IN THIS ISSUE

LETTERS ................................................................. 4
CONSECUTIVE CONJUNCTIONS OF JUPITER AND SATURN FROM 185 B.C. TO 114 A.D. ........................................... Garry T. Stasiuk 6
STARGAZING WITH PLANETARIUM AND TELESCOPE ........... Tim W. Kuzniar 9
PRELIMINARY STATISTICS TAKEN FROM AN ENQUIRY CONCERNING EUROPEAN PLANETARIUMS ..................... Véronique Mischler 11
IN MEMORIAM . . . MAXINE B. HAARSTICK, 1922–1985 ........ Rodney M. Nerdahl and Gary Tomlinson 15

FEATURES

President’s Message ...................................................... Alan Friedman 16
Gibbous Gazette .......................................................... John Wharton 17
Regional Roundup .......................................................... Kathleen Hedges 21
Computer Corner .......................................................... John Mosley 22
Focus on Education ...................................................... Mark S. Sonntag 24
Planetarium Usage for Secondary Students ....................... Gerald L. Mallon 26
What’s New .................................................................. James Brown 29
Jane’s Corner ................................................................. Jane G. Hastings 30

Volume 14, Number 3  Third Quarter, 1985
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Letters

Editor:

I have some concerns about Carl Wenning’s article, “A Star of Bethlehem Survey,” in the First Quarter, 1985 (Vol. 14, No. 1) issue of the Planetarian. In his first paragraph, Mr. Wenning soft-pedals the religious character of his “Glory of the Lord” explanation of the Christmas Star by referring to “what some consider to be its quasi-religious nature.” It’s not “quasi-religious” at all. It is religious. Later he refers to the “quasi-religious” nature of the Christmas Star planetarium show—as presented at his planetarium. There is an unstated notion here: “Quasi-religious” planetarium shows and explanations are an appropriate match. He justifies this view with his audience profile and poll—which favored the “Glory of the Lord” explanation—and his subjective judgment that Christmas Star show audiences are seeking a “quasi-religious” experience.

In summary, he seems to argue that audiences want a quasi-religious program and that the “quasi-religious” Glory of the Lord orientation is reasonable.

I find all of this to be overbearing, self-serving, and embarrassing. In the past, I found Mr. Wenning’s proposed explanation of the Christmas Star to be unconvincing and scientifically uninteresting because it is untestable. But I don’t quarrel with him for mentioning it. I do quarrel with his belief that a planetarium show is an appropriate forum for the evaluation of miracles. The planetarium is associated in most people’s minds with science and astronomy. That doesn’t mean that everything that takes place in the planetarium theater is scientific or astronomical, but when it isn’t, it should be obvious. Mr. Wenning blurs the distinction between what is science and what isn’t at the expense of the planetarium and scientific community.

I object to the publication of this article in a journal for professionals because it suggests that the author’s actions in the planetarium are, perhaps, dictated by his audience’s response. But look at the questions. Clearly, the show presumes that the “Glory of the Lord” is an appropriate and reasonable explanation of the Christmas Star. The audience’s favorable response is a testimony to Wenning’s presentation, but it has nothing to do with the issues ostensibly raised by the questions in his poll. I suspect many planetarium professionals could contrive a show that devastated the “Glory of the Lord” explanation and could secure an audience poll that disapproves inclusion of religious elements in a planetarium program and rejects the “Glory of the Lord.” The audience might even be induced to regard it as the worst solution ever heard for the Star of Bethlehem.

Whether the audience agrees with Carl Wenning’s “Glory of the Lord” notion and judges it fit for a planetarium review of the Christmas Star is not what should concern us. And that is why I feel publication of Wenning’s survey is inappropriate. Planetarium shows don’t prove things. They do interpret, and their interpretations may be responsible or irresponsible. Professional standards, scientific principles, and disciplined understanding of the methods and goals of logic and history, should guide the approach taken in any planetarium show. Carl Wenning’s report on his Star of Bethlehem survey does not convince me that he has been so guided.

E. C. Krupp, Ph.D.
Director
Griffith Observatory

Carl Wenning replies:

I’m very sorry that Dr. Krupp feels the way he does about the appearance of what he termed a “non-scientific” article. However, it should be pointed out that the Planetarian is not a science journal, but rather a medium for expressing opinions and sharing ideas.

I hesitate to school Dr. Krupp on the nature of scientific inquiry, yet the need for a few comments along these lines is indicated. An historical event cannot be said to be “testable.” It is only “verifiable.” The event is scientifically verifiable only in as much as it leaves physical evidence. In this sense aliens in their flying saucers, unicorns, and the Star of Bethlehem fall into the same category. They must be verified if they are to be taken as scientific fact. Conjunctions of planets, equinoctial passages, the Glory—none left any physical evidence and are therefore by definition “scientifically unverifiable.” Without the physical evidence required for a scientific explanation, we are reduced to determining whether any event was probable, likely, or even possible. On this basis the Glory explanation is as worthy a pursuit as any other object or event.

Dr. Krupp reads something into my article when he claims that I support the Glory thesis because my audience reacted favorably to its inclusion. It should be noted that I supported this thesis long before any survey was ever conducted. I support the Glory thesis because it satisfies some 17 verifying criteria established by way...
of textual, cultural, and historical considerations. I'm not interested in obtaining the best natural explanation of the "Star" as Dr. Krupp would appear to limit himself to. I am interested in obtaining the best overall explanation of the events surrounding the birth of one Jesus Christ.

To imply that "scientific" Star of Bethlehem planetarium programs have no religious overtones is the ultimate in effrontery. To argue that the ISU "Star of Bethlehem" presentation is "religious" solely because it contains information relating to the Glory suggests a total lack of understanding of the historical and cultural contexts surrounding the events of Christ's birth.

If Dr. Krupp wishes to be "scientific" in his criticism that the Glory is not suitable for inclusion in a Christmas program, I would invite him to establish from the Biblical text and other sources criteria that support a natural explanation and that simultaneously "devastates" the Glory thesis. If he can do so, I would happily relinquish my support of the Glory thesis. I would further enjoin him to carefully reread my article. In doing so he will see that I conducted the survey to determine how the public would react to its inclusion, and not whether it should be included based upon audience reaction.

**Carl J. Wenning**
*Illinois State University Planetarium Normal, Illinois*

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**Editor:**

Dr. Ernest L. Martin may be mistaken in what he says about 8 stades and Sheloshim concerning Herod's death in his December, 1982 article in the *Planetarian* (Vol. 11, No. 4).

Martin repeatedly claims that Herod's funeral procession went 8 stades "each day" toward Herodeion, Herod's burial site. He does not state, however, that "each day" is an inferred phrase that does not exist in the actual text of Josephus' *War* and *Antiquities* accounts of Herod's funeral. The Greek text of *Antiquities* XVII, 8, 3, says only, "They went 8 stades toward Herodeion" (note *Planetarian*, vol. 10, no. 3, p. 22).

Dr. Harold W. Hoehner, Professor of New Testament Literature and Exegesis at Dallas Theological Seminary and author of *Chronological Aspects of the Life of Christ*, says the author's analysis of the 8 stades issue is "entirely correct."

Dr. Paul L. Maier, Professor of History at Western Michigan University and author of *First Christmas, First Easter*, and *First Christians*, says, "The rate of 8 stades each day is an unfounded inference."

One of the foremost scholars on the works of Josephus is Dr. Louis H. Feldman, Professor of Classics at Yeshiva University in New York. Dr. Feldman offers the following:

"There is no mention of how long Herod's funeral took or how many stades were traveled each day. The phrase 'each day' does not, in fact, occur in the text. The note in the Loeb edition on AJ 17.199 is definitely an inference which has no basis in the Greek text.

"AJ's use of 'epi' with the genitive means in the direction toward: The meaning would be that 'they went 8 stades in the direction toward Herodeion.' This does not, however, necessarily mean at all that they went 8 stades each day or that they traveled in units of 8 stades, although I admit that the verb 'eisai' is in the imperfect tense and hence might well mean 'they kept on going' or 'they used to go.' Inasmuch as this verb 'to go' in Greek does not have an aorist tense, the imperfect does not necessarily imply repeated action. The meaning is, then, that they went 8 stades in the direction of Herodeion. What happened after that is not stated. It is perfectly possible that thereafter the task of conveying the body was given to a group who could travel faster.

"The statement in BJ (Josephus' *War*) clearly says that the body was conveyed 200 stades into Herodeion, but it does not tell us how. It is perfectly possible that after the initial 8 stades, it was conveyed the rest of the distance by another group without stating the number of days that this took.'

Harvard University's Loeb *Josephus*, vol. 8, p. 463, footnote a, contains a mistaken reference to 8 stades "each day." Zeph Stewart, executive trustee of The Loeb Classical Library published by Harvard University Press, wrote to the author on April 5, 1985, concerning this 8 stades account. He acknowledged that the Loeb footnote speaking of "eight stades each day" is a mistake. Stewart said.

"Thank you very much for pointing out this error (as it clearly is) . . . I imagine that the writer of the note was merely following Whiston's attempt to reconcile the two passages in question. It was a mistaken attempt, and I am sure that Professor Goold, present general editor of The Loeb Classical Library, will delete or correct the sentence in the next printing."

Whiston's attempt to reconcile the *War* and *Antiquities* funeral accounts by using his 8 stades "each day" inference will also be corrected by Baker Book House in future printings of its *Complete Works of Josephus.*

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Continued on page 23
CONSECUTIVE CONJUNCTIONS OF JUPITER AND SATURN FROM 185 BC TO 114 AD

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ABSTRACT

Researching possible explanations for a more accurate telling of the "Star of Bethlehem" has led to a rediscovery of the "method" used by Johannes Kepler to determine important dates in world history. (Kepler argued that great events in history occurred every 800 years using multiples of Jupiter/Saturn conjunctions.)

This "method" plots geocentrically the consecutive conjunctions of Jupiter and Saturn (Figure 1). Each conjunction occurs on the average every 19.85 years and they are approximately 1170 apart. The figures used in the diagram are from Bryant Tuckerman's, Planetary Lunar and Solar Positions, Volumes I & II, Memoirs of the American Philosophical Society, Philadelphia.

The diagram leads me to ask the following questions:
1) Did the "Magi" use or know about this "method"?
2) If they did, how would they interpret it?
3) Are "triple" conjunctions of Jupiter and Saturn really significant?
4) Do written records of this "method" exist in ancient literature or mythology?
5) How would you interpret seven consecutive conjunctions of Jupiter and Saturn, in Pisces, approaching the vernal equinox?

THE ROLE OF JUPITER/SATURN CONJUNCTIONS IN MYTHOLOGY

The heart of this thesis, originated by Giorgio de Santillana and Hertha von Dechend in their book, Hamlet's Mill (1977), and supported by Harald A. T. Reiche of the Massachusetts Institute of Technology, holds that "myths were vehicles for memorizing and transmitting certain kinds of astronomical and cosmological information." The mythological formula identified by the authors is really a mechanism to precisely explain the slowest of all observable motions of the heavens, the precession of the equinoxes.

According to de Santillana and von Dechend, "Number gave the key. Way back in time, before writing was even invented, it was measures and counting that provided the armature, the frame on which the rich texture of real myth was to grow."

The mythological framework is splendid indeed, for it is the celestial sphere. Within the celestial sphere, we find the "mythical earth:" not our physical earth, but instead "the implied plane through the four points of the year, marked by the equinoxes and solstices . . . in other words, the ecliptic." Von Dechend and de Santillana explain that the zodiacal constellations that rise

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TABLE 1

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<th>Year of Conjunction</th>
<th>Geocentric Longitude of Saturn</th>
<th>Geocentric Longitude of Jupiter</th>
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<td>319.50</td>
<td>318.78</td>
<td>19 JA 24</td>
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<td></td>
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<td>10 SE 15</td>
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<td>106.40</td>
<td>106.34</td>
<td>11 OC 16</td>
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<td>106.69</td>
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<tr>
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<td>105.41</td>
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<td></td>
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<td>101.61</td>
<td>101.41</td>
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<td>MY 3</td>
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<td>29 AP MY 4</td>
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<td>114.59</td>
<td>114.40</td>
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<td>345.33</td>
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<td>357.17</td>
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<td>7.23</td>
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</tr>
</tbody>
</table>

6
The mythological formula identified by the authors is really a mechanism to precisely explain the slowest of all observable motions of the heavens, the precession of the equinoxes.

heliacally are the points that locate the "mythical earth." However, the framework is not fixed but constantly changing due to precession of the equinoxes. That, they argue, is what prehistoric, preliterate man was trying to tell us or preserve knowledge of, by using his scientific language, mythology.

But the most important aspect of the Jupiter/Saturn mythological relationship is seen with the realization that Saturn and Jupiter can be used as a clock for keeping track of "cosmological" periods of time, particularly, precession of the equinoxes.

According to von Dechend and de Santillana, there is no doubt that the Greek Kronos (Saturn) is the same as Chronos (Father Time). In dialogue between Kronos (Chronos) and Jupiter (Zeus), we learn "kai panta ta metates hules demiourgas endidosin," which translates as "Saturn gives Jupiter all the measures of creation." With this act of Jupiter overthrowing his father, the sun, moon and planets are set in motion. During each successive conjunction, Saturn gives Jupiter "all the measures of creation." Furthermore, successive Jupiter/Saturn conjunctions can be used to keep track of even longer periods of time.

Successive conjunctions of Jupiter and Saturn are one of the easiest-to-observe long-period astronomical cycles. That this cycle repeats in almost twenty year intervals (more precisely, 19.85 years on the average) is less important than the fact that it is a recurring, measurable period of time.

The last of the great "mythographers" was Johannes Kepler. In De Stella Nova, Kepler applied observational data (i.e., successive conjunctions of Jupiter and Saturn)
to reconstruct the history of the world. His chosen method was borrowed from the “lingua franca” of astrology. This method has nothing to do with astrology per se, but Kepler found in it a simple, “bookkeeping” style for tabulating large quantities of time.

Figure #1 illustrates successive plots of Jupiter/Saturn conjunctions. To understand the diagram, the following relationships are of value: 1) Any conjunction of Jupiter and Saturn is called a “great conjunction.” 2) Three successive “great conjunctions” form a triangle called a trigon. The diagram shows that in every 60-year period (59.55 years to be exact), a great conjunction occurs near or slightly displaced from the point of origin. While successive great conjunctions are about 117 degrees apart, the vertices of successive trignos move approximately 360 - ° (117° x 3) = 9° farther eastward in this same period. We can see that it takes 40 great conjunctions to return to our initial starting point (9 degrees times 40 = 360 degrees).

The elapsed time counted by proceeding from conjunction to conjunction and back to the origin is thus 40 times 20 years = 800 years, or more precisely, 794.25 years. This represents one-third of a “rotation” of the initial trigon. Similarly, the elapsed time counted by proceeding from trigon to trigon, continuing around the zodiacal circle and back to the original starting point is 40 x 60 years = 2,400 years. A more accurate value for the actual elapsed time is 2,382 years.

What we see here is a very neat method for keeping track of cosmological periods of time. The amount of elapsed time observed by the ancients would be incredibly close to the amount of time necessary for the vernal equinox to actually move through one zodiacal constellation (25,800 years divided by 12 equals 2,150 years). Now let us return to Kepler and his method for determining great moments in history, using the “lingua franca” of astrology.

Astrology had grouped the 12 zodiacal constellations into four collections called “triplicities.” These triplicities, and their associated “elements” are:

- Aries, Leo, and Sagittarius...............Fire
- Taurus, Virgo and Capricornus..........Earth
- Gemini, Libra and Aquarius...........Air
- Cancer, Scorpio and Pisces...........Water

Successive great conjunctions of Jupiter and Saturn will remain in one triplicity about 200 years (10 successive conjunctions). In other words, it will take 800 years or 40 successive great conjunctions to pass through the four triplicities once. However, in order for all the great conjunctions to return, the cycle must be repeated two more times, for a total of 2400 years.

According to Kepler, great worldly events thus took place in this manner every 800 years when great conjunctions entered a Fiery Triplicity.

Using this bookkeeping method, it is possible to predict when and where succeeding great conjunctions will occur. In following this line of reasoning, it becomes imperative to see the great conjunctions as they occurred during the centuries preceding the Christian Era. (Refer back to Figure 1.) The diagram contains plots of successive great conjunctions from 185 B.C. to 114 A.D.

Assuming that the constellation of Pisces covers some 45 degrees of sky, seven great conjunctions took place in Pisces (including the triple conjunctions of 7 B.C.) in this time. Each succeeding conjunction occurred closer and closer to the vernal equinox.

This fact, combined with a knowledge that the vernal equinox itself was moving from Aries into Pisces during this era (symbolically marking the end of a “World-Age”), may thus be the key to understanding the nature of the Star of Bethlehem. It is certainly the theory favored by von Dechend and de Santillana.

The three great conjunctions of 7 B.C. are unusual in that “triples” are rare and do not happen in a pattern. There was also a “triple” conjunction in 146 B.C., so it was known that triples do occur. I suspect, as do the authors of *Hamlet’s Mill*, that there are many mythological stories connected with conjunctions of Saturn and Jupiter, because of their association with “measures of creation and of time.” We will likely never know them all.

**REFERENCE**


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![Diagram](image-url)
The main topic of the show was the world of amateur astronomy, but on the wrong scale. Then, the idea came to us! We would organize a workshop on amateur astronomy; a series of presentations, open to the public, that would concentrate on the practical knowledge necessary to become a stargazer.

In answering the ringing phone, I fully expected to be taking yet another reservation for a popular light show that we were currently running. Instead, I found myself talking to another helpless person who was interested in entering the world of amateur astronomy, but had not the faintest notion of how to go about it.

The questions were familiar: “What kind of telescope should I buy?”, “How much money should I spend on it?”, “Just what is there to look at in the sky?”, “Where can I find information on all of this?” and so on. Later, as I was relating the contents of this 30-minute conversation to a few friends and colleagues, we entered into a discussion of the plight of those who are ignorant of the joys (and tribulations) of amateur astronomy.

I pointed out that our upcoming fall program in the planetarium, entitled “STARGAZER,” might serve to help. The main topic of the show was the world of amateur astronomy: what types of equipment were necessary (and unnecessary), what types of objects were within the scope of amateur observing programs, and what contributions could be made to astronomy through the efforts of amateurs. The program finished up with a brief survey of the current state of astronomy and science education as well as certain social and political issues we felt were of importance.

The benefits from such an undertaking would be four-fold. First, we would be providing many more people with the kind of accurate and reliable information they would need to enter the world of amateur astronomy. Second, it would provide a source for possible future members in a local astronomy club that our planetarium is affiliated with.

Third, it would fit in nicely with our “STARGAZER” program: not only were both programs on the same subject, thereby reinforcing each other, but we could use the planetarium show to advertise our workshop and we could use the workshop to advertise our planetarium show. And fourth, it would provide us with the opportunity to do some serious education; to make even a small portion of the general public aware of the current state of astronomy and science education as well as certain social and political issues we felt were of importance.

Our first concern was equipment, but this turned out to be no concern at all. A quick check among those of us who were amateur astronomers revealed a startling supply of nearly a dozen telescopes of all sizes that would be available for use. Early estimates of the workshop’s attendance were on the order of 20 to 30 people, thereby giving us a 1:4 telescope/person ratio; great for an intimate, one-on-one type of instructional environment.

In the area of staff, there was also no problem. There would be four of us running the workshop, and with the help of several other volunteers, we would have three people on four telescopes. This was good for the sake of efficiency as well as security. (Telescope lifetime is limited when there are curious little children running about!)

The only other problem was a good viewing location. Our planetarium was ruled out, as it sits in the middle of a city, with all its attendant problems of industrial and light pollution. Fortunately, in the nearby suburb of Boardman, Ohio, sits the Boardman Park, with a fairly dark sky and good exposure to the east and south.

On contacting the Park Director and his staff, we found them more than willing to host our workshop and to provide us with an indoor facility. The latter was necessary as a lecture hall for a few brief slide presentations and for displays of equipment/literature. Also, being well acquainted with northeastern Ohio weather, we knew it was imperative to have a place of retreat.

With all in readiness, we set the schedule for the workshop: 2 hours, from 8:00 P.M. to 10:00 P.M., on each of the four Wednesdays in November. Sessions would include a brief introduction and informal talk with questions and answers, lasting about 45 minutes. This would be followed by an outdoor observing session that would be extended as long as participants wished to stay.
We had no idea what to expect in terms of attendance, but we deemed it wise to maintain a reservation list with names and phone numbers. This job was to be supervised by the park secretary. Informational brochures were prepared; the public relations announcements were sent out; equipment, literature and slides were gathered and assembled; and we held our breath in the fear that the whole thing might flop.

Three days after our PR hit the newspapers, the park secretary was on the phone explaining that our original estimate of 30 participants had been covered, and that her phone was still ringing persistently. We were amazed, but felt the explanation lay in the encouragement of family attendance; several families with several children each could easily fill up 30 slots. No problem; we upped the cutoff to 50.

Two days later, the secretary informed us of another full list; and not families, but rather many singles and couples. Astronomy, it seemed, was more popular than we thought! As our personal and professional schedules did not allow the addition of a second workshop, we decided to go all out. We put our new cutoff at 100, and drafted more telescopes and more volunteers. In another two and a half days, our list was full again! The park had to move us to a new facility, the only one they had which could accommodate 100 people—an old church that was listed on the National Register of Historic Sites!

Workshop Session One came, and we dove in head first, ready for anything; except 30 to 40 additional participants who showed up at the door wondering if they could still register! If they were this interested, how could we turn them away? (Besides, we knew there would be some attrition as the weeks went on.) So our first session was standing room only.

Later sessions were less well-attended, as we'd guessed, but our average was still around 55 people—men, women and children of all ages. The workshops went extremely well, but as Nature was not too cooperative in providing clear skies for observing, we spent more time indoors with some back-up presentations than we would have liked. But for future amateur astronomers, this in itself was a valuable lesson: never count on the weather!

Yet, we had a good group of people to work with. Our discussions ranged from how not to get hoodwinked when buying a telescope, and why Instamatic cameras are not good for pictures of the Andromeda Galaxy, to the basics of what kind of star charts and atlases are most useful, and why it is not good to clean your 8-inch refractor's mirror with Windex, as well as more esoteric topics. All of our presentations were well received, and more than a few participants surprised us with their level of intellectual understanding and technical skills.

But if there was one thing we learned from doing this workshop, it is the amazing number of people out there who are interested in all of these things, and who thought that they were the only ones in the area who were interested. They thought they were alone in these pursuits, because no one had made them aware of the fact that there were other people who shared their interests.

This suggested to us that perhaps we were not doing all that we could as far as public education was concerned. Well, at least our workshop was the first step in remedying that situation. From now on, we are going to take every opportunity to offer more services and programs that will bring together those people out there whose minds often contemplate things celestial.

"If there was one thing we learned... it is the amazing number of people who are interested in all of these things, and who thought they were the only ones in the area who were interested."
PRELIMINARY STATISTICS
TAKEN FROM AN
ENQUIRY CONCERNING
EUROPEAN
PLANETARIUMS

Véronique Mischler
Planetarium de Strasbourg
Université Louis Pasteur
France

Editor's Note: Special thanks are due to Jane Hartley, Planetarium de Strasbourg, for translating the following article.

Thirty-seven planetariums replied to our survey; some results are shown here in graphic form. These results were presented to the participants of the first Colloquy of European Planetariums, which was held in Strasbourg at the Council of Europe, May 1984.

### TABLE 1. Number of Planetariums Sampled, by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Planetariums</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>7 + 2 (projects)</td>
</tr>
<tr>
<td>Germany</td>
<td>10 + 1 (under construction)</td>
</tr>
<tr>
<td>Austria</td>
<td>2</td>
</tr>
<tr>
<td>England</td>
<td>3 + 1 (amateur)</td>
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<td>Belgium</td>
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<tr>
<td>Spain</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>1</td>
</tr>
<tr>
<td>Greece</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
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<tr>
<td>Portugal</td>
<td>1</td>
</tr>
<tr>
<td>Roumania</td>
<td>1</td>
</tr>
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<td>Sweden</td>
<td>1</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>1</td>
</tr>
</tbody>
</table>

$\text{N}$ is roughly proportional to the seating area (and to the square of the diameter).

Seating Area $= \pi \cdot \left( \frac{\varnothing}{2} \right)^2$

$= \frac{\pi \cdot \varnothing^2}{4}$

So $N \propto \frac{\pi \cdot \varnothing^2}{4}$

or $N = K \cdot \frac{\pi \cdot \varnothing^2}{4}$

where $K$ varies from about 0.7 (at $\geq 15$-meter size) to about 1.4 (at 5-meter size), from the graph.

The average space available per person correspondingly varies a lot.

Average space per person $= \frac{\text{seating area}}{N}$

or $= \frac{\pi \cdot \varnothing^2}{4N}$

This ranges from about 0.6 $m^2$ at the 5-meter size to about 1.2 $m^2$ at the $\geq 15$-meter size.

More space is given per person in the large planetariums.

**FIGURE 1. Number of Seats ($N$) vs. Dome Diameter ($\varnothing$ in meters).**
While it is quite impossible to trace a curve from these points, some tendencies may be noted:

- the annual number of visitors appears relatively stable for small planetariums;
- in planetariums of 8m diameter and over, enormous differences appear, with Roumania, Paris, Stuttgart and London beating all records.

However, these figures do not always reflect the real activity of the planetarium itself, but may be the result of its cultural or scientific environment (in London, for instance, the Madame Tussaud’s Museum; in Paris, the Palais de la Découverte, . . .).

We did not receive enough specific replies to construct a complete graph.

However, it does appear that the number of personnel on the staff is not a function of the size of the planetarium, but depends more on its organization (fully automated or not, whether there are other activities or not, . . .).

In the smaller planetariums, there is a greater number of volunteer workers.
<table>
<thead>
<tr>
<th>Planetarium</th>
<th>Instrument/ Dimension</th>
<th>Number of Places</th>
<th>Number of Sessions Per Week</th>
<th>Number of Visitors/Year</th>
<th>Personnel Full/Part Time</th>
<th>Other Activities</th>
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<td></td>
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<tr>
<td>Belfort</td>
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<td>30</td>
<td>/</td>
<td>1800 800 2600 241000</td>
<td>7 volunteers / /</td>
<td>Projects</td>
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<tr>
<td>Maison des Sciences</td>
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<td>24</td>
<td>/</td>
<td>9500 7000 16500</td>
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<td></td>
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<td>Cholet</td>
<td>ZKPA Zeiss 6m.</td>
<td>46</td>
<td>14</td>
<td>5000 2000 7000</td>
<td>1 / Concert</td>
<td></td>
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<tr>
<td>Nantes</td>
<td>ZKP2 Zeiss 6m.</td>
<td>65</td>
<td>5 on demand</td>
<td>3000 1500 4500</td>
<td>2 /</td>
<td></td>
</tr>
<tr>
<td>Obs. du Pic des Fées</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hyères</td>
<td>4.2m.</td>
<td>30</td>
<td>/</td>
<td>/</td>
<td>1 / Projects</td>
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<tr>
<td>Palais de la Découverte</td>
<td>Zeiss Jena 15m.</td>
<td>201</td>
<td>29</td>
<td>58500 182500 241000</td>
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<tr>
<td>Paris</td>
<td>Ceiss ZKP2 6m.</td>
<td>35</td>
<td>14 on average</td>
<td>9350 3650 13000</td>
<td>3 1 /</td>
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<tr>
<td>Reims</td>
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<td>65</td>
<td>15 on average</td>
<td>23700 11800 35000</td>
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<tr>
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<td></td>
<td></td>
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<td>6</td>
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<td></td>
<td></td>
<td></td>
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<td>Berlin DDR</td>
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<td>90</td>
<td>/</td>
<td>40000 30000 70000</td>
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<td>140288 64 1200</td>
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<td>Erkrath</td>
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<td>11</td>
<td>7600 9000 16600</td>
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<td>23</td>
<td>90000 60000 150000</td>
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<td>Kassel</td>
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<td>34</td>
<td>/</td>
<td>/</td>
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<td>Kiel</td>
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<td>5000 1000 6000</td>
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<td>München Volksternwarte</td>
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<td>München Deutsch. Mus.</td>
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<td>158</td>
<td>28</td>
<td>200000 2 /</td>
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<td>Recklinghausen</td>
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<td>8</td>
<td>4000 6000 10000</td>
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<td>53534 48584 102118</td>
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<td>150</td>
<td>/</td>
<td>400000</td>
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13
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<th>Planetarium</th>
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<td>Dundee</td>
<td>Spitz type hand-made</td>
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<td>45</td>
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<td>/</td>
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<td>Bruxelles</td>
<td>Zeiss 23m.</td>
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<td>10</td>
<td>60000</td>
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<td>Concerts, lectures</td>
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<td>SPAIN</td>
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<td>3 2</td>
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<td>FINLAND</td>
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<td>Tampere</td>
<td>Minolta MS-15 13m.</td>
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<td>39</td>
<td>200000 50000 70000</td>
<td>3 3</td>
<td>Lectures</td>
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<td>Athens</td>
<td>Zeiss IV 50 ft. 15m.</td>
<td>250</td>
<td>26</td>
<td>87000 18000 105000</td>
<td>23 4</td>
<td>/</td>
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<td>Milano</td>
<td>Zeiss IV 19.80m.</td>
<td>320</td>
<td>22</td>
<td>1200000 80000 280000</td>
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<td>NETHERLANDS</td>
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<td>Hoeven</td>
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<td>Grudziald</td>
<td>ZKP1 Zeiss 6m.</td>
<td>40</td>
<td>6</td>
<td>7280 1600 8880</td>
<td>2 /</td>
<td>Concerts, theater</td>
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<td>Lisboa</td>
<td>Zeiss Jena 23m.</td>
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<td>51</td>
<td>580000 52000 110000</td>
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<td>Lectures, radio observations</td>
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<td>120000</td>
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<td>Lund</td>
<td>Goto GE6 6m.</td>
<td>22</td>
<td>650 per year</td>
<td>9000 4000 13000</td>
<td>/ 1</td>
<td>/</td>
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<tr>
<td>CZECHOSLOVAKIA</td>
<td></td>
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<tr>
<td>Brno</td>
<td>ZKP1 8.4m.</td>
<td>70</td>
<td>51</td>
<td>51497 10120 61617</td>
<td>9 12</td>
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IN MEMORIAM . . .
MAXINE B. HAARSTICK
1922–1985

Rodney M. Nerdahl  
Minneapolis Planetarium  and  Chaffee Planetarium

Gary Tomlinson  
Minneapolis, Minnesota  Grand Rapids, Michigan

The earthly life of Maxine B. Haarstick, Friends’ Board member and Planetarium Committee chair, came to an end on February 6 after a lengthy bout with cancer. Maxine’s genuine concern for people, work experience, and willingness to get involved in a wide variety of activities and projects made her a much-sought-after individual. And her humor and vitality made her a joy to know.

Maxine was born Maxine Lucille Begin in Medicine Lake, Minnesota on March 13, 1922. Her lifelong interest in natural history began in her formative years on her parents farms in Medicine Lake and Robbinsdale. She graduated from Robbinsdale High School in 1940 and attended the University of Minnesota during the War Years. After earning a Bachelor’s Degree in Natural Science, she taught science classes at high schools in Motley and Alexandria, Minnesota. Between 1947 and 1951, Maxine returned to the University of Minnesota to work toward a Master’s Degree, during which time she was employed as a laboratory assistant in the Botany Department.

On June 25, 1951 she began the work for which she became best known—as an educator in the Minneapolis Public Library’s Science Museum. There she helped establish the Twin Cities’ first planetarium, which was also one of the first in the United States. Her program for school groups became the envy of many other facilities in the country.

In 1955, Maxine married Wallace W. Haarstick, proprietor of a well-known Minneapolis boutique, “Wallace of Minneapolis”. Together this ‘dynamic duo’ became a familiar sight in and around the Metro area. At about the same time, the Library began to make plans for a new building; Maxine was involved in planning for a new museum and planetarium. In 1959 she was named Museum Director, a post she continued to hold for twenty years.

Following her retirement from the Library, Maxine moved to a part-time position with the Science Museum of Minnesota as the Special Assistant to the President for Education. Most recently, she was instrumental in the effort to “Save the Planetarium” when circumstances threatened to close it, and she was very actively involved in helping with the operation of the Planetarium under the Friends.

Maxine was involved in an almost unbelievable number of community and professional organizations including the American Association of Museums and its midwestern affiliate, the Midwest Museums Conference; the International Planetarium Society and its regional arm, the Great Lakes Planetarium Association; the Minnesota Academy of Science; Audubon Society; Tour Managers Association of the Twin Cities; Women’s Club; and Stroke Club to mention only a few. She often held executive positions within these organizations, and was highly respected by all who knew her. It must also be added that Maxine was very involved in the lives of family members. Together, she and Wallace battled a stroke which disabled him in 1971. She is survived by Wallace, her sister Audrey B. Cebula, and many nieces and nephews.

It is very difficult to summarize in so few words, the life of one as “alive” as Maxine. She was truly a “grand lady” and she will be very deeply missed by all who knew her . . .

Rodney M. Nerdahl

THE LAST TIME I SAW MAXINE

I never really knew Maxine well. I had heard about her for years before I actually met her. I was greatly impressed by these stories that I heard about this loving, dedicated, energetic person. When I finally did meet her, I fell in love. When Maxine hosted the 1979 Great Lakes Planetarium Association (GLPA) convention and I had trouble securing lodging, I stayed with Maxine and her husband, Wally (at no charge yet!). It was at their apartment that I was honored to meet Grace Spitz. Imagine! Two great ladies in one room.

I cannot say enough good things about Maxine. Everybody who met her also felt a special warmth about this caring, vibrant and concerned individual. Case in point: The last time I saw Maxine, I was in Minneapolis for the National Science Teachers Association (NSTA) convention, which was held one week prior to the GLPA
Meeting Time—those of us fortunate enough to have attended the 1985 IPS Council meeting this summer in Ireland are still exchanging notes which end: "Wasn't that a great meeting!" Terence Murtagh and his staff fashioned a magnificent series of events, from a visit to an ancient archeoastronomy site to previewing the latest computer-graphic video planetarium show. A highlight of highlights had to be lunch at Birr Castle, hosted by the Earl of Rosse, and followed by a tour of the "Leviathan of Parsonstown," the largest telescope in the world for most of 19th century. Lord Rosse's pleasure at showing his family treasure to a group of planetarium staff from around the world is a wondrous memory for me.

We also talked about IPS business in two marathon sessions. There was lots of business, but one major category was—more meetings. Summer of 1986 will see the full IPS membership at Tucson, Arizona, for a look at a beautiful planetarium and one of the great astronomical complexes of all time. Summer of 1988 will be Richmond, Virginia. The "Universe Planetarium" will be exciting enough, but the central east coast location may well make 1988 one of the biggest IPS meetings yet. (By the way, both institutions have had major staff changes recently, but I have been reassured that plans for the two IPS meetings are continuing without a hitch.)

All these meetings. Does IPS exist so that planetarians can visit neat places? Well, yes; visiting astronomical sites and seeing innovative planetariums goes a long way towards renewing our inspiration as we prepare for the 256th performance of "The Comet Comes Calling." But a larger reason for meetings is to spend time with other planetarium people, the hosts and the participants at the meetings. We learn who has solved this problem, who has some bit of information we need, who we might call upon for help on this topic.

For a few days we are part of a large, even international community of people with similar challenges. We need this community for the days which follow when we will return to being isolated as members of a numerically tiny, widely dispersed profession. Even in the United States, where the largest number of planetarians live, we average fewer than 20 in an entire state. Many countries have only one planetarium professional. But for a few days, at meeting time, we are a real community.

The cost of travel is high and the inconvenience can be awful (a suitcase with all my IPS correspondence and notes has never made it back from Ireland — members, please contact me if I haven't responded to recent correspondence from you.) But I'm saving up for Tucson now, and have the next regional meeting firmly on the calendar. We need our community, and the next meeting is when it will come back into existence. ☐

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CONVENTION. I telephoned her apartment, where I spoke to Wally. He said that Maxine was pretty sick and in a lot of pain—that she was at the drug store getting some pain medicine. But Wally insisted that I call back and talk to Maxine. I had planned to drop over and visit, but now that she was feeling so bad, I decided not to bother her. I called back just to say hello, but when she found out I was in town, she invited me over. I lied! I stated that I had several meetings to go to. She asked me what hotel I was at. I told her. She said: "I'll be right over." That was the type of person she was. I told her I would come right over.

I had a nice visit with both Maxine and Wally. I could tell that she was in a lot of pain, by the expression on her face when she thought I wasn't looking. Otherwise she always had a smile. We laughed, joked and talked for several minutes. As I was leaving, she said: "I start chemotherapy this Monday so I don't think I'll be able to make the GLPA convention, but I'm going to fight this thing all the way."

As I was walking out the door, she said: "Wait! We'll walk you down to your car." (I talked her out of that idea.) Some gall! Some woman! Fight it she did, but unfortunately, she lost, as did the entire museum and planetarium profession. I will miss her.

Gary Tomlinson

People wishing to make memorial contributions for Maxine, may send their donations to:

American Cancer Society
3316 West 66th Street
Edina, MN 55435

Courage Center
3915 Golden Valley Road
Golden Valley, MN 55422

Friends of the Minneapolis Public Library and Planetarium
300 Nicollet Mall
Minneapolis, MN 55401-1992
Though I'm sure no one noticed the absence of this column in the last *Planetary*, I'm happy to report that I'm back, and in more ways than one. On July 20, the $3 million renovation of what had been the McDonnell Planetarium was completed, and with the opening of the first phase of the St. Louis Science Center, the McDonnell Star Theater rose from the ashes.

After a year and a half of running a closed planetarium (the Star Theater staff says I'm good at it—I don't know whether I should feel complimented or insulted), it's nice to be back in the star business again. With the euphoria of our opening came a great many feelings: Of how indebted I was to a talented group of staff and production support people, who were caught in the grip of a dream, and pushed to the limit to see it to reality. Of how indebted I was to my wife, who seemed to understand when I said I wouldn't be home 'til 2 am. And, of how indebted I was to many of you, who—in stopping by or calling up—extended support, encouragement and a kind word.

It's not surprising that this period has also generated a lot of reflection: Of how far technology has come in this field in the span of a decade, and the kind of challenge that technology represents. Of the responsibility each of us has in fulfilling the main purpose of the planetarium.

The next several months present all of us with a unique opportunity to popularize our peculiar medium. While others will grow rich as they capitalize on public interest, we have the chance to be responsible, be innovative, and be sought after. And, while it's true that many of our facilities will see and unusual influx of visitors, they shouldn't be viewed just as figures on a ledger. That's the easy part, to capitalize on an event. The hard part is giving them something in return—a new-found interest in the stars. Accomplish that, and they'll be back.

Good luck to all of you in the coming months.

**STILL MORE COMET HALLEY STUFF**

(Besieged by hordes of mailings advertising T-shirts, bumper sticker and el-cheapo telescopes, I have resolved not to inflict the same on you—besides, you're probably getting the same mail. So, what follows are some more valuable Comet Halley-related resources.)

Promising to "turn your television into a computerized planetarium," a company called Urania Systems is offering a 30-minute *Comet Halley Videotape*, a 'computer animated graphic almanac.' Spanning the period from November 1, 1985 to May 31, 1986, the simulation covers the Comet's path with "celestial coordinates, brightness, and distances and velocities to/from the earth and sun shown simultaneously at the bottom of the screen." The cost of the videotape is $19.95, and includes a Guidebook. Contact: Urania Systems/ Box 4890/ Richmond, Virginia 23220-8890/ USA; telephone: 804-358-4715.

Two new Comet Halley books of interest are now available. *Halley's Comet, 1755-1984: A Bibliography "focuses on literature reflecting the cultural, historical and sociological response to the comet, as well as the scientific aspects." The hardbound is available at $35.00 (prepaid) from: Greenwood Press/ 88 Post Road West/ PO. Box 5007/ Westport, Connecticut 06881/ USA.

And finally, the Pacific Science Center has published *The Return Of The Comet: An Activity Book For Skywatchers From 9-14, With Adult Teaching Guide*, by Dennis Schatz. The title pretty well says it all for this attractive, informative—and fun—softbound, which retails at $7.95, with wholesale discounts available. For more information, write Dennis (now associate director) at: Pacific Science Center/ 200 Second Avenue North/ Seattle, Washington 98109/ USA; telephone: 206-443-2001.

**CAPTAIN SCIENCE GET A FACELIFT**

The renovation bug has bitten in Rochester, New York, as the Strasenburgh Planetarium received a major facelift late this past spring. Gone are the swiveling, reclining, individually-speakered seats, as the chamber now sports conventional high-backed theater seats, and in a concentric array at that. An elevated stage has been placed at the "front" of the chamber as well. In the "rear," a portion of the dome has been cut away at the spring line to create a bay for concentrating SPFX projectors. According to Strasenburgh's director, Don Hall, such a change had been contemplated for some time, but the impetus came with a grant from Rochester-based Gannett Foundation to fund a six-month run of the Cinema 360 "Space Shuttle—An American Adventure" film (for which Gannett was the major underwriter).

**UNCLE SAM'S GETTING ONE TOO**

Currently undergoing renovation is the U.S. Air Force Academy Planetarium in Colorado Springs. The remodeling work includes the removal of asbestos insulation, replacement of theater seats and installation of a Richard A. Gray RMC10A automation system as well as a host of other equipment. According to RMPA's *High Altitude Observer*, the facility will reopen next summer.
FISKE UPDATE—LAST GASP FOR LASP?

In the Fourth Quarter, '84 installment of this column, Bob Stoller, technical director of the University of Colorado’s Fiske Planetarium, wrote to correct the impression that Fiske had been closed down (see “Gibbous Gazette” in the Third Quarter, '84 Planetarian). Bob had then announced that management of the Fiske facility had been transferred to the University’s Laboratory for Atmospheric and Space Physics (LASP). In addition to intending to upgrade the public and University use of the Planetarium, LASP planned to install within the facility’s lobby a bona fide satellite operations center, to be operated in full view of the public. A neat idea but, unfortunately, there’s bad news from Boulder: LASP found its satellite operations center just wouldn’t fit. According to colleagues in the area, Fiske currently is getting limited classroom use; for the public, a typical month will see one (free) lecture, one night-sky presentation and one showing of a main-feature type production.

OFFICIALLY WELCOME ANOTHER PLANETARIUM TO THE FOLD

After first opening as an OMNIMAX theater, the Sijthoff Planetarium now is truly a planetarium, with the recent installation of the fourth operational Digistar projector. The 23-meter facility is at the Museum of Education in The Hague, Netherlands.

SOME REAL CREAMPUFFS

Goto Optical Mfg. Company of Japan is announcing the availability of “several used and completely factory-refurbished” GM model star projectors. The instruments, designed for use in 15-meter domes, come with control consoles and, according to Goto representative Jim Nakashita, “will carry full factory warranties like the new instruments.” For more information, contact Jim at 1717 Solano Way #11/ Concord, California 94520/ USA; telephone: 415-687-6664. (In a similar and somewhat personal vein, I’d like to—again—announce the availability of a Goto L-I instrument, the former resident of McDonnell Planetarium. Designed for use in a 18.3-meter dome, the L-I has not been factory refurbished but, when dismantled and crated up to make way for our Digistar, was in working order. I’d like to part with the L-I for $17,000 (console included), but I’ll listen to any offer. The fiscal year’s running out folks, and it’s either this or the scrap heap!)

DUST OFF THAT UNPUBLISHED ARTICLE!

The University of Texas’ McDonald Observatory News is sponsoring an “Astronomy Essay Contest,” for the purpose of promoting public interest in astronomy and the related sciences. According to the sponsors, the open competition is designed “to stimulate the flow of information between scientists, astronomers, science writers and the public. Awards (1st Prize is $750) will be given for essays which best communicate to the average reader material of current or historical interest on astronomy and closely related fields. Winning articles will be published in the McDonald Observatory News.” The deadline for submissions is October 31, 1985. For submission guidelines and more information, contact: Leslie Kjellstrand, Editor—McDonald Observatory News/ c/o McDonald Observatory/ RLM 15.308/ University of Texas at Austin/ Austin, Texas 78712/ USA/ telephone: 512-471-5285.

“EDUCATIONAL AND INSPIRATIONAL . . .”

. . . Is how “Space Walk,” a new commercially-produced videotape is described in promotional material. The tape is a 50-minute chronicle of US manned space efforts, which can be run “as a full-length feature (or) is well suited for interrupted viewing (or) use in conjunction with a lesson plan.” The tape is available in VHS or BETA format for $39.95, plus $3.00 for shipping. For more information, write: Space Walk/ P.O. Box 82/ Haddam, Connecticut 06438/ USA.

THE ULTIMATE IN ACCESSIONING POLICIES

Since early 1978, a boilerplate Apollo capsule—# 202, flown in August of 1966—has resided on the exhibit floor of the Omniplex Science Museum in Oklahoma City, on loan from the Smithsonian. Now, it appears that Apollo 202 may have become a permanent loan. Subsequent to 202’s arrival at Omniplex, an addition was constructed by the Museum’s landlord, Kirkpatrick Center. The new wing, which doubled the size of the complex, was built off of the facility’s old loading dock. Recently, it was discovered that the building’s new loading dock isn’t wide enough to allow Apollo 202 to be removed. This discovery was made after the Smithsonian notified Omniplex that it wanted the capsule back.

IF YOU KNOW OF SOMETHING, GIVE THEM A CALL

Several very talented people are looking for other domes, courtesy of recent cost-cutting decisions by two U.S. universities.

At Eastern Kentucky University in Richmond, a new president wielded the budget axe on the yet-open Hummel Planetarium; as a result, only director Jack Fletcher remains on staff at the major-sized facility. Gone are technical director Fred Carr (who has since joined General Motors), astronomer David Duszynski and artist James Hervat. With regard to the pending litigation between the University and Spitz Space Systems over the facility’s STS installation, a court date is reported to be imminent.
In Manhattan, Kansas, Ted Stalec is out of a job, as Kansas State University suddenly decided this summer to close the department of physics’ planetarium.

In the U.S., it seems that more and more university-based planetariums are becoming endangered species.

**STAR TRAILS**

Dr. Clarence H. Cleminshaw, Director Emeritus of Griffith Observatory, died June 22 in Hollywood, California at the age of 83. Dr. Cleminshaw was Assistant Director of the Observatory from 1936 to 1958, and then Director until 1969. The author of the widely used textbook *Pictorial Astronomy*, he was a graduate of the Harvard Law School and later, his interest sparked by a night course, earned his Ph.D. in astronomy from the University of Michigan.

Ray Shubinski has taken over as director of the University of Arizona’s Flandrau Planetarium in Tucson. He was director of the Memphis (Tennessee) Pink Palace Museum Planetarium, where George Brown is now interim director.

Charles D. Smith has stepped down as director of the Science Museum of Virginia’s Universe Planetarium in Richmond, to assume the director's post at the Museum of Science and Industry in Tampa, Florida.

In Cincinnati, Ohio, Dan Spence has left the Museum of Natural History after having served as the institution’s long-time planetarium director.

Assuming the directorship of the new planetarium facility (rumored to be a 50-foot dome with a Spitz 512) at Angelo State University in San Angelo, Texas, is Mark Sonntag. He had been planetarium director at the South Florida Science Museum in West Palm Beach.

Sharon Parker has been named coordinator of the Hopkins Planetarium at the Roanoke (Virginia) Valley Science Museum, after becoming the 14th graduate of the Strasenburgh Planetarium intern program. She replaces Don Knapp, who has assumed the acting director's position at the Museum.

Mark Hartman is the new director of the McDonald Planetarium at the Hastings (Nebraska) Museum. He replaces Mitch Luman, who is now the director of the Koch Science Center and Planetarium at the Evansville (Indiana) Museum of Arts & Science. (Mitch, by the way, no sooner settled into the job when a fire hit his facility, causing extensive smoke and water damage. The good news is that rebuilding efforts have started.)

Charles Hafey has moved from the Battelle Planetarium at COSI in Columbus to head the Pacific Science Center’s Starlab Planetarium in Seattle, Washington.

Janet Crampton has joined the staff of the American Geological Institute as a senior writer for the magazine *Geotimes* and *Earth Science*. She had been coordinator/compiler of meteor reports for the Scientific Event Alert Network of the Smithsonian’s National Museum of Natural History; her position at SEAN has been filled by Emily Wegert.

Ron Grant is no longer with Spitz Space Systems; he had been the company’s sales manager. Rosanne Cappiello-Taylor is the new Director of Marketing.

Victor, New York-based Sky-Skan, Inc. will, according to president Steve Savage, soon be moving to the “silicon belt of the east.” New Hampshire is the destination, to a town near the Massachusetts border.

Francine Jackson is no longer curator of the Gengras Planetarium at West Hartford’s Science Museum of Connecticut.

Katherine Becker has resigned as director of the Burke Planetarium in Omaha, Nebraska, to finish work on her doctorate.

Doug McCarty has replaced Robert Anderson as the director of the Mt. Hood Community College Planetarium in Gresham, Oregon.

Lynn Dodson is no longer producer at the Omni-plex Science Museum’s Kirkpatrick Planetarium in Oklahoma City.

**KUDOS & CASTIGATIONS**

Kudos to:

*The Plains Planetaria,* for its gutsy editorial on one GPPA member’s trials and tribulations with one major planetarium vendor. Repercussions of the editorial, which ran a few issues back, are still being felt on both sides of the fence, opening up a can of worms on the question of service that evidently needed opening.

*The U.S. Air Force Academy,* for putting its facility under some much-needed renovation — not the least of which is the removal of potentially hazardous particulate asbestos.

Bob Wallace, director of the Gates Planetarium at the Denver Museum of Natural History, for his unique and attention-grabbing alternate use of the facility: the staging of live Tesla coil demonstrations, aptly called “ZAP!”

Castigations to:

*The Board of Trustees of the Denver Museum of Natural History,* for overreacting to the success of the aforementioned “ZAP!” show. They reportedly want to sharply curtail traditional planetarium programming in favor of the flashier (no pun intended) Tesla show.

---Continued on page 23---
THEATRE OF THE MIND...

Voyage To A Green Planet

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Paul Deans

"Popular..."
Mike Murray

"First Class..."
Paul Engle

"Professional..."
Bruce Deitrick

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EUROPEAN/MEDITERRANEAN PLANETARIUM ASSOCIATION (EMPA)

EMPA plans to hold the second colloquy of European planetariums at the Musée de la Villette in Paris, in May 1988. The meeting will be organized jointly by the Strasbourg Planetarium, the Musée de la Villette, and the Council of Europe. For further information, contact: Planetarium de Strasbourg, Rue de l'Observatoire, 67000 Strasbourg, FRANCE.

This December, EMPA plans to publish "European Planetarium News," an annual information bulletin, edited at Strasbourg Planetarium and printed/distributed by the Council of Europe.

GREAT LAKES PLANETARIUM ASSOCIATION (GLPA)

The next conference will be held October 23–26, 1985 in River Grove, Illinois. For further information, contact: Steve Bishop, Triton College, 2000 5th Avenue, River Grove, Illinois 60171.

GREAT PLAINS PLANETARIUM ASSOCIATION (GPPA)

GPPA meets October 18–19 in Marshall, Minnesota. The host is Roger J. Reed, Southwest State University, Marshall, Minnesota 56258. President Katherine Becker reminds everyone that membership is only $5, and dues should be sent to: Carroll Moore, Jensen Planetarium, Nebraska Wesleyan University, Lincoln, NE 68901.

NORDIC PLANETARIUM NETWORK (NPN)

This new group welcomes as members anyone who lives in a Scandinavian country and is interested in planetariums. Coordinator of NPN is: Dr. Lars Broman, Dalarnas Museum, Box 22, S-791 21 Falun, SWEDEN.

NPN held a meeting on April 26 at the Tamppereen Planetario in Tampere, Finland, hosted by Timo Rahunen. Highlights included the current planetarium show Cosmic Quests and a Finnish sauna before dinner. The next meeting is planned for Stockholm in the spring of 1986.

A new major planetarium is planned for Copenhagen, Denmark. The 21.5 meter facility will have a tilted dome, 285 seats, and an Omnimax projector. The star projector has not been decided upon at this writing. The planetarium was funded by a gift of 50 million krone by Bodil and Helge Pedersen. Construction is to start in January, 1986, and the planned opening is late in 1987.

ROCKY MOUNTAIN PLANETARIUM ASSOCIATION (RMPA) AND PACIFIC PLANETARIUM ASSOCIATION (PPA)

RMPA and PPA plan a joint conference at the Hansen Planetarium in Salt Lake City, October 10–12. Planned highlights include: "Islands in the Sky," "Adventures Along the Spectrum," and Hansen's Digistar show, "From Atoms to the Edge of the Universe," a transplanted version of St. Louis' Digistar show, with script by Carolyn Collins Petersen and audio by Mark Petersen; demonstrations of new audio/visual technology, including video projection, computer graphics, and digital audio recording and music generation; visits to planetariums at Weber State College in Ogden and Brigham Young University in Provo and good food at the Snowbird Ski Resort east of Salt Lake.

SOUTHWESTERN ASSOCIATION OF PLANETARIUMS (SWAP)

Special guest at the next meeting of SWAP will be Comet Halley. SWAP plans to meet April 6–8, 1986 in the Davis Mountains of West Texas near McDonald Observatory. This location offers dark skies and a southern latitude which conference planners hope will provide excellent views of the comet. The meeting is the Sunday through Tuesday after Easter, rather than the regular Thursday through Friday. Registration information will be forthcoming.

I would like to thank the following correspondents who sent information on their organizations: EMPA, Jane Hartley; GLPA and GPPA, Mitch Luman; NPN, Dr. Lars Broman; RMPA and PPA, Glenn Taylor and Carolyn Collins Petersen.
Halley's Comet is coming back, and of course we'll all take a look at it. Some of us will see it from our back yards only; some will venture into the dark countryside where we will lug along a telescope or newly-purchased large aperture 'comet hunter' binoculars, and some of us will pay a month's wages to take a cruise to the land "down under" to see it high and bright in the sky. Some of us will watch it on little green monitor screens — and some of us already are.

Of course, the important thing is to see it with your very own eyes, and if you don't, nothing else counts. And, of course the Naval Observatory, the Jet Propulsion Laboratory, and countless others with resources far greater than ours have plotted its position with uncanny accuracy and printed the relevant numbers, and so we don't have to work out its path for ourselves, but the good news is that we can if we want to. Unlike earlier generations who could only look, we can use our micros to make independent calculations and follow its progress mathematically. Little is lost because others have made the calculations with greater accuracy, just as we can enjoy taking pictures of it knowing that others with better cameras will achieve more. The point is that we are participating, and we get out of it what we put into it.

This long preface aside, let's look at commercially available comet programs and see what they have to offer.

Eric Burgess, author of Celestial Basic (both the book and disk), has created a new comet disk called, appropriately, Halley's Comet. It is distributed by S & T Software Service, 13361 Frati Lane, Sebastopol, CA 95472, in editions for Apple, Commodore 64, and TI Professional. Like Celestial Basic, Halley's Comet is an integrated suite of several short and simple programs of medium to low accuracy that attempt to cover the subject thoroughly. The first three programs provide a limited amount of background information, much of it historical, and a reference list of previous apparitions. Only in the fourth, "Orbit Plots," does the computer begin to make calculations, but here we see an orrery displaying the comet, Venus, Earth, and Mars as they appear for any apparition since the year 1000. You can select the apparition and let the orrery run, or select a specific date and see a static display for that date while the comet's coordinates and distances from the earth and sun are given numerically. The fifth program shows the path of the comet through the constellations during its 1985/6 appearance and provides a tabular printout of its positions. The entire sky is shown in a form similar to Hansen's "Chart of the Heavens," but with only about 200 stars plotted. The constellations are difficult to identify. In the last program you select a longitude, latitude, time, and date and are told the comet's altitude and azimuth and twilight times; you are then shown the comet complete with tail in the appropriate part of the sky as you would see it if you were outdoors. The computer selects the proper direction to face and outlines the stars in sufficient detail for the major constellations to be recognized immediately, while the moon and planets are also included.

Although the accuracy of Halley's Comet is limited and the displays rudimentary, there are enough clever features and options to keep a person busy for several nights and they do let you visualize what the comet does. Another strength is that you can get inside the programs and play around with them to customize them to your liking. All in all, the disk is ambitious, educational, and worth the money.

Somewhat more sophisticated is Halley by Starsoft, PO. Box 2524, San Anselmo, CA 94960, and available on disk for the IBM PC. There are four main parts to the program. The first plots a heliocentric view of the comet moving through the solar system to a scale you select and including up to all nine planets. The second plots the comet on a standard rectangular star chart, showing both the tail's length and orientation. The third part accurately calculates the RA, Dec., and distance of the comet from both the earth and sun for any date or series of dates. The fourth allows you to change the orbital elements and substitute any comet — or any other object that orbits around the sun — for Halley, and use the disk after 1986. You can run the program for any apparition (although of course with decreasing accuracy as you leave the present). The current accuracy is impressive.

The third and last good comet program I know of is Ephemeris by Roger Sinnott and available from him for Apples and TRS-80s at 243 White Street, Belmont, MA 02178. This relatively short (1/10th disk) and inexpensive program was written several years ago, when Halley's Comet was still in the future, and apparently Roger didn't think to capitalize on it and call it "Halley Ephemeris" or the like. It is a simple but surprisingly accurate program that requires you to know and enter the orbital elements of the object you are interested in — there are no default comet values. It then gives you, for the dates you specify, a printout of that object's RA, Dec., distances, and magnitude. We got a lot of mileage out of the program in the summer of '83 when Comet IRAS-Araki-Alcock was discovered, and, using the elements in the IAU
Announcement Cards, provided the media with an ephem­
eris of its positions customized for our time zone. This is a
good program to have.

Sample printouts from Ephemeris and Halley were
printed in the October 1984 issue of the Griffith Observer,
and I refer you to it for illustrations.

An interesting and unusual new book that came my
way is Orbits for Amateurs with a Microcomputer by D.
Tattersfield (Halsted Press, distributed by John Wiley
& Sons, One Wiley Drive, Somerset, N.J. 08873, $29.95,
and presumably available on special order through local
bookstores). It tells you in a no-nonsense manner all you
need to know to calculate a comet’s ephemeris from the
orbital elements, the elements from three observations
of the orbit, and how to take into account perturbations
and make differential corrections. I had no idea how to
do these things and now that I know how involved they
are I probably never will. But if you want to know about
comet orbits, I can’t imagine how you could do them
without this book. It is clearly organized and includes
all necessary formulae and tables.

Martin cannot fully use the Jewish
practice of Sheloshim to successfully argue
for a lengthy funeral or mourning period
for Herod, either. Sheloshim is a 30-day
period of mourning for the dead observed
by Jews (containing an initial 7-day period
called “shivah”) “counted from the time of the burial”
(Encyclopaedia Judaica 14, s.v. “Sheloshim,” p. 1537),
not death.

But does this mean that 30 days of mourning must
be fitted between Herod’s burial and the following Pass­
over? Not at all. Passover always cancels a Sheloshim
period. “If the shivah had been completed, then the in­
coming festival canceled the entire Sheloshim period”
(author’s emphasis; Encyclopaedia Judaica 12, s.v. “mourn­
ing,” p. 490). Josephus’ funeral accounts fit this practice.
Josephus tells us that Archelaus mourned Herod seven
days (shivah), then put an end to mourning (Antiquities
XVII, 8, 4, and War II, 1, 1). Passover immediately fol­
lowed. Thus, Sheloshim is not an issue.

More significant than the above is the fact that
the chronological evidence concerning Herod’s suc­
cessors weighs heavily against the Martin theory. Dr. Maier
focuses the issue this way.

“As regards Herodian—and therefore Nativity
chronology, I agree categorically with the tradi­
tional late March–early April, 4 B.C. death for Herod
the Great. The overwhelming evidence, both before
and after 4 B.C., points to 4 B.C. as the watershed
year. Martin’s resort to co-regencies for the Herodian
sons just doesn’t work at all, no matter how hard
he clubs the evidence in order to try to make it fit.
The problem of Herod’s successors forever con­
demns Martin’s work, and all arguments should
focus here, rather than in such trivialities as the
length of the Sheloshim.”

Supporting this point are two recent articles: P. M. Ber­
negger, “Affirmation of Herod’s Death in 4 B.C.,” The Jour­
nal of Theological Studies 34, (October, 1983) pp. 526–31,
and Harold W. Hoehner, “Date of the Death of Herod the
Great” (to be published by Baylor University).

In an authoritative refutation of the
1966 Filmer theory, Bernegger supplements
the Barnes refutation of Filmer by explain­
ing how Herod’s reign years lead us to the
conclusion that “the death of Herod must
have occurred no later than 4 B.C.” And in
a paper supported by 79 footnotes, Hoehner concludes,
“When taking a hard look at the dates of the succession of
Herod the Great’s sons and grandson, one can only con­
clude that the 4 B.C. date is the best date for Herod’s death.”

Readers of the Planetarian with an interest in this
issue may want to watch for two books scheduled to be
published this year. Baylor University is expected to pub­
lish the papers concerning Christ’s birth, Herod’s death,
and related subjects presented during the December 16,
1983, Nativity Conference held at Mississippi State
University. The Hoehner paper cited above should be included.
The second book, authored by Dr. Louis H. Feldman, is
a supplement to Heinz Schreckenberg’s Bibliographie zu
Flavius Josephus, and will be published by Garland Press
in New York in English. It is expected to contain refer­
cences to works by the author and Martin.

Douglas Johnson
131 Hollywood Avenue
Santa Cruz, California 95060

... continued from page 19

Parkland College of Champaign, Illinois. Eager to
quickly erect a monument to an administrator, the Col­
lege has rushed headlong into the construction of a
16-meter facility. This may sound good on the surface,
until one looks closer at the situation: The metro popula­
tion of the area—including neighboring University of
Illinois—is under 150,000, yet school officials have told
me they want the facility to be primarily public in thrust.
Also disturbing were their plans (of as of six months ago)
to have no more than two staff, and no endowment for
ongoing fiscal support.
Focus On Education
MARK S. SONNTAG

MATHEMATICS INTEGRATION IN SECONDARY SCIENCE COURSES AND POSSIBLE IMPLICATIONS FOR POST-SECONDARY ASTRONOMY EDUCATION
Mark S. Sonntag

The mathematics background students bring with them to an astronomy class can certainly affect the outcome of subject matter content and the method of instruction. There is not much argument about that. This background may include not only formal mathematics education but also the integration of mathematics in previous science courses. It is fairly easy to determine the math courses your students have taken, but the question of mathematics applications in the sciences is much more difficult to access. One researcher has attempted to answer this latter question. Let us look at his results and try to sort out some implications for astronomy educators.

One hundred and eighty pages from these 26 texts were randomly selected and then analyzed for mathematics content. Each page investigated was checked for the presence of one or more of 19 categories of mathematics content. The results are listed in Table 2.

Donald L. Pratt of the University of Wyoming published the results of his research in a recent issue of SCHOOL SCIENCE AND MATHEMATICS (Volume 85, #5, May/June 1985, pp. 394-406). Pratt looked at 26 textbooks printed between 1963 and 1985 across four major subject matter areas (chemistry, earth science, biology, and physics/physical science), across two student levels (junior and senior high school), and across two curriculum styles (traditional and nontraditional). Table 1 summarizes the characteristics of his sample.

One hundred and eighty pages from these 26 texts were randomly selected and then analyzed for mathematics content. Each page investigated was checked for the presence of one or more of 19 categories of mathematics content. The results are listed in Table 2.

Pratt found that the most common mathematics categories given in the texts were non-numerical problems (13%, twice as many as numerical problems), ratio and proportion (13%), geometry (9%), and formulas (9%). Pratt did not report on differences between age levels (junior vs. senior high), but non-traditional texts were found to be slightly higher in mathematical content than traditional materials over-all. However, the trend varied a good deal across subject matter. Physics was found by far to have the most abundant mathematical content—38% of the tallies came from physics and/or physical science texts. Biology was the least diverse and had the smallest mathematics representation (18%).

Now let us explore what implications these data may have on formal and nonformal post-secondary astronomy education. We might first ask which in the list of mathematics categories given in the texts were non-numerical problems (13%, twice as many as numerical problems), ratio and proportion (13%), geometry (9%), and formulas (9%). We might also ask which categories are most important for an introductory course in astronomy. One could make a valid case for most of the categories listed, but my choices would be: algebra, formulas, geometry, graphs, and trigonometry. The percentage of tallies in each of these categories is given for three different groups in Table 3.

The “total group” gives us a picture of mathematics content across all four subject areas. It represents a very small part of the student population, because few students will take all of these sciences during secondary school. But it does serve as a useful comparison group.

TABLE 1.

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<tr>
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As we can see by the data, those students who do take physics are very well prepared for our post-secondary astronomy course. Their exposure to the five chosen mathematical categories seems to be significantly higher than the "total" group. But physics is not the most "popular" science course in high schools today—biology is. Let us see how biology students fare in these five math categories.

The student who has only taken biology to meet a minimum science requirement for high school graduation is likely ill-prepared for some of the most important mathematics concepts in elementary astronomy. And this student is the rule rather than the exception. We should not assume this student has had prior experience with trigonometry, solving for unknowns in formulas, or even algebra. This typical student most likely will have had only limited experiences with geometry and graphing skills.

Obviously, this lack of exposure to mathematical skills must be taken into account when designing both credit/non-credit and formal/informal post-secondary astronomy education activities—from adult-audience planetarium shows to formal university-credit introductory astronomy courses. But hopefully, when students leave our planetariums and classrooms, they will have gained much needed practice in these and other areas of mathematics.

REFERENCES


INTRODUCTION

In discussing orbital elements with junior or senior high school students, it is easy to fall into the trap of assuming that they will grasp the abstract nature of the concept, simply because of their age. Even students at this level, struggling to understand some of the intricacies of orbits, would benefit from a concrete experience. The following activity by Jordan Marché could serve this purpose very well. It could either be presented as part of a planetarium lesson on orbits, or else as a preparatory or follow-up exercise for a comet-related planetarium program. The materials necessary for the activity are relatively simple to use and easily obtained, yet the outcome may prove indispensible in helping your students to truly comprehend the nature of orbits, particularly as Halley's Comet becomes visible this year.

Readers are reminded to please send any comments on this lesson, as well as submissions of other lesson plans for the secondary level (grades 7-12), to me. In submitting lesson plans, please remember to use the following format: Title, Purpose, Objectives, Materials, Preparation, and Procedure. Thank you.

THE THREE-DIMENSIONAL MODEL OF AN ORBIT

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North Museum Planetarium
Franklin & Marshall College
Lancaster, PA 17604

PURPOSE:
To acquaint students with the geometric meanings of the six orbital elements of a celestial body orbiting the sun.

GRADES:
10-12; possibly 7-9 (a minimum understanding of plane geometry is required, along with astronomical terms pertaining to the earth's orbit in space, and the conic sections). The exercise is also suited to gifted students of younger age.

MATERIALS (for each student):
The attached exercise; one Sky Publishing Corporation S511 Inner Planets or S512 Outer Planets Chart; sheet of poster-board; ruler; protractor; scissors, tape; string; two thumbtacks; sheet of corkboard or similar material; the orbital elements of an asteroid (may be obtained from a current copy of the Astronomical Almanac, U.S. Naval Observatory) or Halley's Comet (given farther on).

Note: The selection of Inner Planets vs. Outer Planets Chart depends on the type of orbit attempted. For a 'normal' asteroid, the Inner Planets Chart works best; for Halley's Comet, the outer Planets Chart will enable you to fit everything on it, but the region of interest (closest to the sun) comes out very small. To do Halley's Comet on the Inner Planets Chart requires making a large orbit construction.

BEHAVIORAL OBJECTIVES:
By the end of this exercise, the student will be able to construct a three-dimensional model of the orbit of an asteroid or comet from the six orbital elements. Practice in the measurement and visualization of angles, along with exploration of the conic sections, is also achieved.

PREPARATION:
Assembling the materials needed.

PRESENTATION:
The instructor should review the following concepts with students, before beginning the exercise.
planetary orbits
elliptical motion around the sun
celestial longitude and the ecliptic
the measurement of angles with protractors
two planes intersecting along a straight line astronomical units as a system of measurements.

Note: This exercise is an outgrowth of that developed in the Harvard Project Physics Laboratory Manual, Unit 2 ("Motion in the Heavens").
Any comments or questions regarding it may also be directed to the author.
The purpose of this exercise is to further acquaint you with the geometric meanings of the six orbital elements of a celestial body orbiting the sun. The following definitions of each are given in the order of their "appearance" in the lab. However, instead of dwelling upon them for now, use them for reference as you go along.

**ELLIPSE**

- **a** — The semi-major axis of the elliptical orbit (one-half of the ellipse's greatest length). See figure above.
- **e** — The eccentricity of the orbit, equal to the ratio of length "c" above to length "a". This yields a decimal number between zero (for a completely circular orbit) and one (for an extremely elongated orbit).
- **T** — The calendar date of the object's perihelion passage, closest to the sun.
- **Ω** — The heliocentric longitude of the ascending node (the angle measured along the earth's orbital plane, counterclockwise from the vernal equinox, to the north-crossing intersection of the orbital plane).
- **ω** — The argument of perihelion (the angle measured in the object's orbital plane, from the ascending node to the perihelion point, and always in the direction of its motion).
- **i** — The inclination of the orbit (the angle of intersection between the object's, and the earth's, orbital planes). This angle may vary from 0° to 180°. If the inclination is greater than 90° the object is said to be moving in a retrograde path.

**DIRECTIONS**

1. Record the values of the orbital elements of an asteroid selected by your instructor, or use the values for Halley's Comet here, adapted from Donald K. Yeomans, Jet Propulsion Laboratory (ecliptic and equinox of 1950.0).

   - **a** — _______ A.U.
   - **e** — _______  
   - **T** — _______  
   - **Ω** — _______ °  
   - **ω** — _______ °  
   - **i** — _______ °

   **Halley's Comet**
   - **a** = 17.94 A.U.
   - **e** = 0.967
   - **T** = February 9.45, 1986
   - **Ω** = 58.15°
   - **ω** = 111.85°
   - **i** = 162.24°

2. On the solar system (Inner or Outer Planets) chart, measure the distance from the sun to the Earth's orbit (1 Astronomical Unit).

   - 1 A.U. = ______ cm.

   Thus, how large will the scale value of "a" be, in your orbit (multiply the value of "a" from the table of elements, by the length above)?

   "a" = ______ cm.

3. To draw an ellipse with a loop of string and two tacks, the following conditions are known to be true:

   Spacing between the tacks (twice the value of "c") = 2 × e × a

   Circumference of the loop of string = 2 × a × (1 + e)

   Calculate the values of these two quantities, substituting your values of "e" from the table of elements, and "a" from above. Fill in your answers below.

   - Spacing of the tacks = ______ cm.
   - Circumference of the loop of string = ______ cm.

4. Cut off a length of string about 10 cm. longer than the figure above. With a pen, make a mark about 5 cm. from one end of the string. Then measure off the exact length above, and mark it near the other end of the string. Tie a knot connecting the two ends together at the marked points.
5. Take the piece of posterboard provided, and lightly mark the approximate center. With a ruler, draw a line through the center, in the long direction of the board. Along this line, on each side of the center, measure and mark a point equal to one half the spacing of the tacks. These two points represent the foci of the completed ellipse.

6. Take the posterboard and loop of string to the piece of corkboard. Place one tack through the posterboard at each of the foci, and into the corkboard. Hook the loop of string under the heads of the two tacks, pull it taut with a pencil and run the pencil around, producing the ellipse. Remove the tacks, and with scissors cut out your elliptical orbit.

7. Decide which of the foci is to represent the sun, and mark it so. Draw a heavy line from the sun to the nearest end of the ellipse. Mark that end "Perihelion," and the opposite end, "Aphelion." The third orbital element, "T" (the date when the object reaches its perihelion point), is introduced now. Beside the perihelion point, write the expression, "T = __________," filling in the date from the table of elements.

8. The fourth orbital element is "Ω" (the capital Greek letter Omega). On the solar system chart, draw a line from the sun to the edge of the paper, crossing the number corresponding to "Ω" on the outermost circle. With scissors, make a cut along this line. Such a line is called the "line of nodes," and marks the intersection of the earth's orbital plane (the plane of this paper) with the object's orbital plane. The two points along this line where the object's elliptical orbit crosses the paper are called the "nodes." The point of crossing where the object moves northward (upward, and out of the paper) is called the ascending node. The point of crossing where the object moves southward (downward, and into the paper) is called the descending node.

With your pen, draw a curving arrow counterclockwise from the Vernal Equinox line to the cut you have just made. Label the arrow "Ω." This angle represents the longitude of the ascending node.

9. The fifth orbital element is called the "argument of perihe - lium," and is symbolized by "ω" (the small Greek letter Omega). It serves to orient the elliptical orbit in the object's orbital plane. Like "Ω," it may take on any value from 0° to 360°. The reference point from which this angle is measured is the ascending node.

On your elliptical orbit, center a protractor over the sun with its bottom edge along the sun-perihelion line. Now measure off and mark an angle clockwise from the perihelion point to the value of "ω" itself. Draw a line from the sun to your mark. Now draw a curving arrow along the outside of your orbit, from this last line, counterclockwise, back up to the perihelion point. Label this arrow "ω." Finally, extend the straight line past the sun, to the other side of the orbit. Beginning there, make a cut back along this same line, only going as far as the sun.

10. Now comes the fun part! Slip the elliptical orbit into the Inner Planets Chart where the two cuts meet, until the "suns" of the two planes come together. For the time being, have the elliptical orbit facing up. If the value of "ω" is greater than 180°, the perihelion point should appear on the underside of the solar system chart; otherwise, it should appear above it. Align the two cuts accurately with each other, and tape the orbit to the planet chart along the intersection (only).

11. The last thing to be done is to fix the angle at which these planes intersect. This introduces the last orbital element, the inclination "i ."

On a scrap of posterboard, cut a small wedge whose angle is equal to the value of "i," Label the wedge with a curved arrow, and the symbol "i" next to it.

12. On the solar system chart, draw a line from the sun to the point of longitude equal to "Ω + 90°." Place the vertex of the wedge on the chart's sun, and lay the side marked by the tail of the arrow along the line just drawn, with the wedge upright. Tape it well to the chart. Then bring the elliptical orbit into contact with the wedge's other side, and tape it firmly also.

Note: If "i" is greater than 90°, your previous markings on the elliptical orbit will appear upside-down. Viewed from above, the object would thus appear to orbit the sun in the opposite sense from the earth and other planets, or in retrograde. ■
I guess this is as good a time as any to do some house cleaning in my files. I have some things to “clear up” and some things to tell you about that have gotten lost in the shuffle of my recent move.

First, in Vol. 13, No. 3, I reported about a book *Stars of Jade* by Julius D. Staal. Because the publisher used an Old English font style in the name of the company, I incorrectly named the publisher MRIT when it should properly be WRIT. The price of the book has changed, and is now $19.95 + $1.45 postage. My sincere apologies to Mr. Staal and the publisher.


For those of you who buy your Kodalith in 36 exposure rolls, you will find the following information very important. For some reason, Kodak has decided to change the name of the product! It is now called HCS 135-36, Kodak Ektagraphic HC Slide Film. This is terribly misleading for two obvious reasons: first, the trade name Kodalith appears nowhere on the box, and secondly, the product is erroneously labeled “slide” film, when it is in fact high contrast black-and-white negative film. Perhaps the planetarium community would like to write masses of letters to Eastman Kodak and urge them to change the name back into the realm where we planetarians deal with.

Available from Univel, Inc., Publishers, PO. Box 28130, San Diego, CA 92128, is a new book about Kitt Peak National Observatory. Conceived, researched and written with great care, *Realm of the Long Eyes* contains 96 illustrations, mostly photographs, to picture the history, development, operation, maintenance, and use of Kitt Peak National Observatory. It sells in soft cover for $15 per copy plus $1 for postage and handling.

From the same people who brought you the book *Celestial Basic*, by Eric Burgess, comes a new computer disk, *Halley’s Comet on Your Home Computer*. Information about it can be obtained by writing S&T Software Service, Division of America Only, Inc., 13361 Frati Lane, Sebastopol, CA 95472. Perhaps John Mosley will do an in-depth review of the disk in one of his articles.

I would like to add a note to all the companies out there whom we planetarians deal with. I need up-dated material from you all! My files are getting old and when I report about your product, I would like to have the most recent prices and information. If you would, please, send me a complete set of your information to replace what I have now. I thank you!

**EDITOR’S NOTE**

From Astromedia, the publisher of ASTRONOMY Magazine, comes their newly-released book, *Halley’s Comet*, by Francis Reddy. Lest you think otherwise, I would strongly urge you to go out and purchase a copy; you won’t be disappointed. It is, in my estimation, the best available book for adults yet published, and a delight for planetarians.

The book’s illustrations are superb, in keeping with the publisher’s tradition of offering a beautiful product to readers. From cover to cover, there are dozens of large color photographs, drawings and reproductions, all printed on heavy 9 x 12-inch stock which detail every aspect of the comet’s history and return.

Sixteen individual star maps trace the comet’s path from June, 1985 to August, 1986, for one southern and two northern latitudes. Each chart features a rich blue background with white stars and dark gray superimposed path of the comet, plus realistic silhouette horizons. Relevant moon phases and positions for the critical March–April 1986 time period are also plotted.

There is even a three-dimensional model of the comet’s orbit that can be cut out and assembled, showing its relation to Earth during this interval.

The text has been carefully written and brought completely up to date, even describing NASA’S plans to target the ISEE satellite (renamed ICE) to rendezvous with Comet Giacobini-Zinner this September.

For the amount of effort and downright care that went into preparing this book, its price ($9.95) seems unbeatable. This is no mere “handbook,” but instead is a handsome work that is deemed to be read, shared, and most of all, enjoyed.
LET'S GET SMALL — Part I.

Are you, or have you ever been, a member of CUSP? Never heard of it, you say? Planetarian Starr Bahl belongs to CUSP, but he doesn’t know it.

We join Starr at his regional planetarium conference, attending a paper session, watching as a member demonstrates how he converted an inexpensive $500 projector they had “laying around” into an amazing special effect, using only $100 of lenses and motors. It’s a fascinating, clever idea; as Starr studies the gadget, he imagines that the only extra projector he has, a $22.50 model he acquired from Army surplus, could somehow be similarly modified.

The conference moves on to the planetarium, so S. Bahl does too, to see a planetarium show. It’s wonderful, and uses very few special effects, which Starr notes with delight. “I could do that!” he thinks. They announce that the program is for sale: $500 (includes slides and tape). Starr really likes the show but doesn’t pick up one of the price lists they give out at the end.

The lights come up; someone passes out a survey: “How many full-time staff at your facility? How many part-time staff?” It doesn’t take Bahl long to fill it out: 1, 0.

Listless, Starr leans back in his soft padded planetarium seat, and studies the laser housing behind him under the dome. Looks pretty neat. “Is that next?” he wonders. “I hope so; the last time I saw a laser, it was at the conference they let me go to three years ago, the one I paid for myself.” His thoughts are jarred as, yes, the laser show music blasts forth.

Starr enjoys this regional planetarium conference, the first one he’s been to in several years; he watches, listens, takes a few notes. Starr doesn’t talk much; he’s pretty quiet during the sessions. Yes, you guessed it: unbeknownst even to himself, Starr Bahl belongs. He is a member of CUSP: Curators Unenlightened, from Small Planetariums. To be continued next issue: “Let’s Get Small: the Solution” — Part II.

OVERHEAD:

—While she was attending Space Camp for Adults in Huntsville, Alabama, planetarian Regina Cates of STARS Planetarium in Mississippi quizzed Allan Ludwig, of NASA, about a planetarian’s chances to be chosen to be NASA’s Teacher-in-Space. Ludwig, involved in the selection of the Shuttle candidate, said, “You guys are a strange bunch.

We had a hard time figuring out what to do with you. Why, I got this real smart-alecky letter from one planetarium person which began: ‘Look no further . . .’”

—Planetarian Ray Shubinski of Pink Palace Planetarium in Memphis bought a small Russian telescope; it sees only red stars!

—Joe Hopkins, planetarian at Bishop Planetarium in Bradenton, Florida, commenting on the reality of night sky viewing in the city: “Why, in the city, you don’t have to bring the covers up slightly; Nature does that for you!”

—Some advice from Paul Campbell, planetarian at Western Kentucky University concerning his experiences as sky interpreter at Mammoth Cave National Park: “If you use a bright flashlight for a pointer, don’t talk. Insects will fly into your mouth!”

—Jane Hastings picked up a planetarium brochure at a recent conference; the front page showed a big color photo of three people in the planetarium audience, watching a show. Well, at least two of them were; the third was obviously fast asleep!

—Jane also heard this story about another planetarium brochure which pictured a large audience watching a show. A lady picked up the brochure, gasped, and walked out of the planetarium before the show began. She later filed for divorce after seeing her husband in the picture, obviously enjoying the company of another woman.

—Planetarian Kathleen Hedges of New Mexico Tech pointed out a winter constellation with three “belt” stars and asked if anyone knew what it was. Enthusiasm pre-empted embarrassment as a young voice piped up, “O’Rhino!”


—Planetarian Richard Monda of Schenectady Museum and Planetarium in New York recently installed a new starlamp in his Spitz A3P, but because of spurious reflections within the starcup, the brighter stars have “companions” around them when the sky is in a certain position. While explaining that the Dog Star, Sirius, has a companion called “pup,” someone was heard to remark while looking up, “That’s not just a pup, it’s a whole litter!”

—Don McDonald of Eureka, California has had some serious health problems in the past few years. His doctor offered some advice: “Don, you’ve got to stay away from those planetarium conferences. You’re ruining your health.” Don: “Will I live longer if I do?” Doctor: “No, but it will seem longer.”

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Beginning October 1985. The Carl Zeiss Companies in North America proudly announce that they will be underwriting the program **STAR HUSTLER** produced by WPBT-Miami, featuring Jack Horkheimer, Miami Space Transit Planetarium.

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