vice. The parklands and preserves of Gateway stretch along the southern frontier of New York and offer clean dark skies for the urban dweller. The programs include popular-level slideshows, equipment demonstrations, skywatching tutorials, and clear-weather star-viewing. Staff for the Gateway activities is drawn from the AAA's Brooklyn and Staten Island Chapters.

National Astronomy Day is a theme day celebrated in April or May each year. In New York, National Astronomy Day is hosted by a museum, park, or school while the AAA provides the astronomy program. In conjunction with the host facility, this program includes slidetalks, equipment and project exhibits, panels and seminars, fleamarkets, and viewing of sunspots by day and the stars by night. Sometimes movies, videos, and planetarium shows round out the day's activities.

The AAA maintains a panel of experienced speakers available for other clubs, museums, schools, and social and civic groups. Speakers may be AAA members or patron astronomers. The panel can supply a single person to give a simple slidetalk or it can cater to an all-day astronomy fair with a corps of astronomers. Speakers-panel services are customized to suit the client. Fees for speakers-panel service are quite attractive to even the smallest client.

The Association serves the newsmedia by explaining and interpreting astronomy events like comets, novae, and eclipses. Newsmedia obtain quick authoritative answers to their questions and they can engage the AAA for press interviews or radio/TV appearances. The press, both national and local, routinely carry notices of AAA public activities. The Associations's interpretation mission extends also to consultations for outside authors and exhibitors.

Astronomers who serve with the Amateur Astronomers Association directly fulfill one major goal of their profession — to bring enjoyment and edification in astronomy to the people. If you have this goal, too, do consider membership in the Amateur Astronomers Association. For membership details — or for exploring other ways to practice public service astronomy through the AAA — contact us.

STRATEGIES FOR PRESENTING ASTRONOMY TO THE PUBLIC

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Imagine an American trying to explain a triple play to someone who understands English poorly and who has never seen a baseball diamond, much less a game. Yet this is the sort of challenge astronomy educators face every day both in the classroom and in more informal settings.

In a college classroom, the professor has some time to teach students the language of science and astronomy. As the students gain proficiency, they can then

comprehend increasingly complex concepts. Through repeated classroom exposure and study, eventually most students learn the basics of astronomy.

In a public setting such as a planetarium, or in a work of journalism, the constraints on the educator are very different. The contact time is often so brief that it is measured in minutes rather than hours. Familiarity with basic background concepts and the language of science is lacking or absent in most audiences. And finally, the public consists of voluntary learners, rather than grade-motivated students.

The purpose of this paper is to suggest three educational strategies that are very effective for public learners. The paper will finally present examples of applications of these ideas at The Adler Planetarium.

1. Basic Strategies

Strategy 1: Create pictorial models. Pictures are vital to helping people understand concepts rapidly, but not all pictures are equally useful. Some of the hardest images to understand are false-color computer images. Although they make perfect sense to their creators, they can be meaningless to those who have no prior mental concept of what they are looking at.

Cognitive scientists have long known that the mind looks for edges and shapes when trying to comprehend something new. Thus, simple line drawings are probably the most useful means for making a concept understood rapidly.

Before showing actual photographs of the real astronomical object, present a wire-frame drawing — the more generic and symbolic the better.

Although the idea upon which this strategy is based seems obvious, planetariums often violate it in the way they present complex astronomical images. When the photo is presented first, the audience never listens to the explanation because they are concentrating on their primary need to understand visually. Line drawings presented previously can avoid this.

Strategy 2: Use common language. Most scientists, when listening to accountants use financial jargon, will understand how astronomers sound to the general public. Even using an occasional word such as "excitation," "evolutionary," or "conservation" can be confusing and misleading in a brief educational experience.

Clear and simple language is best. Unfortunately, this limitation may require simplifying the subject and ignoring the complexity of the scientific issues, so it is essential to plan carefully the goal and scope of the message.

Effective language tactics include three important ones frequently used by journalists:

1. Begin with a brief "hook" to capture the audience's interest. If the message starts with a difficult concept or begins with jargon, the audience will be lost.
2. Explain concepts using analogies. This is one of the only ways to teach people about large scale phenomena quickly and effectively.
3. Use colorful, descriptive language that actively paints a picture in the minds

of the audience. Avoid the experts' natural tendency to over-explain concepts.

Strategy 3: Take humanistic perspectives. Even though the universe is vast and depersonalizing, the public does not want to feel small and insignificant. As with the previous two strategies, taking into account human perception and understanding requires the use of humanistic considerations to capture the audience's attention effectively and communicate the message. Here are some well-known techniques:

1. Make the subject concrete. Most people cannot rapidly reason abstractly. They can, however, clearly picture concepts that are made concrete.
2. A human story or human conflict can be a very powerful method to capture an audience's interest. Care must be taken, however, not to mislead or lose sight of the science when applying this technique.
3. Address important human concerns such as: life, death, and one's place in the universe to capture peoples' interest directly. Luckily, these are central topics in astronomy and motivate all who contemplate the universe.

2. Application of Strategies at The Adler Planetarium

The strategies presented above are used actively at The Adler Planetarium. Here are three programs that have been improved by these ideas.

Video telescope observing. Since 1987, The Adler Planetarium has conducted public observing programs using a computerized telescope with narrow-band filters and CCD imaging. When a picture is recorded, it is transferred live to our sky theater and projected on the dome for the audience. Any one of hundreds of possible objects can be located and projected within seconds. This opportunity seriously challenges the lecturer to explain rapidly what people are seeing.

The Adler has solved this challenge by showing audiences a simple line drawing of what they will be viewing. Often these pictures are more symbolic than realistic — a star in a bubble to represent a planetary nebula. Nevertheless, they help by giving people a mental concept in a pictorial form they can readily understand.

Exhibition language. In late 1988, The Adler mounted a small exhibition of a type of meteorite that is believed to have come from Mars. This exhibit faced two problems: first, verbal communication through exhibits is notoriously difficult because people walk away from long or complex descriptions; second, the scientific evidence and argument that the meteorites are from Mars are multifaceted and laden with jargon. Thus, for this exhibit, special attention was focused on the words. The result was an attractive title — "Mars Rocks" — and a jargon-free set of short labels presenting the important evidence in the audience's language.

Scale-of-the-solar-system show. One of the best examples at The Adler of "Strategy 3" is a short multi-image show now being produced to help people un-

derstand the scale of both the solar system and the planets. This will be done by using the old technique of creating a concrete model on a human scale. The scale for this model of the solar system was chosen to relate, in a memorable way, familiar objects with familiar places — fruits and vegetables with local landmarks. With 1 A.U. equal to 1 kilometer, and the sun at The Adler Planetarium, the Earth is the size of an apple atop the Sears tower and the other planets can be located at other famous landmarks. This model will be presented as a slide show for visitors to The Adler.

3. Conclusion

There are dangers inherent in the journalistic approach implied by these strategies. If misused it can lead to an emphasis or a simplification that misrepresents science.

Used properly, however, these techniques can help the public comprehend the exciting astronomical discoveries of our age. And if this approach is ignored, the danger is that the public will believe that astronomical knowledge is arcane and only for the elite — a message no one wants to send.

THE POPULARIZATION OF ASTRONOMY IN MEXICO

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Mexican professional astronomers have a great task ahead if they want to popularize astronomy. We are very few and the country has great educational needs, with 4 years of elementary school being the average educational level.

In order to overcome this challenge, the Institute of Astronomy of the National University has popularized astronomy using the following resources: 1) publications, 2) public lectures, 3) advice to museums and planetariums, 4) radio and television interviews, and 5) courses.

1. Publications

a) *Books*: A few years ago, Mexican astronomers started writing books in Spanish, from astrophysics for college students to general themes intended for the layman, and children's books. The number of books now published in Spanish is 25, and several more are being written.

b) *Yearbook*: The Institute of Astronomy has been publishing a yearbook for the past 50 years. It includes ephemerides, positions of cities, lists of Messier objects, and important astronomical events.