2005 IPS UPDATE

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Abstract: The International Planetarium Society (IPS) continues to advocate the interests of the planetarium community. Abbreviated 2005 updates on the poster address IPS Strategic Planning, the IPS Star Partners Fund, the Armand Spitz Planetarium Education Fund, the 2006 IPS Conference in Melbourne, Australia, the IPS Statement on the Ancient Age of the Earth and Universe, the 2005 IPS/Eugenides Scriptwriting Competition, and other relevant news.

IPS Strategic Planning

Over the past several years, the IPS membership has been discussing changes to the IPS organizational structure. The IPS commissioned consultants to suggest several proposals, which have been presented and discussed at previous IPS and GLPA meetings. Follow-up reports, interviews, and questionnaires attempted to discern the interest of IPS members in adopting some of the changes.

At its September 2005 meeting in Beijing, the IPS Council voted to retain the existing structure by which affiliates represent their respective regions. The IPS Finance Committee was tasked with defining the possible role of a Secretariat and of suggesting funding mechanisms by which to pay for such a position if it were deemed favorable to the IPS. The Secretariat notion thus was not dropped. Considerable concern was voiced about a change in dues that would impact smaller and less affluent planetariums.

IPS Star Partners Fund

In 2000 the IPS established the Star Partners Fund to help provide educational materials and IPS services to planetariums in economically challenged countries. Approximately 50 international planetariums received membership packets in February 2005.

Initially supported by $2,500 in seed money from the Planetary Society, the fund's current balance has grown from IPS member donations to just over $5,000. Among the contributions this past year are multiple $25.00 donations made by Ash Enterprises on behalf of its customers with maintenance contracts. The initiative by Ash Enterprises is a model for other planetarium professionals to support colleagues who are less fortunate.

Armand Spitz Planetarium Education Fund

The "Spitz Education Fund" is available for projects which benefit the planetarium community as a whole and which assist individuals in the planetarium profession or entering it to improve their skills. GLPA members are encouraged to apply for these grants administered by IPS.

Since 2003, several Spitz Education Fund scholarships (~$500.00 each) have been granted to international students seeking masters' degrees in science communication at Dalarna University in Sweden. These students have subsequently reported back to the IPS with results of their work, as published in the *Planetarian*. Absent requests from other applicants, IPS renewed the grant for two more students of Dalarna.

Planetariums interested in hosting a student for three months should contact Lars Broman.

2006 IPS Conference in Melbourne, Australia

IPS heads Down Under for its biennial conference July 24-27, 2006. Winter in Melbourne, Australia, allows for fantastic southern skies with the Milky Way positioned high overhead. IPS members are encouraged to peruse the conference offerings online at www.ips2006.com.

Registration is expected to cost $590 Aus (about $450 USD).

A 6-day post-conference tour of research telescopes will likely start in Canberra. Highlights will include the old Sydney Observatory, the Parks Radio Telescope (as seen in the movie *Dish*), the Anglo-Australian Telescope, and the Australia Telescope Array.

Presentation themes proposed by the host institutions include:

- Astronomy in society (media, culture, history, education),
- Successful public programming and outreach (audience evaluation, regional outreach, portables),
- Innovation under the dome (technology, collaborations),
- Facility updates.

Other IPS News

- IPS encourages planetarians to write NASA Administrator Michael Griffin to convey the value of NASA programs to K-12 and informal education. As NASA currently conducts an Agency-wide review, one NASA consideration is to boost its workforce skills by funneling dollars to higher education programs at the expense of K-12 and informal education programs.

- The IPS Finance Committee will address concerns about making IPS membership more accessible to planetariums for whom IPS dues are disproportionately high when compared with the typical income in their country. Examples were cited of IPS dues being equivalent to several weeks' income.

- The Adler Planetarium in Chicago, Illinois, was selected as the host site for the 2008 IPS Conference. Mark your calendar for June 15-20, 2008.

- A Memorandum of Understanding (MOU) between IPS and NASA is nearing completion.

- A new IPS committee chaired by Ed Lantz is now addressing issues specific to digital projection systems and full dome video.

- The IPS Portable Planetarium Committee seeks a GLPA member to be a point of contact for our region. Contact Susan Button.

- For the Planetarium Guidebook, an aid in the development of new planetariums, the IPS Planetarium Development Group seeks volunteers to author chapters on renovation, special effects/multi-image, and participatory planetariums. Contact Kris McCall.

- The IPS Publications Committee reported that John Mosley, executive editor of the IPS flagship publication *Planetarian*, will be retiring from that role at the end of 2005. John Mosley has guided the journal through 76 consecutive issues and over 4800 pages—a immense service to the organization.

  The *2005 IPS Directory* will soon be distributed freely to all members as a CD, with paper copies available at cost. Containing both the *IPS Directory of the World's Planetariums* ("white pages") and the *IPS Resource Directory* ("yellow pages"), the publication can also be found on the IPS website.

  The newly-released Spanish language *Educar con el Planetario* is available on request to any IPS member. Other IPS publications in the pipeline include a scriptwriting book based on the GLPA's *Scriptwriting TIPS* booklet authored by Steve Tidey; the *IPS Songbook* edited by Jon Bell; and a *Moon Phase* booklet created by artist/author Jay Ryan.

  Nearly all past IPS publications have been scanned and archived by Dale Smith. When complete, they will be available on one CD for the Directories and one CD for the Proceedings and Special Publications. Past issues of the *Planetarian* are currently being scanned into electronic format by other IPS colleagues.

- The Robert Cox Certified Public Accounting Firm conducted an audit of the IPS financial records. It gave IPS the highest rating possible— "unqualified"—meaning no additions or corrections to the books were required. Per Cox, IPS accounting practices and financial statements reflect the financial position of the Society and conform to standard U.S. accounting practices.

- GLPA members continue to serve the IPS membership at the IPS Council meeting. Shawn Laatsch and Susan Button are hard-working, integral leaders in their roles as IPS Treasurer and IPS President-Elect, respectively. Dale Smith labors diligently on behalf of the Publications Committee at IPS as he does for GLPA.

- The 2005 IPS Membership is at 682 total members.

- Prize money for the 2005 IPS/Eugenides Foundation Scriptwriting Competition has been increased to $1,000.00 for First Place and $350.00 for Second Place. Scripts are requested for school shows only, on the subject of the solar system. Target age group is 11-14. The deadline for scripts is December 31, 2005. See the March 2005 issue of the *Planetarian* or contact Steve Tidey for details.

- The next "Day of Planetaria," initiated and supported by the Italian Planetaria's Friends Association, will be held on March 19, 2006.

- The IPS adopted an *IPS Statement on the Age of the Earth and Universe*:

IPS Statement on the Ancient Age of the Earth and Universe

Many independent lines of scientific evidence show that the Earth and Universe are billions of years old. Current measurements yield an age of about 4.6 billion years for the Earth and about 14 billion years for the Universe.

How ages are measured

The age of the Earth is measured by studies of radioactive elements. Radioactive elements are unstable and "parent" atoms decay into other "daughter" elements at a steady rate. For example, through a series of steps, atoms of uranium decay into atoms of lead. By measuring the abundance of "parent" and "daughter" atoms in rock samples and knowing the decay rate, geologists can calculate the age of the rock. Using several different sets of parent and daughter elements, geologists have measured the age of a variety of rocks, including terrestrial and lunar rocks as well as meteorites, which originate primarily from asteroids. The results consistently indicate an age of about 4.6 billion years for the Earth.

The age of the Universe is measured in several ways. One method is based on the rate of expansion of the Universe. By measuring the distance to remote galaxies and the rate at which they are expanding away from us, astronomers can calculate how much time the galaxies have needed to get as far away as they are. This tells how long the Universe has been expanding, or how old it is. These studies yield an age of about 14 billion years.

The age of the Universe can also be determined by investigating the oldest clusters of stars. This is done by measuring the brightness and temperature of stars in a cluster and comparing those

measurements with models of how the brightness and temperature of a star change as the star ages. It is somewhat like estimating the age of a person by looking at features of his or her face and knowing how our faces change as we age. These studies show that the oldest star clusters are about 12 billion years old. The Universe must be older than its stars, so this method establishes a minimum age for the Universe. Similar studies show that the Sun is about 5 billion years old, consistent with the age of the Earth measured by radioactive studies.

A third way to determine the age of the Universe involves measuring the ages of long-lived dying stars. As stars like the Sun age, they eventually become very small, faint objects about the size of the Earth. These stellar corpses are called "white dwarf" stars and have no remaining sources of new energy. Astronomers can calculate the rate at which white dwarfs get fainter and cooler, so when they then measure the brightness and temperature of a white dwarf star, they can recognize how old it is. These studies show that the oldest white dwarf stars are at least 10 billion years old. As above, this establishes a minimum age for the Universe since the Universe must be older than its stars.

Why these measurements are accepted by the scientific community

These measurements of age are accepted by nearly all astronomers, including both research astronomers and planetarium educators. These astronomers come from nations and cultures around the world and from a very wide spectrum of religious beliefs.

A fundamental reason why these ancient ages are so widely accepted by the scientific community is that they are derived from several independent lines of evidence accumulated by independent and often competing teams of researchers. Each method involves different measurements and the application of different physical principles to derive ages from those measurements. The physical principles include the same thoroughly-proven principles that underlie the technology that runs the modern world. Hence the fact that the independent methods all yield similar ages reinforces confidence that the methods are sound and accurate despite their complexity and do not contain major fundamental flaws.

A second reason why these ages are so widely accepted is that for scientific results to be published in research journals, they must be critically reviewed by other scientists who are experts in the same research area. This process is called peer review and is employed in nearly all research journals in the physical and biological sciences and in the humanities and social sciences. Often the reviewers are competitors of the author and thus are especially keen to find flaws in the proposed publications. As a consequence of such review, nearly every paper must be revised and improved before it is published, and some papers are rejected because the review exposes flaws in the measurements or in their analysis and interpretation.

A third reason why these ages, and other scientific paradigms such as Einstein's theory of relativity, are so widely accepted is that by the nature of its acquisition—through independent lines of evidence and always subject to scrutiny—scientific evidence is built up only very slowly, one step at a time. Only when a very large and diverse body of evidence has been accumulated is a broad conclusion accepted. Even then, a broad conclusion remains subject to inspection, as further evidence may reinforce or refine it, or in rare cases, overthrow it.

Conclusion

Evidence that the Earth and Universe are billions of years old is based on diverse lines of research that have been rigorously examined and which yield concordant results. Therefore, IPS accepts that these results provide an accurate description of our Universe.

Planetariums are based on science and education and as such reflect the ideals and principles of these disciplines. Planetarium educators seek to present both scientific results and an understanding of how these discoveries are made. IPS respects the personal views and opinions of planetarium patrons and of individual planetarium educators and recognizes that in some cases those views may differ from the material presented in this statement.

Related statements

The American Astronomical Society has a statement on the age of the Universe on its web site at http://www.aas.org/governance/council/resolutions.html#create. It has also, in conjunction with the Astronomical Society of the Pacific, published a booklet *An Ancient Universe: How Astronomers Know the Vast Scale of Cosmic Time*. This booklet is available in PDF form at www.aas.org/education/ancientuniverse.html.

The American Physical Society has a statement on creationism on its web site at www.aps.org/statements/81_1.cfm and a statement on the nature of science at www.aps.org/statements/99_6.cfm.