

A treasure chest of knowledge:

National Museum of Natural Science Words and photos by Chen Chia Yun
Translated by S. Ying



Modern architecture emphasizes functionality and geometric shapes with a focus and simple spirit that echoes the characteristics of the industrial age.

The National Museum of Natural Science--made up of the Science Center, Space Theater, Life Science Hall, Human Cultures Hall, Global Environment Hall and Botanical Garden--maintains the spirit of modern architecture, as distinguished from a traditional classical architecture where complicated sculpting and carving aims to showcase wealth, power, or grandeur.

The museum thus serves a universal education role, offering a setting where people can enjoy a rich temple of knowledge and reflect on the true meaning of civilization and purpose of modern advancement.



Writer Profile Chen, Chia-Yun

Writer Chen Chia Yun majored in Architecture for her bachelor's degree and earned two master's degrees in Urban Design and Construction Management in London. She is used to applying both the left and right sides of her brain via creative design and business management, and practice as an architect while teaching and pursuing excellence in her architectural work. She applies passion and energy to both her life and profession, with the belief that beautiful architecture can bring comfort, and that the value of urban public space lies in resource sharing.

- R.O.C. Ministry of Examination Architect License Test Committee Member
- Owner at Point Architects and Planners
- Part-time lecturer at the Department of Architecture, National Cheng Kung University



A dialogue between science and aesthetics.

It took more than 15 years for Taichung's National Museum of Natural Science (NMNS) to progress from the initial planning stage to being fully open to the public, and it was the first national museum in Taiwan with modern facilities and designed to showcase the application of the natural sciences in real life. At the time, Professor Han Pao-teh was brought on as museum director, overseeing this huge challenge with the changing requirements of planning a museum that stimulated the public's interest in applying the natural sciences to life and educated visitors via engaging artistic and culturally diverse exhibitions.

Architectural plans and spatial layout

In the beginning, space requirements were not clear and both local and foreign experts collaborated to explore the best spatial plans for creating a space suitable for displaying and showcasing the phenomena and principles of the natural sciences while stimulating visitors' interest in science and allocating sufficient space for exhibiting the collections of natural specimens, objects and samples for promoting zoology, botany, geology and anthropology. This is all part of the museum's mission to display, collect, research, and educate. The main philosophy behind the design concept is to integrate science and art when holding exhibits that depict natural evolution and stories of life on Earth.

There were four phases to building this museum. The first phase launched the Science Center and Space IMAX Theater; the Life Science Hall was opened in the second phase; the Human Cultures Hall opened in the third phase; and the fourth phase launched the Global Environment Hall, including the Bird's-Eye View Theater, Environment Theater and 3D Theater. As the museum is dedicated to preserving and collecting related research and showcasing relevant specimens, its overall design and spatial layout must allow sophisticated science exhibitions and displays while maintaining an artistic element in order to convey the message of global advancement and human evolution in natural sciences.

There are six exhibition areas and a southeast-to-northwest alignment to the layout. In addition to the four construction phases, there were expansion plans to set up themed displays in the northeastern side of the Botanical Garden. The Science Center and Space IMAX Theater serve to entertain and educate the public and are thus a main focus at the museum entrance, designed on an axis to grab the attention and forward gaze of visitors as they enter. The Human Cultures Hall promotes the sciences, culture and civilization of China and expands towards the west, facing toward the road outside and the courtyard inside; the Global Environment Hall, depicting the close relationship between ecology and the environment, features a design that curves and turns toward the huge grass space on the

northwestern side. Each exhibition has its own side and faces the four corners. The Botanical Garden, built later on the northern side, created a brand-new landmark for this museum. Architectural programming (see terminology at end of article) is the pre-planning stage of the architectural design process, which entails that planning take into account the mission, spatial layout and facilities, plus the need to integrate specialized equipment, special lighting and air conditioning, as those aspects were an important part of this architectural project to ensure proper ventilation and storage of the display items. Also, this meant that the architectural team needed to design space and a workflow for service staff while thinking about how to create moving space for visitors and connect the large display areas wisely, allowing visitors to rest and maintain enough energy to walk through the various displays, while also considering the transition of moods between the exhibits as one goes from one area to the next. All these were important factors to consider during the planning stage, including the placement of stairs and elevators for different purposes so that they did not disrupt the flow and could serve well in their functions. The sizing and requirements of each displayed specimen was important, as huge animal skeletons couldn't be showcased in areas with low ceilings and required a high-ceiling space to depict their enormous scale by comparison to small humans, underlining the philosophy that people need to maintain a humble attitude toward the world and sciences through such exhibits. In all such cases,



A relationship between man and nature.

architects and exhibit designers had to combine their wisdom to resolve any conflicts between designs or space usage.

Specialization and integration

The establishment of museums was once the privilege of the wealthy and elite, who collected treasures and antiques and used their private residences to display them to a select audience for the social purpose of showcasing their exquisite taste and abundant wealth. Today, museums are shared with the public as a social resource serving various functions and audiences, necessitating a more diverse set of requirements. The vast collections of exhibits and specimens are so diverse that experts are required to carefully and comprehensively design architectural plans to take all of these factors into account.

Fei & Cheng Associates were responsible for the museum's architectural design, with joint efforts with expert exhibition design firms from the United States, Japan and Britain. For example, the Life Sciences Hall was designed by well-known British museum and exhibition designer James Gardner in a close collaboration with builders Beck and Politzer, also from the UK, in order to achieve such a perfect masterpiece for showcasing exhibits. The NMNS was the first of its kind in Taiwan at the time with no previous precedents to follow. Therefore, a lot of research was carried out to study overseas architectural design plans. Through a trial and error learning process,

the structure was slowly planned and created with unique aspects designed to suit the local environment.

In fact, no single architect, engineer or designer can master all such details. Numerous factors and knowledge was used to determine the best measurements and requirements including, for example, humidity, ventilation, air quality, safety from toxins, and comfort levels for the visitors. High temperatures and humidity are bad for the body and have the potential to damage displayed objects, while lighting can affect not only the brightness but

also the discoloration of displayed models, or result in a mood that is not true to the design. Visually, the placement of toilet facilities cannot be too near central exhibit areas, but also requires the consideration of distance, placement of water lines, and convenience for visitors.

This project shows that efforts inverted by architects in any professional architectural projects are not reduced by project scope or the number of building functions. Also, owners are only willing to invest in architectural plans that have integrated their ideas while showcasing the architects' professional skills in order to create a masterpiece that is aesthetically pleasing and melds well with the environment.

Urban space development policies and environmental context

The NMNS originally covered 87,276 square meters of land and was expanded with the addition of 44,856 square meters. The construction of the Botanical Garden served to boost the local economy and beautify the urban landscape. Since the emphasis of the museum is to highlight the relationship between man and nature, the architectural design educates the public about a co-existence with nature and understanding different perspectives on humans, and how these are tightly connected to the surroundings.

A rotating windmill structure reminds visitors of the evolution of wind and leads visitors across the Path of Evolution to the Museum. The Path of Evolution guides visitors to the entrance plaza, transitioning from the noise of the crowds to a quieter ambiance and more restrained mood. Stairs lead to the entrance area, so that no cars can enter, and a space set aside for outdoor events and activities. The Space Theater and Science Center also serves as an entrance with an L-shaped design, creating an iconic entryway with a simple design that allowed further development as it was designed at a height much higher than the buildings built in the later three phases. When the Life Science Hall was completed, it fulfilled the overall design concept and strengthened the architectural design. The Human Culture Hall and Global Environment Hall have a dome design that can shut out all the noise and create a more relaxing



Virtual design vs. actual structural style.

mood for visitors to slow down in as they experience the museum's various functions. The courtyard plaza opens to the sky with layered outdoor space, and is a nice contrast to the museum's geometrically-shaped design, creating a botanical greenhouse on the side. The spatial layout connects the structures, roads and green space and allows a smooth, unimpeded flow to the community and visitors' activities at the museum.

In the past, public structures such as cathedrals, city halls or police stations stood tall and distinct in the city with grand designs and an exaggerated use of space. With the progression of time, the NMNS has stood tall as a vast treasure chest with a much more friendly ambiance. Visitors continue to be welcomed to come and savor its designs and explore as they enjoy the collections and displays and immerse themselves in the knowledge left behind by our predecessors, in an institution that showcases the importance of collaboration and integration. ✨

National Museum of Natural Science

Location: 1, GuanQian Rd., North Dist., Taichung

Date: Phase I completed in January, 1986 and opened to public; final phase completed in 1999

Design: Fei & Cheng Associates, James Gardner, UK

Specialty: Simple, yet sophisticated, design using the principles of axis configuration and geometric shapes as a medium to create a transition to spaces and areas that serve different functions.

Terminology

Architectural Programming: Pre-planning of the design stage to consider people's behaviors and their relationship to the space, and to set out a spatial layout that takes into account the goals and missions of the architectural project.