

Universum, the Science Museum



*Jorge Flores Valdes **

The Universum Science Museum at the National University of Mexico (*UNAM*) opened its doors to the public on December 12, 1992. The museum is located in the “cultural zone” of University City, in the southern part of Mexico’s capital.

On that day, visitors toured eight exhibition halls: Mathematics, the Structure of Matter, Energy, Biodiversity, Agriculture and Food, Ecology, Human Biology and Health, and the Universe. Two more halls—one devoted to Chemistry and another, called Consciousness of the Great City, to Mexico City itself—opened in mid-1993. We hope to finish work on two additional halls before the end of the year: one on Animal Behavior and Society, and one entitled Infrastructure of a Nation.

These twelve halls, in an enormous (77,000-square-foot) building, are home to approximately 450 “science toys” which children can play with and learn from.

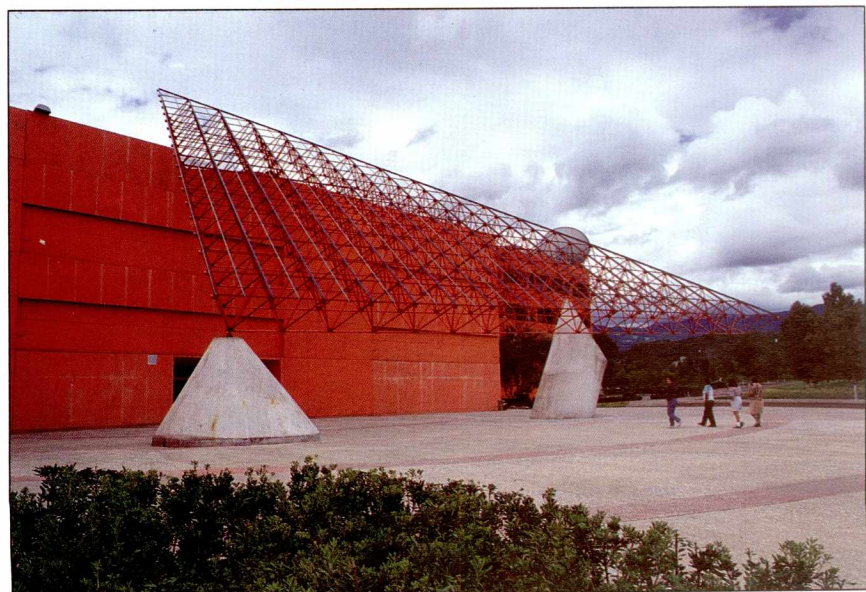
Nevertheless, the original plans for Universum were even more ambitious. The halls on Our Planet and the Avenues of Evolution (Cosmic, Biological and Sociocultural) have remained on the

drawing-board; blueprints were made, but it has not been possible to build these halls yet.

Three elements were required in order to carry out this huge project: ideas, people, and financial resources. First, a group of people was formed which gave birth to the ideas; the appropriate and sufficient flow of material resources was due to the support of *UNAM*’s Rector José Sarukhán and his two administrative secretaries—Tomás Garza (1989-1991) and Mario Melgar (1991-1992)—during the rector’s first term in office.

The biggest obstacles to carrying through a large-scale project are not, as many people believe, those of a financial or economic nature. Instead, they have to do with bringing together individual will-powers in order to bring the project to fruition, especially when the project seeks to disseminate scientific understanding and calls for an inter-disciplinary effort.

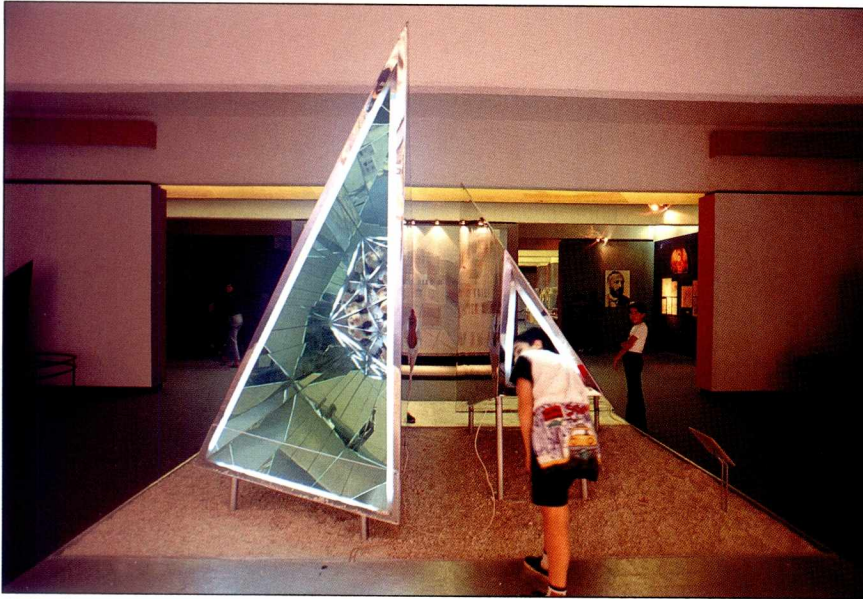
People who combine a knowledge of science with the ability to explain it are few and far between. Different gifts are required when it comes to knowing what to say and



Entrance to the museum.

* Director of the Museum and researcher at the Institute of Physics, *UNAM*.

Sergio Dorantes.



Kaleidoscope.

knowing how to say it. Thus we put together mixed work groups of scientists and science communicators, who designed and built the various exhibits that today make up the backbone of Universum.

The first ideas, often in very rough form, came from the scientists responsible for the exhibition halls. Then we carried out an exercise in the popularization of science, in which the chief of each hall tried to convince a

group of science communication experts of his ideas.

Up to twenty-five different professions or trades were represented in these meetings. For example, we had a biologist give a talk to engineers, computer specialists, interior designers, writers, film-makers, draughtsmen, pedagogues, scientists from other fields, museum specialists, architects, painters and sculptors.

Sergio Dorantes.



Central area with mosaic and sculpture.



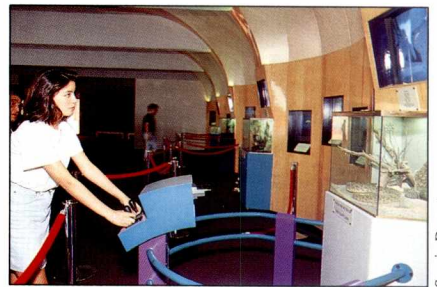
Gyroscopic chair.

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Insects and lens for close-up examination.

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Animals in their habitat, with video monitor.

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Another of the experiments which can be carried out in the gyroscope chair.

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Pendulum.

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Biodiversity bingo, one of the games museum visitors can enjoy.

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This machine shows how electricity is generated.

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Gyroscope.

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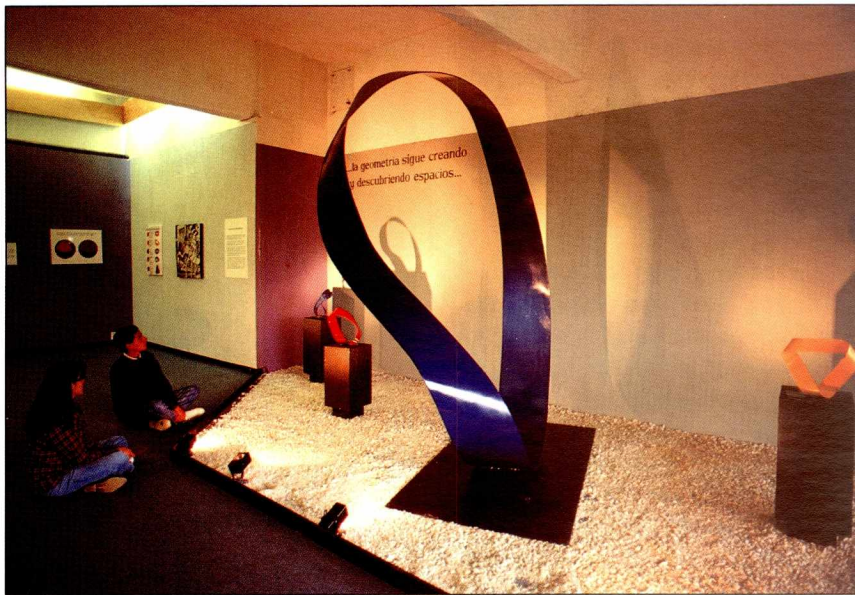


Magnetic polarization.

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Pendulum of chaotic movement.



Moebius strips.

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After one or more such meetings, through a rich process of exchanging ideas, the educational exhibits which make up Universum began to take shape. Each group of specialists set about doing their “homework” with the assignment to show up at the next meeting, within a set period, with the detailed design for the various installations.

When you are building a museum of the sciences, with so many

complicated installations, strict deadlines must be set for design, construction and try-outs. This was done in the case of Universum, giving rise to the sectoral or partial exhibits which were like pieces of the huge jigsaw puzzle that today is our museum.

These partial exhibits —39 of which were opened to the public before December 12, 1992— allowed us to speed up the work of construction. For example, it was



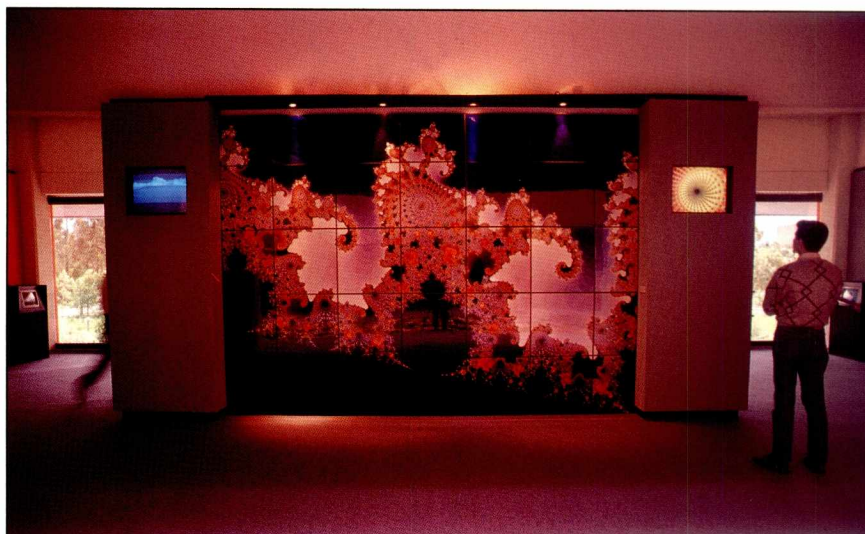
Pythagoras' theorem.

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decided that “Nevertheless, It Moves,” one of the sections of the Structure of Materials hall, would be inaugurated in the Federal Electricity Commission’s Technological Museum on February 20, 1990; that the 1992 International Book Fair, held in the Palacio de Minería (the “Mining Palace” in downtown Mexico City), would be the temporary home for the Encyclopedia of Human Reproduction; and that on July 11, 1991 we would inaugurate an exhibit on eclipses in the Tunnel of Science, located in the La Raza metro station.

This enabled us not only to insure that prototypes (at least) of these installations would be ready, but also to measure their physical durability—in interactive science centers, the public participates not only by looking but also by touching, pushing buttons and levers at will—as well as how viable they were, their quality as teaching tools, and their visual attractiveness. In short, we were able to see the public’s reaction to our installations and educational exhibits.

After the partial exhibits were dismantled, the evaluation team presented the results of their studies. These studies (which we continue to carry out today) consist of surveys,



Fractal mural.

“cold” observation, evaluation by experts in the given field, and analysis of audience behavior.

Thus, the inter-disciplinary group which built each exhibit found itself taking a test, and anxiously waiting to find out what grade it would get. Sometimes the grade was good, while other times the group flunked. A flunking grade meant starting the project over, redesigning many of the installations, even changing the exhibit’s basic idea.

But when the installations passed the test, they would become part of

Universum. This is how the museum was built, and continues to be built, since a project such as this never comes to an end.

We were surprised by the response to our hall of Mathematics. Aware of the difficulties involved in popularizing this science, we put particular effort into the design of this hall, emphasizing objects of art which are at the same time mathematical objects. Together with computer games, this has made the hall one of those in which visitors spend the most time.

In an interactive museum *not touching* is against the rules. It is well known among those who run this kind of museum that three or four broken machines (especially if they are located near one another) inevitably lead to the fatal sentence: “Nothing works in this museum.” So the main problem is to keep the machinery working without restricting enthusiastic visitors.

In addition to its exhibition halls, Universum organizes a wide variety of activities: lectures, plays, movie clubs, workshops for children and young people, educational concerts, etc. In addition to popularizing and publicizing science and its own research activities, *UNAM* thereby establishes one more link to Mexican society as a whole **M**



Main hall, with various exhibits.