:00 P.M. We will be hosting Mr. David Atkins with his account of "Arecibo." Mr. Atkins is from the Rochester Astronomy Club. Let us give Mr. Atkins a hearty welcome.

A Furry Tail

A Space man landed
in my back yard
and handed me his
ID card
I looked at it
with fear and awe
The ID card
was a furry paw.
My dog ran out
with a knowing bark
and told the Space man
where to park.
Interpreters
at times like these
can solve the worst
emergencies!

Esther L. Goetz

Our Moon

Our moon seems happier
than before
the astronauts banged
on her door.
She keeps her craters
close at hand
to greet new space ships
as they land,
for she has rendezvoused
with men
and knows full well
she will again.
While Jupiters moons
sleep unaware
Our moon is having
an affair!

Esther L. Goetz

From her SORRY ABOUT THAT collection

FOR SALE

6 month old MEADE 6" Model 591 - \$260 - Present factory and shipping costs are \$350 - Call 691-8525 and ask for Paul.

ASTRONOMY DAY

The BAA will be celebrating Astronomy Day this year with an exhibit at the Eastern Hills Mall. Present plans (2-20) call for an exhibit Thursday and Friday evenings and Saturday all day on April 24, 25 & 26. The Mall committee hopes to arrange for a display of club photos, astronomical slides and photos, telescopes and two handouts. The handouts will acquaint the general public with both the various activities of the BAA as well as area astronomical opportunities and organizations. Anyone who may be interested in volunteering aid to the exhibit who has not already talked to Al K., please call 694-1317. See you at the Mall!

BEAVER MEADOW OBSERVATORY

The Buffalo Audubon Society welcomes an astronomy class this summer. See or call Tom Dessert for particulars. (652-5530)

Nominations for officers; 1980-1982

Nominations for officers will be announced at the May meeting. Please contact any Board Member if you have someone in mind to become President, Vice-President, Secretary, or Treasurer. You can be of help to the board with your preferences.

Membership Involvement

Edith Geiger has done so much in the past for the club that there is not enough paper to write it all on. She is still doing and I believe that a hearty thanks should go out to her. THANK YOU EDITH. I am not the only one behind the 'SPECTRUM' and so--- let those be recognized; Ken & Diane Biggie and Elaine Deazley as well as Edith Geiger. Thanks to you all.

Our membership has been on a gradual decline. We have had a great number of people who have been members at one time or another in the past. You can help to revitalize the B.A.A. by calling any former member and inviting him to attend our meetings. Your call may be the energizing force that will bring him back to active membership. Perhaps among your acquaintances there are those who could become interested members, if YOU extend the invitation. The B.A.A. has much to offer. Let's get in back of OUR organization and push for a better attendance, the return of former members, and new memberships. The success and strength of the B.A.A. depends on YOU.

E.L.G.

The Herschel Club

The Herschel Club is an observing program of deep sky objects compiled by Sir William Herschel in the 18th and early 19th centuries. It consists of 400 selected objects for 6-inch and 8-inch telescopes. The Program is an official observing program of the Astronomical

League and is an excellent sequel to the popular Meesier Club, which is composed of observers of 107 deep sky objects.

An observing manual with descriptions, selected photographs, charts, and instructions will be available about June 1980. It will also include suggestions and hints compiled by experienced observers of the 400 finest Herschel objects included in the program. When the book is ready, request information from the Astronomical League Book Service, 102 Supreme Court, East Peoria, Ill. 61611.

In the mean time, observers are encouraged to get a start with this list of Herschel objects(sub-note). You should compile a log of your observations, listing the object, the date and time, seeing conditions, instrument used, and your personal description of the object.

Becoming a member of the Herschel Club is not easy. But, it is a route to many nights and hours of enjoyment of the heavens. After you have completed your log, have it endorsed by an officer of your astronomy club or send it direct to: Brenda Guzman, Coordinator, Ancient City Astronomy Club, 495 Arricola Ave., St. Augustine, Fla. 32084.

Your observations will be checked out by the program committee and you will be issued an attractive special certificate which you can display on your wall or in your observatory, attesting to the fact that you are an experienced deep-sky observer.

Good observing!

*The list of Herschel deep-sky objects will be on the table with the sign-in sheet, or see Mrs. Geiger.

Observations of the variable star o Ceti (Mira) by Shigeru Morikubo

| Month | Day | Time JST | Julian day | Observe | Degr. | Remarks | | |
|-------|-----|-------------|---------------|----------|-------|---------|-----|--------------------------|
| 1979 | | | 244 | | | | | |
| Oct. | 20 | 21:05 | 4167.00 | 3.6=* | 3.6 | N- C | O S | 10 |
| | 21 | 22:00 | 4168.04 | 3.61V | 3.7 | | " | |
| Nov. | 11 | 20:00 | 4188.96 | 3.6=V | 3.6 | | " | |
| | 13 | 20:50 | 4190.99 | 3.62V | 3.8 | | " | |
| | 14 | 20:50 | 4191.99 | 4.01V | 4.1 | | " | |
| Dec. | 25 | 19:05 | 4232.92 | V5 5.5 | 5.0 | B- | " | <u>Moon age</u> 6 day |
| | 27 | 19:05 | 4234.92 | V5 5.5 | 5.0 | | " | 8 " |
| 1980 | | | | | | | | |
| Jan. | 1 | 23.20 | 4240.10 | V5 5.5 | 5.0 | | " | 13 " |
| | 3 | 18:40 | 4241.90 | V4 5.6 | 5.2 | | " | 15 " |
| | 5 | 19:05 | 4243.90 | V4 5.6 | 5.2 | | " | |
| | 7 | 18:02 | 4245.88 | V4 5.6 | 5.2 | | " | |
| | 11 | 18:30 | 4249.90 | V3 5.6 | 5.3 | | " | |
| | 14 | 18:30 | 4252.90 | V1 5.6 | 5.5 | | " | |
| | 17 | 18:05 | 4255.88 | V= 5.6 | 5.6 | | " | |
| | 20 | 19:08 | 4258.92 | 5.6 2V | 5.8 | | " | |
| | 24 | 19:03 | 4262.92 | 5.6 3V | 5.9 | | " | 7 " |
| | 27 | 18:13 | 4265.89 | 5.65V6.3 | 6.0 | | " | 10 " |

N : naked eye
B binoculars 7x35
C cloud (0-10)
S seeing (0-10)

SPY AND TELL

Edith L. Geiger

In looking through some clippings, I ran across a full page photo-

graphic article (April 14, 1971) on Irv Goetz in the Photo News, a Hamburg paper no longer in existence. Six pictures show: the first telescope that he made, Irv polishing a mirror, his charts and maps, the observatory he constructed in 1968, a moon shot he took with his telescope, and a new larger telescope with a clock drive which he had finished. Irv made most of his equipment.

Olga Lindberg has a daily column in the Buffalo Evening News entitled "Through the Years." Look for the black outline around this special feature.

The Deazleys are selling their home with the anticipation of building a new one. They went to Boonville, N.Y. the week of February 11th for a skiing holiday.

Ernst Both is, as always, a very busy man at the museum with his administrative duties as head curator, curator of both astronomy and mycology, along with his Friday night public lectures in the museum auditorium at 7 P.M. on astronomical subjects, followed by public viewing under his supervision in the Kellogg Observatory. Last November, Ernst visited Kitt Peak Observatory in Arizona. His visit was part of the planning program for a new major exhibit hall at the museum.

Larry Carlino is teaching an astronomy course at Williamsville South to enthusiastic students. He is also coaching the indoor track team, and in the spring will coach the outdoor track team.

Bob Mayer gave a beautiful slide presentation on the Fairchild Travel Talks program on February 6th to a large crowd in the museum auditorium. His talk was on the "Tip of Tobermory and Western Canada."

Tom Giasomo, who has a bachelors and masters in physics, is working on a second masters in business administration.

Al Kolodziejczak will be giving a workshop on alternate energy sources at the New York State Outdoor Education Association's spring workshop in May, at Camp Weona, Orangeville, N. Y.

Shigeru Morikubo, Darwin Christy's micrometeorite colleague from Japan, was in India with a party of twenty to view the solar eclipse on Feb. 16th.

Darwin has a staggering project of remodeling the living room area of his home.

I'm happy to spread the good news that Bob Burdick, a former active member who has had some health problems in the last few years, is feeling much better and hopes to attend a B.A.A. meeting in the near future.

BAA ANNALS

Rowland Rupp

5 YEARS AGO - Dr. Seville Chapman was our speaker at the March 1975 meeting. His topic was not given in the Spectrum, but I recall he spoke on an electronic gadget related to astronomy he and his son constructed.

In April, Dr. Francis J. Bajer presented a lecture-demonstration

entitled "Lasers, the New Technology."

The Beaver Meadow Observatory fund raising program had reached \$2625 by April. A bake sale was scheduled for May with proceeds going to help finance the observatory. We announced a course, "Wonders of the Sky," to be given at the meadow by John Riggs during the summer. John's course was a general survey for people new to astronomy.

10 YEARS AGO- A noted German astronomer, Dr. W. D. Heintz, spoke on "Astronomical Observations of Mars" in March.

Our first astrophotography exhibit had just ended the month before. It was a success but unfortunately some of the photographs "disappeared." Who would steal astrophotos? Astronomers? No, they're all honest. Others? What would they do with them?

Several members, including Dale Hankin, Larry Hazel, Walter Semerau and Walter Whyman, spoke on the 1970 solar eclipse at the April 1970 meeting. Dr. Fred West wrote an article for the April Spectrum--"Transits of Mercury." The transit scheduled for May 9, 1970, must have prompted the article. We should see another transit of Mercury on November 13, 1986, according to Fred. Apparently, they occur only in April or November as Mercury goes through its descending or ascending nodes respectively.

15 YEARS AGO - In March 1965, Norman J. Vester was our speaker. Mr. Vester dealt with the philosophical implication of cosmology and its effects on our society. Harold Becker talked on astrophotography in April. One of those anonymous articles appeared in the April Spectrum--a short one on "Mars, The Crimson World." The highest temperatures projected for the surface were 10°C to 30°C--somewhat higher than the two Vikings found when they landed 11 years later.

25 YEARS AGO - In March 1955, Harry Olsen spoke on "The Nature of Light." Kurt Stehling, a club member working at Bell AirCraft, showed movies of the Bell X-1A aircraft and rockets at the April meeting.

KENNETH W. KIMBLE

Edith L. Geiger

Ken, one of five brothers, was born in Buffalo. He was educated in the Kenmore schools, graduating from Kenmore East High School. When he was fourteen years old he started to work nights and weekends in garages, and continued to do so throughout his high school years.

After high school he went into the service and spent a year in Denver in a school for electronics and missile guidance. From there he went on to Orlando for a six month course in missile maintenance. Then it was on to Germany for two and a half years as crew chief on missile site maintenance. In 1965 he was chosen to help write a maintenance manual, and was also honored with three cash awards for suggestions for improving maintenance techniques. He was discharged from the service in 1966 and headed homeward.

While he was in Germany he was able, from time to time, to take short trips to Switzerland, Denmark, Holland, France, Italy and Spain. On returning to the United States, Ken traveled around the country picking up odd jobs here and there. In fact, he had tried so many jobs that in 1966 he had to fill out twenty-nine W-2 Forms from different states.

Shortly thereafter, he became employed at JEF Design in Cheektowaga as an electronics technician. This was a "sit down" job and not to Ken's liking, so he went on to another job as an industrial

electrician, after which he spent three years as a mechanic in a British car dealership in Amherst. He was hired by a general truck repair shop in Buffalo, from 1969 to 1975, where he did frame and front-end work along with fabricating. It was at this shop that he learned to weld. He worked up to management, but in 1975 he had the opportunity to go to Brighton Design as a designer. He enjoys his work and plans to stay with this company designing assembly machinery for the automotive industry. Most of the customers are from the General Motors Company.

It was in 1970 that Ken was coming home from work with his boss, who wanted to stop at H. Salt to get some fish to take home for dinner. The lines waiting for service were "miles long." Adrienne Freeman was standing in line with her mother and grandmother. As she looked over to another line she noticed Ken whom she had met, as she had often "hung around" with his younger brother, David. It seems that at that time in his life, when Ken was nervous his one eye would twitch, so when he looked at Adrienne she interpreted that twitch to be a wink. That evening she went to the restaurant in the plaza with some of her friends, and who was there, but Ken. Adrienne went over and approached him about his winking at her. Ken declared that he didn't know that he did. So you see, having the right kind of a twitch can be the "start of something big," for it led Ken and Adrienne to the altar in 1974.

Adrienne was a food buyer for Kenmore Mercy Hospital and she and Ken lived in an apartment on Delaware Street in Tonawanda. Their desire to share a common interest caused them to take flying lessons at the Niagara Falls Airport. The idea was great except that their lessons had Ken and Adrienne flying in different directions, so their togetherness was flying apart. In 1975 they bought a house in the Town of Tonawanda, so the flying lessons flew out the window. Now Ken flies model airplanes.

It was in 1977 that Kevin was born, and Ken is very proud that he attended the delivery of his son. Daughter, Karen, appeared shortly in September of 1978. Ken is still very enthused about aircraft and you'll find him at the airport every Sunday with Kevin, who at two and a half, is enjoying his Daddy's hobby.

In 1976 Ken met Darwin Christy through a friend of Ken's mother in the American Legion. As a result he visited Darwin's Honeyhouse Observatory. He was also invited to Orrin's home when Orrin's adult education class in astronomy met there for follow-up study and observation. Darwin encouraged Ken to attend the B.A.A. meetings in the spring of '78. Ken was impressed with our group and became a member in the fall of '78.

He has embarked on an ambitious project of building a spectrohelioscope. It is in the planning stage, with some of the parts already purchased. After a long discussion with Walter Semerau, and after seeing his spectroheliograph with all of his spectacular equipment, Ken came away "floating on air." With concentrated effort, he hopes to have his spectrohelioscope finished in a year.

Ken is ardently pursuing the study of astronomy with one of his great interests being nucleosynthesis, the study of the creation of new elements in the stars. He enjoys reading scientific material especially on astronomy and aircraft. He also has a fully equipped photographic darkroom where, besides his general photographic interests, he hopes to do a considerable amount of astrophotography. He has taken over the leadership of the B.A.A. Study Section, and is also keeping the records for our newly formed astronomical lending library.

Ken is an industrious, affable gentleman who is eager to assist in

any of the B.A.A. activities. We are all grateful for his cooperation and helpful ideas. Adrienne is our refreshment hostess and she and Ken make a fine team as members of our association.

MERCURY

by Anonymous

It's almost a cliché to comment on how fortunate we are to live in this era of planetary exploration. We now have detailed information about conditions on, and near, the inner planets that we could hardly have hoped to obtain twenty-five years ago. If you think back on what you knew about these worlds before space exploration began, you'll find it was rather little and, in many instances, wrong.

No doubt a similar leap in understanding the planets occurred following the invention of the telescope in the first decade of the seventeenth century. But, thereafter, progress was slow, many mistakes were made, and amazing speculations about the nature of the planets were expounded. Take Mercury for example.

Around the turn of the nineteenth century only its orbital characteristics were accurately known. Cavallo, writing a general treatise on natural philosophy at this time (Philosophy c.1810), gave 88 days for Mercury's revolution about the sun and 116 days for its syndic period (the average time from one inferior conjunction to the next as seen from earth). The inclination of its orbit to the plane of the ecliptic had been accurately observed to be 7° , and its orbital eccentricity of 0.21 had also been determined. Cavallo gave 0.387 astronomical units as Mercury's distance from the sun, a number unchanged today.

Other information was far less precise. The Mass of Mercury has always presented a problem because the planet has no satellite. If it had, its mass could be found from the satellite's period of revolution and distance. Unfortunately, Mercury has no moon, so its mass must be determined from the gravitational perturbations it causes on other planets. Precise measurements are required to obtain reasonable accuracy using this method--precision not easily obtained in the first years of the nineteenth century.

Cavallo gives the mass of Mercury as 0.1654 times the mass of Earth. That's real accuracy; however, the number is high by 3 to 1. He also notes Mercury's density is $9 \frac{1}{6}$ times the density of water--denser than iron! Unfortunately, the chart containing the planet's diameter had been torn from the book. Calculations based on other data given in the text yields 3445 miles--too large according to modern measurements.

"No spots have as yet been discovered upon its disc, consequently neither its rotation about its axis, nor the position of the axis, can be determined." Despite this disclaimer, Cavallo credited the German astronomer Johann Schroter with finding a rotation period of 24 hours 5 minutes from some undefined observations he had made.

Nearly 45 years later, this erroneous rotation was still accepted. Mattison (Hiram, High School Astronomer, N. N. 1858) noted that Schroter had found "numerous mountains on the surface," one of them 11 miles high, from whose movement this rotation was determined. Mattison pointed out these observations had not been confirmed.

By the 1870's Proctor (Richard A., Other Worlds Than Ours, N. Y. 1902) and Guillemin (Amadee, The Heavens, N. Y. 1871) still gave a little more than 24 hours for Mercury's rotation. Furthermore, Schroter was reported to have seen a dark band across the diameter of the planet according to Guillemin. Schroter concluded this was an equatorial band, and from it he calculated the inclination of the

planet's axis. Its value was not given. During the 1799 transit of Mercury across the sun, a bright point was seen on Mercury's surface--evidence for a volcano. Who was the observer? You guessed it--Schroter. Isn't it interesting how long an unconfirmed observation can be referenced despite improvements in instruments that should cast serious doubts on the validity, or for that matter the possibility, of the earlier observation.

In some instances, these two authors disagreed with one another. Proctor stated the orientation of the axis is unknown. He gave the density of Mercury as no more than $7/6$ that of the Earth's density. Both are lower than Cavallo's estimate, given sixty years earlier. That made the ratio more than 2 to 1.

They did agree on some things, like the 24 hour rotation and that Mercury had a substantial atmosphere. Proctor noted that Mercury's atmosphere is "loaded with cloud masses of enormous extent." Both authors were pleased about this atmosphere because it offered a rationale for moderating the intense sunlight bombarding Mercury, which otherwise might make the planet uninhabitable. A hundred years ago, it was almost a foregone conclusion that the planets must be inhabited by intelligent beings. Otherwise, why were they put there? Proctor expressed his view clearly when he said, "Until it has been demonstrated that no form of life can exist upon a planet, the presumption must be made that the planet is inhabited." He even went so far as to speculate how those beings might live in only the polar regions because of the tremendous heat elsewhere. They might communicate with their members at the opposite pole, according to Proctor, by rushing across the equatorial zone during the coolness of the night. On the other hand, they might dig tunnels from pole to pole to make travel more comfortable.

NOTE:-(Richard Anthony Proctor (1837-1888) was a Fellow of the Royal Astronomical Society and a respected author of many astronomy books. This particular volume contained a preface written by Proctor in 1870, probably the date when the book itself was written. This book was a popular astronomy for laymen and hence may contain some views Proctor found effective in selling books, but which he might not express strongly among his peers. That his books sold is attested by this edition being published in 1902, fourteen years after the author's death.

to be continued in next Spectrum

TELESCOPE MAKING

Ed Lindberg

A few amateur astronomers are also interested in the craft of telescope making. When followed as a hobby, a craft can be highly demanding. There is no employer to drive one to greater efforts - only an inner spark urges the craftsman to strive to reach his highest attainable level of ability. A few pioneer T/M's formed the Buffalo Telescope Makers, forerunner of the present BAA, in the 30's. Since that time many telescopes have been made in our area. Telescope Making classes have been conducted at the Museum of Science for some 40 years. The Instrument Section of the BAA carries on after the classes, encouraging any maker having difficulties to bring in his mirror for testing and suggestions for remedial procedures.

Nearly all amateur telescope made telescopes are reflectors as there is only one optical surface to finish. However, the project is, even then, not an easy one. The worker finds that glass is a completely different material to work with than others that he may have been used to, such as wood or metal. Two glass disks, separated by a thin layer of abrasive grains, are worked together. Pressure on the

top disk, combined with a sliding motion, causes a fracturing of the adjacent glass surfaces. The glass actually breaks away in tiny chips, their size depending on the size of the abrasive grains. It is a unique action, completely different from methods of shaping other materials. The coarse grinding stage is a noisy one too, attracting spectators from other parts of the museum.

A back and forth motion of the upper disk combined with constant changing of position and direction produces two complementary spherical surfaces. By adjustment of stroke length and lateral overhang, the curve can be made to practically any radius of curvature. But in practice, for a six inch mirror, the depth of the curve is held to the thickness of a dime at the center, giving a mirror of about 50 inches in focal length. When the desired depth is reached and the two surfaces maintain their contact in whatever position they are tested (the mark of sphericity), the mirror is ready for fine grinding. Successively finer and finer abrasives are used to reduce the size of the pits made by the coarse grinding action until no pits are visible to the naked eye. The concave surface is then polished on a convex surface of pitch in which is embedded a very fine polishing abrasive. The polished mirror is tested and corrected to the desired parabolic curve. A mounting is made and the completed telescope set up and collimated. The builder can then experience the thrill of viewing distant celestial bodies with a precision instrument made by himself with simple tools and materials.

One attraction of telescope making, especially the making of the mirror, is the extreme difficulty of some of the phases of the work and the fact that we can develop the necessary skill to meet the severe demands. There is also the unbelievable precision to which we can make an optical element. The mirror maker, using only the simplest working materials and testing apparatus combined with his own (to some extent acquired) qualities of patience and persistence, produces a surface more precise than can the expert machinist using the finest available machine tools. The machinist works to tenths of thousandths of an inch while the amateur optician, because he tests the mirror against itself, works to millionths of an inch. For some of us, the fascination never fades.

METEOR SHOWERS

| | |
|-------|--------------------------|
| March | 16th - Corona Australids |
| | 26th - Virginids |
| April | 9th - Alpha Virginids |
| | 21st - Lyrids |

The Corona Australids and Alpha Virginids are lesser showers and are not readily discernable as the other two above showers. The Virginids are a 'stream' with short, rapid, 5th magnitude meteor shower. The average count is but 5 hourly but their duration is almost 15 days with maximum on the 26th. The radiant is RA 12h 40m on the celestial equator. The Lyrids are an annual shower which is believed to be related to Halley's Comet of 1861. These produce white, swift streaks, about 3rd magnitude in brightness. One might count as many as 12 hourly. Their duration is only 2 days and nights. Radiant-RA18h 04m, declination 33 degrees north.

STUDY GROUP

Ken Kimble

The Study Group met on Friday, February 15. Our topic was

spectroscopy and discussion was led by John Raymonda. A spectroscopist by profession. Eleven club members attended and we were all treated to a very complete lecture augmented by a handout written and printed by John. The meeting lasted until almost 11:30, and with such a broad subject, we decided on a follow-up meeting on the same subject for March. John Raymonda is very knowledgeable and a real asset to the club.

For our April meeting, Phil Cizdziel will speak on Wolf-Rayet stars, and for May, our meeting will be a group discussion on star clusters.

The study group meets the 3rd Friday of each month in Dr. Price's 2nd floor lab at Buffalo State at 8:00 P.M. See you there.

ANSWERS TO THE QUIZ

#1-1 Each planet moves in an ellipse with the sun at one focus.
2 The line between the sun and planet sweeps out equal areas in equal amounts of time. (Law of areas)

3 The ratio of the cube of the semi-major axis to the square of the periods is the same for each planet. (Harmonic law)

#2 $E = MC^2$ (Energy equals Mass times the speed of light squared)

#3 Sir Isaac Newton

APRIL CONSTELLATION

One of the more conspicuous constellations is one on the ecliptic and a member of the zodiac is LEO. This constellation still seems to retain its shape as that of a lion. A first magnitude star, just below the renown 'Sickle', is Alpha Leonis - Regulus, which is also a double star with a companion of magnitude 7.6. Along with Regulus is Gamma Leonis - Algeiba - which is a double star with components of magnitude 2.29 and 3.54. A long-period variable star, R Leonis, ranges from 5th through 11th magnitude in 313 days. It is of the Mira type; also it is a red star and well worth observing at RA 9h 45m - 12° north declination. Messier objects in Leo are M-65, M-66, M-95, M-96 and M-105.

The Buffalo Astronomical Assn., Inc.
c/o Darwin Christy, Editor- The Spectrum
216 Kohler Street
Tonawanda, New York 14150

FIRST CLASS