PROPER PRECESSIONAL MOTION WITH THE SPITZ A-3-P

By Robert J. Gardner, Director
Robert A. Hedrick Planetarium, Toledo, Ohio

The Spitz A-3-P Planetarium Projector simplifies the task of teaching apparent precessional motion. By turning the precessional switch clockwise, the star sphere rotates on the ecliptic axis. Stars move clockwise around the ecliptic pole; certain stars take their turn as the pole star.

Proper precessional motion can also be demonstrated with the Spitz A-3-P projector. The projector is set for the planetarium latitude. The stars and home latitude lamp are turned on. The home latitude lamp is used to point out and emphasize the position of the north celestial pole. Attention is devoted to the polar region. When the precessional switch is turned clockwise, the usual apparent motion is demonstrated and discussed. While attention is still focused on the happenings at the celestial pole, daily motion is added. The daily motion switch is turned on full clockwise. There is an immediate illusion that the stars suddenly stand stationary and the celestial pole (home latitude spot) appears to wander counter-clockwise, pointing to different stars as the pole star. This illusion demonstrates proper precessional motion.

As the lecturer continues, the daily motion is alternately turned on and off several times to emphasize the difference between apparent and proper motion. The operator will find a daily motion speed which will give the best illusion of proper motion; that is, where the stars appear to be stationary. This demonstration is also very effective when the projector is set for +90° north latitude.

Caution: Frequent combined operation of daily and precessional motion winds up the arc lamp lead wire at the base of the star sphere. In time, the wire will pull out of the connector and the stars will suddenly disappear. The lead can be disconnected and unwound by hand between demonstrations.

THE FATEFUL JOURNEY BEGINS

By David L. DeBruyn

EDITOR'S NOTE - On April 11th, I was among the fortunate guests invited by N.A.S.A. to watch the launch of Apollo 13. Immediately upon my return from this thrilling experience, I put my thoughts and recollections down on paper for my bi-weekly newspaper column, "West Michigan Skies." I hope that the reprint included here will be of interest to G.L.P.A. members. Among those from G.L.P.A. also present at the launch were Maxine Haarstick, Reed Belasco, and Alton Yarian. This article was written before the development of the spacecraft troubles that later periled the mission.
On Saturday, April 11th, this reporter was privileged to tour the facilities of the Kennedy Space Center in Florida. Thousands of people take this exciting tour each month. However, on this occasion, conditions were far from ordinary, for this was the day when Apollo 13 would be launched toward the moon.

Our party included a group of educators and planetarium directors from around the country who had received an invitation to tour the space center and observe the blastoff from within three miles of the launch pad, a vantage point of minimal safe distance from the powerful booster rocket. Only a small group of launch technicians were closer than we were, and the general public was restricted to an area almost three times as far away.

As we approached the Space Center grounds during mid-morning of the launch day, we were moved by the appearance of the vehicle assembly building, and nearby, the silent Apollo 13 rocket, resting majestically on its launch pad. Our tour guide explained that the vehicle was presently being fueled for blastoff, which was then about three hours away, and that the astronauts were expected at the center in about an hour.

The whole thing seemed a bit unreal. Here I was, less than three miles from the mighty rocket that would later today have the attention of the whole world focused upon it. From a distance, both the rocket and vehicle assembly building looked disappointingly small. I had often read that the hangar-like structure where the Apollo spacecraft were built and tested was one of the world's largest structures by volume. Yet as I peered at it across the surrounding marshlands from the approaching bus, it actually seemed a bit puny.

I am now convinced that this initial impression was an illusion wrought by the absence of surrounding structures with which to compare it. As we left the bus and approached the entrance, the building's overwhelming size really manifested itself. Inside, there is enough room for the Empire State Building to be cut into four pieces and conveniently stored away.

As our delegation entered, we were enthralled by the vastness of the manmade cavern, and by the monstrous components of the Apollo 14 vehicle, now being assembled for possible launch later this year. After completing our tour of the vehicle assembly building, and a control center, including an inspection of the crawler that transfers missiles to the launch pad, our attention returned to Saturn 13, still resting silently on its launch pad three miles away, waiting!

We were efficiently directed to the stands where we would watch the launch, now less than half an hour away. A public address system kept us informed of count down progress, which was proceeding on schedule toward the 2:13 P.M. blastoff time. In spite of problems with the meules, and earlier uncertainties about the weather conditions at the time of the launch, it now appeared that all would "go" on schedule under partly cloudy skies and intermittent sunshine.

Even as the final minutes before liftoff approached, and the crowd hushed in anticipation, I continued to be impressed by the silence of that needlelike white spire in the distance. It seemed as if nothing was happening out there, or was going to happen. Closer inspection through binoculars showed that launch tower service arms were being withdrawn at certain critical moments as the countdown approached its final seconds. The cone-shaped command module, where the three astronauts sat poised for ignition, seemed so tiny in contrast to the booster that it seemed inconceivable to me that anyone would dare ride the thing.

Tension mounted as the countdown proceeded toward ignition of the powerful cluster of five first stage boosters, programmed to occur 8.3 seconds before liftoff. Right at the appointed time, a sudden but brief orange flash burst from beneath the rocket. This
was followed a second or so later by a much more brilliant gushing of fire as the dormant projectile suddenly came to life. Billows of black smoke and steam emanated horizontally in all directions as the mighty engines began to build thrust toward the approaching liftoff. Around me, there were gasps of amazement and disbelief.

The tower arms fell away, the huge rocket seemed to just sit there, almost like it was precariously balanced on its own exhaust, and would soon topple over. Then it began to move. The vertical motion seemed labored and almost painful at the onset, but became more definitive as the vehicle's base cleared the launch tower. Apollo 13 was on its way to the moon.

The rocket now accelerated rapidly, with its intensely bright exhaust trailing behind as it rose. Then the sound hit us. First a dull roar, then a series of crackling reports and a continuous rumble that shook the stands and ground beneath our feet.

As the roar gradually diminished in intensity, so too did the brilliant contrail of the receding rocket. The vehicle, now many miles above us, seemed to arch out over the ocean amid gasps and applause from the assembled crowd. The rocket itself soon became lost in the clouds, though the contrail lingered for a few more seconds, disappearing and then reappearing briefly through an opening in the scattered clouds.

Somewhat breathless from an awesome event that lasted for only about a minute and a half, I looked across the marshland toward the smoking launch tower. The huge white projectile which had sat there so silently just two minutes ago was now nowhere to be seen. Only a fading rumble and cloud of smoke attested to the fact that the hardware that had once stood there was indeed carrying three men toward a rendezvous with the moon.

NEWS NOTES

THE CONFERENCE OF AMERICAN PLANETARIUM EDUCATORS, will take place October 21st, 22nd, and 23rd at Michigan State University, East Lansing, Michigan. Preparations are now progressing rapidly, and a number of noted personalities have already agreed to take part in the program. They include Professor Harold Urey of the University of California, and James Bernardo of N.A.S.A. George Abbel or Alan Sandage may also be included on the schedule. Those who have not responded to a questionnaire issued earlier by the steering committee should do so at once. These responses are imperative to conference planning. There will be a number of concurrent seminar meetings, and those wishing to chair one of these sections or suggest a topic should get in touch with VonDel Chamberlain, conference chairman. Selection of topics for seminars will be made at a forthcoming meeting of the steering committee.

PRE-CONFERENCE MEETINGS will be held on October 19th and 20th. These would be of interest to those involved in the proposal for a national organization, a national publication, and the executive committees of the various regions represented. More information on the conference program will appear in the Summer Solstice "Newsletter."

THE THIRD ISSUE OF THE PROJECTOR will hopefully appear later this spring or early in the fall. This issue will include a transcript of papers presented last year during a meeting of the education committee of The American Astronomical Society, and at the last convention of the G.L.P.A.

MANY MEMBERS OF G.L.P.A. SAW THE SOLAR ECLIPSE OF MARCH 7TH from within the path of totality. Robert Victor and David Batch of Abrams Planetarium, Michigan State University, and Maxine Haarstick of Minneapolis observed the event from Mexico. The editor suspects that they were not the only ones from G.L.P.A. to see totality from so favored a place. A large expedition of approximately 40 from Grand Rapids, Michigan, were
COMET BENNETT, photographed in early April by Robert C. Moler at James C. Veen Observatory. Photos above and right were taken on high speed ektachrome at F/2.

Photo above taken at prime focus of 12½ inch Borr Memorial Telescope (f/6) on April 7th; 5 minute exposure on H.S.E.

Participants in eclipse expedition to Bladenboro, North Carolina, including representatives of G.R. Amateur Astronomical Association, Chaffee Planetarium, and Grand Valley State College.
Above and right; flagraising and hasty reassembly of equipment at alternate eclipse site, near Bladenboro, N.C.

Photo above, showing structure of inner corona, was taken by Thomas Strach using a 3 inch Unitron refractor.

SOLAR PROMINENCES, photographed by George Sypniewski through a Questar telescope. This is one of hundreds of excellent photographs obtained by students and faculty members of Grand Valley State College, who participated in the Bladenboro, N.C. safari.
NORFOLK, VIRGINIA was the fortunate choice of sites for four West Michigan students, including Thomas Strikwerda, David Wojczynski, and Thomas Muller from the G.R.A.A.A. At right is Muller's spectacular photo of the Diamond Ring. Below, sunspots are visible on the photosphere as the moon's limb advances.

OUTER CORONA shows well in photo at right, taken by Thomas Strikwerda using a 3 inch f/6 reflector with Ektachrome X and ½ second exposure.
stationed at several points along the East Coast path of totality. Dave DeBruyn and colleagues were at Bladenboro, North Carolina, after being forced by an approaching weather front to move northward from their original headquarters in Waycross, Georgia. Other Grand Rapids observers were in Norfolk, Virginia; Elizabethtown, North Carolina; and Waycross. In all, over 500 photographs were obtained by participants in the West Michigan expeditions. Some of the better ones are reproduced here from the Inside Orbit, publication of the Grand Rapids Amateur Astronomical Association.

COMET BENNETT proved to be the most spectacular such object observed in northern hemisphere skies since Ikeya-Seki in 1965. It was widely observed and photographed when at its brightest in late April and early May. Included in this issue are photographs taken at the James C. Veen Observatory near Grand Rapids, Michigan. They were recorded by Robert C. Moler, president of the Grand Rapids Amateur Astronomical Association, and are reprinted from the Inside Orbit.

PRESIDENT ROBERT ELLIOTT was scheduled to take office at the time of the Vernal Equinox. However, due to his extended leave at Kitt Peak, he will not do so until late summer. In the meantime, Ralph Ewers will continue to serve as acting president. Don Tuttle assumed the position of President-elect at the time of the equinox, and Maxine Haarstick, who was somehow re-elected at the time the last convention, just continues to swing along as secretary-treasurer.

POSITIONS AND PERSONNEL

THE ROGER B. CHAFFEE PLANETARIUM OF THE GRAND RAPIDS PUBLIC MUSEUM announces a vacancy in the position of Curator of Planetarium Education. The person selected for this position would be in charge of developing sound educational practices in the planetarium, and promoting curriculum coordination and teacher assistance in the Grand Rapids School System and surrounding areas. The facility includes a Goto M-1 projector under a 30 foot dome, with a wide variety of auxiliary projectors. Excellent office and workroom facilities and secretarial services are available. There is also opportunity for work with an astronomical observatory housing two telescopes. Approximately 30,000 people visit the Planetarium annually, with 75% of that figure composed of school classes. The person selected for this position would deliver some school and public lectures, and would supervise part time assistants in such endeavors. Salary is negotiable from $6,800 depending on background and experience, with excellent fringe benefits. Requirements include a bachelors degree in one of the physical sciences or education; also a working knowledge of the fundamentals of astronomy and strong interest in the educational potential of a planetarium. Ability in teaching and public speaking is essential and some classroom or planetarium lecturing experience is desirable. Send background resume to David L. DeBruyn, Curator of Astronomy, Grand Rapids Public Museum, 54 Jefferson, S.E., Grand Rapids, Michigan 49502.

MICHAEL BENNETT, formerly of San Francisco's Morrison Planetarium, and editor of the Pointer, official publication of the Pacific Planetarium Association, is now associated with Planetariums Unlimited of Holbrook, New York. He has also become a member of the Great Lakes Planetarium Association and its Publications committee. Welcome to G.L.P.A. Mike. We can certainly use a man with your talents and enthusiasm. Charles F. Hagar, of the Morrison Planetarium in San Francisco, is the new editor of the Pointer.

JACK HOLWARTH, Director of San Antonio College Planetarium, San Antonio, Texas, is now editor of the Journal of the Southwestern Association of Planetariums, which held its annual meeting in Dallas in January.

TERRY DICKINSON, formerly of the McLaughlin Planetarium, Toronto, has been named assistant director of the Strasenburgh Planetarium in Rochester, New York. He took over the position vacated by Don Hall when he was named director.
SCOTT R. NEGLEY, JR., 511 Plymouth Road, Glenside, Pennsylvania is looking for a position as astronomy instructor and/or planetarium director. He is now an instructor at Pennsylvania State University's Philadelphia area campus. He is now in his third year of teaching astronomy and engineering courses at the undergraduate level, and he also teaches a graduate level astronomy course for science teachers. Mr. Negley has a masters degree, including considerable course work in astronomy and engineering.

COMMITTEE NEWS

THE RESOURCES AND PUBLICATION COMMITTEE met in Lansing on February 19th, and proceeded to make some significant changes in its structure. The name was changed to simply "Publication Committee," and Frank Jettner assumed co-chairmanship with Dave DeBruyn, who has handled that function since the committee was formed in 1965. Jettner will handle promotional and fund raising aspects of the committee's operation, while DeBruyn will continue to edit the "Newsletter" and assist John Christian in production of the Projector. He will also continue to sit on the executive committee. Don Bean of Jackson, a relative newcomer to G.L.P.A. and the committee, was appointed as circulation manager; to keep mailing lists etc. up-to-date. If you have not responded yet to Don's recent questionnaire, please do so at once. Mr. Jettner will serve as coordinator for the formation of a steering committee to plan the format for a national trade journal, and is already hard at work trying to find sources of financing for present and proposed publications.

THE EDUCATION COMMITTEE, under the capable chairmanship of Larry Sabbath, appears to be well on its way to rejuvenation. The members are compiling sources of up to date audiovisual materials, and are issuing periodic book reviews. Two of these appear in this issue of the "Newsletter." 

THE CONFERENCE PLANNING COMMITTEE is currently under the direction of VonDel Chamberlain, and of course, has a really big job in producing the upcoming international conference. The committee is composed primarily of representatives of planetariums in southern lower Michigan, so that meetings can be held fairly frequently. The last such meeting was on February 12th, at which time a tentative schedule of events was set up and prospects for invited speakers decided upon. There will be another meeting early this summer.

BOOK REVIEWS


Planetariums are becoming so well distributed and well known that it is rarely that a lecturer is asked to open the dome, or receives a request to be shown the telescope. But even planetarium directors and lecturers are frequently unaware of the long history of the planetarium idea. Harriet Pratt Lattin has endeavored to correct this in her book for young people, entitled STAR PERFORMANCE.

Opening with a description of a visit to a large, modern planetarium, and an example of a typical lecture, the book moves into some of the early astronomical ideas that came from Egypt, Babylonia and Greece. A later chapter tells how astronomical features were shown and includes descriptions of the painted ceilings of Egyptian tombs, Babylonian boundary stones, Roman and medieval fabrics, manuscripts and wall paintings.
Mrs. Lattin notes that the use of globes to depict the sky was a rather late development, and she devotes a considerable amount of space to the various makes of celestial globes, armillary spheres, astrolabes and similar instruments, even including clocks that depicted astronomical events.

An entire chapter describes orreries and their histories. It is illustrated by several photographs of famous ones in Europe and the United States.

The last two chapters deal specifically with the projection planetarium and trace the modern instruments from the Gottorp Globe Planetarium built in the 17th century and reconstructed in the Museum Lomonosov in Leningrad. The development of the Zeiss, Spitz and various Japanese instruments is included, and examples of them are shown in the illustrations.

The book concludes with a bibliography of the materials used by the author, which could be helpful to the planetarium director but which might not be available to the general reader for whom the book is basically designed. Many of the references listed would not be found in the average library, and would be too technical for the teen-ager to enjoy. Some are foreign language publications. There is also an index that is well arranged and complete enough to be very useful.

Although most of the text of the book is very definitely aimed at the lower teen-ager, the middle portion of the book, with its extensive listings of the many types of instruments and their makers, may become wearisome reading for this age group. In this portion of the book, too, there is a tendency to lose the clearcut distinction between attempts to depict the appearance of the sky, and the development of astronomical equipment for observational purposes. As a result, the person who is actively engaged in planetarium work may find this section more interesting than will the younger, more casual reader.

The black and white illustrations are, for the most part, clear and help to understand the text. The few exceptions are those taken from old manuscripts which did not reproduce well when photographed. Even these are not objectionable, and might serve to spark an interest in some of the old records.

On the whole, STAR PERFORMANCE is a concise, smoothly written account, not only of the ways man has striven to show the sky, but an introduction to the history of the science of astronomy itself, both of which have gone together through the ages. As such, it is a book which the planetarium operator can use as a convenient reference and can suggest as reading material for the young members of his audiences.


A very detailed and inclusive volume regarding man's effort to extend his sense of sight into our universe. The book is very complete and can be understood by the Junior High students. Some of the chapters are on the size of the universe, how stars shine and the astronomers tools. It talks of the theories of the universe and what is ahead in space. The continuity of the book is excellent in that it starts with concrete earth based ideas and then leads you into theories on which we base our understanding of the universe.

This is an outstanding beginning dictionary and book of tables for those just starting to study astronomy. It is divided into four sections: The dictionary of terms, Reference tables; Detailed constellation map; Principles of the telescope. Each entry in the dictionary is explained in detail and cross references are given when applicable. The entire volume is well done and will be a help to the students.

THE GREAT LAKES PLANETARIUM ASSOCIATION offers membership opportunities to all individuals in any way connected with the operation of planetariums. The only pre-requisite for membership is a sincere interest in and sympathy for the objectives of the association and payment of annual dues. Annual membership dues are $5 per individual, to be paid annually at the time of the autumnal equinox. General correspondence and membership application should be submitted to Mrs. Maxine Haarstick, Planetarium of the Minneapolis Public Library, 300 Nicollet Avenue, Minneapolis, Minnesota 55401. Contributions to the Projector, official G.L.P.A. journal, should be submitted to Mr. John Christian, Robert T. Longway Planetarium, 1310 E. Kearsley Street, Flint, Michigan 48503. Contributions and notices for the quarterly "Newsletter" should be sent to David L. DeBruyn, Editor, Roger B. Chaffee Planetarium, 233 Washington, S.E., Grand Rapids, Michigan 49502. Deadlines for contributions to the latest "Newsletter" fall at the beginnings of the four seasons.
OUR CALENDAR

By Harry E. CruII
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A calendar is a device whereby civilization reconciles, for record-keeping purposes, the various natural and artificial time divisions. Our calendar, in general use today, is the product of more than 2000 years of development and is based on foundations perhaps many times older.

The earliest calendars were probably lunar. The moon has always fascinated mankind and its 29 1/2 day period between successive new moons probably provided an early means of keeping track of the passage of time. Lunar calendars have been used for millenia, probably the best-known and most widespread in usage today is the Moslem calendar.

While most of us think a prime requirement for a usable calendar is that it stay in step with the seasons of the year, a lunar calendar cannot achieve this. Twelve lunations total 354 days, about 11 1/4 days shorter than the tropical year and thirteen total 383 1/2, about 18 1/4 longer. A lunar calendar must steadily gain or lose on the seasons of the year; indeed in the Moslem calendar there are 12 lunar months, the year is 354 days long and every 32 1/2 years it gains one year on the calendar in general use, the Gregorian.

A compromise calendar is the luni-solar type. The months are lunar (alternately 29 and 30 days) but at appropriate intervals extra or "intercalary" months are introduced to bring the calendar into step with the seasons. Since nineteen tropical years equals nineteen intervals of twelve lunations each plus seven lunations, that is 19 years = 19 x (12 months) + 7 months, a formal pattern of introducing seven intercalary months each nineteen years can be devised, thus preserving both the lunar month and the solar year in the same calendar. Such a device is called luni-solar, and an example is the Hebrew calendar. It has the advantage of remaining synchronous with the seasons but preserving the religious features of its origin. The intercalation of months causes Hebrew religious holidays to move about in the Gregorian calendar but never to depart seriously from their mean place.

Lack of uniformity or open disagreement regarding the pattern of intercalation can result in endless confusion and so it was in ancient Rome. The situation led Julius Caesar in 46 B.C. to reform the luni-solar calendar into a strictly solar one which serves as the foundation of the calendar we use today.

Information available in ancient times indicated that the tropical year (i.e., the year of the seasons) was 365 1/4 days long. It is impractical to have fractions
of a day in a year so the leap year device was resorted to. Three years of 365 days each were followed by one of 366 days; an intercalary day, February 29, appears each fourth year. After some juggling of days in certain months and a moving of New Year's Day from the vernal equinox to January 1, the Julian calendar became official and was universally adopted by European civilization. It was undisturbed for over 16 centuries.

The difference between 365 1/4 days and the true length of the tropical year is 11 minutes 14 seconds. Since the Julian year is too long by this amount, the seasons slowly shifted with respect to the calendar, one day in 128 years. The vernal equinox which in ancient Rome had occurred on March 25, by 325 A.D. was coming on March 21, and in 1582 was reached on March 11. Clearly reform was called for.

With advice from the astronomer Clavius, Pope Gregory XIII reformed the Julian calendar in 1582. Two basic changes were made. The first put the vernal equinox back to March 21 where it had been in 325 when rules for determining the date of Easter were formulated, thus reinstating a stable method for this determination and removing causes of conflict and confusion. In order to effect this change, October 4, 1582 was followed by October 15. Some consternation developed among ignorant and superstitious people who felt they were somehow having their lives shortened, but careful provision was made to avoid inequities in rents, interest, salaries, and the like and the reform was adopted at once in all Catholic countries.

The second reform was designed to prevent a recurrence of the dilemma which the first had solved. To keep the vernal equinox at or near March 21, the length of the Gregorian year was shortened by deletion of three leap years every four centuries. This was done by providing that century years are leap years only if divisible by 400. Thus 1600 was a leap year, 1700, 1800, and 1900 were not and 2000 will be. The average Gregorian year differs from the tropical by only 26 seconds which will accumulate to one day in about 33 centuries. Sometime around the year 5000 this problem can be confronted.

Protestant countries generally adopted the Gregorian calendar reluctantly and the Eastern churches still use the Julian calendar for religious observances. The British Empire adopted the Gregorian system in 1752 when the difference between the two calendars had increased to eleven days. The reform inspired riots in Bristol where the rioters chanted "Give us back our fortnight." George Washington, whose birthday we now observe on February 22, was born on February 11 (old style, as it was called) and after the reform this date became February 22, new style.

The United States purchased Alaska from Russia and in the nineteenth century the difference between the Julian and Gregorian calendars was 12 days. However, since the dateline was changed at the same time, only eleven days were removed from the reckoning to bring Alaska into conformity with the rest of the United States. Russia adopted the Gregorian calendar in 1917 when the difference had accumulated to thirteen days. There is similarly a thirteen day difference between the religious observances of the Western Church and some of the Eastern ones.

Future calendar reform will probably take a different course than in the past. Now that the true length of the year has been so nearly approximated, we can turn our attention to the haphazard apportionment of days to the months. Roughly the 30 and 31 day months alternate (except for the July-August and the December-January juxtapositions), but the quarters are hopelessly unequal (90,91, 92, and 92 days respectfully) and dates creep through the days of the week as the years pass. Disatisfaction with this latter fact is reflected in the recently enacted Federal law fixing certain national holidays on Mondays rather than on specific dates.

One proposed reform of the calendar is embodied in the World Calendar which adheres to the Gregorian calendar in determination of apportionment of intercalary
days but revises the length of months within the year. Each quarter in this calendar has 91 days (exactly 13 weeks of seven days each). January, April, July, and October start on Sunday and contain 31 days each. February, May, August, and November start on Wednesday and have 30 days and the remaining four months start of Friday and contain 30 days. Since four quarters of 91 days each total 364 days, the extra day is placed between December 30 and January 1. It is called Year Day and is a holiday having no name as a day of the week. Leap year day comes between June 30 and July 1, again being a holiday and having no name in the week but being assigned by the Gregorian system.

The advantage of the World Calendar is its uniformity. Particular dates would forever fall on the same day of the week. Christmas, December 25, would always come on Monday, Independence Day, July 4, on Wednesday and similarly for all birthdays and anniversaries.

The chief resistance to this proposed change, other than the inertia of tradition, will probably stem from religious considerations engendered by the seven day week and possible wandering of the Sabbath Day through the week. This objection is formidable and remains to be solved.

So we see that our calendar, as in use today, is the result of centuries of development but still remains short of perfection from all standpoints. Only the future can reveal what revisions may lie there.

NEWS NOTES

THE CONFERENCE OF AMERICAN PLANETARIUM EDUCATORS is now only a couple of months away, and final preparations are progressing smoothly. The official conference dates are from October 21st to 23rd at Michigan State University. If you have not received the program and registration brochure, please write to Abrams Planetarium, Michigan State University, East Lansing, Michigan 48823, requesting same. Please reserve rooms and meal tickets as soon as possible. Early returns will help the planning committee immeasurably.

SPEAKERS AT THE C.A.P.E. CONFERENCE will include astronaut Alan Bean; Nobel Prize winner Harold C. Urey; James V. Bernardo, formerly with N.A.S.A.; and noted astronomer George Abell; and astronomical historian Henry C. King. There will also be seminars and planetarium shows, as well as ample time for committee and regional meetings.

ALL PERSONS CONNECTED WITH PLANS FOR FORMATION OF A NATIONAL PUBLICATION are urged to be in East Lansing on Monday, October 19th for a pre-conference planning session. Numerous ideas and possibilities have been suggested for a national or international trade journal. It would be particularly helpful in lessening the redundancy that now exists between regional groups, and might result in the wide circulation necessary to promote financial backing and advertising. All regional editors and publication committee members are particularly urged to be present. The meeting will probably be held in Kellogg Center someplace, and will begin at 7 P.M. October 19th.

THE MIDDLE ATLANTIC PLANETARIUM SOCIETY recently elected new officers. President is Mr. Norman Dean, who resides at Upper Crossroads, Fallston, Maryland.

THE PLANETARIUM ASSOCIATION OF CANADA will hold its 1970 general conference at the Centennial Planetarium, Calgary, Alberta on September 9th, 10th, and 11th. If southern friends want to go up for the event, they are welcome, but they had better contact Sig Wieser in Calgary soon to make arrangements. This editor has vivid recollections of last year's P.A.C. conference in Vancouver, which he had the pleasure of attending. The Canadians, of course, are noted for their friendliness and the uniqueness of their conferences.
RESULTS OF THE APOLLO 11 LUNAR SCIENCE CONFERENCE, held in Houston early this year have been published in a special issue of Science (January 30, 1970, Volume 167, Number 3918) which may be purchased for $3 from the American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005.

THE PUBLICATIONS COMMITTEE of the G.L.P.A. met in Grand Rapids on July 23rd. At that time, future financing of The Projector, along with promotion and advertising were discussed. There was a general consensus that it would be wise to wait until after the National Conference before making concrete decisions relative to future directions.

POSITIONS AND PERSONNEL

THE NEW DES MOINES CENTER OF SCIENCE AND INDUSTRY is seeking a planetarium director for its elaborate Spitz A-4 installation, with 40 foot dome, professional sound system, and custom built console. Duties will include presentation of public programs, preparation of school programs in conjunction with educational coordinator and designing special effects to be built in fully equipped shop. Salary is commensurate with experience, which should include some work in the areas listed above. Contact Robert Bridigum, Director, Des Moines Center of Science and Industry.

THE WALLINGFORD, CONNECTICUT Public School System is looking for a planetarium director. Contact Mr. Frank Donovan, Superintendent.

THE ROGER B. CHAFFEE PLANETARIUM, Grand Rapids, Michigan announces the appointment of Mr. Larry Gwinn as Curator of Planetarium Education. Mr. Gwinn is a graduate of Grand Valley State College and has a longtime interest in astronomy. He recently returned from Hawaii where he did work at a solar observatory located there. Previous to that, he was associated with Bell and Howell in Chicago.

MUSIC FOR THE PLANETARIUM

Editor's Note - One of the most often requested functions of a "Newsletter" is to keep Association members abreast of the many "good ideas" and "inspirations" that are floating around in the planetarium community. Because almost all of us use music to some degree in planetarium programming, and because many of us are far from connoisseurs of this fine art, I am always on the lookout for good compilations of compositions used in various planetariums. The list below, which comes from Donald Davis, director of Montreal's Dow Planetarium, contains some particularly novel and, I believe, very valuable ideas. Some of Mr. Davis's comments from the P.A.C. Journal are included with the listing.

Twilight and Appearance of the Stars.

Richard Strauss, "Also Sprach Zarathustra". Although the opening 1 1/2 minutes of this work are widely known ("2001 - A Space Odyssey"), this music is rich in other useful excerpts for the planetarium. Immediately after the famous 1 1/2 minutes there is a long, slow, quiet passage which eventually develops into a beautiful rich crescendo. Use as much as you need. Disc widely available.

Bach/Walton, "The Wise Virgins". This imitation Baroque work (Bach tunes, Walton orchestrations) is another rich source of planetarium material. Almost every section is useful for something (exit music, solar prominences, for example). There are two or three quiet sections which can be used for a "baroque" sunset. This old London disc is currently unavailable, but we can dub it for anyone who is interested.
Malher, Symphony No. 5, Fourth Movement, opening 2 minutes, 45 seconds. We used Vanguard VSC 1001/2 as our disc.

Musical Introductions and Backgrounds for Transcriptions.

John Barry, "The Lion in Winter" (film soundtrack). There is a great introduction with mixed chorus, ominous and full of strange portents, that we have used as an opener for an astrology show. The disc also contains a great finale. That's Columbia OS 3250, for all interested Aquarians.

Elmer Bernstein, "The Ten Commandments" (film soundtrack). The overture to Act II is the greatest splash opener I have ever heard. We used it for a "history of the space age" introduction. Disc: United Artists UAS 6495.

Gregorian Chant. Disc: London LL 1463. Our recent Galileo Show began in the Cathedral of Pisa, so...

Stravinsky, (1) Double Canon for String Quartet, (2) Epitaphium for Flute, Clarinet and Harp. These two dreamy, surrealistic pieces were used in tandem as background for a transcription on the history of man's ideas about going to the moon. Total time: 1 minute, 52 seconds. Disc: Columbia MS 6272.

Miscellaneous Special Effects.

Sunrise/Finale. "The Lion in Winter" (see above) has a nice, spectacular closer that goes well with a sunrise.


End of a solar eclipse (coincides with the end of the show). Aaron Copland, "Fanfare for the Common Man". Extremely impressive. This piece, which is about three minutes long, made an excellent show closer. We kept it playing as exit music while the audience stumbled out, much shaken. Disc: Westminster XWN 18284.


Another Strange Planetary Landscape. "Song of the Second Moon", an album of electronic music by Tom Dissevelt. This strange music is very effective for a great number of things. It is also rather nice. Disc: Mercury Limelight LS 86050.

BOOK REVIEWS

SEARCH AMONG THE STARS

By Carl Heintze. D. Van Nostrand, Co. New York, N.Y. 1966. $4.50: This volume concerns itself with the problem—is there the possibility of life outside the earth? Written with the younger readers in mind, the evolution and requirements of life on the earth are traced. This information is then used to explain why, or why not, life could exist in other parts of the universe. A discussion of what is being done today in regard to investigating these problems is presented.

SECRETS OF THE SKY

well done book that can be used in the upper elementary grades. The pictures and illustrations used are excellent. The text is very well done and touches upon most all phases of astronomy in some detail. While this book would probably not be used as a classroom text, it is very well suited as a reference book to be kept in a classroom rather than a library.

ASTRONOMY

By William M. Smart. Oxford University Press, Inc. London, England. 1956: A very excellent introduction to astronomy. It covers the science of the subject very well but leaves the observing to other volumes. The photographs are excellent throughout the text. The explanation of terms and concepts are very well done.

THE GREAT LAKES PLANETARIUM ASSOCIATION offers membership opportunities to all individuals in any way connected with the operation of planetariums. The only pre-requisite for membership is a sincere interest in and sympathy for the objectives of the association and payment of annual dues. Annual membership dues are $5 per individual, to be paid annually at the time of the autumnal equinox. General correspondence and membership application should be submitted to Mrs. Maxine B. Haarstick, Planetarium, Minneapolis Public Library, 300 Nicollet Mall, Minneapolis, Minnesota 55401. Contributions to the Projector, official G.L.P.A. journal, should be submitted to Mr. John Christian, Robert T. Longway Planetarium, 1310 E. Kearsley Street, Flint, Michigan 48503. Contributions and notices for the quarterly "Newsletter" should be sent to David L. DeBruyn, Editor, Roger B. Chaffee Planetarium, 233 Washington, S.E., Grand Rapids, Michigan 49502. Deadlines for contributions to the latest "Newsletter" fall at the beginnings of the four seasons.
No autumn issue of the *GLPA Newsletter* was published this year.
A POINTED SKYLINE

By David L. DeBruyn, Chief Curator
Roger B. Chaffee Planetarium of the Grand Rapids Public Museum
Grand Rapids, Michigan

Most of those engaged in operating planetariums agree that skylines of one sort or another lend an added dimension of realism and presence to the projected sky. There are two basic methods now in widespread use for producing skylines, one incorporating a black silhouette at the base of the dome, and the other depending on an elaborate battery of optical projectors. Certainly, the latter method of placing eight to twelve slide projectors at strategic locations and projecting an artist's panorama in sections can produce magnificent results, but we are all painfully aware that the technique is expensive, requiring considerable time and talent to execute effectively. Thus, most small installations with limited budgets and resources use the less effective silhouette skylines, which can be inexpensively built out of masonite or even cardboard. While these provide a satisfactory alternative, especially when used in planetariums where there is a cove lighting system, the scene can be changed only by installing a whole new skyline, and the realism is generally less satisfying than with a projected panorama.

Some months ago, we here at the Chaffee Planetarium developed a method of projecting skylines which is less expensive and more versatile than the silhouette technique. However, it produces a panorama which, considering its simplicity, compares surprisingly well with elaborate optical landscapes. We are indebted to that great past wizard of the planetarium profession, Mr. Ralph Ewers, for inspiring what we shall call our pinpoint skyline. He used a somewhat similar method for producing a projected Stonehenge silhouette at the Cincinnati Planetarium (see "Newsletter" for the summer solstice of 1968, Volume III, Number 2), and often admonished his many followers that miracles could be performed using cardboard and good old number 605 flashlight bulbs.

The number 605 bulbs use six volts and have a very small filament, making them particularly suitable for pinpoint projection. Many of us use them in soup cans with appropriate Ortho overlays for producing constellation outlines and other simple diagrams on the planetarium dome. Most planetarium instruments or auxiliary panels have an extra six volt source or two, and if you can find one that is not being used, and have a bit of ingenuity and artistic talent available, you are well on your way to producing a suitable pinpoint skyline at minimal cost.

We devised this method in the fall of 1969 when we were putting together a program on Project Apollo entitled "Conquest of the Moon." While making his elaborate preparations, the producer of the program, Robert Moler, casually asked the rest of us if we could come up with something that would give the effect of a lunar landscape. After considerable headscratching, it was decided that a pinpoint panorama patterned after Ewers' Stonehenge thing might be the answer. Following the inspiration, it took only
two hours of art work and about five hours of construction time to produce the finished product. So in less than the time of one complete working day, we had made ourselves a device that not only helped immensely in simulating a lunar landing but which, with appropriate variations and improvements, has been serving our various skyline needs ever since.

The setup consists of two cylindrical units, each with a 605 bulb at its geometrical center, and with sides opened to allow light to pass through an acetate transparency and then over a 200 degree area at the base of the projection dome. (see diagram 1) Using the two units, one on each side of the projector in an east-west direction, allows full coverage of the horizon area without producing nuisance shadows of the machine or auxiliary contraptions. Mounting was accomplished very easily here in Grand Rapids, where we have a Goto projector with its massive support frame and brackets for the morning and evening twilight projectors sufficiently strong enough to carry the relatively lightweight horizon units beneath them. The problem of installation might be a bit more difficult with Spitz A3P projectors, but whatever you come up with, it is important to have the units mounted horizontally and approximately at the level of the dome base, and with a provision for at least a slight amount of horizontal rotation.

Use a band saw and 1/2 inch plywood to produce four circles 8 inches in diameter. These can be larger (up to about 12 inches) if you have plenty of room alongside the planetarium projector, but should not be any smaller if you want a projected skyline of satisfactory sharpness. The greater the distance from the pinpoint light source to the transparency plane, the greater will be the sharpness of the panorama. From a section of 2 by 4, cut out two blocks about three inches long. Now nail or screw these on edge between the plywood circles as shown in diagram 1, thus forming two rigid though open sided cylinders. Be sure that the plywood blocks are placed so that when the light bulb units are affixed to them, the filaments will be nearly at the geometrical center of each cylinder.

Black cardboard can now be glued around the back one third of each cylinder, and the units painted flat black. While the paint is drying, cut out two cardboard rectangles of proper width and sufficient length to completely cover the remaining exposed area of each cylinder when wrapped around it. Cut a slit two inches wide and long enough to extend through at least 200 degrees in each of these cardboard pieces. (see diagram 2) Glue some heavy acetate to one side of these pieces, and then set them aside to dry.

Screw type bases with a slotted mount for the 605 light bulbs can hopefully be obtained from a local electrical or electronic supply store. (see diagram 3) General Electric or Newark Industrial Supply outlets are usually the best bet for obtaining them. One screw through the elongated slot can be used to mount the socket to the 2 by 4 support within each cylinder, thus allowing the bulb to be raised or lowered slightly for fine adjustment. Solder lamp cord leads to the terminals, cut a small hole in the bottom of each cylinder for the power line, and then attach the cords in parallel to your variable six volt source. Mount the two units precisely on a horizontal plane and at the same height, with provision for a slight amount of horizontal rotation which might be necessary to bring the two sections of the skyline into proper adjustment.

Now retrieve the transparent acetate frames and affix them to each cylinder with thumbtacks, small screws, brackets, or a combination of these. However, don't use cement, as these must be easily removable for changing bulbs and skylines. Further adjust the bulb and unit positions so that there is a broad band of light surrounding the base of the dome when the source is faded up, with its bottom at the edge of the cove or base of the dome. The bands of light from each projector should overlap somewhat, but they do not have to meet perfectly. Now doublecheck to be sure that each unit is
rigidly mounted and that the acetate frame is securely fastened to the cylinder before proceeding to the last and most important step.

The artwork must be done carefully and with the right tools, but it is not terribly difficult. We were fortunate to have a Curator of Education who was also a pretty fair artist in the person of Richard Thompson. He produced the original moonscape and a Christmas skyline. However, the author, who does not consider himself to be much of an artist, had no trouble in producing additional transparencies containing trees, hills, and buildings. Use a fine point magic marker that will adhere to acetate, but which is erasable (The people at your local art supply store will be very helpful here.) It is best to work in the dark with the projector light sources turned up to a moderate degree. Decide on the general nature of the panorama and the height that you want it to extend above the cove, and then draw in the top edges of the figures you want, such as houses, trees, hills, camels, craters, or whatever is appropriate to your needs.

After the rough outline is achieved, inner details can be added to a certain degree. How effectively this is done depends only on the ingenuity of the artist and quality of the marker used. Don't overdo fine details; just give the features enough highlight to reveal their true nature. Finally, when everything is satisfactory, (some erasing and redrawing might be necessary along the way.) completely opaque out the transparent area above the skyline and where the two panoramas overlap. Black tape can be used for part of this, along with your magic marker and Kodak opaquing material, which seems to work very well. As a final touch, you might want to put a color filter around the bulb, or color it with the handy transparent paints for slides, lamps, etc. available from Edmunds Scientific Salvage Company, (Stock #71,067, $11.25 per set). A blue tinge adds to the Christmas skyline, while yellow gives a touch of desolation to a lunar landscape, and green is appropriate to the general trees and hills type skyline that is used most often. We have not experimented with coloring different parts of the panorama different colors to bring out the individual features, but it might work using the Edmund coloring kit and a good bit of skill and patience.

As indicated above, we first concocted this arrangement as a desperation effort to produce a lunar landscape, fully realizing that we did not have the resources necessary for an optical panorama. We would be kidding ourselves if we said that the pinpoint skyline is as effective or dramatic as an optical one, but considering the great difference in sophistication between the two techniques, the pinpoint system is surprisingly realistic and far more practical for smaller installations. The projected lines remain reasonably sharp and the bulbs easily bright enough for use in domes up to 40 feet in diameter.

We were so happy with the initial results in "Conquest of the Moon" a year and a half ago that we have expanded and improved our use of pinpoint skylines in subsequent months. For the 1969 version of our annual Christmas program, "Star of Wonder," we scrapped the cardboard silhouette used during previous years, and in a matter of a couple hours, came up with a transparency skyline of Wisemen, buildings, and palm trees that proved to be far more effective. With the basic unit now permanently installed on our planetarium instrument, during the recent holiday season, we merely had to pull the Christmas transparencies out of storage and slap them in place.

For most of our programs, including some of our school class sessions, we use the basic country scene, which includes rolling hills, a distant wooded area, and isolated trees. However, with appropriately worked slides and several small single frame projectors that most of us have laying around, variations can be played on the basic theme and appropriate buildings and other features can be added. Using a properly opaqued slide of our James C. Veen Observatory taken in moonlight, (See the "Newsletter" for the vernal equinox of 1969, Volume IV, Number 2 for Ron Cobia's ingenious method of producing non-slide slides.) and projected against the pinpoint horizon, we can take
the audience to the summit of Kissing Rock Hill (See Sky and Telescope for September, 1970, Page 154) for a night's observing. Or, using the lunar horizon, we can fade in a lunar module sitting among the boulders.

In a current program on the Milky Way, we use the basic skyline throughout, but at various places in the narrative, fade in appropriately opaqued non-slide slides of a giant radio telescope sitting in a clearing, Herschel's 20 foot colossus, and the dome of the 200 inch Hale telescope on Palomar Mountain. Admittedly, the scene only partially changes during the various episodes in the story, but this is better than having no change of scene at all. Sometime in the future, we hope to gang these projectors. Up to three or four units could be built above and below one another, with separate control circuits allowing use of several skylines without having to change the setup.

I am thoroughly convinced that the full potential of this method of producing skylines has not yet been realized, and that it can be put to advantageous use in the great majority of installations where time, money, and diverse talent is at a premium. The effect, even though less than ideal, fully repays the rather modest amount of work and money that goes into preparing it, and adds greatly to the realism of the planetarium sky.

**DIAGRAM 1**
2 disks, 8 inches or more in diameter between 2 by 4 block on edge. 4 inches long.

Support units from above or below

**DIAGRAM 2**
Black Cardboard Frame

**DIAGRAM 3**

Socket and Slotted Mount for 605 Bulb - Mount so that filament is near geometrical center of cylinder, using single screw.

**DIAGRAM 4**

4,3/8" Length of window sufficient to cover 200 degrees of circumference when wrapped around cylinder.
THE 1971 ANNUAL CONFERENCE OF THE GREAT LAKES PLANETARIUM ASSOCIATION is tentatively scheduled for Mount Clements, Michigan on Friday and Saturday, October 8th and 9th. Jim Pike of Mount Clements High school will be the host, and he promises the availability of excellent facilities and easy access to airports. Hopefully, more detailed and positive information will be available for the vernal equinox edition of the "Newsletter."

ATTENTION ALL G.L.P.A. MEMBERS - If you are tired of reading articles by the editor and hearing about all the wonderful things that are going on in Grand Rapids, why not do something about it? We desperately need a good backlog of articles and interesting items for forthcoming issues of the "Newsletter." Share your tricks with your colleagues, or explain the unique way that you do this or that under the planetarium dome. Your ideas have real merit and are the kinds of things that will make your "Newsletter" an effective organ. Get with it today! Send your items to David L. DeBruyn, Roger B. Chaffee Planetarium, 233 Washington, S.E., Grand Rapids, Michigan 49502.

APOLOGIES FROM THE EDITOR for not producing an Autumnal Equinox issue of the "Newsletter." With all the hubbub surrounding the planning of CAPE early in the season, and the need to recover from the influence of Maxine Haarstick after it was all over, the "Newsletter" got lost in the shuffle. Besides, as noted in the preceding paragraph, there has been a poor backlog of items lately. How can you publish an effective "Newsletter," when you have nothing to put in it? Please help.

THE CONFERENCE OF AMERICAN PLANETARIUM EDUCATORS is now history, and I hope that we can all agree that it was a truly historic and significant event. There is no need to summarize the activities here, as most of us were fortunate enough to be in attendance for most of the exciting activities. An excellent and comprehensive summary has been published by Norman Sperling in the January issue of Sky and Telescope. It also includes a number of pictures of featured speakers and convention events. The texts of key speeches will be published in a forthcoming issue of the Projector or in the new international trade journal which will hopefully make its appearance in 1971. A great deal of credit must go to Von Del Chamberlain and his fine staff for handling the mountain of work that must have been required to make this convention come off so smoothly.

AN INTERNATIONAL ORGANIZATION of planetarium educators did evolve from the sometimes stormy general sessions of CAPE. The group will temporarily be called the Conference of American Planetarium Educators, pending final recommendation of a name to be submitted by the constitutional committee, which was formed at the meeting. This committee consists of the three provisional officers elected at the conference: Professor Paul Engle of McAllen, Texas, Chairman; Mr. Sig Weiser of Calgary, Alberta, vice-chairman; and Jack Howarth of San Antonio, Texas as executive secretary; along with the following representatives of the various regional groups: James Hooks (SEPA), Stephen F. Berr (MAPS), VonDel Chamberlain (GLPA), John Akey (RMPA), and Rich Calvird (SWAP). They will meet late in the winter, and will hopefully have a proposal ready for mailing shortly thereafter.

THE PLANETARIUM TRADE JOURNAL will hopefully move forward even if the international organization does not. This was the concensus of the members of the ad hoc publications committee which met before and during CAPE. Under the chairmanship fo Mr. Frank Jettner of Albany, New York, this committee drafted a proposal that a North American Trade Journal evolve from the existing publications of the various regions, which currently operate with a great deal of overlapping and duplication. Finances and format were thoroughly discussed, with it being resolved that the new journal would have the highest standards of excellence possible, with a professional rather than newsy type format. Members of the committee which will hopefully bring this publication into existence and work out attendant details within the coming year are: Frank Jettner, chairman (GLPA); Michael Bennett, secretary (GLPA); Jack Howarth (SWAP); Norman Sperling (MAPS); Larry
Gilchrist (PAC); Jack Hooks (SEPA); and R. Hartman (PPA); and a delegate to be named from RMPA. Justifications for the journal were emphatically stated by the publications committee and indorsed by the entire convention body. They are: (1) to improve inter-regional communications, (2) to consolidate editorial efforts and eliminate unnecessary duplication, thus reducing the magnitude of the paper explosion, (3) increase the level of professionalism by encouraging more planetarium educators to communicate and disseminate ideas among their colleagues.

THE AMERICAN ASTRONOMICAL SOCIETY has established a list of professional astronomers who are willing to serve occasionally in the capacity of consultants to educational institutions or departments in schools, colleges, planetaria, and industry. Consultant services may range from replies to occasional telephone or mail inquiries, to short visits by the consultants, or in some cases to participation in special institutes. Consultants expect to be reimbursed for expenses by the contracting institution, and most would expect some compensation for services when more than a trivial amount of their time is involved. Inquiries should be addressed to Mr. H. M. Gurin, Executive Officer, American Astronomical Society, 211 FitzRandolph Road, Princeton, New Jersey 08540. Mr. Gurin will supply lists of available consultants in the geographical area of the requesting institution, but cannot attest to the reliability or expertise of the consultants, other than that they are bona fide members of the Society. It is the responsibility of the requesting institution to verify the qualifications of those consultants it wishes to engage.

THE NATIONAL RADIO ASTRONOMY OBSERVATORY is willing to provide illustrative material for planetarium use in the form of glossy prints or slides of interesting radio astronomical subjects which lend themselves to presentation in a planetarium show. A package is being developed which will include shaded maps of the radio sky seen at various wavelengths, some of the best known radio sources, and photographs of the telescopes at Green Bank. A tape recording of pulsar sounds is presently available, and the tape will be developed later to include other sounds relevant to radio astronomy observations. Requests and recommendations relative to this program can be addressed to: Dr. G.L. Verschuur, National Radio Astronomy Observatory, P. O. Box 2, Green Bank, West Virginia 24944.

THE PLANETARIUM ASSOCIATION OF CANADA, at their annual fall meeting, elected the following officers for the coming year: Father Leclaire of Laurentian University, Sudbury, Ontario, president; James Wright, acting director of the H.R. MacMillan Planetarium, Vancouver, B.C., vice-president; and Sig Wieser, director of the Calgary Centennial Planetarium, secretary-treasurer.

THE NATIONAL SCIENCE TEACHERS ASSOCIATION will hold their 19th annual convention in Washington, D.C. from March 26th through 30th, 1971. The general theme is "Decision Making in Science Education," and a number of noted speakers have already been engaged. Seminars of note will include "Astronomy and Space Science for Elementary School Teachers," with Dr. Franklyn Branley, Chairman of the American Museum-Hayden Planetarium in New York, and "Three Astronomical Happenings," with Dr. Richard McCray, Assistant Professor of Astronomy, Harvard University. For reservation and program brochure, write to Millard C. Davis, National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036.

REGIONAL N.S.T.A. CONVENTIONS of note to G.L.P.A. members will be held in Cleveland from October 7th through the 9th, and in Milwaukee from September 30th through October 2nd.

THOSE WHO ATTENDED CAPE are hereby urged by leaders of the conference to write to their appropriate congressmen and senators, urging reinstatement of some of the space oriented services recently cut by the National Aeronautics and Space Administration due to budget limitations. Perhaps a large scale plea from those involved in space age education might have some positive future effects. A resolution drafted by provisional executive secretary Jack C. Howarth, which might serve as a basis for such communications, reads as follows:

(6)
RESOLUTION of the Conference of American Planetarium Educators held in East Lansing, Michigan 21-23 October, 1970. The conference of American Planetarium Educators commends the Educational Programs Division, Public Affairs Division, Exhibits and Audio-Visual Division of the National Aeronautics and Space Administrative on their efforts in helping in the education of the American children through their services and programs. It is hereby resolved that this conference strongly urges the House and Senate Subcommittees on Space to restore their program and budget to continue said services, and to continue exploration into space, space travel, and astronomy.

THE SPRING MEETING OF M.A.P.S. will be held in Reading, Pennsylvania on March 26th and 27th. The Reading School District Planetarium will host the convention with headquarters at the Reading Motor Inn.

POSITIONS AND PERSONNEL

NEIL B. HOPKINS, 58 Lilly Street, Florence, Massachusetts 01060 is seeking a position as a planetarium staff member. Mr. Hopkins is currently a teaching assistant at Smith College, and he holds an M.S. degree and considerable practical experience in the science of astronomy. He has also had an opportunity to operate the Amherst College Planetarium on numerous occasions. Mr. Hopkins will supply a complete resume upon request.

DONALD A. ROSENFIELD, who has been studying for a PhD. in Brazil, will be returning to the United States in April, and is seeking a position in the field of planetarium curriculum development. Mr. Rosenfield was director of the Delta College Planetarium in 1963 and 64, and has extensive experience and academic training in the field of education. He is also an experienced amateur astronomer. Salary and location are open. Communications may be addressed to Mr. Rosenfield's home address, 332 E. Jefferson, Grand Ledge, Michigan 48837, though he will probably not arrive there until early in April.

THE NORWALK, CONNECTICUT BOARD OF EDUCATION is seeking a planetarium teacher for their school system. The person selected would have full time leadership in the space science program of the system, grades K through 12, with use of a Spitz A3P prime projector in a chamber seating 60 persons. Connecticut teacher certification would be required. Contact Donald W. Buckley, Director of Secondary Education, Board of Education, 105 Main Street, Norwalk, Connecticut 06852.

THE WARREN WOODS PUBLIC SCHOOLS, 27100 Schoenherr, Warren, Michigan 48093 are seeking to fill a vacancy for teaching astronomy in their senior high school. There is potential for establishment of a planetarium director. For further information, contact Mr. Beckett at the above address.

THE FORT WORTH, TEXAS MUSEUM OF SCIENCE AND HISTORY, previously known as the Fort Worth Children's Museum, is seeking to fill the vacant position of Astronomy Department Director. They are seeking an ambitious individual with a firm knowledge of planetarium operation and a desire to innovate in the area of school and public programming in the Museum's Charlie Noble Planetarium. There is an A3P projector under a 30 foot dome, with an annual attendance of over 40,000. Part time and volunteer help is available, and there is ready access to the Museum's exhibit and art departments. Starting salary is $8,500. To apply, send resume and current photograph to Don J. Starkey, Assistant Director, Fort Worth Museum of Science and History, 1501 Montgomery, Fort Worth, Texas 76017.
MARK CHARTRAND, formerly of Cleveland, Ohio, and longtime member of G.L.P.A., is now an assistant astronomer at the American Museum-Hayden Planetarium in New York City. He recently completed his doctorate at Case Western Reserve University.

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