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国立民族学博物館学術情報リポジトリ National Museum of Ethnology

## The Museum and Environmental Education : A Case Study of the National Museum of Prehistory, Taiwan

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## **The Museum and Environmental Education: A Case Study of the National Museum of Prehistory, Taiwan**

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### **Abstract**

On 5 June 2010, the Taiwan government announced the Environmental Education Act, which encouraged agencies, schools, institutions, and organisations to apply for certification as ‘environmental education institutions’. The National Museum of Prehistory (NMP) responded positively to this call and ‘Peinan Site Park’ and ‘Kangle Main Museum’, the two spaces under the jurisdiction of the NMP, were certified in 2014 and 2015, respectively. Each year, according to the connotations and functions of the NMP, using the exhibition facilities inside the museum and the diverse outdoor park resources, and with interpretation and guiding activities, the museum has helped devise the environmental education system and encouraged the public to learn more about the richness and variety of natural ecology, prehistoric cultures, cultural heritage, and indigenous cultures in Taiwan. Although the NMP has contributed to environmental education for only four years, the review and analysis presented in this article allow for a better understanding of the environmental issues and interaction between the museum and the community, and by this means to consider a more active role for the museum in environmental education.

### **I. Introduction**

On 5 June 2010, the Taiwan government announced the Environmental Education Act, which took Taiwan’s environmental movement one step further. This Act encouraged schools, agencies, institutions, and organisations to apply to the central authorities to become central government-certified environmental education sites, train environmental educators, and provide opportunities for environmental education research. The National Museum of Prehistory (Hereafter referred to as ‘the NMP’) responded positively to this policy and the two spaces under the jurisdiction of the museum were certified as ‘Environmental Education Facility Sites’. One was Peinan Site Park which was certified at the end of October 2014 (Lin 2014), while the other, the Main Museum in Fongtien, was certified in July of 2015. Each certified institution or site is required to propose a series of programmes to promote environmental education activities each year.

The purpose of the Environmental Education Act is to ‘Cultivate people’s understanding of their ethical relationship to increase their knowledge, skills, attitudes and values of environmental protection, inform them of the importance of the environment and take action, hence achieving the process of citizens’ education on sustainable development’. Like other museums, the NMP also has connotations and functions of environmental education programmes, with the aim of helping citizens to develop their understanding of the richness and variety of natural ecology, prehistoric cultures, cultural heritage, and indigenous cultures in Taiwan, and to foster their appreciation and respect for their own natural and cultural life. In terms of implementation strategies, the museum constructed the environmental education system using the exhibition facilities inside the museum as well as the diverse outdoor park resources, and by including interpretation and guiding activities. To expand the effectiveness of environmental education, the NMP has also joined an alliance. This alliance is a partnership established by several public and private environmental education facilities (institutions) in Taitung County where the museum is located.

The Taitung County Environmental Education Alliance is not a formal organization but a platform for sharing experiences and meeting regularly. It is an alliance formed by the following nine “units”. The first six “units” ((1)-(6)) are facilities that have been certified as the “Environmental Education Facilities”, and the last three ((7)-(9)) have not been certified yet. They claim to be a partnership with each other, they are the following: (1) The Jhihben Natural Education Center, a facility in the Jhihben Forest Recreation Area managed by the Taitung Forest Management Office; (2) “Yong-an Community Environmental Education Park” managed by Yong-an Community Development Association, Lu-ye Township, Taitung County; (3) The “Kangle Main Museum” managed by the NMP; (4) The “Peinan site Park” managed by the NMP; (5) “Xiaoyeliu Nature Classroom” managed by the East Coast National Scenic Area Management Office; (6) “Waste Incineration Plant” managed by the Taitung County Environmental Education Center established by the Taitung County Environmental Protection Bureau; (7) “Taitung County Museum of Natural History” managed by Taitung County Education Department; (8) “Chenggong Marine Environment Classroom” managed by the East Coast National Scenic Area Management Office; (9) “Environmental education counseling group” set up in the Education Department of Taitung County Government. Since 2015, the staff of each unit of this alliance has started to gather and share experiences, and further developed into a network of mutual support for staff and resources. After 2019, it has become a cross-site collaboration project proposal for funding to promote further action on environmental education courses. The two out of the six places that have earned the “Certified Environmental Education Facilities” belong to the NMP, which shows that the NMP attaches great importance to environmental education.

Although the NMP has only been a part of the environmental education system for four years, the Main Museum won the highest honour in the country in the 2018 museum evaluations. Therefore, it is hoped that through the review and analysis presented in this article, we may understand the strategies of practice of environmental education undertaken in the museum, shed light on the environmental issues, relationship, and

interaction between the museum and the community, and consider a more active role for the museum in environmental education.

## **II. About the NMP**

The NMP was established on 17 August 2002, in Taitung City, a subdivision of Taitung County in southeast Taiwan. Thus far, the museum has established three spaces. The first is the Main Museum, located at No. 1 Museum Road, Fongtien Village, Taitung City. Geographically speaking, this lies at the centre of the Taitung Plain. Five-hundred metres away from the Main Museum is a railway station called 'Kangle Station'. Because the museum is located in the vicinity of Kangle and near Kangle Railway Station, museum staff call it 'Kangle Main Museum'. The area of this museum space is 10.65 hectares. The second space is Peinan Site Park, or Peinan Culture Park, as it is more commonly called by the public. This space has a total area of 30 hectares, of which 12 hectares comprise national prehistoric sites. The third space is located in the west of Taiwan, in the 'Nanke Industrial Park' (Southern Taiwan Science Park) in Xinshi in Tainan City. This branch of the NMP is called 'Nanke Museum' and has an area of 2.4 hectares. However, the main part of the Nanke Museum project, which has just been completed and began trial operation in late 2018, has not yet been certified as an environmental education facility. Therefore, this article does not include discussion of this project.

The NMP is a national museum established to preserve Taiwan's prehistoric culture. In July 1980, when Taitung New Station on the South-link Line (formerly known as the Peinan Station of the EASTERN LINE) and the switchyard were being built, large-scale construction work uncovered the Peinan site, which was rich in prehistoric relics. In the following ten years, Song Wen-hsun and Lian Chao-mei led the National Taiwan University archaeological team to carry out more than ten times of rescue work. The whole excavation area covers more than 10,000 square meters, and about 2,000 tombs and tens of thousands of pottery and stone tools have been unearthed. It is a very important representative site of the late Neolithic period in Taiwan. Professor Song Wen-xun believed that if we wanted to preserve the Peinan Site, we should build a museum on the archaeological site. After many efforts and expectations, the museum officially opened on August 17, 2002. Now in its 18th year of operation, it is still a young museum.

Therefore, although the museum's establishment was first proposed in 1980, and the Preparatory Office was established in 1990, it was not until the 21st century that the museum was finally completed. Now in its 18th year of operation, it is still a young museum.

## **III. The Relationship between the NMP and its Environment**

When Donald Fred McMichael discussed the relationship between a museum and the environment in which it is situated, he noted that three important factors should be considered: (1) the impact of the museum on the environment; (2) the impact of the

environment on the museum and its collections; and (3) the role of the museum in promoting the relationship between people and the environment (McMichael 1992: 11–16). These three directions proposed by McMichael are used here as an entry point for observing the interaction between the NMP and environmental issues. In the following passages, I will explore the relationship between the NMP and its environment, review the controversial issues in relation to the environment, and discuss what difference the museum can make after becoming an environmental education site.

### **The impact of the environment on the NMP**

Before discussing the impact of the environment on the NMP, it is first necessary to review the characteristics of the environment in East Taiwan. East Taiwan has a subtropical climate, with very hot summers and frequent typhoons. It is adjacent to the sea, and falls just within the Eurasian plate boundary zone; therefore, this area sees many earthquakes. These environmental conditions pose a potential or apparent threat to the museum. In my memory, the natural factors causing disasters to the NMP (including Peinan Site Park) have mainly been floods and strong winds caused by typhoons, as well as earthquake damage. Although the museum is located close to the ocean, there is no obvious effect of salt damage. Among the above-mentioned threats, typhoons are the most common environmental factors encountered by the NMP. A brief description is provided below:

Peinan Site Park is a place where heavy groundwater easily accumulates and an artificial drainage system was built to mitigate this environmental problem. However, when the site was first built, the original plan was to build Wenchang Road to lead to Taitung Railway Station in front of the park. The aim of so doing was to (1) ease traffic from the community roadway to the railway station, (2) improve tourist access to Peinan Site Park, and (3) set up a drainage system in conjunction with the construction of the road to dredge the water flowing down Peinan Hill. However, in 1995 when Wenchang Road was under construction, rich prehistoric cultural artefacts were discovered and unearthed. Based on the idea that the preservation of cultural heritage comes first, the road construction project was suspended, leaving some 200 m of road for archaeological excavation; and an ‘archaeological site’ was built for the public to visit. For this reason, the drainage system, which was to be built in conjunction with the construction, could not be conducted. Therefore, during storms, the archaeological studio in the southeast of Peinan Culture Park and the lawn near the toilets are often flooded with pools of water that do not drain away and become stagnant. Although local residents have reported this issue many times, the problem of flood discharge in the rainy season has not yet been solved, because the project would contravene the law on preserving cultural heritage.

Typhoon Neibert, which hit Taiwan on 8 July 2016, was a severe typhoon with strong wind and heavy rain. Trees along the roadside snapped and equipment broke, causing disruption to traffic in the park; numerous trees and plants in the park were also blown down. On 7 October of the same year, Typhoon Aere struck the area, and the heavy rainfall it brought caused debris to flow down Peinan Hill. Dirt and rocks flooded into the tourist service centre of Peinan Site Park, causing serious damage to the offices

and exhibition spaces, and even flooding into other office spaces and showrooms. This disaster attracted a great deal of media attention<sup>1)</sup>. Typhoon Neibert also caused severe damage in the Kangle Main Museum: apart from causing damage to the building's facade, the sudden accumulation of water also disabled the drainage facilities and, as a result, the water flooded into the buildings, destroying offices, libraries, and repositories. The financial loss of the disaster amounted to USD 350,000 that year.

In addition to typhoons, earthquakes also have a major environmental impact on the museum. There are two aspects to this impact: the first is the potential threat, as defined by environmental assessment. The second is the real effect of earthquakes. Regarding the first aspect, this effect occurred at the early stages of preparation for the museum construction. It was found that Peinan Site Park, which was originally to be used as the base for the museum construction, was located on the geological fault zone and was therefore not an appropriate location for a museum. In this regard, Zeng Sheng-yuan, former director of the site park and deputy curator of the NMP, pointed out more important issues: if it was appropriate for large-scale buildings to be built on Grade I historic sites? So, in December 1991, the committee of the preparatory office decided the main building of the NMP would be built at another place. After negotiation, the Taitung County Government agreed to reserve a land in the south of Kangle Station for the use of constructing the Main Museum of the NMP. The original place was planned to be a site park. (Zeng 2009: 18–21)

In fact, the process, from the meeting of the Planning Committee of the Preparatory Office in December 1991, where it was decided that the main building of the NMP had to be built elsewhere, to approval of the decision by Mao Gao-wen, then Minister of Education, to reserve land to the south of Kangle Station for museum construction, led to great political controversy. This was because, when the Committee decided to find an alternative location, there was a suggestion to move the museum to the Kuantu area in Taipei. This caused a local backlash in Taitung, particularly in the political arena and the media. As a result, the central authorities could not ignore local opinion and the NMP ultimately came to be located on the present-day site (Lin 2012: 57–66).

The museum is located right in the geographical centre of the Taitung Plain, and the alluvial plain formed by two major rivers—Lijia River and Taiping River. Traditionally, this area used to be a hunting place for the indigenous people. Then, during the period of Japanese occupation, the government focused on developing the region, and most of this area was owned by Taitung Sugar Factory. Due to the market influences, Taitung Sugar Factory reduced its area of sugar cultivation and opened up to farmers to rent and plant economic crops, such as custard apple, pineapple, and watermelon. Because of the flat terrain, and because there was no possibility of other environmental or cultural heritage controversy, the place became the site for the Main Museum of the NMP.

Taitung is located on the seismic belt, so it usually has many earthquakes. Although there have been numerous earthquakes since the construction of the NMP, most have been below Magnitude 5 and have not had a significant impact on the museum. The only earthquake with an obvious effect occurred at 12:38 Taiwan Time on 10 December 2003 (Richter Scale 6.4) (Wikipedia 2018). Despite its strength, the quake caused little

damage, only having some slight effect on the buildings and storehouses. Although the damage was mild, it did suggest that the NMP was under threat of earthquake damage.

In addition, there are many flowers, trees, and grassy areas in Peinan Site Park, and some of the national sites are kept in the original state of farmland with rich wild vegetation, so that part of the space has retained its wild ecological appearance, teeming with birds, small animals, snakes, and other organisms. The Kangle Main Museum is mainly surrounded by farmland, and the museum itself has more than four hectares of gardens, so there are plenty of birds, insects, and snakes there, particularly venomous snakes which pose a potential threat to tourists. Therefore, both spaces have warning signs in certain locations, reminding tourists to be cautious. However, of all the creatures, those that most affect the daily operations of the museum are flies. Because farmers in the vicinity plant cash crops such as custard apple and use a large amount of chicken manure fertiliser, flies that are attracted by fertiliser fill the sky. Although the park and museum space are equipped with various protective measures, it is difficult to prevent flies from entering. Tourists complain a great deal about the nuisance, and worry about the potential health effects. However, this situation has greatly improved in the past two years after the government banned the use of improper fertilizers.

### **The Impact of the NMP on the Environment**

A large-scale project will inevitably impact the environment, including both the natural environment and the social and cultural environment. In a social environment where environmental impacts are increasingly being considered, large-scale development projects (over 10 hectares) must pass 'environmental assessments' before they are given the green light. Three environmental assessments were required for the development and construction of the NMP. The first was conducted in 1990 and comprised the assessment of Peinan Site Park for the museum site, which was ultimately rejected. The second environmental assessment was conducted in 1995 to assess the current location of the Kangle Main Museum—which was approved. In 2007, Peinan Site Park promoted the second phase of the project, which was not large in scale, but due to the environmentally sensitive areas (slopes and prehistoric sites) of the park, environmental assessment was still conducted and the environmental monitoring work lasted nearly 10 years. Nanke Museum in Tainan has an area of only 2.4 hectares, so it was exempt from environmental assessment procedures.

Peinan Site Park is not only an environmentally sensitive area, but, due to the complex social environment, it has also experienced many environment-related events since the park was built. For example, tension has been created in the community by the first land expropriation event, the secondary land expropriation of the second phase project, the farmers' request to open the agricultural road through the park, site damage caused by adjacent land development, the suspension of the construction of Wenchang Road (residents' request for access and drainage facilities), and other incidents. For more information on the interaction between the park and the community, please see the work of the author (Lin 1998; 2012) and Lin Chia-Ching (2015). In general, the construction of Peinan Site Park not only affected the natural environment, but also affected the lives



and interests of the original residents. The changing natural environment of the space (from farmland to park) caused social tension, due to the expropriation of private land and a clash of interests. However, the impact on the natural environment was rather paradoxical, because one of the purposes of expropriating the site space in Peinan was to restore the natural environment of the prehistoric era. Therefore, the environmental impact caused by the park construction was to limit the influence of agriculture and utilisation of the environment before establishing the park. However, before the second phase of land expropriation, the landlord and public planted a large area of approximately 1–2 hectares of precious camphor trees to increase the compensation pay-out. After the expropriation, however, the museum did not deal with the trees on time. When they discovered that the roots of the trees might have had an impact on underground sites and cultural relics, they applied to the Bureau of Cultural Heritage for the removal of the trees, but they were opposed by tree conservationists. The museum authorities were also concerned about the disagreement of tree conservation groups, so the issue has thus far remained unresolved.

### **The Role of the NMP in Environmental Education**

Clifford (1999) and Lin (2012) have noted that a museum is a ‘contact zone’, a field where diverse populations with multiple values and power meet and interact with each other. The mission entrusted by the state to the NMP at the beginning of its establishment was to preserve cultural heritage and develop the local cultural economy; however, the consciousness and task of environmental education were not obvious at the beginning. After the implementation of the Environmental Education Act in 2009, the responsibility for environmental education became a new mission of all the schools, institutes, and organisations. However, this still did not become an important task for the NMP. Although the NMP’s research was rich in environmental topics, there was still no obvious policy intention with regard to environmental education until Zhang Shan-nan became museum director, prompting a more active attitude. In 2014, Peinan Site Park of Prehistoric Museum successfully applied for environmental education field certification, followed by the Kangle Main Museum in 2015. One more item was then added to the responsibility of NMP environmental education.

However, whether it was a policy mission of cultural preservation or environmental education, from the perspective of the local community in Taiwan, the value seemed to be coming from the elite of environmental and cultural protectionists. In the author’s (Lin 1998) article, the author noted that a National Museum, as a practical place of national values and concepts, might sometimes overlook the needs and values of neighbouring communities when the goal of the establishment is pursued, particularly when that goal was planned. In the case of the NMP, The needs of these communities included farming, for business development arising from the construction of railway stations, and for indigenous communities securing their social cohesion and cultural protection in the face of dramatic changes caused by modernization in the times. The above-mentioned local or community residents’ needs did not necessarily correspond to the intentions of the museum space. Despite the problem of cultural preservation, the link between the



conservation of Peinan Site Park and the nearby community of Peinan cultures did not become clear until late 2007 (Lin Chia-Ching 2015). Generally speaking, the majority of residents were concerned with their livelihoods and economic problems. so they were quite active, In the opposite, the local residents were often passive, while dealing with such issues as cultural preservation and environmental education. Encouraged by the Central Government's 2003 World Heritage Potential Location Policy, the Peinan Site and Dulan mountain region were considered the most promising recommended projects by invited World Heritage Committee members, but despite the enthusiasm of the central authorities, local government and residents remained disinterested in this policy (Lin Chih-Hsing 2015: 157–178).

To face the diverse needs of society, the author has summarised the characteristics of the NMP, and believes that, if the museum can present the environmental experience encountered in its own development process, as well as the environmental issues in the field of prehistoric and indigenous culture, it should be able to make the greatest contribution to environmental education. In particular, the fields of prehistoric and indigenous culture are rich in experience and knowledge regarding the interaction between humans and the Taiwan island environment. Next, we will see whether the practice of the NMP contains any unique experience.

#### **IV. Environmental Education at the NMP**

##### **Origin**

When did environmental education at the NMP begin? Broadly speaking, when the Peinan Site was discovered and the construction of the museum was proposed in 1980, environmental education 'work' in the NMP had begun. After that, the social discussions triggered by the series of events mentioned above were all related to environmental issues. Since the preservation of cultural heritage itself was an important aspect of environmental issues, and the very establishment of the NMP aimed to preserve the country's important cultural heritage, when the author asked Lin Chia-Ching, one of the most senior staff members in charge of environmental education in the NMP, about the history of NMP's development of environmental education, she stated. 'The park has been offering courses since very early on, and environmental education has been provided all along. As the museum has passed the certification, in addition to increasing publicity and attracting more visiting groups, it can also tell people that we are a good environmental education site'.

The NMP strived to become an environmental education site due to Director Zhang Shan-nan's attitude. Lin Chia-Ching stated: 'The accredited sites will attract groups that need hours of study (such as civil servants). Having the site certified means having authority, thus we can check and approve environmental education and study hours on the net'. She added, 'it was just for this reason that Director Zhang Shan-nan hoped that we could pass the certification as soon as possible'. Therefore, the NMP's promotion of environmental certification was actually a marketing strategy. From another perspective, however, the purpose of Taiwan's environmental education law was to strengthen the

education and promotion of environmental ethics.

According to the Environmental Education Act, before a site can be certified to provide environmental education facilities, it must have more than one employee at the site who has obtained environmental education personnel certification. Therefore, a senior environmental education staff member of the NMP participated in the application for environmental education personnel certification. Although the Environmental Education Act was passed in 2009, it was not until 2013 that some of the museum staff members applied for certification as environmental educators. The first environmental education site certification was not obtained by Peinan Site Park until 20 October 2014.

In its promotion of environmental education policy, the museum belongs to the field of social environmental education. Social educational institutions, civil organisations, and public and private enterprises all belong to this field (Wu 2012: 9–11). In terms of strategy, Taiwan has adopted the following important methods: (1) Environmental education studies: the public sector should take the lead, and all its employees should participate in environmental education for more than four hours per year, creating a demand for environmental education and thus providing opportunities for all environmental education sites. Zhang Shan-nan, director of the NMP, thought it was a great opportunity to increase the number of visitors and the fame of the NMP. (2) Certification: certification of environmental education professionals, sites, and training institutions creates new incentives to qualify for certification as a competency in the workplace. (3) Providing funding: enable relevant sites and institutions that have won certification to strive to hold related educational activities and attract participants to join. (4) Evaluation incentives: guide personnel, sites, and training institutions to strive for excellence in the direction of healthy and smooth development (Wu 2012: 9–20). Under those planned systems, in order to gain recognition, each certified institution is driven by financial subsidies and evaluation awards, to which are added manpower training, the planning of an attractive and high-quality activity teaching plan, and the introduction of operational management staff for educational sites. The implementation of the NMP's environmental education practice at the Peinan Site Park and the Kangle Main Museum, the two certified sites, can also be observed by using the above four criteria.

### **The Practice of Environmental Education at the NMP**

As far as the NMP is concerned, although it is divided into two spaces, it is in fact the same institution. However, from the point of view of the Environmental Education Act, since every site has its own space, 'Peinan Site Park' and 'Kangle Main Museum' should be considered two separate sites. Therefore, in promoting environmental education at the NMP, the two sites were basically provided with certified environmental education personnel responsible for promotion, although at the same time, they supported each other. The two sites underwent environmental education facilities evaluation in 2017 (the Peinan Site Park) and 2018 (the Kangle Main Museum). Through the NMP's own evaluation report, we learned and understood the environmental education promotion situation.

According to the two evaluation work reports, environmental education professional

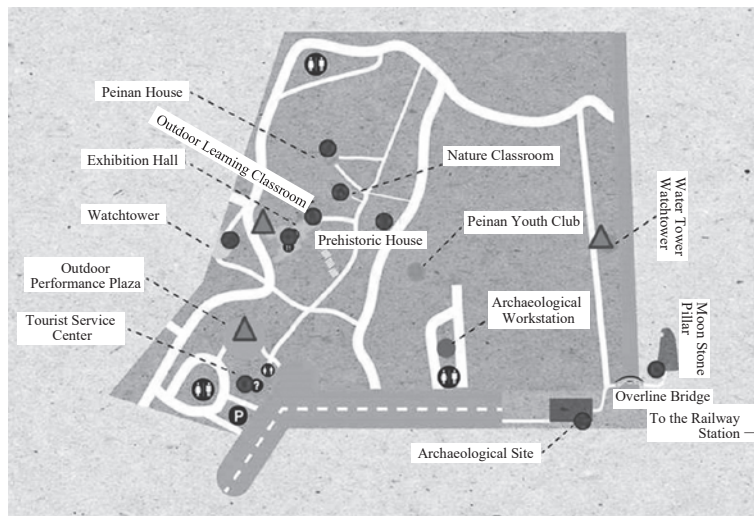
manpower, the course plan, and the operation management plan constitute the three aspects of evaluation. Let us first examine the planning and practice of environmental education in the Peinan Site Park.

### 1) Practice of Peinan Site Park

The report of the Peinan Site Park emphasised its own environmental, natural, and humanistic characteristics. The Peinan Site Park is a famous national site. Therefore, the archaeological site at the Peinan Site, the site of the stone columns, the restored prehistoric houses, the unearthed artefacts, and related research results displayed in the exhibition hall constitute the first feature of the site (humanistic). Second, the park has a large area of 30 hectares. At the outset, the NMP established a goal of turning the original agricultural production space used by farmers for cultivation into a natural environment that closely resembled the prehistoric era. Planting planning was based on the idea of environmental regeneration, in the hope of restoring Taiwan's lowland native plants. Therefore, before the NMP became a park, Li Rui-zong was entrusted to restore Taiwan's native plants, and transplanted seedlings into the park. At that time, it was claimed that nearly 400 species of native Taiwan plants had been replanted. After 20 years of the park's development, the survey demonstrates that there are 37 species of birds, 7 species of mammals, 8 species of amphibious reptiles, and 18 species of insects in the park. In terms of plant resources, there are 130 species of tree, 69 species of shrub, 60 species of rattan, and 197 species of herbs. The park contains the following endemic species: *Pyracantha koidzumii*, *Crepidiastrum lanceolatum*, *Celtis formosana* hayata, *Polygonum multiflorum*, *Eupatorium formosanum* hayata, Taiwan golden-rain tree, etc.

The third feature is the park's nearby indigenous communities, which form a social and humanistic feature. In terms of neighbourhood, the people closest to the Peinan Site Park are the Peinan ethnic group. In the area of Taitung Plain, there are at least the Puyuma, Amis, Rukai, and Paiwan indigenous groups, as well as a large number of Han Chinese people. Therefore, when the environmental education course plan of the park was designed, it was based on the three major tasks of establishing the 'Site Park Management Center' in the NMP: to preserve and promote cultural heritage; to promote environmental and ecological education; and the presentation of and education on indigenous culture.

The Peinan Site Management Center<sup>2)</sup> was the organisational unit of the NMP that managed the Peinan Site Park. Before 2014, it was not a site for environmental education; however, strategies and methods had already been in place for popularising prehistoric cultures and strengthening park operation. The most common activities were guided tours, DIY activities, outdoor teaching, professional studies and workshops, and holiday theme activities (such as concerts under Peinan Mountain, etc.). To promote education activities, the staff members not only used their own resources by organising activities inside the park, but also often took the initiative to combine with schools. For example, they cooperated with elementary and junior high schools in neighbouring areas. They sometimes invited the schools to bring their students to the park for classes, or went to the schools to teach students.



**Figure 1** Main and alternative teaching facilities for environmental education courses in the Peinan Site Park By Yang Hiao-cin

Since 2014, when the Peinan Site Park became an environmental education site, due to the need for certification, members of the Site Management Center have launched five certified environmental education course plans, based on available resources, for which the public can register. The five programmes are: (1) Discussing Peinan through Time and Space, (2) Searching for National Treasures, (3) Examining the World from a New Perspective, (4) Changes of Food, and (5) Micro travel on the site. Today, there is also a new course plan, 'Treasure Hunt in Peinan Site', that can be taken in the process of applying for certification. These courses were designed to use the related facilities in the park. The main facilities are: Exhibition Hall, Archaeological Site, Moon Stone Pillar, Peinan House, Nature Classroom, Outdoor Learning Classroom, Watchtower, Prairie, and Tourist Service Center. Alternative facilities include the Water Tower Watchtower, Outdoor Performance Plaza, and Exhibition Hall Classroom (see Figure 1).

The first course, called 'Talking about Peinan through Time and Space', is aimed at students in grades 4 to 6 of elementary school. The students can learn about Peinan Site and its surrounding natural environment; furthermore, by gaining practical personal experience in the Park, the students can learn about the relationship between Peinan prehistoric culture and their living environment, learn why the park was founded, recognise its status and value in the history of Taiwan, and perceive how important the site's environmental protection is to the preservation of cultural heritage. Thus, the students learn how to adopt the correct behaviour for preserving cultural heritage. This programme comprises a combination of teaching and visits, and four modules have been designed: The Life of the People of Peinan Culture (90 minutes), The Site of Peinan and Its Surrounding Environment (40 minutes), Talk on Peinan Culture Park (40 minutes), Walking on the Site and A Comprehensive Discussion (60 minutes). Altogether, there are 230 minutes of course activity plus rest and meal times, so participants spend more than

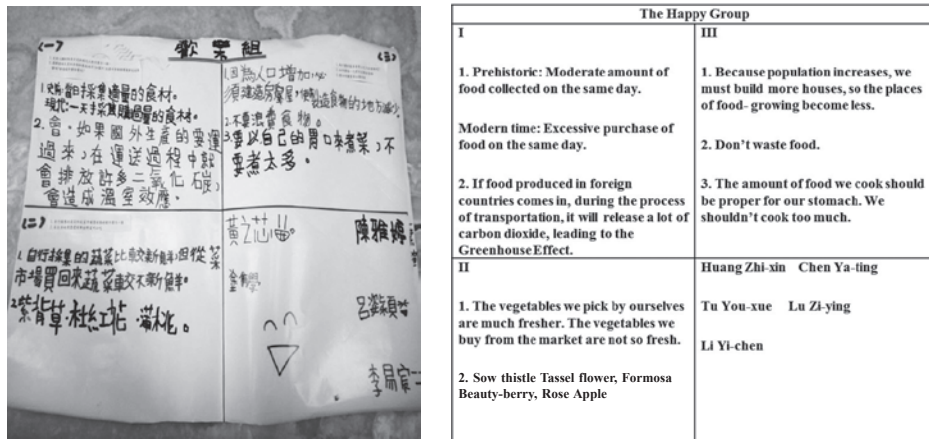
half a day in the park.

The second course is 'The Search for National Treasures', which is aimed at students above Grade 5 in elementary school. It is designed to develop participants' ability to read maps in the field and the spirit of teamwork and mutual help, facilitate their understanding of the prehistoric Peinan cultural relics and cultural context, and reflect on the importance of heritage preservation. The programme is implemented by exploring the park in small teams, attempting to find objects by following maps designed by educators. The educators set up various games to be played in the process. The messages and experience that the activity hopes to deliver are conveyed via the games.

The third course is 'Looking at the World from a New Perspective', which is aimed at lower grade elementary school students. The purpose is to guide students to learn how to use their five senses to observe and experience nature, to understand the native plants in the park through the experience of their five senses, to feel nature through personal experience, and to produce feelings and an attitude of loving nature. Educators conduct natural observations by leading visitors to see, listen, touch, smell, and taste.

The fourth course is 'Changes of Food', which is aimed at elementary school students above Grade 4 or adult groups. The objectives of the course are to understand the differences between prehistoric and indigenous people and modern people, to understand the impact of mistaken eating habits on the environment, and to guide students to understand the concept of an environmentally-friendly diet and practice it in daily life. It is also hoped that participants in this programme have a half day experience, so the programme designer designed a total of six activity modules. These modules are: Learn Something about the Peinan Site Park (20 minutes), Diet of the Prehistoric Culture People (30 minutes), The Search for Wild Vegetables (70 minutes), Old Food with a New View (50 minutes), Food Battle (20 minutes), and Comprehensive Discussion (40 minutes) and other activities. In the activity Food Battle, educators lead participants to think about the following questions (in groups): Why can some people not get enough food? How can each generation have enough food? How can resources be made sustainable? Figure 2 is the outcome of the discussion of the elementary school participants in the Food Battle.

The fifth course is 'Short travel on the Site', which is aimed at adults. The target of the course is to facilitate understanding of the discovery and rescue of the Peinan sites, and the mode of production and technology of prehistoric Peinan cultures through a practical participation experience, to learn about the current situation of the ancient sites in Taiwan and to realise the importance of preserving them, as well as the laws and regulations and methods of doing so. Simultaneously, participants are also prompted to consider the importance of preserving cultural heritage and how to take relevant actions. This scheme also takes a half-day, with five activity modules designed altogether. They attend Discovery of the Peinan Site (50 minutes of visits to the Moon Stone Pillars and Archaeological Sites), The First Contact with Prehistoric People of Peinan Culture (90 minutes of exhibition visits), and The Great Battle of Preservation of Cultural heritage (40 minutes in the classroom inside the Exhibition Hall), Site Development Public Hearing (50 minutes), and Comprehensive Discussion (10 minutes), etc.



**Figure 2** The outcome of the joint discussion in 'Food Battle' in the course 'Changes of Food' (Lin 2019)

All of the above activities are planned and implemented by the staff of the Site Management Center of the NMP. In 2013, one staff member of the centre passed the certification with environmental education personnel, and subsequently full-time staff members and dispatched staff members participated in certification one after another. Thus far, five staff members have been certified in the fields of nature conservation, disaster prevention and rescue, school and social environmental education, and so on. The environmental educators were given the role of planners and enablers. In practice, however, the NMP invested more personnel than just these educators. Due to the particularity of the Peinan Site Park, all staff of the site management centre joined, in the practice of environmental education from the administrative supervisor to cleaners, preservers, and gardening staff. In addition to using the park's own manpower, environmental educators also promote it through outside communities, volunteers, the Taitung County Environmental Education Union, and other organisations.

## 2) The Practice of the Kangle Main Museum

Compared with the Peinan Site Park, the biggest difference between the mission statements of the two spaces is that the Peinan Site Park seeks to tell small stories about itself, while the Kangle Main Museum is designed to tell the 'big stories' of Taiwan island and its surrounding areas. Therefore, the goal of environmental education at the Main Museum also presents a macro view.

Through its research, collection, display, education, and recreation functions, the museum aims to enable the public to better understand the richness and variety of Taiwan's natural ecology and prehistoric and indigenous cultures. It also aims to encourage the public to cherish and respect the continuing natural and cultural life on this land. This aim gives us an inevitable responsibility to promote environmental education. (National Museum of Prehistoric Cultures of Taiwan ed. 2018a: 217) On the whole, the NMP aimed to illustrate the interaction between human beings and the



environment in human life and development on the island of Taiwan. Inevitably, this involves the interaction between human life and its stage space - the natural environment. Therefore, we can say that the NMP itself is the best stage upon which to present the changes to Taiwan's natural environment.

In terms of staffing for environmental education, the biggest difference between the Kangle Main Museum and Peinan Site Park is that the former outsources its labour, while the latter handles it from within. Of course, labour outsourcing has always been an important strategy for the government to tackle personnel shortage. However, this strategy also presents an interesting phenomenon. Let us compare the two spaces. The Main Museum has a much larger staff than the Park, but the Park uses self-handling while the Museum adopts labour outsourcing because the proportion of environmental education personnel differs between the two sites. The Park has four staff members who have been certified in environmental education, while the Museum has only one such staff member. Even more interesting, under environmental education law, education professionals are divided into the following eight categories: school and social environmental education, climate change, disaster prevention and rescue, nature conservation, pollution prevention and control, environment and resource management, cultural preservation, and community participation (Wu 2012: 24). In fact, in the NMP, there are also some people with a suitable background who can participate in the certification of cultural preservation personnel, but thus far, there have been no such personnel in the Prehistoric Museum. Today, most staff members who have achieved environmental education certification have an academic background in natural subjects.

The question then arises: is there a prejudice that environmental education is derived from natural science and is therefore only suitable for staff with a background in such subjects? Or is the workload of other staff simply too heavy to add more responsibility? While the author has not yet investigated this issue, he believes that both reasons are likely relevant.

Nevertheless, no matter how many people are qualified for the environmental education certification, after participating in environmental education site certification, the impact of environmental education policies can be observed among all staff members, and their environmental consciousness has been greatly improved. As a result of the recent forward-looking plan of the NMP, the discussions in meetings about the renewal plans for permanent exhibitions are often accompanied by discussions about environmental issues, be it about increasing the contents of the World Permanent Exhibition of Austronesian Cultures or renewal of the permanent exhibition on Taiwan's indigenous areas. This should be seen as a positive effect of participating in environmental education site certification.

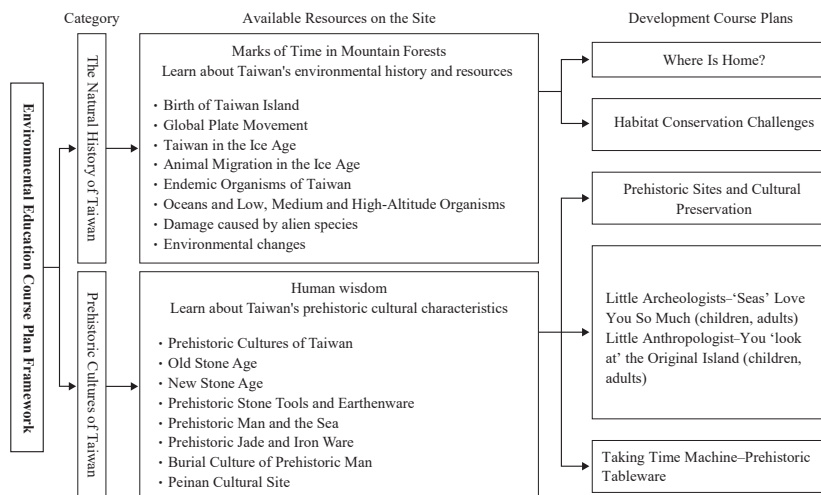
Since environmental education site certification was only completed in 2015, it has only been in practice in the Kangle Main Museum for four years (2016 to 2019). Since the museum has only one environmental educator, it has adopted a labour outsourcing strategy and developed three types of activity: (1) environmental education courses, comprising courses that have been submitted and approved by the environmental education organisers; (2) other environmental education promotion activities, which



means the course plans have not been submitted to or approved by the environmental education organisers but are self-run; and (3) outreach courses, referring to activities not held in the museum, but usually in cooperation with other institutions, or referring to outdoor activities organised by the institutions themselves. All three types of activity are available to the public.

The first type of activity is the most important and can be taken as part of the permanent ‘menu’ presented to Environmental Protection Administration, Executive Yuan, providing visitors with choices to the environmental education courses. Since the application for environmental education site certification in 2015, the NMP has referred to all the site resources and developed the following course plans. Two major courses, ‘Where is your Home?’ and ‘Preservation of Prehistoric Sites and Cultures’, were planned at the beginning of certification in 2016. In 2017, the two programmes, ‘Little Archaeologists’ for children and ‘Little Anthropologist–You “look at” the Original Island’ for adults, were introduced in succession. In 2018, two amended versions were developed–‘Little Archaeologists’ for adults and ‘Little Anthropologist–look the Island of indigenous’ for children. In the same year, tests and applications were also conducted for the two new schemes, ‘The Great Challenge of Habitat Guarding’ and ‘Taking Time Machine–Prehistoric Tableware’, which are expected to be officially launched in 2019. Thus far, the Kangle Main Museum has eight course plans. For the relationship between site resources and development courses, see Figure 3. The aforementioned course plans are based on the ideas stated below.

This course is taught from three angles: IN (teaching IN the environment), FOR (teaching FOR the environment), and ABOUT (teaching ABOUT the environment). It is conducted mainly through the NMP collection, through on-the-spot observation and



**Figure 3** A list of environmental education course plans at the National Museum of Prehistory

Note: This table was created from the materials of the National Museum of Prehistory, Taiwan (2018a: 35) and adjusted with reference to the latest information.

interactive explanatory teaching, combined with the Ministry of Education's nine-year indicators of environmental education capability. Students are sensitised through topics such as natural environment and cultural heritage and learn the importance of culture conservation and conservation of animal natural habitats in Taiwan. All of these reflect the function and development of the NMP's environmental education (The National Museum of Prehistory, Taiwan 2018a).

As for the actual teaching plan, due to limited space, only the explanation provided in the two teaching plans in news reference materials from 2018 are here given to allow readers to understand the key points.

The teaching sites comprise the Exhibition Hall of Natural History and the Landscape Garden of the Main Museum. In the first section of the course, students are led into the Exhibition Hall of Natural History to understand Taiwan's unique ecology, animals, and plants, and to understand the development and interaction between human beings and ecology. The latter section of the course moves to the Landscape Garden to discuss ecological crises with students through the activity experience, and to foster students' understanding of the concept of ecological care and conservation. The Landscape Garden of the Main Museum has the functions of recreation, walking, games, exhibitions, viewing, and so on. It can not only provide students with the opportunity to experience natural scenery, but also provides an excellent venue for outdoor teaching; students here can also learn about the natural environment through the experience of the five senses, and cultivate a passion for the natural environment.

### **Teaching plan II: Take the Time Machine–Prehistoric Tableware**

The Exhibition Hall of Prehistoric Cultures has abundant archaeological relics of prehistoric cultures, including those of the Palaeolithic Age, Neolithic Age, Metal Age, etc., all of which have remarkable characteristics and representative features. In addition to the different living utensils, the life patterns in each period also have their own characteristics, from preliminary agriculture derived from collecting and hunting food, all the way to modern life and agriculture implements, from the beaten to metal implements and finally to modern plastic items. All demonstrate the changes to human lives and implements. However, with these changes, the Earth's environmental load is increasingly heavy, affecting the environment in which we live. For example, animals can eat or be hurt by plastic products, and large volumes of polluting gas (dioxin) generated by burning modern plastic utensils are destroying the atmosphere. Through the course, the students can learn about the environmental burden of modern daily use items, particularly plastic products, and cultivate the concept of plastic reduction and the idea of saving energy and reducing carbon (The National Museum of Prehistory, Taiwan 2018b).

The second type of course activity is 'Other Environmental Education Promotion Activities', which is conducted by watching the guides of the Exhibition Hall of the Main Museum, courses, activities, visits, experience, film appreciation, lectures, etc. According to the tabular statistics presented in the evaluation report, the following activities were conducted in 2015: Wrigley Bamboo Pad, the Promotion and Development of Liji Geopark, and the Movement of Taitung Plate, Introduction to Shark Fisheries in

the Surrounding Waters of Taiwan, namely Analysis and Discussion of Fish Bones Unearthed from Chaolai Bridge Site, the Museum is Really Interesting, Theme Activities of Prehistoric Cultures, Theme Activities of Natural History in Taiwan, and so on. These activities were conducted a total of seven times with 933 people participating. In 2016, activities comprised: A Trip to Taiwan's World Heritage Potential Site, Visiting the Southern Branch of the National Palace Museum, Viewing the Earth from the Air, the Core Value and Social Responsibility of the Museum, the Mobility and Fixation of the Dead in Madagascar, and the Development of the Museum in Taitung. These activities were conducted a total of six times with 59 participants. In 2017, activities comprised: Environmental Education Teaching and Training of the NMP, Outdoor Courses–Natural Environment Experience, Environmental Education Course in Response to 12 Years of National Education Teaching Indicators–Experience Sharing and Practical Interpretation Exercises, Outdoor Courses–Nature Stop! Look! Listen!, Environmental Education Course Plan R&D Pilot Teaching Activities. These activities were conducted a total of five times with 174 applications participating. In 2018, activities comprised: The Exhibition Hall Guide and Interpretation, Nature Stops! Look! Listen!, Outreach Activities, and so on. These activities were conducted a total of 19 times with 649 participants (The National Museum of Prehistory, Taiwan 2018a: 127–131).

The third type of activity is outreach activities, which were only developed in 2018. As mentioned earlier, these usually comprise programmes that are made in cooperation with other institutions to promote activities away from the NMP 'site' or self-handled outdoor activities. Among the institutions were Fushan Fishing Harbor, Green Island Elementary School, Taoyuan Junior High School, Fuyuan Elementary School, and Lanyu Senior High School. These institutions applied for seven sessions of outreach activities, of which three were conducted in cooperation with the Taitung County Environmental Education Center. An overview of the implementation of outreach activities is shown in Table 1.

### **3) Evaluation and award**

In 2018, the Kangle Main Museum participated in the evaluation of environmental education sites throughout the country. It won two national environmental education excellence awards: 'the National Appraisal of the Excellent Environmental Education Facilities Field' and 'the Outstanding Units of the EPA Supplementary (Donor) Program in 2018'. The NMP explained the receipt of these awards in the news reference it provided:

The Environmental Protection Administration of the Executive Yuan held an 'Environmental Education Achievements Sharing Conference 2018' on November 13. The NMP stood out among the outstanding competition teams throughout the country and won the National Appraisal of the Excellent Environmental Education Facilities Field and the Outstanding Units of the EPA Supplementary (Donor) Program of 2018. The two major outstanding national environmental education awards are our remarkable achievements, showing we are highly affirmed.

**Table 1** Summary of the implementation results of the outreach course service of the NMP (NMP 2018a)

Echelon	Date	Hours	Institutions	Number of Participants	Age group	Course Applied
1	3/31/2018	2	Stalls at Fushan Fishing Harbor - outreach	116	General group	EPA subsidised - outreach (archaeological experience & environmental education)
2	4/11/2018	2	Green Island Elementary School - outreach (Environmental Education Centre)	51	Grade 1–6	EPA subsidised - outreach [Marine Defence War]
3	4/25/2018	2	Taoyuan Junior High School - outreach (E.E. Centre)	22	Grade 7–8	EPA subsidised - outreach [Marine Defence War]
4	4/27/2018	2	Fuyuan Elementary School - outreach (E.E. Centre)	38	Grade 6	EPA subsidised - outreach [Marine Defence War]
5	5/1/2018	2	Lanyu Senior High School	34	Grade 7	The sea loves you so much (interactive device & fixed spot guide)
6	5/14/2018	2	Lanyu Senior High School (Grade 2, 3)	30		EPA subsidised - outreach (Archaeological experience & environmental education / Marine Defence War)
7	5/15/2018	2	Lanyu Senior High School (Grade 1)	19		EPA subsidised - outreach (Archaeological experience & environmental education / Marine Defence War)
Total number of participants				310		

### Outstanding Environmental Education Field

Through its research, collection, display, education, and recreation functions, the Main Museum aims to enable the public to have a better understanding of the richness and variety of Taiwan's natural ecology, prehistoric and indigenous cultures, and to encourage the public to cherish and respect the continuing natural and cultural life of this land. This aim makes it our duty to promote 'environmental education'. The NMP is an important institution of social education and lifelong learning in east Taiwan, and the only national museum in the east. It has played an important role in environmental education in the region since it passed the evaluation five-star environment education facilities.

To further implement the concept of environmental education, the rich exhibition collections of the museum hold a variety of special exhibition activities in addition to the permanent exhibitions. The Exhibition Hall introduces high science and technology multimedia teaching designed to help the public to interact and learn with the Exhibition Hall. The management of environmental education in our museum is adept at making good use of the diverse collections in the museum, designing diversified environmental education courses, and promoting the cooperative mode between the community and the alliance, and hopes to use 'environmental education' as a vehicle to enter the community and become a promotion model for local rejuvenation. By introducing environmental education, we can discover the culture and environment of the community, assist in the

planning and design of thematic activities and courses, and discover action plans to solve environmental issues, so as to implement the concept and goal of environmental education (The National Museum of Prehistory, Taiwan 2018c).

Examining the evaluation report of the Kangle Main Museum, judging from the statistics, compared with the total number of visitors to the NMP, the number who visit the Kangle Main Museum to engage in environmental education does not have an obvious influence on the Prehistoric Museum's overall number of visitors. However, the achievements promoted by the environmental education policy reveal the potential of the contents of the Prehistoric Museum itself, as demonstrated by the participation of the Kangle Main Museum in the 2018 national evaluation awards.

## V. Conclusion

In this article, the NMP was taken as a case study to explore the relationship between museums and environmental education. From the review of the history and evolution of the NMP, we can observe that its specific 'environmental education' operations began in 2014 and comprised a new operational project in response to and in line with the country's Environmental Education Act. Although the Act was passed in 2009, it was not until five years later in 2014 that Peinan Site Park succeeded in achieving certification and became a standard 'environmental education site'. This is mainly attributed to Zhang Shan-nan, the director of the museum. He saw that the state's promotion of environmental education had created a demand for environmental education and believed that promoting the museum as an 'environmental education site' would help promote and market the museum and increase the number of visitors as well as improving performance. Perhaps because the environmental education operations have not been conducted for long, the relationship between environmental education and performance growth is less obvious. However, the NMP has made great achievements in promoting environmental education. The Kangle Main Museum became an 'environmental education site' late in 2015 and won 'the National Appraisal of the Excellent Environmental Education Facilities Field' and 'Outstanding Unit of the EPA Subsidy Program of 2018'.

In fact, as stated in this article, the museum was able to earn this honour due to the great efforts of all NMP staff members who participated in promoting environmental education and because the NMP was an organisation rich in environmental education contents. At the beginning of this article, McMichael's views on observing museum and environmental education were used to review the relationship between the NMP and environmental issues from three perspectives: the impact of the environment on the museum, the impact of the museum on the environment, and the social responsibility and role of the museum. By reviewing these three aspects, we have uncovered many stories encountered in the birth and development of the NMP itself. These stories are valuable resources that can be converted into environmental education use. The purpose of the establishment of the museum, and its collection and display of the story of human development on Taiwan island are all topics about the interaction between humans and

the environment. They include archaeological knowledge about the island's vast time domain. They also include the extraction of indigenous environmental wisdom in ethnological research. Examining the practice of the two environmental education sites, we can see that Peinan Site Park presents abundant natural and humanistic environmental education conditions in a single space, particularly in the interaction of indigenous communities. However, the Kangle Main Museum tells the greater story of Taiwan Island and has the potential for macro-development. Each, therefore, has its own unique characteristics.

As a whole, the environmental education work in the NMP has just begun. From the responsibility and role of the museum in environmental education, the NMP has a huge potential to open up and develop in the creative transformation of educational promotion from the research and production of environmental knowledge to resources energy. We look forward to seeing this development. The cultivation and training of environmental education professionals is the most important aspect of the development of environmental education. Personnel certification is an important issue and beneficial to individuals' career development. The NMP should encourage its staff, particularly those in the field of cultural preservation, to participate in the certification. However, although obtaining certification is important, it ultimately involves personal interest and will, and can only be encouraged. In fact, if we can strengthen the awareness of environmental education within the NMP and encourage part of the investment to be promoted as a whole, we can produce the energy for a stronger social role.

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## Notes

- 1) Typhoon Aere's outer circulation affects Taitung's torrential rainstorm, Peinan Cultural Park Thousand-year old tomb site can't escape flooding. Unique Satellite Television News, October 7, 2016. (<https://www.youtube.com/watch?v=I6JEki18qgk> July 10, 2018online)
- 2) In September 2018, in response to the establishment of Nanke Museum, the NMP changed its organisational structure and the Site Management Center was revised to the Site Development Group.

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