GLPA Newsletter

1978

4 issues — 52 pages
CRANBROOK INSTITUTE OF SCIENCE

Welcomes you...
Plan now to attend the 20th Annual GLPA Conference at the Cranbrook Institute of Science in Bloomfield Hills (near Detroit), Michigan on October 18 through October 21, 1978.

Planetarium Director and Conference Hostess Martha Schaefer reports that headquarters will be CIS and the Kingsley Inn.

Perhaps you are unaware of the fact that the first symposium to concern itself particularly with the problems of the smaller planetaria of the U.S. were invited to the Cranbrook Institute just twenty years ago and over a hundred people attended. Representatives arrived from New York City, Pittsburgh, Chicago and the Air Force Academy. It is a matter of history that the delegates so welcomed this opportunity to present their ideas and discuss their problems that they proposed that this event be followed by similar ones, and to that end they formed a committee to plan a Planetarium Association. It was from these initial endeavors that the GLPA was finally formed.

The list of attendees included many still active in the field: Jack Spoehr, Herb Williams, E. Koestner, Maxine Haarstick, Jeanne Bishop, (the youngest, a teenager named "Emmons"), S. Hruska, J. Rosemergy, Joseph Chamberlain, Martha Schaefer as well as Ruth Howard, Dan Snow. Also attending were the late Drs. Armand Spitz and Donald Menzel.

Martha Schaefer thought it might be interesting this year to follow some of the format of the original meeting and assess the progress attained in twenty years in the field. Toward this end, look over the following topics that were presented twenty years ago and decide if there is any area you might enjoy adding to, updating, or participating in. If so, let Martha hear from you. Her address: 500 Lone Pine Road, Bloomfield Hills, MI, 48013.

Session I: Astronomical Subjects and Applied Science
Use of the Planetarium in Teaching Navigation
Calendars and Time Measurement

Session II: Fitting the Demonstration to the Audience
Teaching Aids Used to Correlate Classwork in the Elementary
Grades with the Planetarium
The Use of the Planetarium in Secondary Schools
The Use of the Planetarium for College and University Classes
The Planetarium and Adult Education
Planetarium Programs for the Handicapped
The Planetarium and the Junior Museum

Session III: Training Programs
The Educational Task of a Planetarium
Satellite Tracking Practice in a Planetarium
Training Planetarium Demonstrators - Group Discussion

Session IV: Correlation and Cooperation
Integrating the Planetarium Program with General Science and
Special Subject Interests
The Planetarium and the School Curriculum
Session V: Reference, Sales Materials, and Exhibits
The Role of Reference and Sales Materials in a Planetarium
Planetarium Exhibits

Session VI: Presentation Methods and Special Effect Techniques
Presentation of a Planetarium Program
A Forty Five Cent Planetarium Project
Autumn Stars - A Recorded Lecture
Sound Effects in the Planetarium
The Development and Use of Auxiliary Devices in the Planetarium
Sound Effects easily produced
The Use of Black Light in the Planetarium

Do any of these topics interest you? Can you present something to add to them? Let Martha know - don't keep it a secret!

Education Committee Report

Bob Ledger has accepted the position as Editor of a booklet which President-Elect Lloyd Bodie suggested for the Education Committee's "Tips" series. It will be titled, "Tips in Planning for a planetarium" and it is tentatively scheduled for distribution in Fall, 1979. Bob, in planning for his school's planetarium, has already surveyed a number of people and given the concept much thought. But our booklets should reflect the ideas of as many as possible. So please send Bob your ideas for aspects of planning a new planetarium facility in either public school, museum, or college. Write: Bob Ledger, 1812 Orchid Court, Indianapolis, IN 46219.

As previously requested, send School-program ideas to Marilynn Bacyinski and ideas for the preparation of printed materials to Bob Allen. Their addresses:

Marilynn Bacyinski
10253 Lakepointe
Detroit, MI 48224

Robert Allen
Physics Department Planetarium
University of Wisconsin
LaCrosse, WI 54601

These two booklets should be printed next summer, ready for distribution at the 1978 Fall GLPA meeting at Cranbrook Institute. They will be booklets #3 and #4. The series is growing. Recently part 1 of the two-part printing of our first Education booklet, edited by Bill Rush, appeared in the ISPE Planetarian. Our efforts are meant for GLPA, but others may eventually benefit as well.

Don Knapp not only has assumed responsibility for the Education Committee Script and Printed Materials File, but he will also serve as liaison with the A-V Materials Committee. Send materials for the file to him. Spring regional workshop chairpersons should have sent requests to him for the entire file on workshop dates.

Donald Knapp
East Senior High School
230 S. Marr Road
Columbus, IN 47201

Jeanne Bishop, Chairman

-3-
Although planetarium attendance figures are generally down these days, here's a bright spot. Gary Mechler's 32' dome, 96 seat planetarium in the Cincinnati Museum of Natural History broke all previous attendance records in 1977. In spite of the severe 1977 winter, 30,430 people attended the public sky shows. Gary reports that much of the success of the past year was due to the unusual summer program, "The Last Question" by Isaac Asimov. Fully half of the year's attendance saw that one show.

Have you paid your 1978 GLPA dues yet? Send your money to Secy-Treas Jerry Mansfield, Allen Memorial Planetarium, 3737 South Seventh Street, Terre Haute, Indiana 47802.

If you are planning to renew, or initiate, an ISPE membership, send $20 to Walt Tenschert, Membership Chairman, Thomas Jefferson High School, 6560 Braddock Road, Alexandria, Va. 22312.

A note from retiring Secy-Treas. Dave Batch: "On the eve of my retirement let me say that it has been a pleasure to serve as Secy-Treas. for the past 6½ years, and I look forward to continued association with this grand bunch of kooks disguised as planetarium professionals. Matters requiring the attention of the Secy.-Treas. should now be sent to Jerry Mansfield. Thanks again for your support of GLPA. May the universe be always at your fingertips."

In the last issue of the Newsletter it was reported that the proposed By-Laws of ISPE "will be voted on by Council members within a month." This information was incorrect. Council approved these revisions last August. The confusion arose from the fact that the ISPE membership was yet to vote on the recommendations. ISPE members, please note.

Bill Hill, Director of the Planetarium of Waubonsie Valley High School; 32 W 310 Rte 34, Aurora, Ill. 60504, is looking for an assistant. His planetarium instrument is a fully automated Viewlex Series II under a 30' dome and augmented by 36 peripheral slide projectors. So Bill is looking for a person with an undergraduate degree strong in astronomy and physics with some background in photography and electronics.

An exhibit of many of the entries in the Abrams Planetarium of Michigan State University was shown following a contest, held toward the end of last year, to find a new logo for the planetarium. The winning design, shown here, was submitted by Mr. John Heald of Lansing, Michigan.

Do any of you have any ideas for a new logo for the GLPA?
You may now call our new Secy-Treas, Jerry Mansfield, direct! Director of the Allen Memorial Planetarium in Terre Haute, IN, his # is 812-238-4272.

Dorothy Angeloff of the Erie, Pa. Planetarium has volunteered to type new Tips booklets and scripts considered suitable for distribution to the entire membership at fall GLPA meetings. Bob Elliott of WI State Univ at Eau Claire has volunteered to duplicate booklets and scripts as passed along to him from Dorothy. Materials for publication should be passed along from the editors of Tips booklets and Don Knapp (Script Bank Chairman) to Jeanne Bishop. Sounding like a classic double-play sequence, it will go from Bishop to Angeloff to Elliott.

Bob Elliott will soon be a contributing Editor/Coordinator of a column, to appear regularly in the Newsletter, concerning a continuing update on astronomy suitable for planetariums.

An area of concern, for which a Tips booklet would be appropriate, has been suggested by Lloyd Bodie. A set of guidelines on physical features and logistics should be available to those who set up new planetarium operations. Such a booklet would be published and distributed in 1979. An editor is forthcoming. Any volunteers?

Everyone is encouraged to review the great numbers of new materials in all software classifications: books, journals, films, TV Educational Programs, filmstrips, film loops, etc. Send your reviews to the Newsletter by the 21st of the month before a solstice or equinox.

At least two astronomy education sessions will be held this year at the Washington, D.C. NSTA meeting, April 6-10. A workshop on Piaget (developmental abilities of children) will be given by Jeanne Bishop, Dennis Sunal, Dennis Schatz, and past GLPA member Lynn Bondurant.

MAPS has recently initiated an Education Committee under the direction of Quentin Carr of Herkimer, New York. Perhaps we will share ideas and materials with them.

Congratulations to R.E. Thomas, formerly of the Cleveland Museum of Natural History, on the assumption of his new duties as Curator of Education at the Planetarium of the Kalamazoo Public Museum in Michigan (The post vacated by the retirement of Ruth Howard).

Norm Sperling, Assistant Editor of Sky and Telescope and the only U.S. council member of the International Union of Amateur Astronomers, reports that that group is having its fourth General Assembly in Dublin, Ireland, next August from the 14th to the 19th. For more information, write to him or to Ciaran Kilbride, Organizing Secretary, IUAA; 26 Cedarwood Park, Ballymun, Dublin 11, Ireland.

The above gathering coincides nicely with the next biannual meeting of ISPE in Washington, D.C. August 6 through 10. Wouldn't it be a great excursion to attend two international meetings in one month next summer? Save your pennies!
HELP! MAYDAY! M'AIDEZ! However you spell it, Bob Allen needs your assistance. He is editing a Tips booklet, soon to be published, and requires examples and/or descriptions of any printed item which you distribute from the planetarium to teachers, students, community, public; passed out or mailed. He would like your ideas on methods of publicizing services, the purposes of printed materials from your planetarium, and advantages and disadvantages of different printed materials methods compared with one another, and with non-printed materials methods of communication. Also, some philosophy on why you use the materials you do. Communicate with him at the University of Wisconsin-La Crosse, Physics Dept. Cowley Hall, La Crosse, WI 54601.

SPRING AREA MEETINGS AND WORKSHOPS

The 1978 Ohio Meeting will be held at the Planetarium in the Cincinnati Museum of Natural History on Saturday, May 6, with Dr. Gary Mechler acting as host. Featured will be a special showing of "Laserworks", a new laser light show, and possibly a demonstration of a "toy" radio telescope operable by students in a planetarium to let them discover the radio sky, courtesy of Dr. Bill Rush of Toledo. Also, there will be ready access to the GLPA Resource Bank, soon to be transferred to Cincinnati.

The 1978 Wisconsin-Iowa-Minnesota Planetarium's (WIMP) spring meeting will be held on Saturday, April 22 in the Planetarium of Wausau West High school in Wausau, WI. The meeting will be hosted by Arnold Nelson. Write him for information as to the agenda, or call him at (608) 785-8669.

The 1978 Indiana Planetarium Director's Workshop will be co-hosted by Gail Bouslog and David Parker, Directors, respectively, of the planetariums of Western High School in Russiaville and Tipton High School in Tipton on April 14-15. Here's how things will be organized:

Friday, April 14
6:00 - 7 P.M. .......... Registration, Tipton Planetarium
7:00 - 8 P.M. .......... Show: "What's your Sagittarius?"
8:00 - 9 P.M. .......... Star Party featuring a Celestron 8

Saturday, April 15
8:00 - 9 A.M. .......... Western High School Living Center
 Registration, Coffee and Donuts
Script and slide shopping
9:00 - 9:30 ............ VTR of lesson presentation in planetarium,
"live" viewing of planetarium program co-
ordinated to the lesson - Gail Bouslog
9:30 - 10 A.M. ........ "The Golden Fleece" - David Parker
10:00 - 12 noon .......... Presentations from other planetariums
12:00 - 1 P.M. .......... Luncheon in the Living Center
1:00 - 1:45 ............ Mr. Richard Rea, Western School Supt.
 Topic: "Superintendent and the Planetarium Curriculum."
1:45 - 2:30 ............ Business meeting
2:30 - 3 P.M. .......... Dr. Richard Steldt of Indiana Univ. at Kokomo.
 Topic: "Astrophotography Featuring the Celestron 8 and the Schmidt Camera."
3:00 - 5 P.M. .......... Script and Slide shopping
The Michigan Section of GLPA will meet at the Chaffee Planetarium in Grand Rapids on April 15. Topics to be discussed include: "Electronics and the Planetarium", and "School Programming: Live vs Recorded." For further information, write Gary Tomlinson, Mark Perkins or Dave DeBruyn, 233 Washington SE, Grand Rapids 49503, or call (616) 456-3985.

A CONVERSATION WITH JEANNE BISHOP
Director of the Westlake Schools Planetarium
Westlake, OHIO

My wife always gets the last word - and I can't wait till she comes to it. On one of those occasions which our family euphemistically refers to as a "discussion," the last word, as I recall, was "pig!" This word had been immediately preceded by "chauvanist" and "male."

Male chauvanist pig? Who, me?

"Yes, you!" my better half scowled, waving an accusing finger. "I've been looking through the back issues of the GLPA Newsletter and no where, NOT ANY WHERE, do you conduct a conversation with a female! Shame on you. Aren't there any women worth talking to in your organization?

Indeed there are. So with the excuse to myself that I was doing it to preserve the peace at home, I struggled to overcome my innate shyness in the presence of the fair sex and singled one out. I soon found that I didn't need an excuse at all. Jeanne Bishop has the uncanny ability of putting one at ease almost immediately. I began our conversation with my favorite question: "How did you get into the planetarium business?"

"Well, Dave," she began, "You could say that I grew up among the stars, what with planetarium-drilling and telescope mirror-grinding constantly going on in our basement. You see, my father was one of the first to initiate the small planetarium concept. Even while Armand Spitz was making his first models in the 1940's, so was my dad. He used metal earth globes and drilled each star by hand. In the 1950's, he had a large garage built in our back yard, not really for cars, but for a planetarium. We called it 'The Star Barn' and thousands of people, mostly elementary classes from within a 50-mile radius of North Canton, Ohio, came to see programs. The presentations were taped, with a music background. As a matter of fact, to my knowledge, my father was the first in the world to recommend taped shows. My job during the presentations, by the way, was to supply the music with a small player, fading it in and out at appropriate points. Believe me, the recording conditions were anything but sophisticated, but the results were quite good."

I was a little taken aback. I didn't realize that planetarium shows were being taped way back in the 50's, and I told Jeanne so.

"Oh, yes," she exclaimed, "and when the debate over taped vs live shows began at the same time. I remember that in 1958, I attended the first national planetarium symposium with my father at the Cranbrook Institute."

"Hey, wait a minute," I interrupted, "That's where we will be holding the GLPA annual conference in 1978!"

"Yes, and I'm very glad of that too," she continued, "for 1978 will be the 20th anniversary of that historic meeting!"
"Can you recall some of the things that went on at that meeting?"

"Vividly, I was the 'operator' for the presentation of Dad's 'Autumn Constellations' taped lecture. I pointed out constellations and planets, moved diurnal motion, and operated the tape recorder. I think my father made his point that even a young student could give a good taped program, but I'll never forget Bill Schultz of Cranbrook kindly saying to me in private after it was over, 'I think you did a fine job, but you showed us Draco's head for Hercules.' Another thing I remember is that Armand Spitz was also present at the meeting, and he did not look kindly upon the taped show."

"Why not?" I broke in.

"In his opinion, any taped presentation was beneath the dignity of the audience. I wish he could be around today to see what beautiful things all types of planetariums are doing with taped or partially taped presentations."

"Do you have other memories of that meeting?"

"Oh, yes, I remember meeting Ruth Howard and Martha Schafer at this meeting, and they are still my good GLPA friends."

"When did you get to 'solo'? I mean, when did you get your own planetarium?"

"Well, I didn't really get to 'solo', as you put it, Dave, in the beginning, but when a new Historical Center with an A3P instrument was to be installed in Canton, Ohio, I took the job as its first director. In addition to public and school programs I enjoyed giving adult and student astronomy courses with the able assistance of Jane Mahoney. Jane, by the way, is its current Director. As the 'Canton astronomy interpreter', I had a monthly newspaper column and a monthly spot on WHBC radio, which I enjoyed. Anyway, my brother built the versatile sound system and gave Saturday public programs. We three, my brother, Father, and I were known as the 'Star Family' of the area. Together we attended the GLPA organizational meeting in Grand Rapids, arriving in a blizzard and almost having an accident."

"That was then. How about now?" I asked.

"At the present time I'm Director of the Westlake Schools' Planetarium. I love this position, as I have ample opportunity for initiating and putting innovations into effect, and last year, I was nominated by my district and received the Master Teacher Award from the Ohio Martha Holden Jennings Foundation. That gave my $3,000 for study and travel and a year's leave of absence with salary."

I got a kick out of asking Jeanne my final question. Jeanne is so full of enthusiasm and purposeful energy, I could almost guess her answer. You see, I had done my homework, and knew before I spoke to her that she was active as Executive Secretary of ISPE where she served for two terms, Education Committee Chairperson for GLPA since 1975, co-edited the Cleveland Regional Association of Planetariums' Newsletter (CRAP) for the past three years, is active with the Task Force on Astronomy Education, and is a Board member, Newsletter Editor, and Vice-President on the Cleveland Astronomical Society. I also found out that Jeanne was invited to Regina, Saskatchewan to conduct two workshops and, along with past GLPA members Dennis Sunal, Lynn Bondurant, and Dennis Schatz, will present a Piaget session in Astronomy education at the Annual National Science Teachers Association Convention in March in Washington D.C. She is also involved in writing a book with Dr. Virginia Johnson of the University of Denver dealing with the topic of deepest interest to her, educational activities. My last question to her
was: "What were you able to accomplish in the year you were away from your planetarium?"

"I completed almost all my course work for my Ph.D. in science education with a minor in psychology, and two planetarium research studies: the day-night concept with second graders and the moon-phases concept with sixth graders. It was an eye-opening experience to learn that most second graders can't grasp the dual perspective (in-space and on-earth) of day and night, regardless of innovative planetarium experiences. My advice to all planetarians is to ask yourself what your audience can understand, not what YOU know and can do. Then move from there in program planning."

Jeanne then apologized for having to take her leave. "Oh, by the way," she added as her husband, Allan joined us, "you might be interested to know that a well meaning student of mine cast my horoscope and said that my career should have been one of beautician, dress designer, diplomat or welfare worker. Maybe somewhere along the line, I missed the boat!"

As she and Allan turned the corner, I blew her a kiss. You see I felt grateful to her for helping me prove to myself, to my wife, and I hope to you, too, that as far as these Conversations columns are concerned, I am a liberated male.

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ANSWER TO THE LAST PUZZLE BY DUANE ALIMAN

#8

A. Nobel  O. Athens
B. Optic  P. Rune
C. Ursa  Q. Dawes
D. Rockets  R. Atoms
E. Scatters  S. Shift
F. Epigenes  T. Tektites
G. Them  U. Rheita Valley
H. High  V. Orbs
I. Erechtheum  W. Nebula
J. Barsoom  X. Orbit
K. Avesta  Y. Manganese Star
L. Cepheus  Z. Emit
M. Krypton  @ Roche
N. Ygdrasil

Nourse: "The Backyard Astronomer" Most people assume that these particles known as Meteors must be very large in order to cause such a bright streak across the sky, but in fact, the average meteor is probably less than one-eighth inch in diameter.
The Madison Astronomical Society cordially invites you to the 1978 National Convention in observance of the centennial celebration of the Washburn Observatory. When the University of Wisconsin Washburn Observatory was started in 1878, the 15.6 inch Alvan Clark refractor was the fourth largest telescope in the United States. With this instrument, University of Wisconsin astronomers pioneered work in photoelectric astronomy. Tours of this facility as well as the current research facility at Pine Bluff, which houses the 36-inch Ritchey-Chretien reflector, will be offered.

Our city has much to offer for the varied interests of visitors: many beautiful lakes, a 2500 acre arboretum, an art center, a free zoo, a national historical society, a unique capitol building, a Forest Products Research Center, and many other points of cultural and artistic interest.

The committee has chosen the Sheraton Inn as the site of the convention. It's a first class hotel, close to all major highways entering Madison and within easy access to the university and downtown area without the snarls and frustration of transportation in the square area and the cost of parking. The nice part of your stay is the fact you are getting first-class accommodations at bargain prices. The package price has the Madison Astronomical Society really excited.

Single room for 3 nights & meals . . . . . . $ 87.00
Double room for 3 nights & meals . . . . 69.00 per person
Triple room for 3 nights & meals . . . . 61.00 per person
Quad room for 3 nights & meals . . . . . 51.00 per person

Meal package separately is $33 and includes two breakfasts, three group luncheons, Thursday dinner, and the Saturday banquet. (Children under 18 stay free in their parents' room.)

Remember, this is an air conditioned hotel with free parking, a beautiful pool, large meeting rooms, excellent food, a liquor store, beauty salon, gift salon, and a staff trained to make every detail of your trip pleasant and comfortable. All of this at bargain prices!

For 1978, June 29, 30, & July 1
THINK MADISON!

General Chairman: Mrs. Arthur L. Koster
Route 2, 5794 Devoro Road
Madison, Wisconsin 53711
(608) 271-6770
<table>
<thead>
<tr>
<th>Definitions</th>
<th>Words</th>
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<tbody>
<tr>
<td>A. Experiencing little gravity</td>
<td>213 140 73 76 108 74 31 189</td>
<td>L. Mercury, Venus, Earth, and Mars (2 words)</td>
<td>84 21 201 38 156 95 142 56</td>
</tr>
<tr>
<td>B. Result; consequence</td>
<td>68 15 117 150 46 156</td>
<td>M. Legends</td>
<td>216 107 132 189</td>
</tr>
<tr>
<td>C. Near to the center</td>
<td>28 62 188 128 149</td>
<td>N. Visible energy of a single cell (2 words)</td>
<td>29 157 85 222 64</td>
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<tr>
<td>D. Name of a Lunar Valley near Herodetus</td>
<td>121 50 89 39 114 102 63 185</td>
<td>O. The reflux of water due to Sun and Moon (2 words)</td>
<td>108 36 70 1 47 226 216</td>
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<tr>
<td>E. Bright prismatic lines (2 words)</td>
<td>197</td>
<td>P. Cardinal Point</td>
<td>193 184 27 17 173</td>
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<td>F. Disciple of Tyche, lived 1562-1647; a Lunar Crater bears his name</td>
<td>98 48 226 66 166 119 192 146</td>
<td>Q. Radiates</td>
<td>170 206 83 128 176</td>
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<td>G. Gravitational bending of light (2 words)</td>
<td>209 100 32 62 116 94 224 111</td>
<td>R. Retates</td>
<td>54 127 156 190 20 176 137</td>
</tr>
<tr>
<td>H. In Norse Mythology, this symbolizes the Universe</td>
<td>86 41 36 160 10 142 85 195</td>
<td>S. Or Jupiter</td>
<td>18 76 191 139 53</td>
</tr>
<tr>
<td>I. First chemical element artificially made</td>
<td>214 72 112 37 128 9 172 187 144</td>
<td>T. Circumnavigating</td>
<td>60 167 22 207 123</td>
</tr>
<tr>
<td>J. Opera by Paul Hindemith about J. Kepler, Der</td>
<td>103 61 48 6 138 203 81 33 181 120 56 217 166 181 23</td>
<td>U. Site of Observatory and University in Sweden</td>
<td>58 130 154 15 44 148 218 40</td>
</tr>
<tr>
<td>K. Absorption of heat energy</td>
<td>97 206</td>
<td>V. The X-18 (2 words)</td>
<td>136 91 153 11 116 223</td>
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<td></td>
<td>182</td>
<td>W. A set of similar objects (mathematics)</td>
<td>229 2 113 99 30 188 133 80</td>
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<td>97 109 110 96</td>
<td>X. Radiate</td>
<td>172 183 194</td>
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<td></td>
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<td>Y. The Sun is such a star (2 words)</td>
<td>36 186 212 79</td>
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![Image of the astro-gram puzzle](image-url)
THE GREAT LAKES PLANETARIUM ASSOCIATION offers membership opportunities to all individuals in any way connected with the operation of Planetariums, regardless of geographical location. G.L.P.A. is an affiliate of the International Society of Planetarium Educators, and the National Science Teachers Association. Membership dues are $5 annually, payable at the time of the autumnal equinox. General correspondence and requests for membership should be addressed to Mr. Jerry Mansfield, GLPA Secretary/Treasurer, c/o Allen Memorial Planetarium, South Vigo High School 3737 S. 7th St. Terre Haute, IN 47802

All GLPA members in good standing receive the quarterly "Newsletter". Contributions and notices for the "Newsletter" should be sent to Dave Hoffman, Editor, Reiser Planetarium, 35th St. and Division Ave. South, Wyoming, MI 49508. Deadlines for contributions to the latest "Newsletter" fall on Feb. 21st, May 21st, August 21st, and November 21st. Contributions for the Planetarian should be sent to either Dave Hoffman or Bill Fagan, 2900 Sutton Road, Vienna, Va. 22180

Printed and mailed from:
Elgin Observatory and Planetarium
School District U-46
4 S. Gifford St.
Elgin, IL. 60120
Memo from your new President

It is with a sincere sense of honor that I assume the office of President of the G.L.P.A. It is one of the most enjoyable and unique organizations that I have had the pleasure of membership. There could not be another group of sincere, devoted people with such diverse backgrounds that can work and socialize together with such accord.

There are so many things that we can do as a group I would advise anyone with similar feelings about the Great Lakes Planetarium Association to let their feelings be known and seek a position on one of the many committees or the Executive Board. Even with the two years of presidency facing me, the rewards and satisfaction from past positions on the Executive Board and various committees tend to suppress my apprehensions.

I NEED YOUR HELP! You are what makes the Great Lakes Planetarium Association work.

Lloyd L. Bodie, Jr.
President
A WORD FROM OUR RETIRING PRESIDENT:

It is with fondness and some satisfaction that I look back upon almost 14 years of participating in one way or another as one of the leaders of GLPA. I am also anticipating the future years when it will be my pleasure to relinquish that role to some of the younger and more energetic members of our great Association, with their fresh ideas and keen insight.

The past two years as your President have been particularly gratifying. I knew when I accepted the job that it would be demanding and challenging - and it was. However, it was not nearly so difficult as it might have been. In the first place, the GLPA is on a firm footing in regards to philosophy and goals, and with a strong financial base. It is composed of about 160 men and women with a strong motivation. They share the firm belief in the viability of our unique medium as a means of stimulating people in one way or another to a greater awareness of the majesty and order of the universe, and of the humble though powerful role of scientific man in the cosmic environment. Our group appears to be largely free of most of the bickering and dissension that has been encountered to a greater or lesser extent in some of the other regional groups. These are difficulties that can only tend to ultimately weaken such organizations.

The GLPA, as the oldest, soldest and one of the most active of regional groups, was fundamental, through the inspiration of our founding father VonDel Chamberlain, in launching IPS onto its somewhat shaky though basically sound course. As your incoming representative to that organization, I look forward to making a contribution over the next two years to keeping that vital organization on an even keel.

As I look at GLPA today, with its record of successful conventions over the past few years, its broad spectrum of membership, from directors of major planetariums to those with humble cloakroom and basement installations - and some with no physical planetarium at all - I am pleased with what I see. There is such a warm comradery among us. So many of us consider our professional colleagues among our closest friends. We are eager to share ideas and resources among ourselves. Please, in the years to come, let us never lose sight of the unique ways in which we have and will continue to help one another. After all, that is why we banded together in the first place.

Our record of progress, I am happy to say, continues today. We are achieving our goal of planning annual meetings farther ahead, with sites for 1979 and '80 all but decided. Our educational committee has been revitalized under the innovative leadership of Jeanne Bishop. In the past two years, this group has issued several publications of use to teaching and beginning planetariums, with more on the way. Under Dave Hoffman, our Newsletter finally appears on time, every time. Jerry Mansfield has expanded our resource files of scripts and slides. Indeed, a president's job is easy when he is backed up by people like this who are resourceful and dependable.

A special word of thanks is in order to Dave Batch, who served with distinction in the very demanding job of Secretary-Treasurer over 6 years. Nobody would argue with the observation that this position is the most vital of all to the smooth working of any organization. It is long on work and short on glory. Truly, Dave is a professional in everything he does. I have been extremely fortunate to have had him working closely with me during my tenure as President.

As you read this, Lloyd Bodie is President, and from what I know about Lloyd, it might be safe to say that things may never be the same again. Lloyd has an unusual gift of imagination and a captivating personality. Beyond that, I know from the way he has assisted me in the past two years that he can be counted on to get things done. I wish him well in the challenge before him. I'm confident that the next two years will result in new heights of achievement for the GLPA. When his term is done,
Lloyd will also have the opportunity to experience the feeling that I am having right now. It is one of relief that a great challenge has come and gone, but it is also one of gratitude of having been selected to lead such a fine and successful organization.

David L. DeBruyn

THE KEY TO THE PRESIDENCY CHANGES HANDS

NEW SCRIPTS ADDED TO THE LIBRARY

"Colonization of Space" - 26 pages..................Dorothy Angeloff
"The Twelve Labors of Hercules" - 28 pages...............Dorothy Angeloff
"The Maya: Sky-Watchers of Ancient Mexico" - 18 pps.......Pat McGee
"Teachers Guide to the Planetarium: Gr. 4 - 8 pps........Pat McGee
"Teachers Guide to the Planetarium: Gr. 6 - 10 pps.......Pat McGee

In the past month the script library has visited three states: Indiana, Wisconsin and Ohio. Volunteers are still needed to help evaluate the scripts. Interested persons should contact Don Knapp, Noblitt Planetarium, 230 South Marr Road, Columbus, Indiana 47201, or call (812) 376-4330.

POSITION WANTED:

March 1978 graduate Abrams Planetarium M.A.T. program. Extensive astronomical background with B.S. Case Western Reserve Univ., Cleveland. Skills include educational graphics and photography, exhibit design, planetarium show production, public lecturing. MI certified secondary physical science, minor physics. Sample scripts and tapes, publications, slides etc. available upon request. You really should ask for a resume from: Larry Krumenaker, 1240 Haslett Road 68, East Lansing, MI. 48823 (517) 332-4303 nights.

-3-
The minutes of the executive committee meeting were approved as submitted.

The balance as of April 22 is $2,354.47 plus one undeposited check of $5.00.

Lloyd Bodie announced that all standing committee assignments are filled for this year. No new standing committee assignments are necessary.

Dave Hoffman reported that the Publication Committee has no problems to bring up at this meeting. Dave DeBruyn announced that Dave Hoffman has accepted the responsibility of editor of THE PLANETARIAN publication of IPS. Congratulations were extended to Dave Hoffman and to Jeanne Bishop, one of the feature editors of this publication.

Lloyd Bodie expressed thanks for the excellent job this committee has done—Dave Hoffman, Don Tuttle and Nancy Topolewski.

Jeanne Bishop reported that plans for the two TIPS booklets for this year are under way with Marilyn Baczinski editing "Preparing School Programs" and Bob Allen editing "Preparation of Printed Materials." Jeanne urged committee members and GLPA members who have appropriate materials for these booklets to share them with the editors very soon. These booklets are not to exceed 35 pages each.

The chairman wanted to recognize that Dorothy Angeloff will be doing a lot of typing for this committee and that Bob Elliott will be doing the printing. The charge for the printing is uncertain at this time and may be free.

Bob Elliott has agreed to have a continuing article in the Newsletter on the subject of astronomy today and what is appropriate for planetarium people to know and use in planetarium programs.


Don Knapp is heading to Aid-to-Education Committee of MAPS. Securing a liaison person to help both groups is in the thinking stage.

Dave DeBruyn advised that he is compiling information on music and recording which may become a TIPS booklet in 1980.

Jerry Mansfield reported the slide library is in the process of being copied by Dave Parker (who will be reimbursed up to $250 as agreed in the April 2, 1977, executive committee meeting). The change in responsibility from Jerry Mansfield to Gary Mechler will take place when the slides are taken to the Cincinnati workshop on May 6, 1978. Gail Boualog has volunteered to categorize and title the slides. There are no tapes in the library. There are two programs: Stonehenge and Star of Life. Lloyd Bodie suggested the French and Spanish shows from the Allen Memorial Planetarium be added.
Dave DeBruyn announced that he will be attending council meetings at the conference in August and that the GLPA regional meeting has been arranged for August 7 at 3:00 p.m. in the Renoire B Room on the second floor of the hotel. Lloyd Bodie or Lee Shapiro will chair the meeting. Preliminary information has been sent to members, and it promises to be an outstanding meeting.

Jeanne Bishop reported that Dave Batch has been nominated for IPS secretary.

Old Business: The first item of Old Business was copyright laws. Lee Shapiro reported that small planetariums that do not charge admission have nothing to worry about while large planetariums that charge and use music may have a problem. All this is not clear yet and may not be for a long time. Lloyd Bodie suggested that Lee have a handout for distribution at the fall conference or lead a discussion on this subject. Gary Mechler reported that the Great Plains Planetarium Association has an agreement with RCA in which they receive appropriate records for use in planetarium programs and then advertise precisely the music being used. This frees the planetarium from worry of copyright problems. Jeanne Bishop suggested that members include a statement on the scripts they contribute to the script bank and that the statement be a waiver permitting the use of the script. Courtesy would require a recognition of the author. Lee Shapiro suggested a notice in the Newsletter requesting those who object to the use of their script to let the script bank library know, otherwise it is assumed there is no objection.

Logo. Each member of the committee was asked to contribute to the discussion of this subject. The conclusions reached were that Dave DeBruyn would be chairman for the logo contest. All entries are to be submitted to him. He will submit 1 or 2 entries based on the suggestion by Linda Granke in 1976 with variations recommended at the 1977 conference. Dave DeBruyn will arrange for a special awareness to be presented to the person who submitted the basic idea for the winning logo. The winner will be decided by vote by hand at the general meeting.

Position statements. At the 1978 general meeting Don Knapp asked the Executive Committee to consider making a position statement on the value of the planetarium that could be used by planetarium directors to inform their school administrators. Lloyd Bodie stated that he felt this should be the purpose of a new committee. Jeanne Bishop volunteered to chair this committee as she has done some research in this area. Don Knapp, Bob Ledger and Lloyd Bodie will be asked to serve on this committee. A report is to be presented at the next executive committee meeting. The report is to be at most a two-page general statement, followed by information directed toward planetariums operated by a school district.

Visit Your Planetarium Month. This suggestion by Ken Perkins from Phil Stern was discussed. Lloyd Bodie will ask Ken Perkins to chair this committee.

Standards of Education. The request for a list of standards of education for planetarium directors by Bill Stallings at the 1977 general meeting was taken under advisement at that time. The results of discussion were that Lloyd Bodie will contact Bill Stallings for clarification of this issue and which direction to take. Jeanne Bishop offered information from a survey she has made.
New Business: Treasury Funds. It was agreed that Jerry Mansfield would look into the possibility of depositing part of GLPA funds in a savings account so that interest may be realized.

1978 Conference: Martha Schaefer reported on the preliminary plans for the 1978 conference. The Kingsley Hotel will be headquarters for the conference. The following suggestions for fees were made: registration $10, preregistration $9, student $5, and non-members $15. Registration will be at the Kingsley Hotel Wednesday evening and again Thursday morning from 8:30 a.m. to 9:30 a.m.

Discussion continued on the agenda for each day. Suggestions were made, noted and ultimately left in the hands of Martha Schaefer and her committee. She named possible speakers and their topics, and again she and her committee were to make the final decision.

Adjournment: The meeting was adjourned by Lloyd Bodie at 4:00 p.m.

Respectfully submitted:

Jerry R. Mansfield,
Secretary-Treasurer

NEWS NOTES

NASA announces Lunar Samples for hands-on exercises for schools. The moon rocks are encased in plastic. The only requirement is that the teachers using the moon rock take a NASA sponsored workshop. Contact the Education Office of the NASA office in your area.

Michigan area planetarians met at the Chaffee Planetarium in Grand Rapids on April 15 for a full day of activities. Rosemary Carey of the Grand Rapids Public School Instructional Media Center gave an invited paper listing suggestions for recorded planetarium programs as well as suggestions for a slide/tape program that could be used as pre-visit material. The rest of the morning was spent discussing the old question of recorded vs. live educational programs. The afternoon was devoted to a tour of "backstage" at the Chaffee Planetarium and to the new automation system currently being installed. The highlight of the meeting was a talk given by Walt Bisard from Central Michigan University on the use of evaluation in the planetarium.

Planetarium directors from Kentucky and Indiana gathered at the Tipton High School Planetarium for a program and star party on the evening of April 14, hosted by David Parker. Then on April 15, the group met at Western School Corp's Planetarium in Russiaville, Indiana, Gail Bouslog, Director, for a morning of contributions from elementary level, high school level, and university level directors. After luncheon, the group heard Mr. Rea's speech (see page 7) and a talk by Dr. Richard Steldt, Associate Professor of Physics and Mathematics at Indiana University at Kokomo. Dr. Steldt demonstrated, as well as discussed, astrophotography using a camera, a Schmidt camera, and a Celestron 8 telescope, concluding with samples of slides his students had photographed using his techniques.

Pioneer II will fly by Saturn on September 3, 1979. NASA Ames Research Center in California is in charge. To get an invitation to be present at this event, contact Mr. Garth Hull there.
SPACE EDUCATION

(Editor's Note) The following was a speech delivered by Mr. Richard Rea, Superintendent of the Western School Corp., Russiaville, Indiana at the Indiana Area Spring Workshop co-hosted by Gail Bouslog and Dave Parker.

Opening Remarks:

First, on behalf of all of us here at Western School Corporation, we're extremely pleased to have you visit with us today and to have you use our facilities. It is a distinct honor on my part to be a part of your program and I appreciate it very much. I hope each of you will feel welcome here at Western and that you will take advantage of all the opportunities of the program.

Introduction:

I'd like to preface what I have to say today with a little story that I heard Dr. Olds, President of Kent State University, tell. I suppose it can be used in many different ways. He tells this Russian fable. As he says, of course, all Russian stories have to have a character named Ivan. Remember this is a fable, and all fables have morals. It seems Ivan lived out on the very cold steppes of Russia, out in the Siberian area where the winds blow and the snow is cold. One morning Ivan got up and stepped out of his little hut on to the porch. As he stood there in the early morning light shivering and looking around, he happened to glance down and he saw a little bird lying there. He picked the bird up and while it wasn't frozen stiff as yet, it appeared for all intents and purposes to be lifeless. But Ivan was compassionate and thought he ought to do something about it. So he put the little bird inside of his jacket right next to his body and moved off down to his barn where his cattle were waiting to go into the barn and to be fed and milked.

As he approached the barn he saw where the cattle had been standing there was a pile of fresh cow manure - hot and steaming cow manure. Ivan, being a very practical person, took the little bird out of his vest and put the little bird down into this hot, steaming pile of cow manure.

Well, the heat began to penetrate the body of the little bird, and the bird began to shake a little and some signs of life appeared. It eventually lifted its head and fluffed its wings. The bird realized that it was alive. Now, as you know, a bird that is happy is a singing bird, and so this bird begins to chirp - first a little feebly, but as life surged through it, it continued to chirp and its song grew louder and louder until its voice was heard all around.

At the same time there was a fox over in the hedge. As the fox heard the noise, he began to move toward the sound of the bird's singing, and as he slowly came around the barn, he saw the bird singing at the top of its voice. In one quick bound, he leaped on the bird and gulped it down.

Now like I said, this is a Russian fable and Dr. Olds says it has three morals. The first is that those that get you into it are not necessarily your enemies. The second is that those who get you out of it are not necessarily your friends. The third is that when you start to sing, be sure you know to whom you are singing, why you are singing, and what you want to say.

Part I:

I have to speak about the planetarium program from my own experience. I realize that you people have a varied interest in planetarium or space education programs and that your background and experience may be entirely different than mine. I should clarify that I'm speaking strictly from a small, public school - 2,600 students - a school which took advantage of all of the N.D.E.A. funds they could get their hands on. Our planetarium
program, I have to say, is due partly to the fact that they and I took advantage of that opportunity.

But to go back to the moral, I'm sure that some of you in your planetarium programs may reach the point at some time where you have the feeling that those who got you involved certainly must have been your enemy. Otherwise, they could not have gotten you involved into this kind of a situation where you didn't have a regular classroom and you didn't have a nice, ordered program with an established textbook.

I would ask you to remember that you have a planetarium because somebody convinced a lot of people that here was an educational tool that was better than anything we had. Here was a tool that with the proper people - and this is the key - people. Equipment is great, but it's the people who make the program. Somebody back there said, "Here is an educational tool that will stretch the imagination of every youngster, that will make every youngster who comes in contact with it realize that there is more to his life than just the local community in which he lives. I lived through the era of Wendell Wilke when he was talking about "One World." Only now, 40 years later, have we come to realize what he was talking about. People rejected him at the time. "One world - No! We're one nation!" But you don't lose one nation by become part of one world. And as the voice of one crying out in the wilderness, I think we need to make youngsters realize that they are part of one universe. It's the next step.

One of the arguments I use many times with people in talking about space is that "I probably won't get to do it, but there are youngsters in kindergarten who are going to be in space - regularly!" It's coming. The people who have the knowledge of modern technology verify this. So if you get a little discouraged and you think that everybody - particularly the people who got you into this - were your enemies, don't be too sure. In my opinion, they were very far-sighted educators! People who saw the potential of the instruments for the education of boys and girls.

Part II:

Let's look at the second moral just a minute. Right now I suppose we are going through, in our country, a greater anti-school publicity campaign than any I have experienced in the 40 years I have been in the business. We've had detractors before, but never have I experienced the anti-school sentiment. It's partly based on taxes. It's partly based on the integration movement. There are a lot of reasons for it. Read magazines for general consumption, and you'll find this anti-school theme over and over again.

Sometimes we get the feeling that the innovators are suspect. You really are an innovator. A planetarium program in the public school is an innovation. People are apt to feel that it is one of the first things that can go. Very quickly they begin to tell you that we really ought to get rid of that part of the school program. Here is a thing we can do without because it is expensive. We must be careful that we don't fall into that line of thinking. Those who are trying to get us out: are they really our friends? When they are flaying you over the back with a "Back to Basics" movement, ask what is more basic than the place of an individual person in the whole environment of the universe?

Part III:

Finally, if we're going to sing, who are we going to sing to? If we really believe in what we are doing - if we really believe that this space education program is something that everyone ought to participate in - then I think we can set up the program in a public school and say, "This is for all of the students." Any program must have appeal, a broad appeal, and this program does have an appeal for all the youngsters. It does have a service to perform for all the people.
I think our first approach has to be to youngsters. It has to be a learning program. Learning, as you know, is hard work not only for the teacher but also for the youngster. If we allow our planetariums, our space education program, to become simply entertainments, we're going to short change them. They must be learning programs. In other words, a youngster who goes through the program must come out with some knowledge that he didn't have before, and with some understandings that he didn't have before. He must be a better person for having been there. We have a kind of philosophy around our school: "If it isn't educational, don't do it." Don't do anything unless it has some educational value for the students who are involved.

The second group is the teachers. You cannot do a program of this kind without the cooperation of the teachers. Teachers are a very possessive lot, What do they talk about? They talk about "my class", "my pupils", "my room." You are an intruder into that world which, you see, is mine as a teacher. You are coming in, saying "Let me take your pupils, your room, and do something else with it".

So, as a Planetarium Director you have to convince that teacher that what you're going to do for youngsters is really for them. You become a kind of second fiddle to the thing. The program becomes the thing that happens to the youngsters. Be very sure that you enlist the support of the teachers into your program. Don't let them say, "They took my pupils over to their planetarium." Be sure that they are invited to come in. Be sure that they're given the opportunity to know what you're doing with their pupils. Make them your support.

Who else do you sing to? Sing to the principals. There's not a school in the country but what the principal isn't the key person to what goes on in that school. Not the superintendent. The principal. He runs the school on a day-to-day basis. He assigns the teachers. He determines what the program is. Some guidelines come down from the state or through the Board, but it is the principal who determines whether this program is going to go or whether it isn't going to do. One has to make some effort to be sure that the principal knows what's going on down in that planetarium. What kind of program is involved there? What is it going to do for "his pupils?" Just as the teacher is very possessive about "my classroom" and "my pupils," the principal talks about "my school." I am not condemning that. It ought to be that way. The same as it ought to be your program in the planetarium.

Where does the Board and the superintendent fit in? They're the next step. You've got to let them know what you are doing. At this particular time, Boards and Superintendents probably are bombarded by more attempts to eliminate more things from the whole program than we've seen in a long, long time. We've gone through all this era of expansion. Now people are saying "You've forgotten basics!" We haven't forgotten basics at all. You are teaching basics in the program that you are doing. It's a very basic thing.

Some of your programs bring youngsters in only once in a whole year, and you never see the superintendent, and you never see the Board members. Take a little time to make an outline of what you are doing. Send it down to the central office. Be sure somebody in that central office is aware that here is a viable and important part of their educational program that is doing something for the boys and girls. For just as the teacher says "my pupils," and the principal says "my school," the superintendent says "my corporation."

And finally, we don't want to forget the parents and the other people in the community. Many of you do community programs. I suppose when people walk out they say "Thank you," or "I enjoyed that." Make those visits have a two fold purpose. One is enlightenment and entertainment. However, be sure that your audience understands that this is the way a planetarium is used as an educational tool. Because these are the people who pay for it.
Above all, be enthusiastic. Enthusiasm is the most infectious thing there is, and regardless of what we undertake, it's the one thing that really is the key to success. If you are not enthusiastic about your program, do something to get some enthusiasm into it. Be a seller for it! It's important! Sing loudly in that case.

If all else fails, sing to yourself about your work. Tell yourself it is important until you believe it. Nothing is more frustrating than to see teaching in which the enthusiasm is gone. It makes you want to stand up and shout, "Teacher, could you stand to sit back there and listen to yourself for an hour?" Enthusiasm for what you are doing - it will make your program!

It was my pleasure to speak to you. I hope this meeting will have raised your level of enthusiasm. I hope it will send you back to whatever task you have in the planetarium field with just a little higher level of enthusiasm. I trust that you will be able to maintain that enthusiasm until you get back together where you can share it by singing to each other.

THEY SAID IT COULDN'T BE DONE!

The Chaffee Planetarium, Grand Rapids, Michigan, recently did what was said "couldn't be done." They were approached by the Grand Rapids Symphony to perform a light show (no, they did not put the symphony in the planetarium chamber). The Symphony wanted to perform a benefit concert (for themselves) of music from "The Planets", "Close Encounters," and "Star War." The musicians wanted something special and different, so after being turned down by several other organizations (because they said it couldn't be done), they called Chaffee Planetarium. The reason for all this "couldn't be done" business was because the concert would take place in the 5,000 seat, partially lighted Civic Auditorium. Rear screen projection looked to be the only alternative. The 10x10 screen would be set up directly behind the orchestra. The only concern then was the musician's lighted stands. There were 55 lights - 15 watts each. The plan was to dim the lights to about 3/4 intensity, but the conductor would have none of that. By luck they were shielded enough so that they did not interfere.

Another reason that "it couldn't be done" was that when the symphony make a firm commitment with Chaffee, the concert was only a month away. That is very little time to do the impossible, but they did. They borrowed lasers, strobes, overheads, lasers, police lights, lasers, mirrored balls, lasers, special slide and movie projectors, and more lasers. The reviews were fantastic, and so were all the phone calls and letters. There was a reward in it for them. I mean, when was the last time your planetarium played to an audience of 5,000 people?

ANSWER TO DUANE ALLMAN'S PUZZLE NUMBER 9

A. Lightweight  K. Endothermic  U. Uppsala
B. Effect  L. Inner Planets  V. Rocket Plane
C. Inner  M. Myths  W. Nest
D. Schroters  N. Monochromatic Light  X. Emit
E. Emission Spectrum  O. Ebb Tide  Z. Yellow Dwarf
F. Longomontanus  P. North
G. Einstein Effect  Q. Spins
H. Yggorsil  R. Eggheads
I. Technetium  S. Jovian
J. Harmonie Det Welt  T. Orbiting

L. Eiseley The Immense Journey Contemplating the infinity of time, one wonders if perchance their messages came long ago, hurtling into the swamp musk of the steaming coal forests. The bright projectile chambered over by missing reptiles and the delicate instruments running mindlessly down with no report.
### ASTRO-GRAM

#### Definitions

<table>
<thead>
<tr>
<th>A. 18th century Swiss math.</th>
<th>101 208 185 119 42</th>
<th>N. Tzunam (2 words)</th>
<th>128 33 44 17 187 90 147 104</th>
</tr>
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<tbody>
<tr>
<td>B. Pertaining to the color in word W</td>
<td>174 68 181 17 3 117 38</td>
<td>O. A star cluster</td>
<td>85 20 211 149 70</td>
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<tr>
<td>C. Schenian ore containing Curium, Polonium, and Uranium</td>
<td>193 132 87 107 50 4 20 185</td>
<td>P. Energize an electron</td>
<td>126 192 175 195 176 204</td>
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<td>D. His novel about Christ had Arabian horses named &quot;Rigel, Antares, Alnil, and Aldebaran&quot; (2 words)</td>
<td>46 142 83 99 4 123 212 197</td>
<td>Q. What circle changed Ulysses' man to</td>
<td>85 80 144 2 71</td>
</tr>
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<td>E. &quot;The Bear, and the Pleiades&quot; Job 9:19</td>
<td>180 529 91 159 31</td>
<td>R. The celebrated &quot;horsehoe&quot;, W 17, NGC 6618 (2 words)</td>
<td>39 82 25 166 78 126 172 138</td>
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<tr>
<td>F. Current; Premalent</td>
<td>98 18 137 103</td>
<td>S. Color of lead</td>
<td>86 86 178 135 35</td>
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<td>G. Halogen whose name means &quot;unstable&quot; in Greek</td>
<td>111 198 127 76 155 173 27 48</td>
<td>T. Planetary data first printed in 1483 (2 words)</td>
<td>141 93 119 138 60 208 152</td>
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<td>H. Lunar mountain range near the crater Plato</td>
<td>14 48 109 132 66 88 22 170</td>
<td>U. Measurement along the celestial equator (2 words)</td>
<td>112 213 159 24 177 67 95</td>
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<td>I. Process by which an ion is formed</td>
<td>12 108 61 39 176 78 148 193</td>
<td>V. Dusky; of a dark color</td>
<td>191 120 79 36 56 180</td>
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<td>J. &quot;The Fault, dear Brutus, is not in our stars, but in ________&quot;</td>
<td>117 97 131 145 51 182 49 202</td>
<td>W. A color of the spectrum around 8000 &amp;</td>
<td>160 106 136 174 74 46</td>
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<td>K. Hurting, as a vapor</td>
<td>35 94 143 113 207 81 134</td>
<td>X. Metamorphic crystalline rock that easily splits</td>
<td>52 98 128 171 116 161</td>
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<td>L. Hahn, first to split the atom (1939)</td>
<td>130 76 89 130</td>
<td>Y. Lunar crater (492, 494) near Hyginus Rille</td>
<td>169 106 54 74 4 177 63 133</td>
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<td>M. A state of matter which does not occur on Earth or in a laboratory</td>
<td>25 68 96 122 179 13 110 43</td>
<td>Z. An octave</td>
<td>79 78 109 154 37 118 215 195</td>
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#### Words

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THE GREAT LAKES PLANETARIUM ASSOCIATION offers membership opportunities
to all individuals in any way connected with the operation of Planetariums,
regardless of geographical location. G.L.P.A. is an affiliate of the
International Planetarium Society, and the National Science Teachers
Association. Membership dues are $5 annually, payable at the time of the
autumnal equinox. General correspondence and requests for membership
should be addressed to Mr. Jerry Mansfield, GLPA Secretary/Treasurer,
c/o Allen Memorial Planetarium, South Vigo High School 3737 S. 7th St.
Terre Haute, IN 47802.

All GLPA members in good standing receive the quarterly "Newsletter". Contributions and notices for the "Newsletter" should be sent to Dave
Hoffman, Editor, Reiser Planetarium, 35th St. and Division Ave. South,
Wyoming, MI 49508. Deadlines for contributions to the latest "News-
letter" fall on Feb. 21st, May 21st, August 21st, and November 21st.
Contributions for the Planetarian should also be sent to Dave Hoffman.

Printed and mailed from:
Elgin Observatory and Planetarium
School District U-46
4 S. Gifford St.
Elgin, IL 60120
NEWS NOTES:

The Cleveland Regional Association of Planetarians (CRAP) met at the Westlake Schools Planetarium last May 26. The discussion sparkled as everyone shared, the lemonade flowed, and a good time was had by all. With three participants from Pennsylvania, the group maintained its cosmopolitan standing. The sharing included the distribution of her 7th grade program, "Colonization in Space" by Dorothy Angeloff, who also discussed the logistics involved in inviting main-streamed students in wheelchairs. Bill Kobel demonstrated a home-built dissolve system (two room dimmer switches) for Carousel projectors, while Bud Linderman went through an activity adapted from the April 1976 issue of Astronomy on recognizing the constellations in 100,000 years. Bud uses it as a pre-camp experience, and the flashcard or slide presentations get more difficult as the activity proceeds. The most difficult is Bootes, for Arcturus will shift completely out of the field. Dave Sanford recommended the Hansen programs, "The People," "The Loneliness Factor," and "The Legacy" even for small planetariums. The slides alone, Dave said, make getting the programs worthwhile. Bob Andrews reported that his school (with minority group students) related well to "The People," as they relate to the predicaments of the Native Americans. Bob recommended a set of wide-gate slide projectors (sold by Edmund for about forty dollars each) for making panoramas of the Hansen slides. The edges can be lined up easily. Merrick Owen illustrated a black hole effect and distributed an activity for learning the relationship between the apparent size of a sphere and the distance to it. Doris Flanagan showed slides of the Cleveland STS facility, where she has worked the past year, Jean Hixon, director of the only elementary school planetarium in the area, described how her projector and dome are set within the larger school library (!), and Alan Bishop distributed the latest NASA printed materials.

The Science Teachers' Association of Ontario (STAO) is sponsoring a conference around "Science Teaching for Today and Tomorrow" November 2-4. In addition to more than 60 exhibits and several invited speakers, there will be commercial workshops. For further info, write Stan Shapiro, Publicity Chairman, STAO, 24 Deerbrook Trail, Agincourt, Ontario, Canada M1W 1V4.
The Astronomical League's plans for next February's total eclipse of the sun are going into high gear. Activities are being coordinated by an Eclipse Planning Committee, including the selection and utilization of observing sites along the path of totality. This will be the last total solar eclipse over the continental United States for this century. For detailed info, write Russel Maag, Planetarium of Missouri Western State College, 4525 Downs Drive, St. Joseph, MO. 64507.

Participants in the Great Lakes Astronomical Symposium (GLAS) held in and around the Rogers High School Planetarium, Bob Gardner, Director, in Toledo last May were treated to a provocative talk on the origin of tektites by Dr. James O'Keefe, shown here on the right. You may read a detailed summary of his controversial views concerning the origin of the enigmatic glass-like objects we call tektites in the August 1978 issue of Scientific American. Briefly stated, Dr. O'Keefe believes that tektites were ejected from a volcano on the moon! His views are not to be taken lightly, for he is known as an expert authority and is in the forefront of research in the field. Dr. O'Keefe presently works out of the Stellar and Cosmic Astronomy Branch, Laboratory for Astronomy and Solar Physics the Goddard Space Flight Center of Greenbelt, Maryland.

The American Chemical Society and the American Association for the Advancement of Science are sponsoring the production of a planetarium program entitled, "Springtime of the Universe." The show, being created by the Hansen Planetarium in Salt Lake City, has for its major themes the birth of the universe, the build up of the heavy elements in the supernovae, and how space scientists believe the universe will ultimately end. The show is planned for release sometime this Autumn. For further information, write the Hansen, 15 South State Street, Salt Lake City, Utah 84111.

The Hansen Planetarium also recently announced that it is in production with another program, free of charge to interested planetarians, called "Footsteps." In their own words, it is about "The drama, beauty, and significance of the Apollo moon flights to the life and spirit of man - and what the future may bring." The program is being made available by Rockwell International.

Sometimes all you need to complete your live or taped star show is a special dramatic scene or narration. The Hansen Planetarium now offers such taped segments using professional actors and music. Write to them for details.

Answergram:

Exploration of the Solar System (NASA) It has been said that if life of any kind is discovered elsewhere in our own solar system, we can assume that it will occur wherever conditions amenable to the origin of life exist, and, hence that intelligent civilizations probably exist elsewhere in our galaxy.
To Age 7: Unless a child is precocious, he probably cannot separate true causal reasoning from "one-fact-explains-another" reasoning. (Piaget calls this transductive reasoning.) For example, when a six-year-old is asked, "Why does the sun stay up?" he replies: "Because it's bright." Remembering a correct sequence of events in the sky or astronomy definition comprehension (although the child can mimic) is difficult. These children cannot separate their space viewpoint from others. Egocentrism prohibits their grasping the complete idea of why we have day and night, a topic frequently taught in the primary grades.

At about five, most children can differentiate geometrical patterns. They can then see the constellation shapes as being different from one another. Students could draw constellations, make peep-hole boxes for one or more constellations, and visit a planetarium for a brief program about a few constellations.

Line segments connecting the star dots in drawings and models are extremely helpful. Most will not "see" the mythical forms which the constellations depict, and caution should be exercised in telling children what to see in a constellation. However, children love and even need fantasy for successful development. After emphasizing that a group of people imagined a hero and animal over a group of stars, their myth can be told. American Indian, African, Australian, and Oriental, as well as Greek-Roman myths, are available. One excellent source is: The Stars in Our Heaven: Myths and Fables, Peter Lum. Pantheon Books, 1948.

Constellation study can be combined with a reading skills development program, utilizing mythology.

Introduction to day-and-night, moon phases, planets, and other astronomy concepts may be advantageous to later astronomy comprehension; although the children cannot yet completely understand organization of the bodies and their motions. The introduction should be as "concrete" as possible: models, vivid simple pictures, and NASA photographs of single objects.

Ages 7-11: The child leaves transductive reasoning and begins the stage of concrete reasoning patterns in about second grade. He can now engage in logical thinking about things which are familiar and observable. As in the previous years, models and simple drawings are desirable. (Note: Although experience with objects helps develop comprehension of drawings, second grade children are unique in learning better with pictures and diagrams than with real objects when they recognize them. (Shantz and Smock, 1966; Barufaldi and Dietz, 1975).

Whenever possible, children should physically re-create their perceptions. (The rationale for kinesthetic participation comes from neurophysiological studies of the brain as well as from Piaget data-theory.) Drawing what is observed can be helpful. Drawings of positions of the sun during the day (ONE NEVER SHOULD LOOK DIRECTLY AT THE SUN) and of positions and phases of the moon during day and night will improve as the child grows, and participatory-oriented planetarium (POP) programs thus have a firm basis in developmental psychology. By nine or ten he can reproduce correct intervals between objects.
From about age seven onward, egocentrism is slowly replaced by the ability to correctly imagine things as seen from different positions in space. The child becomes able to imagine looking down on himself on the rotating earth from above it. Late second or third grade appears to be the age when children can learn the dual perspective explanation on day and night (author research, 1976).

However, dual-view concepts of moon phases, seasonal changes of the sun at one latitude, and seasonal changes of the sun compared for different geographic positions are inappropriate. This "combinatorial reasoning" (dual perspective combined with another concept) appears at about age eleven upward.

Students in the concrete stages of mental development can define, order, and classify. Appropriate activities would be grouping astronomical bodies by "stars," "planets," "groups of stars," "moons," and "other small objects in solar system;" learning definitions in language form and demonstrating them in art and vice versa; and putting astronomical bodies in order from smallest to largest. Analogies with more familiar things aid astronomical learning.

Until about age eleven or twelve, children do not understand "infinite" time and space. The idea of "forever" or "going on without end" is nothing but words. However, fourth graders easily accept such facts as "The sun's distance is 93 million miles" and "Sirius is 8 plus light years distant" as concrete information.

Ages 11-17: This is the period in which most children pass to the stage of "formal" thinking, the highest stage of mental development. It is characterized by the ability to think in abstractions. A number of recent studies have shown that many high school and even college students are not fully formal thinkers. It is important to identify those students who are still concrete and early formal thinkers and give them concrete experiences in an astronomy course.

As astronomy is frequently a relatively "new" subject to many, concrete experiences with astronomical subject material is recommended for even formal thinkers in a first astronomy course.

When formal patterns of thinking appear, complete understanding of such concepts as phases of the sun are potentially possible. Activities which incorporate both geocentric (earth-based) views of changes in the sky, via outdoor observations or planetarium experiences, and space-perspective views, via models, photographs, and drawings, will result in the most complete learning.

The October 18-21 Annual Meeting is shaping up nicely. Hostess Martha Schaefer of Cranbrook, Michigan, is hoping that a number of papers will be contributed which will fall under the themes of the first U.S. planetarium conference 20 years ago: "Astronomical Subjects and Applied Science", "Fitting the Demonstration to the Audience", "Training Programmes", "Correlation and Cooperation", "Reference, Sales Materials and Exhibits", and "Presentation Methods and Special Effect Techniques". Remembering that Donald Menzel Presented the opening address of that conference with "Observatories in Space", this year's opener will be "Colonies in Space". The Kingsley Hotel will be headquarters for the conference. For conference information, contact Martha at 500 Lone Pine Road, Bloomfield Hills, MI 48013.
Let me tell you how the conversation got around to Dr. Newton Sprague. I had been talking with an old friend of mine, Don Knapp of the Noblitt Planetarium in Columbus, Indiana. You know him as the keeper of the keys of the GLPA Script Library. Anyway, we were discussing how we were going to hold out until retirement age, a few of our dear friends having just recently "pulled the pin" - Ruth Howard and Duane Stanley, among others - when Don showed me an article in The Muncie Star. The headline, black and bold proclaimed, "PLANETARIUM DIRECTOR RETIRING AT BALL STATE." The lead began, "Newton Sprague, Director and chief planner of Ball State University's planetarium and observatory, will retire at the end of the spring quarter."

"Do you know him?" Don asked me. I had to confess that I didn't remember having the pleasure. "Too bad," Don exclaimed. "He's quite a man. You'd really like him. I'm surprised you never bumped into him, he's been active in GLPA for a number of years."

"I would probably recognize him if I saw him. But, go on," I encouraged. "Tell me more about him."

"He was quite an avid photographer, even in the old days," Don continued. A Butler University graduate, he served as a first lieutenant with the 155th Night Photo Reconnaissance Squadron during World War II. While with the squadron, he earned six battle stars. But that's not the half of it. This is what will really interest you, Dave. While he was with the squadron, he developed and combat tested a moving film magazine, an electrical time delay device, and a split vertical camera. And get this, he also helped H. E. Edgerton design the original K-29 camera!

"I'm impressed," I broke in - and I wasn't kidding. Photography has been a hobby of my own for a number of years and Don was talking my language. Suddenly, that old curiosity of mine got the better of me and my thoughts quickly turned to asking my favorite question: "How did Newton Sprague first get into the planetarium business?"

"He once told me," Don answered. "He joined the faculty at Ball State in 1960 as a chemistry and physics professor. 'Two years later, as he likes to call it, he started 'star trekking.' When the head of the science department put a notice on the bulletin board asking for a volunteer to teach the astronomy course, guess who put in for the job right off the bat? Anyway, as luck would have it, the job got bigger during the next two years and the need for a planetarium and observatory became more apparent. Always ready and willing to listen and learn from the advice of others, Dr. Sprague visited 17 different planetariums and observatories even before starting to plan Ball State's units. By the way, the planetarium and observatory opened in 1967. Since then, he's put through about a thousand students a month representing all grades and ages. Although to likes to listen to others, many times he doesn't wish to depend on what they say or report. He goes to see for himself."

"How's that?"

"Take this for example. In order to add depth to his lectures, he's used holidays, vacations, and released time to do star gazing in New Zealand, Australia, the Republic of South Africa, Central Europe, Scandinavia, the Arctic Circle, and England's Stonehenge. And as if that weren't enough, he's been an invited guest at such places as the
Jet Propulsion Laboratory in Pasadena, Cape Kennedy, and the American Research Center at Mountain View, California. While on these visits, he witnessed major space activities such as the Viking I landing on Mars, and the launchings of Apollo 16, Voyager II, and Mariner 9 and 10. Data, Space agency photographs, and his own slides (he's never lost his keen interest in photography, 10,000 slides attest to that) of these events provided his planetarium shows with current interest. He used to tell me that if he got back from a launch on a Saturday, his following Tuesday night's class would get a report."

"Tell you what, Don. If you see him at the GLPA meeting at the Cranbrook, introduce me to him, okay?"

"You're on!" is what Don promised.

After knowing just this little bit about him, wouldn't you want to meet Newton Sprague too?

......Dave Hoffman

Education Committee Report

At the business meeting last year someone raised the question of whether materials from the resource bank could be made available to individuals not at the annual GLPA meeting or regional meetings where the host has requested the file. Opinions of the Education Committee on this have varied. The problem is one of time and effort for someone to individually mail and re-file such scripts as well as keep track of those which might not be returned quickly. Even if users paid all postage costs, this would be the case. If you have strong feelings on this issue, either way, please send your concerns to me. We will discuss this briefly at our Fall business meeting.

Those contributing materials to the file should put their name and address at the top of each item. Also, on scripts, put a statement that the material can be used directly or adapted by other planetariums and sign your name and the date. This is now judicious with the stringent new copy laws. Send all materials to Don Knapp, who now is Materials Chairman.

I'm currently gathering opinions and ideas relating to the educational value of the planetarium for a special statement which can be presented to school administrators. Please send your ideas to me: questions are on the sheet mailed by 1978 Conference Chairman, Martha Schaefer, with conference information. The more GLPA members who present ideas, the more representative and better the final statement can be. It is my plan to distribute copies of the statement at the Fall meeting. Get your contribution to me immediately, if you haven't yet sent it.

We will also have two new Tips booklets ready for distribution at the Fall meeting. See you there!

Jeanne Bishop,
Westlake Ohio Planetarium
Chairman
I. EASY ONES:

("BANG")  ?!!1111!!  

1.  

II. A LITTLE HARDER:

1.  

III. THINKER STINKERS:

1.  

IV. DOME DROODLES:

1.  

(Answers on Page 10)
BOOK REVIEW
by Jeffrey Hunt
Abrams Planetarium, Michigan State University


At first glance the second edition of Robert Burnham's handbook has not changed, but after careful inspection one can see that it has blossomed into an unsurpassed guide to the heavens. It is divided into four sections: constellations, lists of double and multiple stars, star clusters and nebulae, and descriptive notes. The lists remain virtually unchanged from the first edition except for the addition of some variable stars.

The delightful parts of the handbook contain the descriptive notes. These sections include star lore, "facts", history, and appearances of objects which will make any planetarian, sky interpreter, or astronomy educator lick his chops.

The author intended his handbook for advanced observers, but it is useful for the beginner, too. Outstanding descriptions, directions and charts will leave no doubt in any observer's mind that he has found the desired object. At the end of each volume a table is available to cross-reference it with Norton's Star Atlas and the Skalman Pleso Atlas Coeli.

The handbook has one major problem - Volume III is missing. However, it is due on the market this Autumn. I can hardly wait to have it!
Correct Answers to Planetarium Droodles
J. Bishop

Easy Ones:
1. Big Bang
2. The last question
3. Fantastic slide of UFO landing on the moon photographed by Armstrong (unfortunately only viewable edge-on)
4. Very useful device: brush your teeth with one side before pointing with other in a planetarium.

A Little Harder:
1. Good planetarium window.
2. Eclipse of planetarian (as star ball swings to Equator)
3. Nope—not 4 mice in a beer can, but sky at North Pole—latitude point, iceberg skyline, and all directions "south".
4. hole o' gram (hologram)

Thinker Stinkers:
1. Planetarian as seen by ant looking out blocked star hole, who is inspecting problem.
2. One of those darned black holes.
3. Glasses worn by planetarian wishing to remain incognito in astrotology-minded community after an honest anti-astrology program—not successful—one irrational got him with a b-b gun.

Dome Droodles:
1. Santa and his reindeer searching for an opening in dome—Rudolph made it in somehow.
2. "Dome for Christmas"
3. 3-D Planetarium
4. Spitz Dome Reject
5. Any answer correct—you just made up a Dome droodle!!
6. Sugar-cube igloo for ants: "Dome Sweet Dome"
7. Planetarium building with solar heating (poor planetarium design: people who work in glass houses shouldn’t stow domes)

ANSWER TO ASTROGRAM #10

A. Euler J. Ourselves S. Livid
B. Xanthic K. Noxious U. Right Ascension
C. Pitchblende L. Otto V. Swarthy
D. Lew Wallace M. Forbidden W. Yellow
E. Orion N. Tidal Wave X. Schist
F. Rife O. Hyads Y. Triesnecker
G. Astatine P. Excite Z. Eighth
H. Teneriffe Q. Swine H. Mare Smyth II
I. Ionization R. Omega Nebula

(Continued on Page 3)
ASTRO-GRAM

Using the definitions below, try to fill in the words column. Then, transfer the letters from these words to the proper numbered square in the diagram. Work back and forth from the diagram to the words column until both are completed. The first letters of the answers in the words column will spell out the author and title of the work contained in the diagram. Black squares indicate the ends of words in the diagram.

Answer in next issue

by Duane Allman

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<td>R. The N in NGC</td>
<td>131 43 20</td>
</tr>
<tr>
<td>F. Space Debris</td>
<td>6 104 39 69 122 112 91 75</td>
<td>S. Lunar crater (30°N, 31°W)</td>
<td>117 98 11 21 89 68 138</td>
</tr>
<tr>
<td>G. An electrical conductor leading from a main</td>
<td>61 144 118 85 19 102</td>
<td>T. A moon of Saturn</td>
<td>64 37 116 113 105 44</td>
</tr>
<tr>
<td>H. Vedic Goddess of the dawn</td>
<td>84 100 42 15 71</td>
<td>U. Decay time factor (compound word)</td>
<td>135 55 119 67 79 15 96 115</td>
</tr>
<tr>
<td>I. Orion's belt, once known as Jacob's</td>
<td>66 109 5 35 78</td>
<td>V. An Optic</td>
<td>T 30 39</td>
</tr>
<tr>
<td>J. Egyptian God of Wisdom and Magic</td>
<td>93 33 47 110 76</td>
<td>W. A light mass</td>
<td>7 107 26 85 135</td>
</tr>
<tr>
<td>K. M 13 in Hercules, the</td>
<td>54 38 87 127 27 12</td>
<td>X. An air force</td>
<td>4 137 24 8 47 90 136 126</td>
</tr>
<tr>
<td>L. A diminutive mythological being</td>
<td>129 56 17</td>
<td>Y. Side to side motion</td>
<td>32</td>
</tr>
<tr>
<td>M. Type of Spectrum</td>
<td>10 136 29 53 103</td>
<td></td>
<td>88 23 129</td>
</tr>
</tbody>
</table>

-11-
THE GREAT LAKES PLANETARIUM ASSOCIATION offers membership opportunities to all individuals in any way connected with the operation of planetariums, regardless of geographical location. G.L.P.A. is an affiliate of the International Planetarium Society, and the National Science Teachers Association. Membership dues are $5 annually, payable at the time of the autumnal equinox. General correspondence and requests for membership should be addressed to Mr. Jerry Mansfield, GLPA Secretary/Treasurer, c/o Allen Memorial Planetarium, South Vigo High School 3737 S. 7th St. Terre Haute, IN 47802.

All GLPA members in good standing receive the quarterly "Newsletter". Contributions and notices for the "Newsletter" should be sent to Dave Hoffman, Editor, Reiser Planetarium, 35th St. and Division Ave. South, Wyoming, MI 49508. Deadlines for contributions to the latest "Newsletter" fall on Feb. 21st, May 21st, August 21st, and November 21st. Contributions for the Planetarian should also be sent to Dave Hoffman.

Printed and mailed from:
Elgin Observatory and Planetarium
School District U-46
4 S. Gifford St.
Elgin, Il. 60120
President Lloyd Bodie, Jr. called the meeting to order at 10:45 AM, EST.

Minutes: A motion was made and seconded to dispense with the reading of the Minutes, since they were printed in the Winter Solstice, 1977 issue of the Newsletter.

Treasurer's Report: The treasurer's report indicated a balance of $1809.34 which includes $42.23 in earned interest from a savings account.

Standing Committee Reports: Lloyd Bodie announced that Bill Rush, Conference Planning Chairman, had taken a job in industry and had resigned. Bob Gardner was the unanimous choice of the Executive Committee to fill the vacancy.

Publications: Chairman Dave Hoffman reported that all issues of the Newsletter had been published and mailed on time. Special recognition was given to Don Tuttle and Nancy Topolewski for the work they do in getting the publication out on time.

Education: Chairperson Jeanne Bishop reported that there are two new Tips booklets this year and thanked Dorothy Angeloff and the Erie Public Schools for the typing and running off of these at no cost to GLPA. The Editors of these were Marilynn Baczynski (Tips for School Programs) and Bob Allen (Tips on Printed Material). Two are planned for 1979: "Planning for the New Planetarium" by Bob Ledger, and "Pet Peeves" by Jon Marshall and Bob Elliott. In the future, Gary Tomlinson and Diane Trainque will produce a booklet on "Poetry in Astronomy."

Jeanne mentioned that anyone contributing items to the Script Bank should include a statement that permission is being given for copying. She also reported that it is now possible for individuals to borrow scripts during the year from Don Knapp. The only restrictions are that a limit of 5 may be borrowed at one time, and that they must be returned in two weeks in good condition.

A copy of The Educational Value of the Planetarium, a statement prepared for GLPA, was given to everyone present.

IPS: The IPS meeting in Washington in August was very successful. Two new areas joined the society - BAP (British Association of Planetariums) and EMPA (European Mediterranean Planetarium Association). Members in 1979 will be receiving three publications as part of their membership - Special Booklet on Special Effects, an updated Directory of almost every planetarium in the world, and a Proceedings of everything that happened in Washington. The next meeting will be held in Chicago in 1980.

Copyright: Lee Shapiro suggested that we follow Jack Dunn's lead for his Great Plains Association. That is to contact the record companies asking for permission to use their material. Dunn has been very successful.

Area Workshops: OHIO: Gary Mechler reported that the meeting centered around a discussion of laws either on the books or in the works that would affect the region. There were none. Their next meeting will be at Roger Grosenbacher's PItm. in Lancaster, Ohio, on April 21, 1979.
IOWA, MINNESOTA, AND WISCONSIN: Bob Allen reported that there were only seven people at their meeting at West Warsaw High School. (See News Notes)

MICHIGAN: Eugene Jennewein reported on their meeting in Grand Rapids and announced that the next meeting will be at the Abrams Pltm. in East Lansing. (See News Notes)

INDIANA: Dave Parker reported on a very successful meeting which was split between two planetariums - his at Tipton High School, and Gail Bouslog's in Russiaville. Their next meeting will be held in Muncie on May 5th.

Old Logo: There will definitely be a vote taken on whether to keep or change the logo at the next conference. Deadline for submission to Dave DeBruyn in Grand Rapids is January 1, 1979.

Visit Your Planetarium Month: Because Ken Perkins was not present, the subject was tabled until the next conference.

New Business: Lloyd Bodie brought up the subject of sending a letter informing superiors of the value of attending our annual conferences. If he is sent a letter with the name and address of the person who is to receive his note along with requested information, Lloyd will correspond with the specific administrator.

Letters to Superiors: Lloyd Bodie brought up the subject of sending a letter informing superiors of the value of attending our annual conferences. If he is sent a letter with the name and address of the person who is to receive his note along with requested information, Lloyd will correspond with the specific administrator.

Scheduling Conferences: The Executive Committee asked that there be a motion made that annual conferences be booked two years in advance, with the exception of this year, which would be only a year and a half. Motion was made and passed. (See News Notes)

1979 Conference: An invitation by Maxine Haarstick to come to Minneapolis was accepted by the Executive Committee.

Planetarium Personnel Survey: Bill Stallings made the resolution that GLPA undertake a survey to determine the status of planetariums, personnel, etc. The survey will determine the qualifications, salary, outside teaching-load, planetarium load, education, etc. The resolution was passed, and Bill Stallings and Lloyd Bodie will administer the survey.

Lloyd Bodie concluded the meeting with an extra special "thank you" to Martha Schaefer and her staff at the Cranbrook Institute of Science for a successful conference.

Respectfully submitted,
Jerry B. Mansfield

Site of the 1978 Conference
THE JUPITER NON-EFFECT
by Lee Shapiro, Abrams Planetarium

In their recent book The Jupiter Effect, J.R. Gribbin and S. H. Plagemann attempt to relate the planetary configuration of 1982 to earthquakes. The authors propose the following chain of phenomena: In 1982 there will be a super conjunction of all nine planets on the same side of the sun, producing unusual tidal effects on the sun which will trigger an extraordinary number of sunspots whose effect on the solar wind will reach to the Earth and eventually trigger earthquakes.

This paper deals with the first step in that chain, an alignment producing unusual tidal effects. The U.S. Naval Observatory has calculated that the best aligned configuration will occur on March 10, 1982 and that even then the nine planets will be spread out over 98°3 of heliocentric longitude, more than one quadrant.

The tidal effect of a planet on the sun is proportional to the mass of the planet and inversely proportional to the cube of the distance of the planet from the sun.

\[ F_{\text{tps}} \propto \frac{m_p}{a_p^3} \]

where \( F_{\text{tps}} \) is the tidal force of the planet on the sun, \( m_p \) is the mass of the planet, and \( a_p \) is the distance of the planet from the sun. (see Exploration of the Universe, Abell for more details) In the table below are listed the relative tidal forces of the various planets on the sun, assuming the planets have circular orbits with a radius equal to their semi-major axis. (Values used for mass and semi-major axis are from Astronomy The Evolving Universe by Zeilik.)

<table>
<thead>
<tr>
<th>Relative Tidal Force on the Sun Due to:</th>
<th>Relative Tidal Force (with the Earth’s Value arbitrarily set to 1)</th>
<th>% of the Total Tidal Force if all the planets were lined-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>0.96</td>
<td>15</td>
</tr>
<tr>
<td>Venus</td>
<td>2.16</td>
<td>33</td>
</tr>
<tr>
<td>Earth</td>
<td>1.00</td>
<td>15</td>
</tr>
<tr>
<td>Luna</td>
<td>1.2 x 10^{-2}</td>
<td>0.19</td>
</tr>
<tr>
<td>Mars</td>
<td>3.0 x 10^{-2}</td>
<td>0.46</td>
</tr>
<tr>
<td>Jupiter</td>
<td>2.26</td>
<td>35</td>
</tr>
<tr>
<td>Saturn</td>
<td>0.11</td>
<td>1.7</td>
</tr>
<tr>
<td>Uranus</td>
<td>2.1 x 10^{-3}</td>
<td>3.2 x 10^{-2}</td>
</tr>
<tr>
<td>Neptune</td>
<td>6.3 x 10^{-4}</td>
<td>9.7 x 10^{-3}</td>
</tr>
<tr>
<td>Pluto</td>
<td>3.1 x 10^{-6}</td>
<td>4.7 x 10^{-5}</td>
</tr>
</tbody>
</table>

Note that the tidal force is 68% of total whenever Jupiter and Venus line-up. Since the synodic period between Jupiter and Venus can readily be computed to be 236.99 days, this means that these two planets line up every 118.5 days. Since the tidal forces will add together not only when the planets are in heliocentric conjunction but also when they are in heliocentric opposition, this effect occurs every half synodic period. Thus for example, greatest tides on the earth occur in relationship to the times of new moon and full moon. When Jupiter, Venus, and Earth or Jupiter, Venus, and Mercury line-up the tidal effect would be 83% of the total possible effect. When all four of these planets line up the effect would be 98% of the total possible. Again line-up means all in a relatively straight line, not necessarily on the same side of the sun.

In the case of three or more planets, only very rarely would you get perfect line-up. Let us define a close line-up as occurring whenever the specified planets are within ±25° of a line passing through the sun. Jupiter-Venus-Earth and Jupiter-Venus-Mercury alignments in such cases occur on average sooner than every two years. The four planet alignment of Jupiter-Earth-Venus-Mercury occurs on the order of every nine years. Therefore such alignments are very common and will have greater tidal effects than
the alignment of 1982 since for that alignment the planets are not within as small an angular spread.

If for curiosity you wish to know the tidal effects of each planet and the sun on the earth, consult the table below.

<table>
<thead>
<tr>
<th>Relative Tidal Force on the Earth Due to:</th>
<th>Relative Tidal Force (with the Sun’s Value arbitrarily set to 1)</th>
<th>% of the Total Tidal Force if all the planets were line-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun</td>
<td>1.0</td>
<td>31</td>
</tr>
<tr>
<td>Mercury</td>
<td>7.2 x 10^{-7}</td>
<td>2.2 x 10^{-5}</td>
</tr>
<tr>
<td>Venus</td>
<td>4.2 x 10^{-4}</td>
<td>3.8 x 10^{-3}</td>
</tr>
<tr>
<td>Luna</td>
<td>2.2</td>
<td>6.9 x 10^{-5}</td>
</tr>
<tr>
<td>Mars</td>
<td>2.2 x 10^{-6}</td>
<td>4.1 x 10^{-4}</td>
</tr>
<tr>
<td>Jupiter</td>
<td>1.3 x 10^{-5}</td>
<td>1.4 x 10^{-5}</td>
</tr>
<tr>
<td>Saturn</td>
<td>4.6 x 10^{-7}</td>
<td>2.2 x 10^{-7}</td>
</tr>
<tr>
<td>Uranus</td>
<td>7.2 x 10^{-9}</td>
<td>6.6 x 10^{-8}</td>
</tr>
<tr>
<td>Neptune</td>
<td>2.1 x 10^{-9}</td>
<td>3.1 x 10^{-10}</td>
</tr>
<tr>
<td>Pluto</td>
<td>1.0 x 10^{-11}</td>
<td></td>
</tr>
</tbody>
</table>

(Note: orbits were assumed to be circular. Calculations were done assuming outer planets were in geocentric opposition and inner planets were in inferior conjunction.)

Metric Madness

(From the Arizona Science Teachers' Newsletter, October 1978)

If 10^{-6} phones equals 1 microphone, what does 10^{-2} pedes equal? Try out your metric IQ. Clue - if you know the metric prefixes for the exponents given, you shouldn't have any trouble - just a lot of fun. 9 TL 6TH SAYS WHY

1. 10^{-1} mate =
2. 10^{-3} cans =
3. 2 x 10^{2} withits =
4. 10^{1} dents =
5. 10^{-5} Nanettes =
6. 2 x 10^{3} mockingbirds =
7. 10^{-3} taries =
8. 10^{3} monjaros =
9. 10^{12} fermis =
10. 10^{-6} fish =
11. 10^{-6} phones =
12. 10^{-2} pedes =
13. 10^{6} phones =
14. 10^{-12} boos =
15. 10^{-18} boys =
16. 10^{2} mental =
17. 10^{1} cards =
18. 10^{12} bulls =
19. 2 gorics =
20. 10^{9} los =

Answers to puzzle #11

A. Altitude  H. Ushas  N. Lasilla  T. Tethys
B. Needle  I. Staff  Q. Edda  U. Half-life
C. Oahu  J. Thoth  P. Attitude  V. Eye
D. Nath  K. Galley  Q. Amo  W. Fluff
E. Yellow  L. Elf  R. New  X. Luftwaffe
F. Meteorite  M. Flash  S. Delisle  Y. Yaw

Anonymous: The Flea and the Fly. A flea met a fly as it flew in a flue. Said the flea to the fly, "Oh, what shall we do?" "Let us flee," said the fly. "Let us fly," said the flea. So they fluttered and flew out a flue in the flue.
NEWS NOTES

Invitations for the 1980 annual GLPA conference must be submitted in writing and must be in the hands of the Executive Committee before their regular Spring meeting in 1979.

Projects in astronomy carried out by high school students are invited to be submitted for the 1979 Priscilla and Bart Bok Awards of Boston U. First Prize is $200; Second, $100; Third, $50. A concise, 5 to 15 page description of the project in the style of a serious scientific report including references, figures and diagrams should be submitted to the Dept. of Astronomy of Boston U., Mass. 02215 by February 15, 1979. All entries should be accompanied by a brief endorsement from the student's science advisor. For further info, write Prof. M. Papagiannis at the above address.

Bob Allen reports that a definite date has not as yet been firmed up for the Spring meeting of the Wisconsin-Iowa-Minnesota Planetariums, but that it will be hosted by Denny Brinkman of the Como Planetarium in St. Paul. Watch for more details in the Spring issue of the Newsletter.

Art Lusty wants you to save those cartoons! One of the short programs at the Cranbrook Conference this Fall was a viewing of cartoons dealing with astronomy, as printed in the daily newspapers and periodicals. When you find such, collect and mail to Art Lusty in care of the Newsletter Editor. Also welcome are letters from students which reveal a chuckle. We will photo everything we get and place in the slide file for your copying, if desired. By the way, those present appreciated the show and are looking forward to next Fall in Minneapolis for another program of "Spaced Out Humor." We need all the laughs we can get!

Mr. Daniel Wright, Royal Astronomical Society of Canada, Winnipeg Centre, 264 Winterton Ave., Winnipeg, Manitoba R2K 1K1, Canada is the planning coordinator for the February total eclipse of the sun observations in Manitoba. Write to him for their informative pamphlet or for more information.

Lee Shapiro reports that the Michigan Area Planetarium meeting will take place on Saturday, March 17, 1979 at the Abrams Planetarium in East Lansing. Details and final schedule will be mailed to all Michigan Planetariums and to anyone else who so requests. Featured will be a NASA Aerospace Workshop.

Dear Merlin,

Being a responsible member of GLPA, I was invited to act as a presenter during the workshop sessions at the October meeting in Cranbrook. Although I had a personal business day to use, my immediate supervisor, my principal, would not allow me to leave. He stated that if it entailed hiring a substitute it would not be possible for me to leave. I appealed to the president of my EA. He said that it was within my contract to leave. Even so, I did not go. What would you have done?

M.S.

Editor's Note: It was suggested that we have a regular column, in the pattern of Dear Abby, to help each other in personal and job related problems other than "How to Fix the Instrument" or "How to Make a Special Projector." The above is the first sample. It is a real problem and a real situation. Any advice you can give would be greatly appreciated. Write to Dear Merlin in care of the Newsletter Editor. Answers will be published with your name or initials only if desired.

Write to Merlin also if you have a problem that you would like to see discussed.
ROOTS AND ROUTES: PTOLEMY, COPEHNICUS, SPUTNIK, AND GLPA
By John C. Rosemergy

The Twelfth Annual Armand Spitz Lecture
(edited for the Newsletter)

I especially appreciate an invitation from professional colleagues to speak at an occasion which honors Armand Spitz. The careers of many of us who are here tonight have been quite different, the lives of millions have been enriched, because he invented the projector and energized the movement which brought planetariums to hundreds of communities. His influence will continue as additional millions are instructed and stirred in spirit in these planetariums.

How pleasant it is to convene where the first professional event of this nature took place! It was at the Cranbrook Institute of Science, September 7-10, 1958, that the first major meeting of planetarium educators was held - a symposium on the educational use of planetaria. How strikingly things have changed in our area of professional interest since the first meeting at Cranbrook! I'd like to remind us of six of these changes:

1. In astronomy, for instance, twenty years ago pulsars, quasars, and the highly fashionable black holes had not been discovered - postulated perhaps, but not discovered.

2. In space science twenty years ago only a few artificial satellites had been orbited, and although the Russian dog, Laika, had done so, mankind had not yet travelled in space. Donald Menzel concluded his address opening the Cranbrook symposium by saying that on a recent trip to Russia he had been told that "One of the greatest troubles you Americans have with your satellites is that you can't find a dog small enough to go into them."

3. The number and sophistication of planetarium projectors has increased enormously. Then there were nine major projectors in the United States - six Zeiss, the new Spitz Model B at the Longway Planetarium, and the major, but homemade projectors at Boston and San Francisco. The Air Force Academy Planetarium, with its Spitz Model B projector, was under construction. Its first director, Major Richard Pfrang, was at Cranbrook. There were a few dozen Spitz A1 and A2 projectors in use. Today - who can keep count?

4. There was no professional organization of planetarium specialists. Now we have an international organization and several vigorous and effective regional organizations. Our own GLPA has been in the forefront of this progress.

Incidentally, the first step toward the establishment of an organization was taken at the Cranbrook symposium. Before the symposium was adjourned, a committee was appointed to study this matter. The Chairman was Jim Fowler, then of the Cranbrook Institute of Science. The first meeting of the committee was held in Ann Arbor on April 12, 1959. Maxinne Haarstick from Minneapolis, Dan Snow from Cleveland, Major Richard Pfrang and Major Floyd Ethridge from the Air Force Academy, Herb Williams from Spitz Laboratories, Jim Fowler, and I met. There were a few subsequent meetings and a proposed constitution was drawn up. However, the committee eventually concluded that further effort at that time would result in a premature and stillborn organization.

5. The body of scholarly literature concerning planetarium education was very, very lean. One master's degree thesis had been done by Richard Emmons (who was one of the speakers at the Cranbrook symposium) at Kent State U. in 1950. His thesis described a project in which a simple planetarium was constructed in a physical science course at the Canton Branch of Kent State U. Today the body of literature is copulent.
6. An especially important change, I believe, is the fact that planetarium educators speak now with more objectivity than we did twenty years ago. I believe that this is evidence of increased professionalism and maturity. Twenty years ago some of us were making reckless statements regarding planetarium education. I'm not suggesting, however, that we need to apologize for this. I believe that overly expansive statements in the early years of our work underscore the wonderfully powerful potential of the planetarium for stirring emotions. On the other hand, I'm glad that twenty years of maturation have helped us to bring these matters into sharper focus.

Our activities as planetarium specialists are encompassed by our larger role as astronomy students and teachers. And as students and teachers of astronomy, how deeply our roots extend into the intellectual history and fabric of mankind, and how difficult yet majestic are the routes by which our discipline has come to where it is. I would like to remind us of some of these roots (ROOTS) and routes (ROUTES). They are very special – differing, I believe, from those of other disciplines in some extraordinary ways. Because of their unusual nature, I believe that these roots and routes should be sources of gratification, inspiration, and guidance in our work.

How deep and extensive are the roots of astronomical studies. Plato, in his Republic, advocated that those who were to become philosopher-kings should spend the ten years from ages 20 to 30 studying arithmetic, geometry, music, and astronomy. But clearly the roots of our discipline were already deep long before the time of Plato – so deep that the new specialty of archaeoastronomy is emerging as attempts are made to trace these deep roots. I believe that the depth of these roots suggests that mankind's interest in the cosmos is innate and primordial. Perhaps this interest reflects an instinctual realization that each of us is part of the cosmos. Perhaps the atoms in our bodies were synthesized in the nuclear furnace of an ancient star, hurled into the void by a supernova, and eventually included in the cloud of gas from which our sun and earth condensed. The mysterious spark of life, which we can transmit but not ignite, is sustained in us by the radiant energy of the star we orbit. We live for a moment in the eons of time which stretch into the past and future; then the atoms of our bodies return to the earth and the store of cosmic building material.

As teachers of astronomy, we enjoy an advantage over teachers of many other subjects. We generally do not have to create initial interest in beginning students - they come to us interested. Skillful teaching is required to nurture the interest which brings students to us; clumsy teaching can diminish or even extinguish it. In this regard, I believe that a familiar little piece by Walt Whitman provides wise admonition for all who teach astronomy to beginning students:

"When I heard the learn'd astronomer, When I was shown the charts and diagrams, to add, divide, and measure them, When I sat,再也 the astronomer where he lectured with much applause in the lecture-room, How soon unaccountable I became tired, and sick, Till rising and gliding out I wandered off by myself, In the mystical night air, and from time to time Look'd up in perfect silence at the stars."

But what of the routes (ROUTES) along which our discipline has progressed? In places these routes of the astronomers have merged to form a main thoroughfare along which all of physical science has advanced, as well as important aspects of philosophy and humanism. Certainly this is true as regards the Copernican Revolution, for it is one of the richest chapters in the intellectual history of mankind. This scientific revolution not only cleared a route for the progress
of modern physical science, it also led to profound philosophical ramifications. I sometimes emphasize this for planetarium audiences by pointing out that we can see the influence of the Copernican Revolution in the first sentence of the Declaration of Independence. Recall with me that sentence:

"When in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the laws of nature and nature's God entitle them, a decent respect to the opinion of mankind requires that they should declare the causes which impel them to the separation."

Isn't it striking that Jefferson wrote that it is because of the laws of nature and nature's God that this should be an independent nation? What laws of nature? He wrote this at a time when philosophers and humanists, charmed by the elegance of Newton's contributions and those of the giants on whose shoulders he had stood, felt that human relationships should display some of the beautiful orderliness of celestial motions.

The Copernican Revolution! What valuable lessons we provide our students when we retrace with them the route along which it advanced. It is appropriate for me to remind us of a few of its highlights.

Ptolemy's cosmology was satisfying to most in the western world for 1500 years, and this is not surprising. It explained observations made from an earth which certainly felt stationary. It pictured the wanderers as moving along circular paths, the most pleasing geometry. It permitted reasonably accurate predictions of future planetary positions. And it was satisfying theologically. After all, if the Creator had made mankind little lower than the angels and had given him dominion over the fish of the seas, the fowl of the air, and the beasts of the field, it seemed that the Creator would certainly have mankind at the center of a universe which revolved around him. It became heretical to believe that the earth moved.

As the centuries passed, the wanderers strayed from positions predicted with Ptolemy's cosmology. It became necessary to shore up and complicate his geometry by picturing planets to be moving in epicycles on epicycles on deferents. Alphonso the Wise, a Castillian king of about 1250 AD said that had he been present at creation, and had the Creator invited his opinion, he would have suggested a simpler arrangement. But still the system was accepted.

The hero of our story, Nicolaus Copernicus, was born on February 19, 1473, in Torun, in what is now Poland. His father died when Copernicus was a young man. His very influential uncle, Bishop Lucas Watzelrode, saw to his education and helped him to get established. He was enrolled in the University of Cracow from 1491-95, where he studied mathematics and astronomy. He then went to Italy for eight more years of study. Having completed twelve years of university studies, he returned to Poland in 1503 and took up his duties as one of several canons of Warmia. Copernicus handled many difficult assignments with distinction. For instance, he was responsible for the successful defense of the besieged city of Olszyn, Capital of Warmia, when it was under attack by the Teutonic Knights. During the siege he curbed the spread of an illness by inventing the practice of buttering bread. It was a sanitation and public health measure. Despite the fact that Copernicus was, in effect, fighting a war, one Adolph Buttenadt, a German physician who had heard something about Copernicus' buttering of bread, showed up at Copernicus' headquarters to learn more. Copernicus received him graciously, but it appears that Buttenadt may have been a devious character, because upon leaving Olszyn and the besieged Copernicus, he claimed credit for inventing the practice. The word butter is derived from Buttenadt's name.

After the defense of Olszyn, and upon the request of King Sigismund I, Copernicus took an active part in bringing about currency reforms. Some say
that he clarified the economic principle that we now know as Gresham's Law.
As with the buttering of bread, he hasn't received recognition for this.
Credit has gone to Sr. Thomas Gresham.

When peace came he returned to routine duties as a Canon of Frombork
Cathedral, near the Baltic. He managed while there to do some astronomical
work and corresponded with some European astronomers. He became convinced
that the earth moved. In about 1510 he had actually written a paper suggesting
this, but he hadn't had it printed. He had circulated it among some friends.

Word of Copernicus' thinking spread. In 1539, a young man named Rheticus,
a professor of mathematics at the University of Wittenberg, intrigued by what
he had heard, came to Frombork to visit Copernicus. He was received cordially
and, although he was a Lutheran, he stayed and studied with Copernicus for two
years. In 1541 Copernicus permitted Rheticus to take a copy of the manuscript
to Nuremberg and arrange for its printing. He arranged for one Johannes
Petreius to print it, and for Andreas Osiander, a Lutheran theologian and
mathematician, to oversee the work.

Osiander added a confusing preface, making it appear as though it had been
written by Copernicus, saying that the book sets forth a useful way of handling
calculations, but that the hypotheses are not necessarily correct or even
probable. He did this for either of two reasons: (1) Perhaps he was trying to
protect Copernicus. (2) Perhaps he didn't wish to perpetrate heresy.

The first copy of the book, De Revolutionibus Orbium Coelestium, Libra VI,
came off the press in March, 1543. A copy didn't reach Frombork Cathedral
until May, quite possibly on the very day of the death of Copernicus, May 24.

The book is one of the great works in intellectual history. About 75 copies
of the original 1543 edition exist, and one of them is in Ann Arbor in the
Hatcher Library.

The book didn't cause immediate turmoil. Copernicus had dedicated it,
in a moving statement, to Pope Paul III. He told the Pope that he had had the
most serious misgivings about publishing it and had refrained from doing so
for more than thirty five years. He said that finally such men as the Cardinal
of Capua and the Bishop of Kulm had importuned him to publish and had overcome
his protests. After discussing philosophical reasons for publishing, he said
that the work might be helpful to the church in correcting the ecclesiastical
calendar. He concluded the statement of dedication with this sentence:
"And now, not to seem to promise your Holiness more than I can perform with
regard to the usefulness of the work, I pass to my appointed task." And
what a task! He was to remove mankind from a self-conceived central place
in the universe!

The attack on the book came rather slowly. The work was included in the
Index of Forbidden Books in 1616, 73 years after publication, and wasn't removed
until 1835.

What did Copernicus hypothesize? And how correct was he? He used mostly
ancient observational data and only a little of his own. His geometry was
complex and still involved some epicycles. But he had the all-important general
idea correct - that the sun is at the center of the Solar System, that the earth
rotates on its axis in 24 hours and revolves around the sun in a year, that
many celestial motions are apparent motions resulting from the real motions of the
earth. He had the correct explanation for the retrograde motion of the planets.

He didn't have it all straight. Four fundamental developments were
still needed:
1. Additional observational data on planetary positions had to be accumu-
lated. Tycho Brahe accumulated them.
2. More accurate descriptions of solar system orbits, based on observational
data were needed. Johannes Kepler provided them.
3. Motions of falling objects needed to be described more accurately. Galileo described them.

4. A force which accounted for the motions of falling objects needed to be described. Sir Isaac Newton described it.

I trust that all of us draw valuable lessons for our audiences from the lives of Brahe, Kepler, Galileo, and Newton. I think it important that while we help our students understand how these giants opened the route along which our discipline advanced, we also help them understand that these were real persons with personal problems as vexing as any which we face.

Brahe! Surely all of us have startled audiences by recounting for them how the ornery Brahe lost his nose to the sword of a fellow student in a drunken brawl about a mathematics problem. And, I presume that we've drawn valuable lessons from Brahe's penchant for accuracy of observation and his dedication to a life time of work, surely at times dull work, of recording numbers.

Kepler! How lucky mankind has been that Kepler, his young assistant, sat beside Brahe's death bed in Prague and became the legatee of Brahe's treasure-trove of numbers. What a bizarre genius Kepler was! He augmented his income by casting horoscopes. He had to spend much of a year defending his mother against charges of witchcraft. He promised to fulfill the greatest wish of his dying wife - that he marry one of her friends; the friend refused to marry him. He wrote Somnium, an early example of science fiction. He wrote an important mathematical paper after being puzzled by the volume of a barrel of wine bought at a harvest fair. He thought that the motions of the planets were related in some mystical way to musical scales. But, of course, working with the precious data from Brahe, he described the paths of planets more accurately than they had ever been described before. I presume that we've all mentioned the touching faith that Kepler had in Brahe - how Kepler, in his efforts to determine the orbit of Mars, tore up the results of months of calculating rather than to believe that Brahe had made errors of 5 minutes of arc in his observations. What enormous progress Kepler made along our route when he formulated his three laws of planetary motion! Meticulous observations had been analyzed carefully, and this had revealed that the wanderers move along elliptical rather than circular paths.

Galileo! Feisty Galileo. Some say that no longer can we draw useful lessons from his trial, but I believe that they are wrong. How fortunate mankind is that while a student of medicine at the University of Pisa he was intrigued by the periodicity of a lamp which he watched swinging in the cathedral during mass. This caused him to turn from medicine to the physical sciences and become a founder of mechanics, the study of forces and motions, the branch of physics which finally displaced Aristotelian notions.

He built a 32 power telescope, and in 1609-10 became the first person to make telescopic observations of the heavens. We observed that the surface of the moon is rugged, and he estimated the heights of some of the mountains from the lengths of their shadows. He discovered the Milky Way to be made of stars. By observing sunspots, he concluded that the sun rotates in about 27 days. He discovered four of Jupiter's satellites. And he discovered that Venus goes through a cycle of phases. He became convinced that Copernicus was correct in believing that the planets revolve around the sun, and he said so. He became popular as a lecturer telling of the wonders which he had seen with his spyglass. In 1610 he published a little book, Siderius Nuncius, "Messenger From the Stars," also telling of these wonders and how they supported the Copernican concept of a heliocentric system of planets. And he wrote it in Italian, rather than scholarly Latin, and it could be read by the man in the street. In 1616, church
officials directed Galileo to be silent concerning the Copernican hypothesis, and De Revolutionibus was added to the Index of Forbidden Books.

After sixteen more years he could no longer contain his views, and in 1632 he published his Dialogue Concerning Two Chief World Systems. The Detroit Public Library has a copy of the original edition.

Now he was in big trouble, and the Inquisition ordered him to come to Rome from Florence for a hearing. He was in poor health, and the Pope permitted him to delay his appearance for several months. However, the Inquisition brought great pressure to bear upon him, and, in a moving moment in the history of science, he recanted. As he was being led away to spend eight years in house arrest, he muttered, "But it does move!" Or so the story goes. Surely one lesson here involves the danger inherent in trying to make physical phenomena matter of religious doctrine.

Newton! Born in the year of Galileo's death, 1642, perhaps he was the greatest of these five giants. He entered Trinity College, Cambridge in 1661 as a student of mathematics. To escape the Black Plague, Newton went to the family farm, Woolsthorp Manor, in 1665. At the age of 24, and within a period of a few months, he developed the binomial theorem, differential calculus, the first two of his laws of motion, and important new concepts about light and optics; he also began to develop the formula for gravitational attraction. His creative work is one of the most awesome intellectual achievements in the history of mankind.

He returned to Cambridge, where he became a professor of mathematics and published important papers in optics. Prevailed upon by his friend Edmund Halley, he published Principia Mathematica in 1687. This is certainly one of the greatest of all scientific works. The book develops the theory of general gravitation, and demonstrates that the terrestrial laws governing Galileo's swinging lamp and the celestial laws governing Kepler's orbiting planets are all explained by the more encompassing law of universal gravitation.

Newton said that if he saw further than other men it was because he stood on the shoulders of giants. But there have been giants in the earth in our days, too, including Einstein, and we have witnessed spectacular development of the route along which our discipline has advanced. The most colorful benchmark along this portion of the route was established on October 4, 1957. The news early in that day centered around Little Rock, Arkansas, where the National Guard was facilitating the integration of Central High School, and around the progress of the world series between the Milwaukee Braves and the New York Yankees. But on that evening this nation was stunned by news that Sputnik I was in orbit!

During the weeks and months prior to October 4th, excitement mounted over the approaching launch of Vanguard carrying a grapefruit-size artificial satellite. The placing in orbit of the first artificial satellite was to be the United States' climactic contribution in the International Geophysical Year. When we were surprised by the Russians, the people of this country were not only stunned, they were embarrased and frightened. And they were angered by believing that we must have an educational system inferior to Russia's.

"The Views Science Education Tonight" - this headline was spread across the full width of Page One of The Ann Arbor News, my local paper, on November 13, 1957. What a rare sort of headline! Things were made even worse in mid-December when Vanguard failed to lift off the launch pad. It was re-christened Stallnik, Flopnik, Dudnik, Goofnik, Oopsnik, etc.
Only the stock market crash of 1929 and the bombing of Pearl Harbor, among events within my lifetime, shocked this nation as violently as did the blast which launched Sputnik. I said earlier that the careers of many of us who are here tonight have been influenced profoundly by the contributions of Armand Spitz. So too, in a myriad of obvious ways, have they been influenced profoundly by Sputnik. Suppose Project Vanguard had worked out as planned!

One of my vivid memories in connection with Sputnik is of a single sentence spoken to me by Armand Spitz. Several months before Sputnik, he and I and three or four of my students were seated in the planetarium chatting about Operation Moon Watch. Operation Moon Watch was to be a program for tracking the Vanguard satellite visually. Moon Watch teams were to be stationed on roof tops, and send Vanguard sighting reports to the Smithsonian Astrophysical Observatory. Armand Spitz was coordinating this ambitious program. He concluded the conversation by turning to me and saying softly, "I just hope that the first one we see is ours."

How far the routes have brought our discipline! Astronomers can determine an impressive amount about a star which appears only as a point of light in their telescopes. They can determine its distance, size, composition, mass, temperature, and motion. They can describe the mechanism by which it emits energy. They can tell even something about the age of the point of light, how it came into existence, and how it will eventually disappear. Isn't such progress awesome?

And yet, how far we still have to go, how much of the route is still to be opened! We still don't even know whether or not we are alone in the universe! Will we hear from living things on other celestial objects? Will we be able to travel to other planetary systems? Will the galaxies eventually cease their outward rushing; will gravitation cause them to fall inward into a collapsing universe? Is space infinite or finite? Will the entire universe eventually be dark and cold: does the second law of thermodynamics decree the ultimate fate of the universe? How did it begin? We believe that we know a considerable amount about our place in the universe, but what is our purpose in it?

I think that contemplation of unanswered questions about the cosmos may engender a feeling of humility akin to that which Job must have experienced when God thundered at him from out of the whirlwind:

Where were you when I laid
the foundations of the earth?
Tell me, if you have understanding...

Have you commanded the morning
since your days began,
and caused the dawn to know its place?...

Where is the way to the dwelling of light,
and where is the place of darkness?...

Can you bind the chains
of the Pleiades,
or loose the cords of Orion?...

Do you know the ordinances of the heavens?
I believe that however long we stand at planetarium consoles, and however far astronomers extend the route of progress, that will remain a humbling question -

"DO YOU KNOW THE ORDINANCES OF THE HEAVENS?"
A FILM REVIEW
by Robert Allen
University of Wisconsin at Lacrosse, Wisconsin

"Universe", 1976, 27 minutes, color

Purchase...$122.50 from National Audiovisual Center (GSA) Washington, DC.
Rental.....Free from NASA Regional Film Centers

"Universe is decidedly the best NASA film to date. It follows the pattern of the 1960's black and white classic of the same title which was produced by the National Film Board of Canada. A color version of "Universe" has been needed for some time, but this new film has more than that - it nicely updates the classic film from our solar system to the edges of known space.

Narrated by William Shatner, "Universe" holds the viewer's attention throughout its entirety. Both the sound track and photography of this film show the quality of work that can be achieved by NASA. Those who are familiar with NASA films know how the quality of work can be quite variable.

The information in "Universe" is dramatized and presented in an unforgettable way. It is comprehensible to nearly any age level, whether the subject being covered is pulsars, galaxies, quasars, or black holes. The only subjects not included which this reviewer would like to have seen covered are meteoroids and comets.

"Universe" can be used as a teaching aid for high school, college, or adult classes, but it will also be greeted enthusiastically by general audiences. I can highly recommend the film for showing the first day (or week) of class for introductory astronomy courses at the college level. It can serve as a summary and overview of either a one or two-semester course.

Below are some comments from my students: "thought-provoking...creative...factual...contemporary...excellent special effects...captivating photography...fantastic animation...great music...orderly sequence...simple terminology...aesthetically pleasing narration and musical score...best movie we saw in this course." The only negative comment received was that "the dramatics overwhelmed the information at times."

One of the key elements of the film is its treatment of the ultimate fate of life on Earth, our sun, and the universe itself. Perhaps future NASA films can deal with these topics in more detail. For now, this film should serve as a standard for future NASA and other astronomy films to try to match up to.
1. 1 decimate, 2. 1 millikan, 3. 1 hectowithit, 4. 1 decadent, 5. 1 nonnanette, 6. 2 kilomockingbirds, 7. 1 military, 8. 1 kilomonjara, 9. 1 terra ferma, 10. 1 microfiche, 11. 1 microphone, 12. 1 centipede, 13. 1 megaphone, 14. 1 picoboo, 15. 1 attaboy, 16. 1 centimental, 17. 1 dekacards, 18. 1 terabul, 19. 1 paregoric, 20. 1 gigolo.

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