

NEW PERSPECTIVES IN PLANETARIUM LECTURES

How to Tell Science under the Dome while Preserving the “Enchantment”

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ABSTRACT

We discuss the philosophy and strategy of a modern planetarium lecture within the larger frame of the communication of astronomy. The planetarium is a peculiar medium that requires a creative and rigorous approach in order to balance the three motivating forces behind the ‘planetarium experience’: scientific knowledge (method and contents); technological ‘sense of wonder’ and a pre-rational (not necessarily anti-rational) sense of ‘enchantment’. While scientific and technological resources are typically fully exploited in state-of-the-art domes, the latter concept—introduced by Max Weber in order to categorize the mystic/aesthetic impact of nature on the human mind—has not been sufficiently explored. To use it effectively demands an understanding of the public perception of astronomy, stressing the crucial role of professional communication skills for the effective communication of science. Rather than enforcing a narrow focus on pure science and/or a crusade against astrology, we believe that the planetarium experience should be a stimulating reawakening of curiosity and a holistic awareness of the sky and hence of the Universe. Fine tuning of the above three components makes the classical conflict between the boring academic lecture under the stars versus disneyish, supertechnological shows obsolete. We present some approaches for creating “fine-tuned lectures”, with examples from our experience at the Rome Planetarium.

INTRODUCTION

Organizing a planetarium program using internally produced shows is a highly complex task. One should have a very precise set of objectives in mind and a well defined approach to science communication, while still trying to exploit the incredible potential of a state-of-the-art dome. The main problems are the search for an effective and clear narrative that both informs and entertains, the ability to mix the different media involved (video, sky projection, music, reading, etc.) while stimulating interest and fascination in scientific topics. The unique features of the immersive environment and the theatre-like structure of the dome point naturally to a possible solution: the audience is set under a stage where many stories of the sky and about the sky are told and the lecturer (or the recorded voice) is not an academic but a storyteller that “respects” the methods and truths of science. Such a storyteller, being the science communicator, puts astronomy and astrophysics in a broader cultural context, where science, history, humanities and art can meet and the general public rediscovers the sky as a common, familiar inheritance.

Starting from this perspective we have developed a “philosophical” model of the planetarium experience that allows all planetarium ingredients to be mixed correctly and carefully balanced.

We identify three motivating forces at work under the planetarium dome: Science, Technology and “Enchantment”; striking different chords in the mind and imagination of the audience.

Scientific drive and the technological sense of wonder have been widely explored and exploited during the century-long adventure of the planetarium as a natural consequence of the dominant view about science communication. The traditional approach consisted in a top-down transfer of scientific contents through a high-tech, spectacular device—the sky projector. Essentially, a lesson was presented under the sky, with astronomical phenomena and accelerated motions explained in an educational facility for the masses. The technological sense of wonder, excited and continuously stimulated by cinematic special effects and videogames, has been well cultivated with an impressive escalation towards sophisticated all-sky digital animations, not always related to science or to the sky. The recent interest in PUS (Public Understanding of Science) has scarcely modified this scenario, still ignoring the third component of the planetarium experience: what we have called ‘Enchantment’ (following the suggestion of German sociologist Max Weber). This motivating force, while dealing with the emotions and the imagination of the public, is a precious tool that can inspire curiosity and interest for the world we live in, including the methods and results of science. The intimate pre-rational (but not necessarily anti-rational) connection with the cosmos above us is usually regarded with suspicion by scientists and assumed to be in opposition to the “correct” scientific version, so it is no surprise to find this sense of wonderment ignored in “academic” science popularization as well as in planetaria. We will try to highlight its importance and to show how it can be harnessed in the making of attractive and stimulating sky shows.

THE PLANETARIUM EXPERIENCE: A “PHILOSOPHICAL” APPROACH

Figure 1. The dome of the new Planetarium of Rome



SCIENCE

Science is the key ingredient in a planetarium, and our efforts are aimed at conveying the excitement of the processes of reasoning, discovering and experimenting. All the many different cultural and scientific visions of the sky should enter the shows: the history of observation, cosmology, the astrophysics of celestial objects, the human exploration of space, speculations about extraterrestrial life and so on. Essentially we would like to transmit a way of looking at things and a methodology while still instilling just that final twist of uncertainty. Moreover, our objective is to create an awareness of the many connections between different disciplines and between science, culture and art, concentrating on the outline more than on details. The planetarium, being an independent institution, is best suited for a general review of the discipline without the pressure of the scientific propaganda typical of observatories and research institutes and without the usual jargon and technicalities given by professional astronomers occasionally involved in science communication.

It is impossible to deny the fascination of high technology, both in planetarium attendees and in science communicators. The wonders of an artificial sky and of celestial simulations are of paramount importance in the work of communication, but it is essential to exploit the best available resources without being dominated by the spell of the latest gadget or all-sky digital device. Hence, the real challenge is blending technology and artistic expression in a harmonic composition rather than just looking for the perfect, expensive solution for each effect.

Max Weber (1864-1920) introduced the concept of “disenchantment” (*Entzauberung der Welt*) in order to describe the fall of the ancient cosmological traditions and at the same time to focus on the romantic and pre-romantic interest for the “sublime”, widely analyzed philosophically by Edmund Burke and Immanuel Kant. For Weber the disenchantment is the passage from the old “magical” way of looking at Nature and at the sky to the mechanistic vision that has dominated science since Galileo and Newton.

“The unity of the primitive image of the world, in which everything was concrete magic, has tended to split into rational cognition and mastery of nature, on the one hand, and into “mystic” experiences, on the other. The inexpressible contents of such experiences remain the only possible “beyond”, added to the mechanism of a world robbed of gods”. (M. Weber, *Essays in sociology*)

By gaining modern science we have lost the sense of wonder and of transcendental mystery, leading to an excess of rationalization and intellectualization. In other words, the origin of our technological success contains the roots of an unavoidable crisis as nature and technology collide.

There is still academic debate about the meaning and relevance of such a loss, but we are convinced that a useful and healthy side of the enchantment may be recovered, both in scientific and in communication practice. In fact, the aesthetic astonishment and awe experienced under a clear sky, imbuing the sense of an infinite Universe not amenable to complete calculability, are essential in recovering a positive relationship with nature. They make a holistic cosmological vision possible, in the sense of a vision of the Universe characterized not only by matter and physical laws, but also by mind, life and culture. So, rather than fighting against the fossils of the enchantment (astrology, new age, etc.), we should use their appeal to expand a controlled imagination and develop a knowledge filled with emotions and feelings. This approach, obviously, doesn't necessarily mean justifying pseudo-science: it just consists of an attitude of “existential wonder” and humility, which helps to prevent scientism and instrumentalism, while recovering pluralism and sense of mystery.

TECHNOLOGY

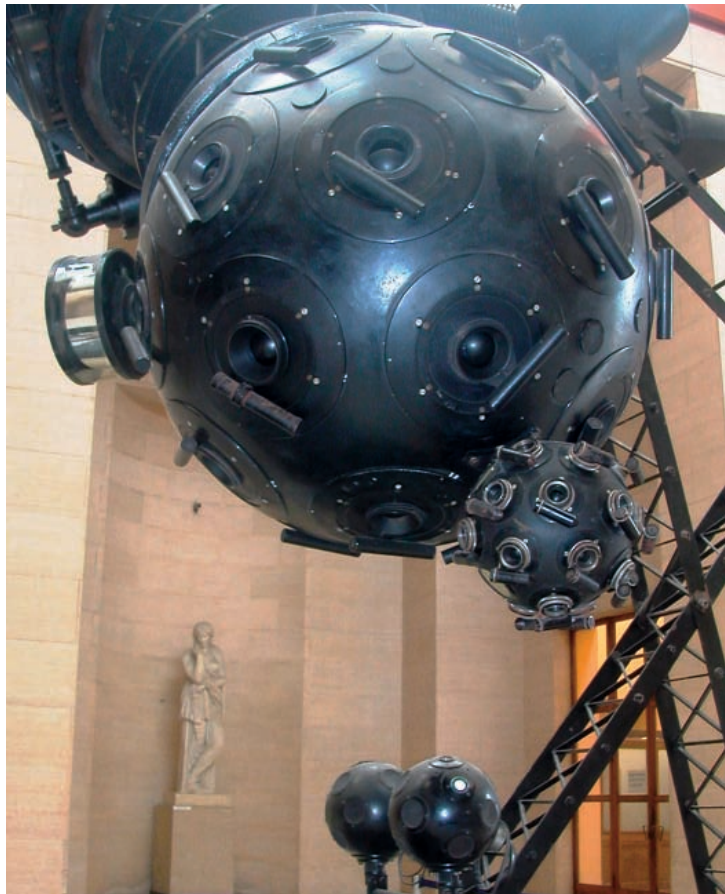
THE WEBERIAN ENCHANTMENT

For us the enchantment is a psychic dimension, a state of consciousness that professional astronomers dismiss as irrelevant for science too often. However their own “vocation” often came from “poetic fancy” and they tend to forget the emotive impact of a starry night on the human quest for knowledge. How many scientists started their careers with the enchantment of a dark starry night? It was certainly the case for Fred Hoyle, as he recalls in his autobiography:

“(.) When on top of a wall that perfect starlit night, I seemed to be in contact with the sky instead of the earth, a sky powdered from horizon to horizon with thousands of points of light, which, on that particularly dry, frosty night, were unusually bright. We were out for perhaps an hour and a half, and, as time went on, I became more and more aware—awed, I suppose, of the heavens. By the time I arrived back at the sandstone block, I made a resolve. I remember standing on the block and looking upwards and deciding that I would find out what those things up there were.”

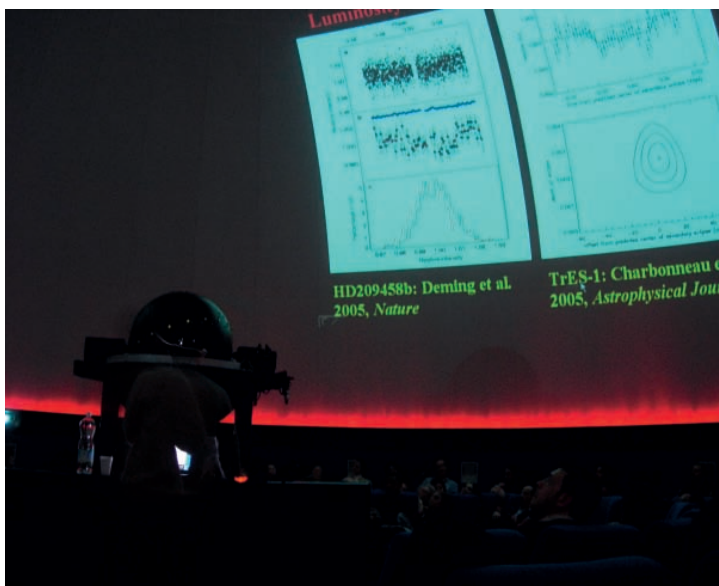
F. Hoyle: Home is Where the Wind Blows

Figure 2. The Zeiss projector of the old Planetarium of Rome in the entrance hall



The planetarium is one of the best places to blend the rational scientific with the mystic sense of enchantment, as everyone who has experienced the strong “wow effect” under a dark starry sky knows. Things that seem contradictory (science, technology, enchantment) may coexist in harmony, stimulating questions and thoughts. As we have already pointed out, the main difficulty here is a careful balance of the ingredients: a narrative that captures the attention of the audience and raises emotions with images; video and sky simulations presented at the right times in the right proportion while telling about science; its impact on history and human perception of the Universe. Usually, the best solution is a voyage in space and time, with a point of view oscillating between the earth’s surface and the depths of space. Terrestrial interludes allow us to insert poetry readings, historical anecdotes, artistic inspirations, philosophical thoughts in the show and to provide the necessary connection to the observability of celestial phenomena. A possible alternative solution is a narrative based on contrasts: human culture presented in a celestial context and the influence of the sky as found in our daily environment (music, architecture, paintings).

Outside Milan and Rome there are only small or medium sized planetaria (less than 100 seats) in Italy. The Live Lecture (so defined here in contrast with the mainstream automatic show) has been the main format from the outset: few planetaria present automatic shows or multimedia productions. The planetarium is conceived almost exclusively as an educational facility, where a lecture is considered equal to a lesson, with a bonus of demonstrative simulations and/or still images.



TOWARDS A FINE TUNING

THE PLANETARIUM OF ROME AND THE ITALIAN SCENARIO

Figure 3. Live shows under the dome
The old Planetarium of Rome, one of the first in Europe, was closed twenty years ago, but had a longstanding tradition of such educational lectures. When it reopened in May 2004, we decided to start an intensive production of Live Lectures along with a few automatic shows, in order to retain the good values and the tradition of the Italian planetarium style, but also to update it. Our goal is to draw attention to science and the natural wonders in a city like Rome, which is dominated by an artistic and historical heritage, while trying to convey the message that the planetarium is a “house of the sky” where people can return and discover new things each time, a fascinating location where science meets culture and culture meets science.

LIVE LECTURES AT THE ROME PLANETARIUM

Lecturers were scientists with a background in science communication or facilitators with a good scientific background. Our effort is aimed at delving into the public perception of astronomy, always keeping in mind the crucial role of professional communication skills for an effective communication of science. This is an objective that requires constant feedback from the public, stimulating debate, interaction and participation.

During the first year of work we have implemented a very large catalogue of Live Lectures (about 50), with a variety of astronomical and para-astronomical topics. In keeping with our principles we design our lectures to focus on Public Awareness of Science rather than on PUS or on plain education. Our purpose is to inspire curiosity and to entertain, to leave the public with many questions, and with a desire to explore in more depth, rediscovering the Sky for themselves. We do not pretend to answer all questions or to be exhaustive in any sense. We consider the planetarium

Figure 4. Live shows under the dome



show to be an experience that raises interest in astronomy, an interest that other media (books, lessons, magazines) may fulfil more extensively later. In order to make our choice clear, we always call our Live Lectures “shows”. And they are actually shows in an astronomical theatre: the lecturers’ storytelling and the flow of images, simulations and videos are neither lesson nor “documentary”. The audience perceives the lecture as a multimedia theatrical performance rather than an explanatory sequence of information about the cosmos. As we usually say: “It’s a show, a stairway to the stars, not a lesson”.



Figure 5. Live shows under the dome

The Live Lectures are organized in thematic groups: Skyscapes, Open Universes, Impacts. Skyscapes describe the sky and its phenomena in general for a public of beginners and children, while Open Universes are single subject shows about astrophysical, cosmological or planetary themes. Impacts explores the connection between celestial objects and the humanities taking an interdisciplinary approach.

We have adopted the classic storyboard technique for the production of Live Lectures, maintaining a large degree of freedom as regards feedback and improvisation. Particular attention is given to technical and conceptual balance in the script.

Three golden rules summarize our productions (Live Lectures as well as automatic shows and events). The first rule is: “Rhythm, rhythm and rhythm again!” That not only implies the constant presence of music (and of silences considered as music), but also the right interplay between different media: images, sky projection, animations and all-skies. One can never have too many still images, or motionless skyscapes, or open-ended videos. Furthermore, the theatrical “presence” of the lecturer is fundamental, although his/her silhouette may fade frequently into the darkness.

THE GOLDEN RULES

Strong criteria in the selection of the staff are storytelling qualities, diction and voice control.

Paraphrasing Duke Ellington we might say: “It don’t mean a thing if it ain’t got that swing”. Actually jazz is a very effective metaphor for Live Lectures: they have a strong improvisational side, the lecturer has many flexible solos on a fixed canvas (as in Ellington compositions), “mood” and “arrangements” may vary in different executions, depending on feedback from the public, and finally, as in a Jazz Orchestra, we have a conductor (the show director at the console) and a soloist (the lecturer).

The second rule is: “Give the public an emotional context, not just information!”

Keeping that in mind means exploiting suspense, and the senses of wonder and humour at the right times. Narrative structures are also naturally charged with emotions and we vary them in different lectures, exploring the atmosphere with fiction, dialogues, time travels, musical journeys and explicit theatrical performances.

The last rule is perhaps the most trivial, but also the most constraining: “The Sky is always on the Stage”. It implies that the “slide show effect” of a standard seminar must be avoided, while remembering that the planetarium is not cinema, but a show characterized by astronomical objects and phenomena ‘up there’. Conferences and movies may be programmed in a planetarium hall, but they are definitely another kind of performance, which doesn’t exploit the magic of a starry dome at its best.

SOME EXAMPLES

Live Lectures at Rome Planetarium are multimedia journeys, synthetic adventures that capture the imagination and try to paint several pictures of the cosmos with a touch of originality. It is difficult to convey the variety of experiences offered: they span from a trip around the Lord of the Rings of the Solar System (“Between the Rings of Saturn”, a show with a fictional narrative and many 3D panoramas); to the romantic and multi-ethnic skylore of “The Sky of Lovers”, full of mythology and poetry; to a flight in search of exoplanets starting with Giordano Bruno at the stake in Campo dei Fiori (“Towards Distant Worlds”); to the medieval saga of “Celestial Code of the Templars”, a title referring to the atmosphere of pre-Copernican astronomy and at the same time debunking many inconsistent myths concerning the famous knights; to the ethnic music, sound effects and panoramas of “A Tour of the World in 30 Minutes”, where celestial cartography is discovered along with terrestrial landscapes, observing the sky at different latitudes on the path of Jules Verne.

Some of our shows explore a two-voice option: that is the case in such successful lectures as “The Black-Holes, Monsters in Space”, with several quotes from music, fantastic speculations and cinema (one lecturer takes care of scientific aspects, the

other evokes emotions and fantasies), or “Travel in Time between Earth and Sky”, where cosmology faces geology in a journey through time, the far reaches of space and our planet’s history (one voice presents the appearance of Universe, the other the contemporary evolution of the terrestrial surface).

We also look for a strong connection with the historical background of Rome in “The Sky of the Romans”, a lecture characterized by original ancient music, text readings, recreations of the sky and a virtual archeo-astronomical walk through the ruins.

After one year of experiments our production of Live Lectures is still improving and expanding. We have noticed that initially many attendees expected a single standard show, but more recently people have become aware of the richness of our catalogue and are returning for other shows or events. The feedback from the public seems really positive: an active part of the audience asks for new specific topics and our mailing list (about 2000 subscribers) is growing constantly, with many messages of encouragement and appreciation. Criticism mainly addresses technicalities, not conceptual points. Presently we monitor impressions, comments and suggestions in a logbook, but we plan to conduct a more quantitative survey with focus groups and survey forms.

CONCLUSIONS