

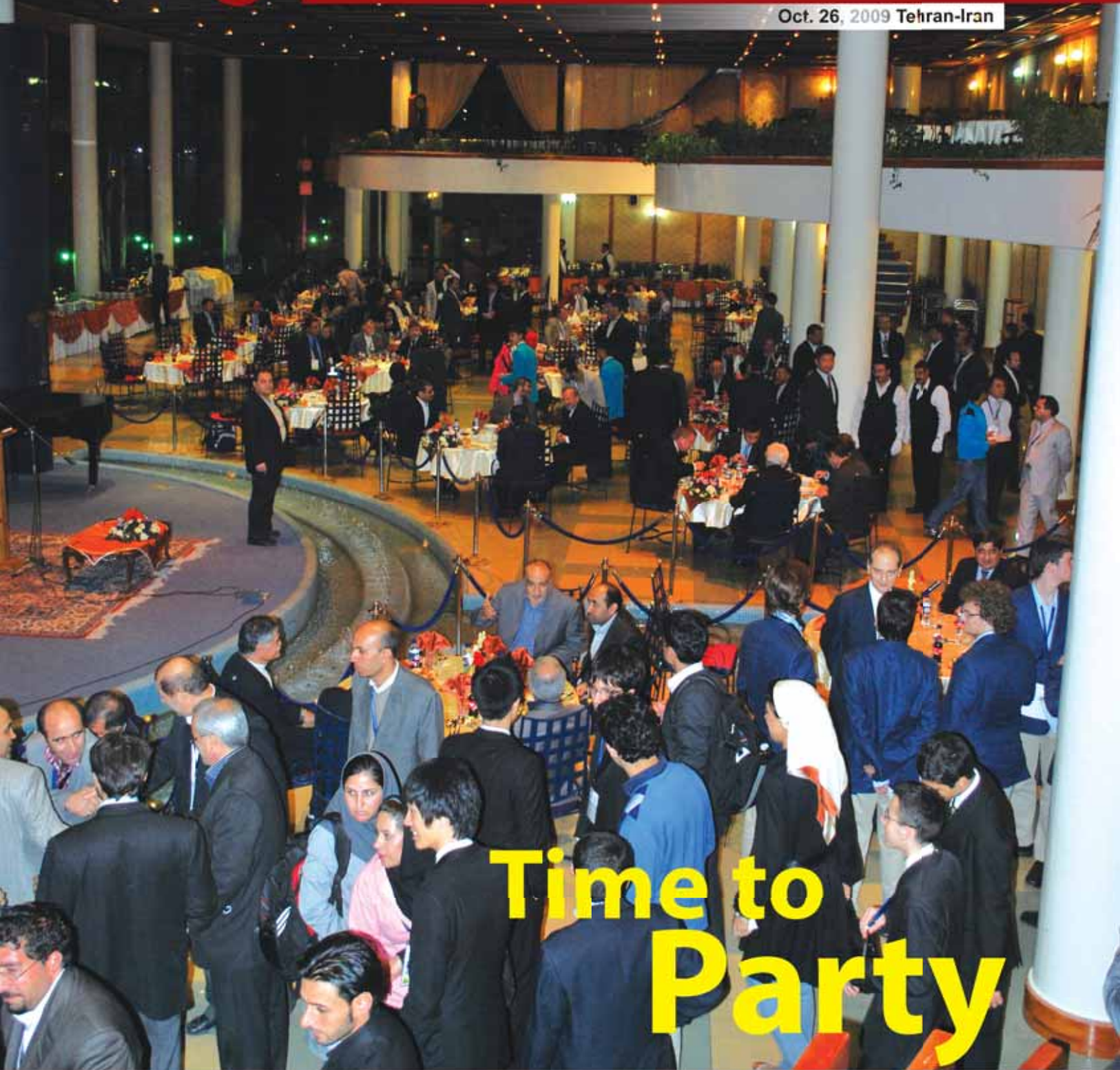
Official Newsletter



Astrolabe

3rd International Olympiad on Astronomy and Astrophysics

Oct. 26, 2009 Tehran-Iran



Time to Party

TODAY'S PROGRAM

STUDENTS

The closing ceremonies and the awarding of the medals

TEAM LEADERS

The closing ceremonies and the awarding of the medals

3rd
IOAA
International Olympiad on
Astronomy and Astrophysics
Tehran, Iran, Oct. 17-26, 2009

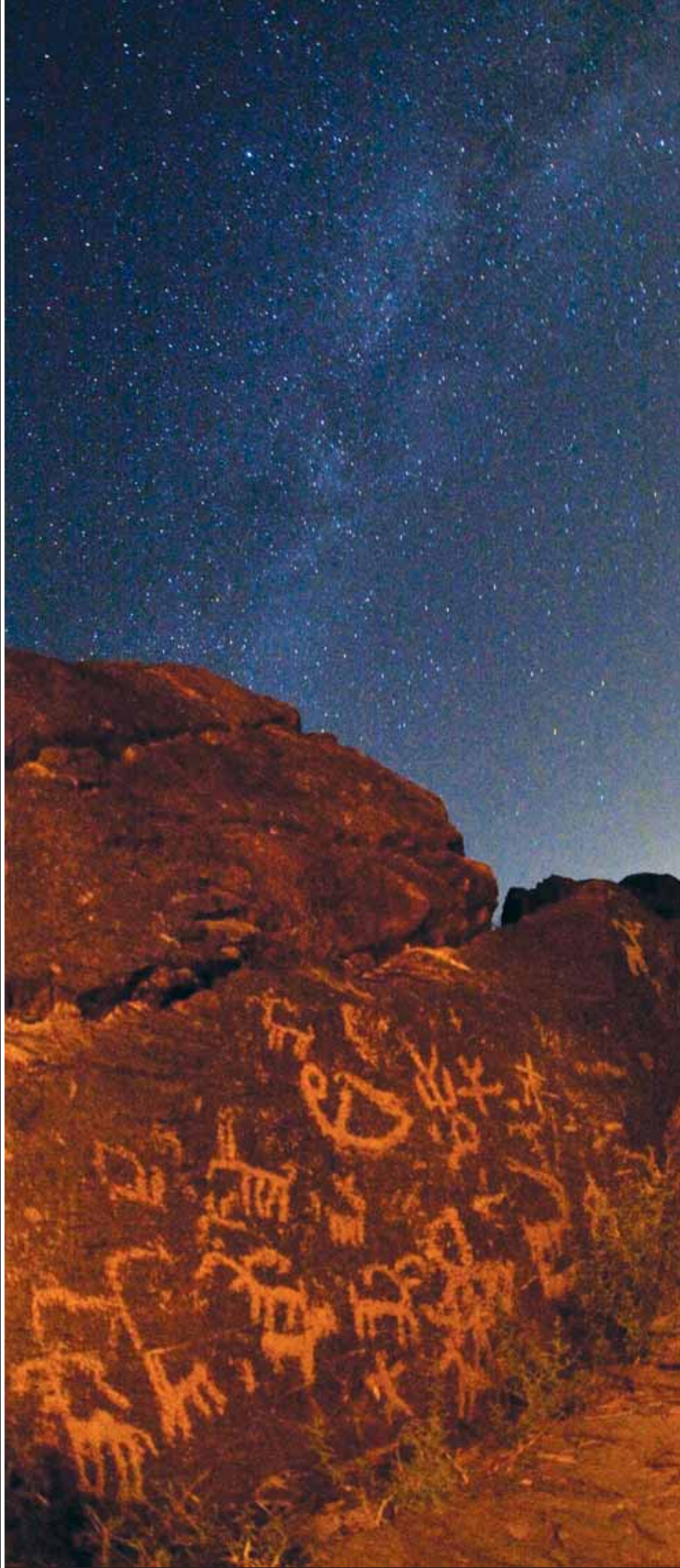


►► *Stone Age Night*

The Milky Way and stars of the Summer Triangle shine above prehistoric rock art in the remote valley of Teymareh in central Iran. The Plateau of Iran has been home to civilizations since over 10,000 years ago. The first signs of such early residents have come from ancient archeological hills (roughly one million sites in the country!) and such petroglyph sites. Teymareh valley is full of ancient petroglyphs belonging to 4500 to 17000 years ago. With over 30,000 engraved images, the valley is one of the world's most important petroglyph sites, still largely undiscovered. Here in the foreground the rock art has been dated to 10,000-15000 years old. As noted by the photographer "there is a strong connection between the night sky and our ancient heritages. People have been inspired by the eternal sky from the eons ago. Some astronomy historians date back the creation of the first human-made celestial constellations to over 10,000 years ago. Are some of these mysterious stone-age symbols connected with the starry skies our ancestors observed above them?"

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Photo by Babak A. Tafreshi
www.twanight.org/tafreshi



▶▶ IOAA AS RECOGNIZED BY THE INTERNATIONAL ASTRONOMICAL UNION

In response to a letter of the President of IOAA to the President of the International Astronomical Union (IAU) on August 19, 2009, IAU through its Commission 46 on Astronomy Education and Development (President: Prof. Rosa M. Ros) is sending an observer to the present IOAA event. In the 29th General Assembly of IAU, August 2009 in Rio de Janeiro, Brazil, IAU, through its President, Prof. Robert Williams, has recognized IOAA to be one of the partners in the astronomical education and popularization. The secretary of IOAA has been asked to prepare an article for the Commission 46th Newsletter that describes the foundation and implementation of IOAA since its establishment in 2007.

At present, Dr. Hakim L. Malasan, a member of Program Group of World-Wide Development Astronomy (PGD-

WWDA) within the Commission 46, and the leader of Indonesian team in this event, has been assigned to be an observer for the evaluation of effectiveness in the event, and for assessing impacts on the development of IOAA on Astronomy, especially on the developing countries who are participating the event. For this purpose, interviews have been conducted with other team leaders.

It is hoped that a full assessment can be used as a baseline of Commission 46 to step further toward inclusion of IOAA as a Commission 46 program. A growing IOAA in terms of participating countries would be something that is expected by and can be supported by means of the IAU.

▶▶ At the Olympiad

Friday October 23rd

- The observational exam supervisors were collecting the observations instruments until dawn and they were in their rooms back in Tehran around 8 AM. Following the grueling session of the exam, some of the supervisors slept till 8 PM.

- The academic markers for the experimental exam assembled; like the theoretical exam, marking the papers took until noon.

- Some of the students climbed up to Tochaal using the lift gondolas.

- A dinner was hosted by the Foreign Ministry for all participants in the 3rd IOAA; the Foreign Minister, and the acting Minister of Education were also present.

In this dinner Manoochehr Muttaki, the Foreign Minister, expressed his hope that the availability of science shall be the same for all nations, and emphasized that all nations have the right to utilize the achievements made possible by science.

- After dinner, the markers started marking the observational exam papers. The work had to be continued on the next day.

Saturday, October 24th

- The moderation session for the Theoretical Exam was held in one of the halls of Hotel Parsian-e Evin, with the participation of the leaders of the 20 teams taking part in IOAA and the markers. After lunch it was the turn for the moderation session of the Experimental Exam.

- Manoochehr Arian conducted the Sun-dial Workshop

at Shahid Baahunar Camp.

- The Group Competitions were held between the participating teams. In this competition, the members of each team who could answer the questions correctly, got to blow up balloons with the name of their country written on them, with the darts given to them. The winner was Greece, the name of which was inside the last balloon.

The marking session continued from the night before at the Teachers' Club and after 6 hours the observational exam papers were marked. The leaders of the teams, freshly out of the Theoretical Exam moderation session, were finally informed of the results.

- The IOAA participants visited Tehran's Science and Astronomy Center, worked with the scientific and educational tools, and visited the planetarium.

- All IOAA participants took part in the dinner hosted by Tehran's Science and Astronomy Center at Hotel Shiyaaan. After dinner, members of the StarPeace Global Project conducted a general observation session for IOAA participants; they could observe the Moon and Jupiter and sign the StarPeace wall.

- The IOAA participants visited Tehran's Science and Astronomy Center, worked with the scientific and educational tools, and visited the planetarium.

Sunday October 25th

- The moderation session for the Observational Exam was held. This session lasted one and a half hours, after which, the International Board Meeting was held in the Conference Hall of Hotel Parsian-e Evin.

The 3rd IOAA organizers with the Foreign Minister and the acting Minister of Education.



SAY CHEEEEEEESE!!

The Sun-dial Workshop



Group Competitions



The students visiting the planetarium



The moderation session



All of team guides in one view

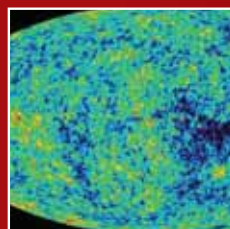
1994 CE

The Shoemaker-Levy comet collides with Jupiter.



2001 CE

Precise measurements of the Cosmic Background Radiation indicate that the visible matter constitutes only 5% of the matter in universe.



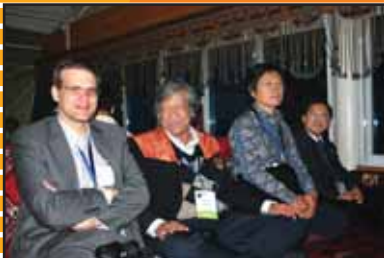
2003 CE

New measurements indicate that the Universe is 13.7 billion years old.





At the top of Mount Tochaal



Happy Birthday!



2004 CE

Under the direction of Firooz Naderi, the Mars rovers, Spirit and Opportunity, land on Mars for a 3-month mission. These rovers are still collecting data after 5 years.



2006 CE

Prague: In the meeting of the International Astronomical Union, a new definition is accepted for planets, according to which, Pluto is no longer a planet.



2009 CE

International year of astronomy



▶▶ The Astrolabe and Tusi Couple

The astrolabe is a small instrument for taking the altitude of the sun or stars and for the solution of other problems in astronomy and navigation. In Persian, it is called Jam-e Jam, Jam-e Jahan-bin and Dayere-ye Jahan-nama. It usually consists of a solid disk of bronze, brass, iron, steel or wood and is used in astronomical studies and calculations such as determining the altitude and declination of the sun, the coordinates of stars and planets, the latitude and longitude at various hours and in different seasons, the height of mountains, the width of rivers, the rising time of different stars, etc.

About this instrument, many Persian astronomers have written several chapters in their books. Abd al-Rahman al-Sufi has written 386 chapters, Nasir al-Din al-Tusi 20 Chapters and Sheykh Bahaaee 70 Chapters. Abd al-Rahman al-Sufi was a Persian astronomer also known in the west as Azophi; the lunar crater Azophi, and the minor planet 12621, Alsufi, are named after him. Al-Sufi published his famous Book of Fixed Stars in 964, describing much of his work, both in textual descriptions and pictures. He identified the Large Magellanic Cloud, which is visible from Yemen, though not from Isfahan; it was not seen by Europeans until Magellan's voyage in the 16th century. He also made the earliest recorded observation of the Andromeda Galaxy in 964 AD, describing it as a "small cloud".

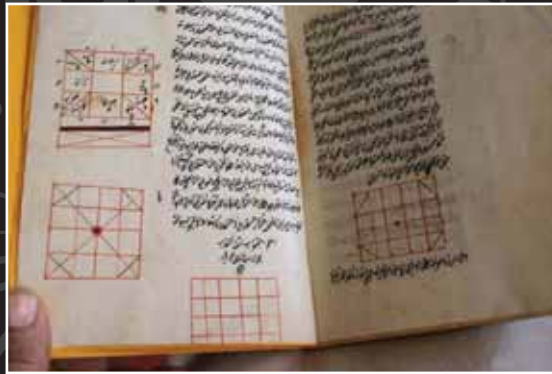
Nasir al-Din al-Tusi, who lived in the 13th century, is one of the most famous Iranian astronomers in history of Iran. Sheykh Bahaaee (1547- 1621) was an Iranian Muslim scholar, philosopher, architect, mathematician, astronomer and poet.

Tusi Couple

The Tusi couple is a mathematical device in which a small circle rotates inside a larger circle with a radius twice that of the smaller circle. Rotations of the circles cause a point on the circumference of the smaller circle to oscillate back and forth in linear motion along a diameter of the larger circle. Nasir Al-Din Tusi devel-

oped this tool as an alternative to the problematic equant introduced over a thousand years earlier in Ptolemy's Almagest.

Some modern commentators also call the Tusi couple a "rolling device" and describe it as a small circle rolling inside a large fixed circle. However, Tusi himself described it differently: If two coplanar circles, the diameter of one of which is equal to half the diameter of the other, are taken to be internally tangent at a point, and if a point is taken on the smaller circle—and let it be at the point of tangen-



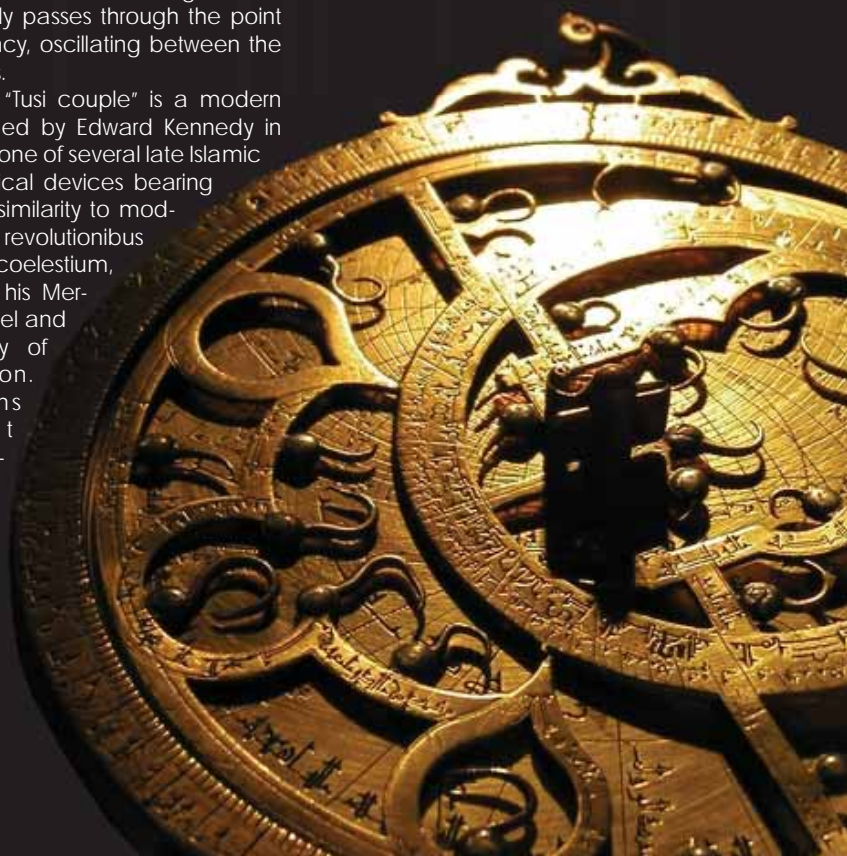
cy—and if the two circles move with simple motions in opposite direction in such a way that the motion of the smaller [circle] is twice that of the larger so the smaller completes two rotations for each rotation of the larger, then that point will be seen to move on the diameter of the larger circle that initially passes through the point of tangency, oscillating between the endpoints.

The term "Tusi couple" is a modern one, coined by Edward Kennedy in 1966. It is one of several late Islamic astronomical devices bearing a striking similarity to models in De revolutionibus orbium coelestium, including his Mercury model and his theory of trepidation. Historians suspect that Copernicus or another European author

had access to an Islamic astronomical text, but an exact chain of transmission has not yet been identified.

There are hints that the "Tusi-couple" was known in Paris by the middle of the 14th Century. In his questiones on the Sphere (written before 1362), Nicole Oresme described how to combine circular motions to produce a reciprocating linear motion. The description is unclear and it is not certain whether this represents an independent invention or an attempt to come to grips with a poorly understood Arabic text. Since the Tusi couple was used by Nicolaus Copernicus in his reformulation of mathematical astronomy, there is a growing consensus that he became aware of this idea in some way. It has been suggested both by a historian of Medieval European astronomy and by a historian of Arabic astronomy that the idea of the Tusi couple may have arrived in Europe leaving few manuscript traces, since it could have occurred without the translation of any Arabic text into Latin.

One possible route of transmission may have been through Byzantine science, which translated some of al-Tusi's works from Arabic into Byzantine Greek. Several Byzantine Greek manuscripts containing the Tusi couple are still extant in Italy.





Find the Differences!!

These four pictures appear to be made up of two identical pairs, but actually there are 7 differences between the pictures in each pair. Can you find them? You can look up the answers on the next page, but be patient and do not give up hastily!





▶▶ *Photo of the Day*

Saguaro Moon Rise

Scenic moonrise in southern Arizona, USA, among the endless plains of Saguaro cactus in Saguaro National Park.

Stefan Seip



▶▶ **IYA 2009 Projects**
in 209 Words
 ▶ **From Earth to the Universe**

With images taken from both ground- and space-based telescopes, From Earth to the Universe (FETU) showcases the incredible variety of astronomical objects that are known to exist. The exhibit also shows how these objects look when viewed across the electromagnetic spectrum, from the ultraviolet and visible light to infrared, X-rays and gamma rays.

Indeed, popular images of the cosmos can engage the general public not only in the aesthetics of the visual realm, but also in the science of the knowledge and understanding behind them.

FETU is being shown in non-traditional public venues such as parks and gardens, shopping malls, metro stations and airports in major cities across the world. The FETU images have been selected for their stunning beauty to engage members of the general public who might normally ignore or avoid astronomy. With short, but informative captions on each panel, FETU introduces some basics of the science involved once an individual has been drawn to the image.

The worldwide response to the FETU project continues to be astounding. More than 55 countries around the world have signed to host FETU exhibits in more than 200 separate locations ranging from Brazil to Bulgaria and from Uruguay to Iran. The most current list can be found at this website:

(www.fromearthtotheuniverse.org)

Living on Earth may be expensive, but it includes an annual free trip around the Sun.



If there was no such thing as "Night", the Sun would have run out twice as fast.

From the remark of Sherlock Holmes: "It's a capital mistake to theorize before you have all the evidence." It follows that astronomers are bad detectives.



The speed of time is one second per second!

When do astronauts have lunch? At Launch Time!



"Find the Differences" Answers (From Page 7):



Front Page:

Friday night's dinner hosted by the Ministry of Foreign Affairs.

Photo by: Ehsan Mehrjoo

Astrolabe

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