故宫零废弃

故宫零废弃
主题导览手册

'Zero Waste at the Palace Museum' thematic guidebook

A 太和门广场

B 太和殿

C 冰窖

D 隆宗门

E 乾清门广场

F 景运门

G 箭亭

前言

也许谈及
紫禁城的颜色，您多半会想到宫墙的
红色与琉璃瓦的黄色，实则在城中，还不乏一
抹抹“绿色”的存在。正所谓“人法地，地法天，
天法道，道法自然”，中华民族历来注重人与自然
的和谐，紫禁城太和殿的“太和”二字，就是和谐
的至高境界。在这样的观念推动下，各种朴素的绿
色理念顺理成章地被注入进古代紫禁城，有些是得
自潜移默化的生成，有些是通过自上而下的意志。

自建院以来，故宫博物院始终肩负有管理、保护紫
禁城的责任。近年来，更特别致力于推动在基础设
施建设、参观游览、行政办公等方面的绿色实践，
旨在提高包括院内员工和观众在内的全民环保与绿
色发展意识，让社会大众切身感受到“生态环境没
有替代品，用之不觉，失之难存”的奥义，期待
达到科学阐释人与自然的关系，促进人类文
明可持续发展的目的。

Preface

When discussing the colors of the Forbidden City, you might initially think of its red walls and yellow glazed tiles. However, the city is also notably ‘green’. The Chinese philosophy of ‘Man follows the Earth, the Earth follows Heaven, Heaven follows the Dao, and the Dao follows Nature’ reflects the nation’s longstanding emphasis on harmony between humanity and nature. The name of the Hall of Supreme Harmony epitomizes this paramount state of balance. This philosophy has naturally infused various green practices into the ancient Forbidden City, some arising organically and others through top-down initiatives.

Since
its establishment, the
Palace Museum has borne
the responsibility of managing and
protecting the Forbidden City. In recent
years, the museum has particularly
focused on promoting green practices
in infrastructure development, tourism,
and administrative operations. The goal
is to raise environmental awareness and
foster sustainable development among
both staff and visitors. This effort aims
to underscore the irreplaceability of the
ecological environment and convey the
message that, once lost, it is difficult
to recover. The ultimate objective is to
scientifically explain the relationship
between humanity and nature, thereby
promoting sustainable human
civilization.

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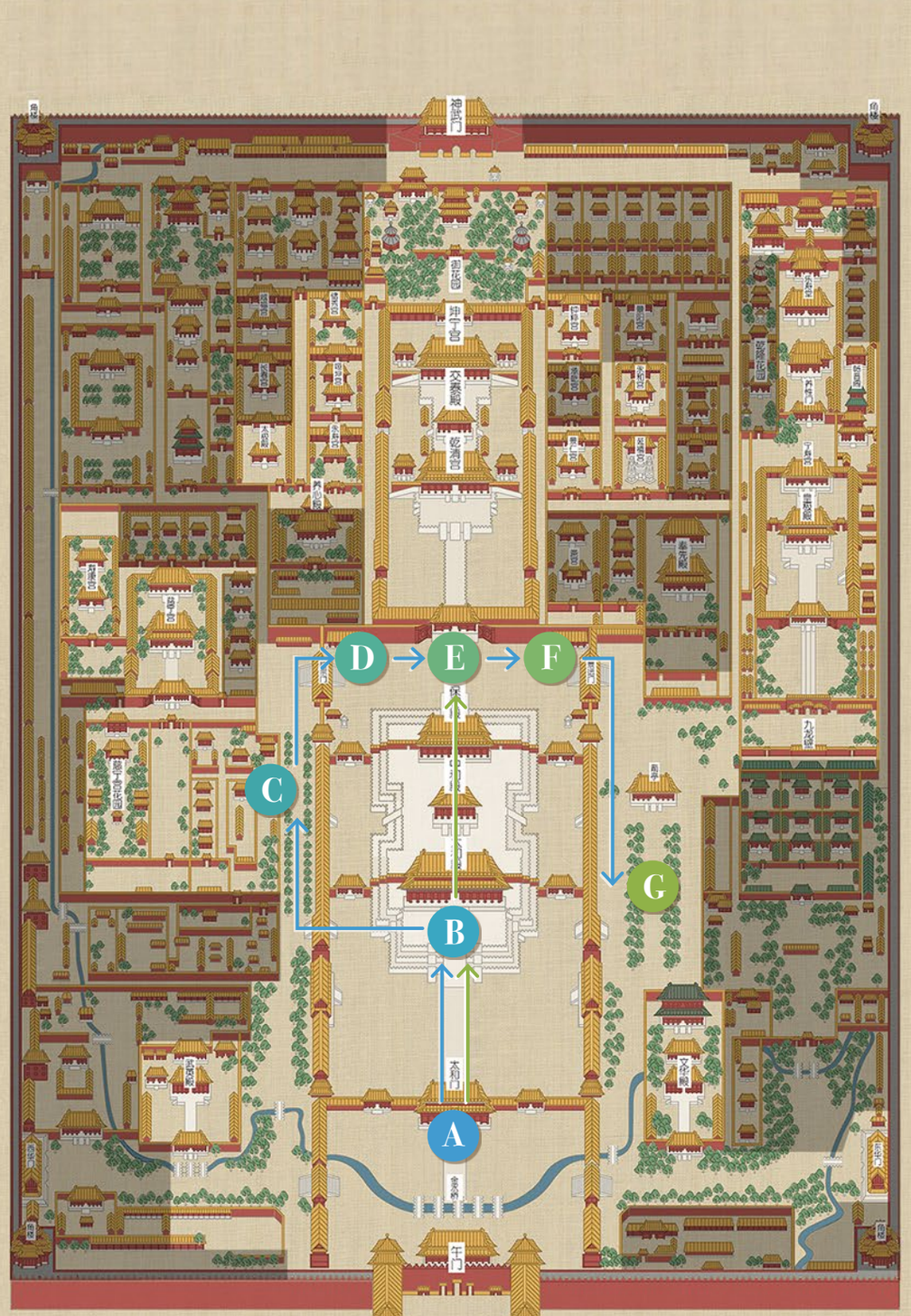


故宫零废弃主题导览地图

Zero Waste at the Palace Museum Tour Map

→ 路线 1 完整版导览路线
Full Version
A B C D E F G

→ 路线 2 基础版导览路线
Basic Version
A B E

太和门广场

Gate of Supreme Harmony Plaza

古代紫禁城的绿色理念 Traditional Green Concepts in the Forbidden City

Modern Green Practices at the World Heritage Site 今天世界遗产地的绿色实践

和谐共生 Harmony in Coexistence

紫禁城“背山面水”，北有景山，南为内金水河。永乐年间营建紫禁城时，护城河挖掘出大量泥土，拆毁元朝宫殿遗留的渣土也无法处理，于是“废物利用”，将这些泥土堆积成山，并在其上广植树木，从而形成了后来的“景山”。筒子河水经西北角楼下的涵洞进入紫禁城，成为内金水河，由城隍庙一路向南蜿蜒，过武英殿向东，经太和门广场，一路绕行文华殿，最终从东南角楼下流出。内金水河不仅承载了紫禁城的生活和消防用水需求，还营造出灵动的景观。它与景山相呼应，形成了有山有水、山水协调的审美意向。内金水河的河面低于紫禁城地面，紫禁城的主体部分就建在景山和内金水河间的向阳台地上。通过景山和内金水河，紫禁城在审美意义上做到了与天地自然的和谐。

The overall layout of the Forbidden City also follows the guiding principle of ‘back to the mountains and face to the water’, with Jingshan hill to the north and the Inner Golden Water River to the south. During the Yongle period, the construction of the Forbidden City involved excavating large amounts of soil from the moat and dealing with debris from the demolished Yuan dynasty palace. This ‘waste’ was used to form Jingshan hill, where numerous trees were planted. The Tongzi River flows through a culvert under the northwest corner tower into the Forbidden City, becoming the Inner Golden Water River. This river winds southward from the City God Temple, passing by the Hall of Martial Valor, turning east, circling the Hall of Literary Brilliance, and finally flowing out under the southeast corner tower. It brings water to the Forbidden City while creating a dynamic landscape. Together with Jingshan hill, it forms a harmonious aesthetic of ‘mountains and water’. The Inner Golden Water River’s surface is lower than the ground level of the Forbidden City, with its main structures built on the sunlit terrace between Jingshan hill and the Inner Golden Water River. Through these features, the Forbidden City achieves harmony with nature aesthetically.

故宫零废弃

作为世界文化遗产地和国家一级博物馆，故宫博物院积极承担起推动环境保护和可持续发展的责任。2020 年 1 月，故宫博物院与万科公益基金会合作启动了故宫零废弃项目，以减量化、资源化和无害化为原则，从“零废弃办公”和“零废弃游览”两方面入手，通过科学精细的废弃物管理，不断优化紫禁城的生态风貌。

经过四年的努力，项目已经带动约千万名工作人员、导游和观众一起加入到共建绿色故宫的行动中来，不仅如此，还有超过 200 位重要的国内外嘉宾走进故宫，分享、交流绿色发展实践经验。故宫零废弃项目希望为观众带来更优质的绿色参观体验，让观众在参观过程中既收获历史知识，又增强低碳环保意识，积极参与践行故宫零废弃行动。

As a UNESCO World Heritage Site and a national first-class museum, the Palace Museum actively assumes the responsibility of promoting environmental protection and sustainable development. In January 2020, the Palace Museum, in collaboration with the Vanke Foundation, launched the ‘Zero Waste at the Palace Museum’ project. Adhering to the principles of reducing waste, utilizing waste, and minimizing harm, the project begins from ‘zero waste administration’ and ‘zero waste tourism’, seeking to continuously optimize the ecological landscape of the Forbidden City through meticulous waste management.

After four years of effort, the project has mobilized around ten million staff, guides, and visitors to participate in creating a green Palace Museum. Additionally, over 200 important domestic and international guests have visited the museum to share and exchange experiences in green development practices. The ‘Zero Waste at the Palace Museum’ project aims to provide visitors with a better green visiting experience, in the process of visiting, the audience can not only gain historical knowledge, but also enhance the awareness of low-carbon environmental protection, and actively participate in the practice of Zero Waste at the Palace Museum.

太和殿

Hall of Supreme Harmony

古代紫禁城的绿色理念 Traditional Green Concepts in the Forbidden City

Modern Green Practices at the World Heritage Site 今天世界遗产地的绿色实践

巧用能源

Ingenious Use of Energy

紫禁城建筑朝向均为坐北朝南，以太和殿为典型，南面设窗户，北面为墙体。这样的设计考虑到了北京地处北半球，太阳从东南方升起的情况。南面的窗户可获得更多采光量，北面的墙体则可以抵御冬季西北寒风的侵袭。这种设计最大限度利用了太阳能，保证了冬季室内的温度。

紫禁城古建筑的屋檐一般是由中间向梁端逐渐起翘，俗称“挑檐”。在明清时期，北京地区冬夏季的太阳高度角决定了挑檐的设计基本上要达到柱高一丈，出檐三尺的比例关系。冬季，北京地区的正午太阳高度角是27度。太阳逐渐升起到最高点时，可以直射到宫殿最内侧墙壁的角落，使得殿内暖洋洋；夏季，正午时太阳高度角是 76 度，只能直射到建筑墙壁最外侧的角落，保证室内温度不会过高。

All buildings in the Forbidden City face south. The Hall of Supreme Harmony is typical: windows are placed on the south side, while the north side is a solid wall. This design takes into account Beijing's location in the Northern Hemisphere, where the sun rises from the southeast. The south-facing windows capture more sunlight, while the north wall shields against the cold northwest winter winds. This design maximizes solar energy use while maintaining indoor warmth in winter.

The eaves of the Forbidden City buildings gradually tilt up from the center to the beam ends. During the Ming and Qing dynasties, the angles of Beijing's winter and summer sun influenced the eaves design, maintaining a ratio of one zhang (3.3 meters) in height to three chi (one meter) in eave extension. In winter, the noon sun angle in Beijing is 27 degrees, allowing sunlight to reach the innermost corners of palace walls, gradually warming the interior. In summer, the noon sun angle is 76 degrees, ensuring that even at midday sunlight only reaches the outermost edges of the walls, preventing excessive indoor heat.

今天，故宫博物院积极落实国家节能减排政策，用现代科技为这座古老宫殿注入新的活力。

在院内，我们推动职工全面开展“零废弃办公”，通过知识竞赛、21天低碳行为打卡等活动，帮助职工建立珍惜纸张、节约用电、零废茶歇、电子办公、减少厨余、垃圾分类等低碳生活习惯。

故宫博物院在能源管理方面也连续两年获得中国质量认证中心颁发的能源管理体系认证证书。通过智慧供热系统合理调控用热，通过智能电表掌握院内重点区域的用电负荷，统筹调控降低能耗。改造开放区域 14 个卫生间，实现节能卫具的全覆盖，尽可能减少水电资源浪费现象的发生。

Today, the Palace Museum is actively implementing national energy conservation and emission reduction policies, using modern technology to inject new vitality into this historic complex.

Within the museum, we promote "zero-waste office" practices among the staff by organizing activities such as knowledge competitions and 21-day low-carbon behavior challenges. These initiatives help staff cultivate low-carbon habits, including saving paper, conserving electricity, zero-waste tea breaks, electronic office work, reducing food waste, and waste sorting.

The Palace Museum has also received the energy management system certification from the China Quality Certification Center for two consecutive years in energy management. By reasonably regulating heating through a smart heating system and monitoring the electricity load in key areas with smart meters, we coordinate and control energy consumption. Additionally, we have renovated 14 restrooms in the open areas, ensuring full coverage of energy-saving sanitary ware to minimize the wastage of water and electricity resources.

古代紫禁城的绿色理念
The Green Concept of the Ancient Forbidden City

物尽其材
Making the Most of Materials

明永乐年间兴建紫禁城时，因为缺乏大型木材，不得不从西南地区采办运送。而到了清代，西南地区木料的开采和运输愈发困难。面对如此现状，建筑工匠们在木结构技术与木材取用方面，充分发挥他们的智慧。

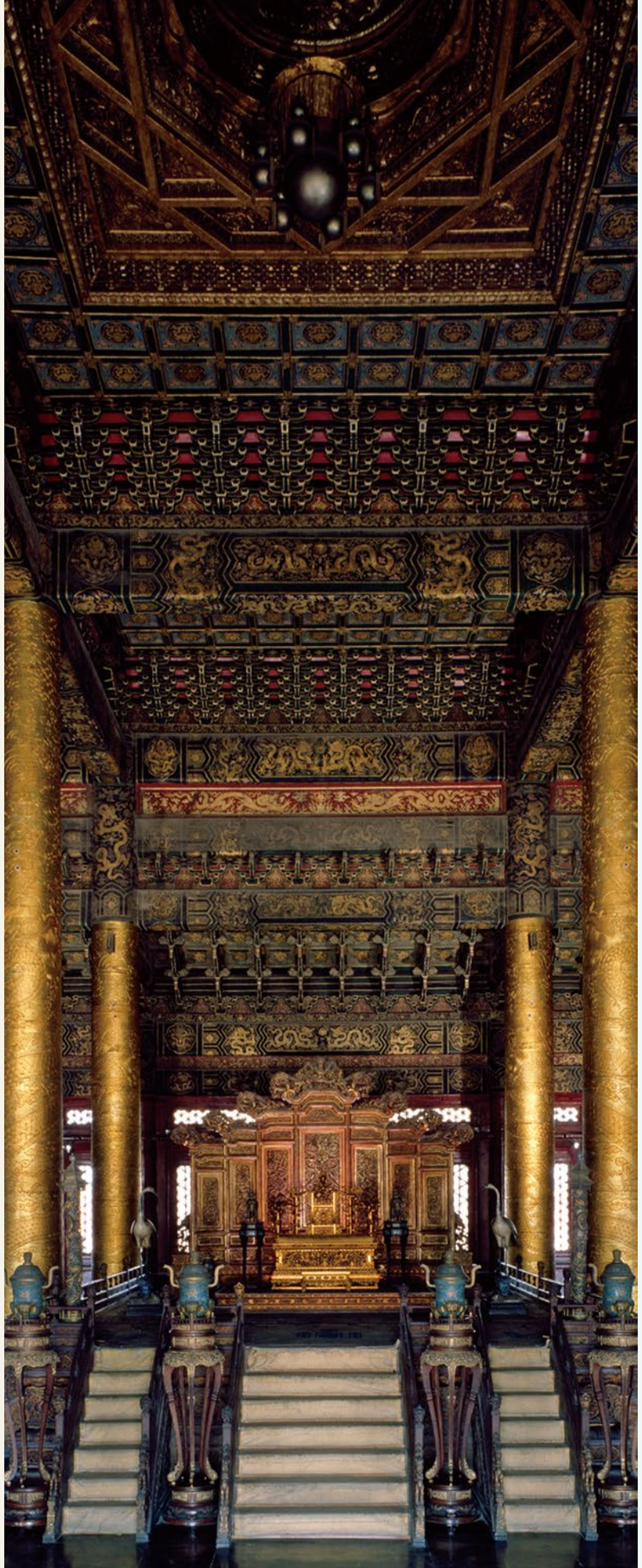
首先是拼合梁柱构件技术的发展。这种技术使用拼合料，即用小块木料拼接成大块木料，创造了包镶柱子、包镶梁等做法。例如，现在在太和殿可以看到直径 1.06 米、高 13 米的蟠龙金柱，外表像是一整块木料，但实际上是由许多块木料拼接而成。

其次是木料的取材范围不再局限于楠木等名贵木材，而是就地取材、因材施用。这一转变既是由于珍贵木材短缺，同时也是当时观念上的一大进步。如康熙年间重建太和殿时，就放弃了传统的官式用料惯例，将楠木改用东北松木。

During the Forbidden City's construction in the Yongle reign, during the Ming dynasty, the scarcity of large timber necessitated sourcing from southwestern China. By the Qing dynasty, the extraction and transportation of timber from this region became increasingly difficult. In response, craftsmen showed their ingenuity in carpentry techniques and choosing materials .

One notable development was the technique of joining smaller pieces of wood to form larger beams and columns. For example, the golden columns in the Hall of Supreme Harmony, which measures 1.06 meters in diameter and 13 meters in height, and appear to be single pieces of wood, are actually combined from many smaller pieces.

Additionally, the range of wood types used expanded beyond traditional precious woods like nanmu. Embracing the principle of sourcing materials locally, this shift represented a significant advancement in both practice and thought. For instance, during the Kangxi period, the reconstruction of the Hall of Supreme Harmony substituted the traditional nanmu with northeastern pine.



今天世界遗产地的绿色实践
Modern Green Practices at the World Heritage Site

故宫博物院古建部门在遗产地古建筑的修缮过程中，遵循最小干预的原则，能保留的构件尽可能保留使用，通过粘接、剔补、加箍的方式进行性能补强以继续使用，这既是文物修缮的要求，客观上也起到了节约能源与材料的作用。

如果实在难以为继的话，专家们也会想办法最大限度地对残件加以利用。木构件会截取其可用的部分做成小型木构件，断裂的砖、瓦碎件可以用来填充地面垫层、瓦面灰背以及其他建筑较大空隙处，极大节约保养维护的材料成本。此外，古建部门的库房还主动收集有款识的砖、瓦以及木构件残件，归入文物资料收存，并作为展览展品使用。

During the restoration of heritage buildings at the Palace Museum, the Department of Heritage Architecture adheres to the principle of minimal intervention. Components that can be preserved are retained and reinforced for continued use. This not only meets the requirements of heritage conservation but also contributes to energy and material savings.

When direct reuse is challenging, experts find ways to maximize the use of remaining fragments. Usable parts of wooden components are made into smaller wooden pieces, and broken bricks and tiles are used to fill ground layers, tile surfaces, and other large gaps in the structures, significantly saving on maintenance material costs. Additionally, the department's storeroom actively collects bricks, tiles, and wooden fragments with inscriptions, storing them as cultural artefacts and utilizing them as exhibition items.

节约粮食 *Grain Conservation*

太和殿前的嘉量为乾隆时期制作。嘉量本身是中国古代的标准量具，与粮食息息相关，将嘉量放置在宫殿前，一方面为展示皇帝的权威，显示其对度量衡的控制，另一方面也表露出统治者对粮食的重视。

清朝很多皇帝提倡节约粮食，避免浪费。雍正皇帝就针对浪费粮食下过圣旨，命令宫中剩余食物不能直接扔掉，而是要留给需要的人；人不能吃的，可以喂给猫狗；猫狗不吃的，则能晾干了做鸟食；乾隆皇帝曾在得知浙江地区禾稻丰收后，便立即通知地方官员，让他们劝告百姓不要一次性将粮食吃光或售卖出去，应多储余粮，以备荒年食用；道光皇帝在饮食方面较为节俭，一年四季都是早晚两膳菜肴、饽饽各五品，菜色也大都以鸭子、羊肉、鸡蛋、油糕等为主，相对单调。

In front of the Hall of Supreme Harmony stands the Jialiang, a traditional Chinese measuring instrument made during the Qianlong reign and closely associated with grain production. Placing it before the palace symbolized the emperor's authority over weights and measures and highlighted the importance the rulers placed on grain.

Many Qing emperors promoted grain conservation to prevent waste. The Yongzheng Emperor issued a decree against wasting food, he commanded the leftover porridge and dishes should not be discarded into drains,they should be given to servants or, if inedible by humans, fed to cats and dogs; what even cats and dogs cannot eat should be dried and fed to birds.

The Qianlong Emperor, upon learning of a bountiful rice harvest in Zhejiang, immediately instructed local officials to advise the public not to consume or sell all the grain at once but to store reserves for lean years. The Daoguang Emperor led by example, maintaining a comparatively simple diet throughout the year. Each meal centered on five dishes: duck, lamb, eggs, and pastries.

故宫博物院自 2021 年起，连续 3 年在世界粮食日期间，举办“故宫零废弃餐饮文化周”活动，向公众展示故宫创新绿色餐饮模式，倡导厉行节约、杜绝粮食浪费的风尚。

在开放区，以故宫餐厅景运门店、冰窖餐厅、冰窖咖啡为试点，店面内设置分阶段沉浸式顾客引导，根据观众用餐流程，结合餐饮店内顾客用餐动线，布设宣传倡导、装饰提示、行动指引等，促发观众主动减少浪费，完成“零废弃”就餐。

故宫博物院的职工食堂也积极响应“光盘行动”，倡导节约粮食，减少厨余垃圾，让资源循环利用成为一种习惯。不仅如此，食堂还取消了一次性塑料袋，推广小份菜和半份米饭，减少食物浪费的同时，也减少了垃圾的产生。

Since 2021, the Palace Museum has held the "Palace Museum Zero-Waste Food Culture Week" during World Food Day for three consecutive years. This event showcases the museum's innovative green dining to the public, promoting the practice of thriftiness and the elimination of food waste.

In the open area, the museum has used the Palace Museum Restaurant, Icehouse Restaurant, and Icehouse Café as pilot locations. These venues have implemented phased, immersive customer guidance, incorporating advocacy, decorative reminders, and action guides throughout the dining experience to encourage visitors to actively reduce waste and achieve zero-waste dining.

The staff café at the Palace Museum also actively supports the "Clean Plate Campaign," advocating for food conservation and reducing kitchen waste, making resource recycling a habit. Furthermore, the staff café has eliminated single-use plastic bags and promoted smaller portions and half servings of rice, which reduces both food waste and the generation of garbage.

资源回收 Resource Recycling

在紫禁城建筑的多次修建过程中，出现过许多建筑工程拆卸旧料后回收管理再利用的案例。

皇家十分注重对宫殿地面金砖的回收利用，清代多位皇帝都对旧金砖的回收有明确规定，要求各处工程换下的旧金砖，在工程完毕后，由管理人员负责详细审查旧砖数量以及残缺大小的情况并如实记录在奏销册内，然后上报给工部查核。楠木也是建筑过程中着重回收的一种。雍正五年（1727）有旨意，将所有拆下来的旧楠木进行收集核点并统一存贮在木仓。之后，乾隆、嘉庆等朝都曾沿用此办法。

当然，不仅珍贵砖、木材料需要回收，普通的建筑物料也是如此。早在乾隆时期就开始实行“交旧换新”的办法，要求各项工程如有换下来的砖、木等旧料，都要逐一说明使用情况和上交数量。

Throughout the multiple construction phases of the Forbidden City, there have been man cases of managing and reusing materials from old buildings.

Given their value, the imperial family stressed that they should be recycled. Many emperors had explicit regulations for recovering old ‘gold bricks’. After construction, officials were responsible for inspecting and recording the quantity and condition of old bricks and reporting the details to the Ministry of Works.

Nanmu was another material prioritized for recycling. In the fifth year of the Yongzheng Emperor's reign (1727), a decree stated: ‘All nanmu wood from demolished official buildings should be reported and Stored properly in the warehouse. This practice was continued by the subsequent Qianlong and Jiaqing emperors.

The recycling principle extended to ordinary building materials as well. During the Qianlong reign, a ‘trade old for new’ policy was implemented, requiring detailed records of the usage and quantity of old materials like bricks and wood replaced and recollected in construction projects.

如今常用的垃圾分类方法将生活垃圾分为“厨余垃圾、可回收物、有害垃圾、其他垃圾”四类，而在公共场所，具体分类设施会略有不同，通常只设置“可回收物、其他垃圾（不可回收物）”两类。大家应尽可能按照垃圾桶上的标识分类投放垃圾，提高垃圾资源利用水平。

据调查，故宫博物院内垃圾以观众自带餐食产生的厨余垃圾、一次性塑料水瓶为主。对此，故宫博物院内垃圾桶在分类设计上进行了调整，可分为四大类七小类，比常见的四分类垃圾桶还多了三个桶位，包括三个可回收物桶位，分别放置塑料瓶、玻璃瓶和纸张，另设液体这一专门垃圾桶位，可以用来丢弃未喝完的饮料。调整后的垃圾桶布局更合理，既是对遗产地风貌的保护，也方便资源回收中心逐类对接专业垃圾回收渠道，提升垃圾分类效率和院内美观度。

Today's common waste classification method divides household waste into four categories: kitchen waste, recyclables, hazardous waste, and other waste. In public places classification facilities may vary. Generally, there are two categories: recyclables and other, non-recyclables waste. As far as possible, we should classify garbage according to the logo on the garbage can to improve the utilization level of garbage resources.

Surveys indicate that most waste in the Palace Museum comprises kitchen waste from visitors' meals and disposable plastic water bottles. In response, the museum has adjusted its waste bin design to include four major categories and seven subcategories, including separate bins for plastic bottles, glass bottles, and paper, as well as a dedicated bin for liquids to dispose of unfinished drinks.

After adjustment, the layout of the garbage can is more reasonable, the landscape is less disturbed, the working area of the cleaner is more concentrated, and the classification efficiency is greatly improved.

取自天成

Harnessing Natural Resources

古时若想在夏天用冰，就必须将冬天的冰储存到夏季使用。从某种程度上说，这也是对天然资源的一种合理调配与利用。为了更好地利用与存储冰块，古人制定了从采冰到储冰的系列流程。

明清宫廷使用的冰块主要来源于太液池和护城河。每年立冬之后，会对河道进行洗涮，通常是上游先放水进行河道的冲刷，清除杂草杂物，再由下游关闭闸门，开启上游水闸，进行整个水源的清洁和管理。冬至前后开始，会有专门人员携带保暖设备与工具上冰采冰。一个冬季可采冰 3—4 次。采集的冰块会通过各种方式运送到冰窖进行储存，之间用稻草隔开，直到立夏才会开启使用。紫禁城冰窖位于隆宗门西南方向，储冰量可达 25000 块。

In ancient times, storing winter ice for use in summer was a way to utilize natural resources efficiently. In order to make better use of and store ice, the ancients developed a series of processes from collecting ice to storing ice.

The ice for the Forbidden City was mainly sourced from the Taiye Pond and the moat. After the solar term ‘Beginning of Winter’ (generally in November), the river channels were cleaned by flushing from upstream and closing the sluice gates downstream, ensuring clean water. Ice harvesting began around the Winter Solstice, and designated ice harvesters, equipped with protective gear and tools, would perform this task up to four times a season. These blocks were then transported to the ice houses for storage, separated by straw, and remained there until the ‘Beginning of Summer’ solar term (typically in May).The Ice Houses, located southwest of the Gate of the Thriving Imperial Clan, had a significant storage capacity of up to 25,000 ice blocks.

冰窖

Ice Houses

园林绿化垃圾，通常指的是修剪下来的树枝、落叶、杂草等植物残余。这些看似无用的废弃物，实则蕴含着丰富的有机质，是自然界循环再利用的宝贵资源。然而，园林绿化垃圾的处理一直是一个难题。传统的处理方式，如焚烧或填埋，不仅消耗能源，还可能对环境造成二次污染。

面对这一挑战，故宫博物院在院内设置了 40 个堆肥箱，采用“好氧堆肥”的方法，将这些园林枝叶转化为肥沃的土壤改良剂。截至 2023 年底，我们已经累计消纳了 54.5 吨园林绿化垃圾，产出了 19.9 吨的堆肥土壤改良剂。

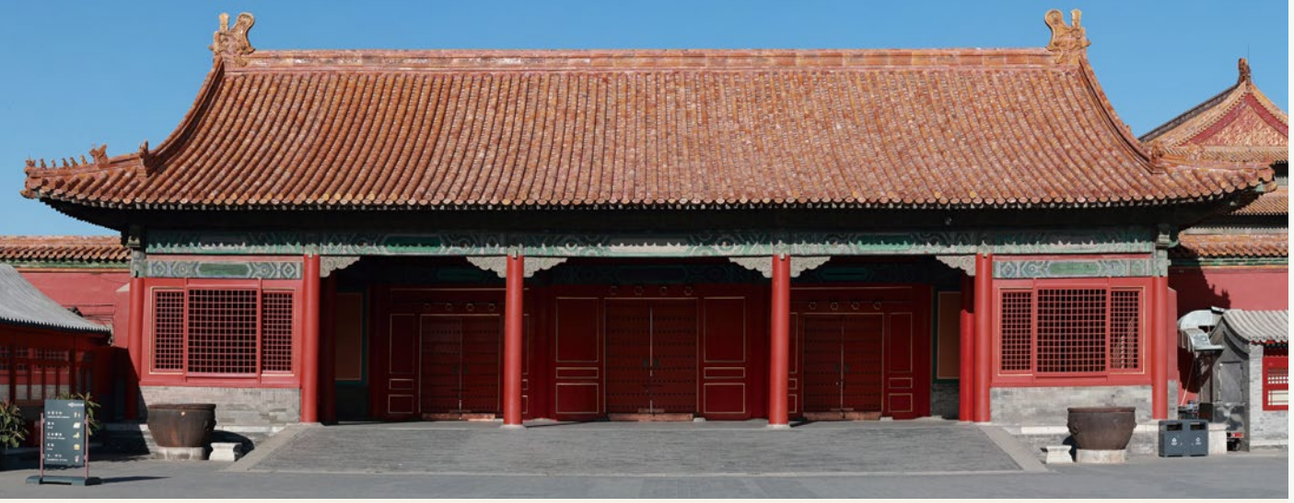
这些改良剂被重新用于院内园林绿植的土壤优化，不仅提升了土壤的肥力和透气性，还增强了植物的抗病虫害能力，实现了资源的自循环和生态平衡。

Garden waste, typically referring to pruned branches, fallen leaves, weeds, and other plant remnants, contains abundant organic matter and is a valuable resource for natural recycling. However, managing garden waste has long been a challenge. Traditional methods such as burning or landfilling consume energy and can cause secondary environmental pollution.

To address this challenge, the Palace Museum has installed 40 compost bins on its premises, using the aerobic composting method to transform these garden clippings into fertile soil amendments. By the end of 2023, we had processed a total of 54.5 tons of garden waste, producing 19.9 tons of compost soil amendments.

These soil amendments are then reused to enhance the soil quality of the museum's gardens, improving soil fertility and aeration while also boosting plants' resistance to pests and diseases. This practice achieves resource recycling and ecological balance.

隆宗门 Gate of Thriving Imperial Clan



古代紫禁城的绿色理念 Traditional Green Concepts in the Forbidden City

旧料利用 *Utilizing Old Materials*

乾隆二十五年（1760）修建隆宗门、景运门时，内务府曾计划在甬路、海墁、牙子铺设新砖，共需花费白银二千二百二两八钱九分。

不过最终按照皇帝指令，仅有甬路用新砖，海墁牙子都拣选用旧砖。如此一来，节省白银二百六十六两。在当时，甬路是人员主要通过的地方，用平整的新砖能增添美观性。海墁位置稍偏，可以稍不平整；而再碎的条砖可以裁切改作牙子。这样的安排，既节省了预算，又充分利用了存贮的旧砖，取得了一举两得的效果。

当然，随着历史变迁，隆宗门前已无法看见过去铺设甬路、海墁、牙子的形式，但是在西一长街仍留有旧貌。正中间“五路方砖”的部分即甬路；边上收边的窄条砖是牙子，院落区域其他平铺的砖为海墁。

During the reconstruction of the Gate of the Thriving Imperial Clan and the Gate of Good Fortune in the 25th year of the Qianlong reign (1760), the Imperial Household Department planned to use new bricks for the pathways, pavements and edges, costing 2,220 taels and 8 coins of silver. However, following the emperor's directive, only the pathway was paved with new bricks, while the pavements and edges were laid with selected old bricks, saving over 10% of the cost. The pathway was a major route requiring smooth and new bricks for aesthetic appeal. The slightly less prominent pavements could use fewer new bricks, and even broken bricks could be repurposed for the edges. This approach not only conserved the budget but also made full use of stored old bricks, achieving a win-win situation.

While the original layout of the pathways and pavements around the Gate of the Thriving Imperial Clan is no longer visible today, its original appearance can still be seen on The Primary West Corridor. The central ‘five-way square bricks’ section represents the pathway, the narrow bricks at the side are the edges, and the remaining area of the courtyard forms the pavements.

Modern Green Practices at the World Heritage Site 今天世界遗产地的绿色实践

在故宫文创商店的货架上有一种兼具“环保范”与“文化范”的商品——故宫零废弃环保文创。

这些文创品部分来自故宫的废弃塑料瓶，经过回收、清洗、切片，运用“化塑为丝”工艺转化为再生聚酯纤维，结合故宫传统纹样，加工成眼罩、丝巾、环保袋，截至 2024 年 1 月，已有 60322 只塑料瓶化身成为环保文创产品，相当于减碳 1.72 吨。

还有部分使用故宫落叶作为发酵原料编织成手环，用苹果皮加工制作而成包袋等，一共诞生了 33 款独具文化特色的环保的“零废弃”文创。

此类环保文创品不仅回应了公众对于文化消费多元化与高品质的追求，更增强了公众对循环经济的认同，促使更多人开始关注并实践“零废弃”的生活方式。

On the shelves of the Palace Museum's cultural product stores, there are items that combine eco-friendliness with cultural charm - the ‘Palace Zero Waste’ eco-friendly cultural products. These items are partially made from recycled plastic bottles from the Palace Museum. The bottles are collected, cleaned, sliced, and transformed into recycled polyester fibers through the ‘plastic-to-silk’ process. These fibers, combined with traditional Palace patterns, are made into eye masks, scarves, eco-bags.By January 2024, a total of 60,322 plastic bottles had been turned into eco-friendly cultural products, equivalent to reducing carbon emissions by 1.72 tons.

There are also some uses of the Imperial Palace leaves as fermentation raw materials woven into a bracelet, processed into bags with apple peel, etc., a total of 33 unique cultural characteristics of environmental protection "zero waste" cultural creation.

Such environmental protection articles not only respond to the public's pursuit of diversified and high-quality cultural consumption, but also enhance the public's recognition of the circular economy, prompting more people to start to pay attention to and practice the "zero waste" lifestyle.

变废为宝

Turning Waste into Treasure

紫禁城里陈设着不少大水缸，古时缸内储水，遇火灾方便就近取用，以作消防。它们有铁质的，也有铜质的，还有铜鎏金材质的。乾清门前的这几件，便是铜鎏金的。

清代乾隆时期，宫内有变废为宝、熔铜铸缸的情况。乾隆三十七年（1772），为造新缸二十八口，曾熔掉造办处原有闲置大小铜钟共十七架，计折重三万六千三百九十八斤。后来又为添铜缸二十四口，派员前往五城各寺庙查得现有旧铜钟、鼎、炉二十九件，约计重三万八千三百余斤。显然，这是要对从各地寺庙里收集的废旧铜器，进行改造利用。

The Forbidden City features many large water vats for storing water, which were crucial for firefighting. These vats were made of iron, copper, or gilt copper, like those in front of the Gate of Heavenly Purity.

During the Qianlong era, the palace recycled old copper items to cast new vats. In the 37th year of Qianlong's reign (1772), 17 old copper bells weighing over 18,000 kg were melted down to make 28 new vats. Later, another 24 vats were cast using 29 old copper bells, tripods, and furnaces weighing over 19,000 kg collected from various temples. This practice exemplified the effective reuse of waste materials.

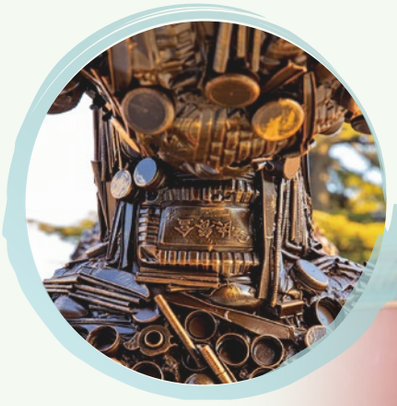
不知您是否记得，在紫禁城慈宁宫区域，曾陈设过这么一件作品——《福牛辞“旧”》废弃物再生雕塑。它由故宫博物院联合万科公益基金会、韩美林艺术基金会共同推出，其中超过 90% 的创作材料来自故宫博物院分类回收的废弃物。

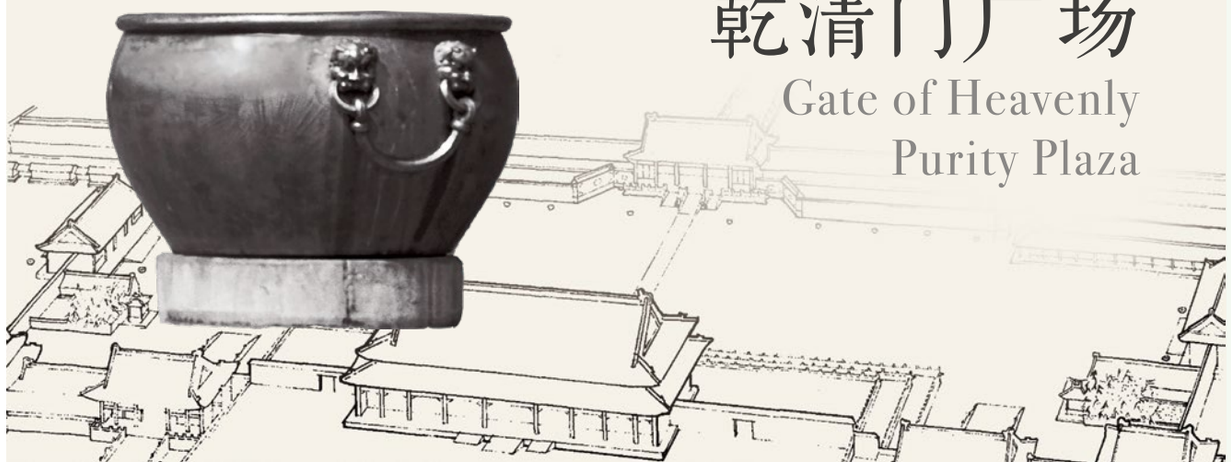
这些收集到的物品，经过艺术制作团队的消毒、修剪、打磨等工序实现焕然一新。艺术设计团队利用废旧钢材搭建骨架，将废弃塑料制品填充、粘合、拼接于骨架之上，最后塑造成型，完成了废弃物“变废为美”。

“福牛”雕塑不仅象征着牛本身的优秀品质，也具有更多环保意义，希望观众通过它了解“零废弃”的理念内涵：废旧物品再利用不仅可以阻止它们成为二次污染的源头，通过分类回收、物尽其用还可以将旧物重新变为资源，发挥其未尽的使用价值。

In the Palace of Compassion and Tranquility area of the Forbidden City, there previously stood a sculpture titled ‘The Auspicious Ox’, created from recycled waste materials. This artwork, launched by the Palace Museum, Vanke Public Welfare Foundation, and Han Meilin Art Foundation, derived over 90% of its materials from recycled waste sorted by the Palace Museum.

The collected items were disinfected, trimmed, polished, and assembled by the artistic team. They built the frame using old steel and filled and bonded discarded plastic products onto it, completing the transformation from waste to beauty. The ‘Auspicious Ox’ symbolizes the admirable qualities of oxen and carries a deeper environmental message. Through this sculpture, the audience is encouraged to understand the essence of the zero-waste concept: repurposing discarded items not only prevents them from causing secondary pollution but also makes them into valuable resources, maximizing their usage.





乾清门广场

Gate of Heavenly Purity Plaza

恒念物力

Cherishing Resources

清代乾隆皇帝曾发下一道谕旨，个中内容与景运门和隆宗门有关。事情要从有官员上奏要将这两座门的地面沙砖改成金砖铺墁说起。上奏者认为在换成金砖后，原有沙砖就能随意处置了。不过乾隆皇帝不这样想，他认为普通的沙砖也是重要建筑材料，在修建中换下的沙砖旧料同样需要上缴。

另外，乾隆皇帝还称自己时常经过景运门和隆宗门，对所用砖石十分熟悉，怀疑官员们奏报的景运、隆宗二门之前均用沙砖的说法不符合实际情况，要求查明具奏。虽然目前已经无法得知景运门和隆宗门在当时所用方砖具体是金砖还是沙砖，但这项专门颁布给砖瓦事务的旨意，体现出即便在康乾盛世，当时最高统治者依然对日常的一砖一瓦都很关注和爱惜。

The Qianlong Emperor once issued an edict concerning the use of bricks for the Gate of Good Fortune and Gate of the Thriving Imperial Clan. An official proposed replacing the sand bricks with golden bricks, suggesting that the old bricks could then be disposed of freely. However, the Emperor insisted that even the sand bricks were valuable materials and should be collected after their removal.

Furthermore, the Emperor expressed his familiarity with the bricks used at these gates, suspecting that the official's report on the exclusive use of sand bricks was inaccurate and demanded verification. Although the exact type of bricks used at that time remains unclear, this episode reflects a high regard for everyday materials, even during the prosperous Kangxi-Qianlong period.

景运门

Gate of Good Fortune

零浪费的美好生活，从一日三餐开始。而光盘，便是对美食的最高赞赏。其实不止光盘行动，在采购、料理、食用、厨余等环节处处都有减少食物浪费的机会。

在选购食材方面，建议大家预计好料理所需的量，列出采购清单；同时记得多购买新鲜、健康的当季蔬菜。尽量自己多做饭，少点外卖；经常检查食物的储存周期，正确储存食物，避免浪费；充分利用食材，物尽其用。在享用美食时使用公筷公勺，减少一次性餐具使用；在处理厨余垃圾时，做好垃圾分类，进行厨余堆肥，做到零浪费。

一粥一饭，当思来之不易；半丝半缕，珍惜物力维艰。让我们和古人一样，节约粮食，在生活中践行“零废弃”吧！

A good life with zero waste commences with three daily meals. Moreover,"clear your plate"campaign represents the highest appreciation of food. In reality, there are numerous opportunities to minimize food waste in aspects such as procurement, cooking, food consumption, and food leftovers, etc.

When it comes to purchasing ingredients, it is advisable that you estimate the quantity of food needed and create a purchasing list; Also, remember to purchase fresh and healthy seasonal vegetables. During cooking, endeavor to cook by yourself more and order less takeout; Always inspect the storage period of food to store it correctly and prevent waste; Make the fullest use of your ingredients. Utilize serving chopsticks and spoons when having meals, reduce the utilization of disposable tableware; When handling food waste, do a good job in garbage classification and food waste composting, in order to achieve zero waste.

A porridge and a meal, when considering, are hard-won; Half a thread and half a piece, it is difficult to cherish the materials. Let us, like the ancients, save food and practice "zero waste" in our lives!

怀抱自然

Embracing Nature

箭亭始建于清初，是皇帝与皇子皇孙练习射箭的场所，在它南侧可以看到许多郁郁葱葱的植物，这是故宫博物院的工作人员为美化环境而栽种的。

其实古人对自然景观的重要作用也有深刻认识，明清时期，紫禁城除外朝区域为了彰显威严不见树木外，其他区域均有所栽植。比如在武英殿东侧、断虹桥北，就矗立着一大片古槐树，被誉为“紫禁十八槐”；在宁寿宫区域皇极门内的广场四周，分布有“十八罗汉松”，它们构成了紫禁城中最古老的油松群；慈宁宫花园南端还有两棵紫禁城中最古老的银杏树，平均树龄已达 300 年以上。御花园里的古树最为集中，比如绛雪轩前的龙爪槐、钦安殿前的白皮松，它们见证了紫禁城的岁月变迁。

The Archery Pavilion, built in the early Qing dynasty, served as a practice area for archery by the emperor and his descendants. Today, the pavilion's southern side is adorned with lush vegetation planted by the Palace Museum’s staff for beautification.

The historic inhabitants of the Forbidden City also understood the importance of natural landscapes. During the Ming and Qing dynasties, except for the outer court which was designed to project authority, other areas of the Forbidden City were planted with various trees. Among the most notable are the group of ancient pagoda trees known as the ‘Eighteen Pagoda Trees of the Forbidden City’ near Broken Rainbow Bridge, and the ‘Eighteen Arhat Pines’ in the square around the Gate of Imperial Supremacy in the Palace of Tranquility and Longevity area, the oldest oil pine group in the Forbidden City. The south end of the Garden of the Palace of Compassion and Tranquility houses the oldest ginkgo trees in the Forbidden City, each over three centuries old. The imperial garden contains the greatest concentration of historic trees, such as the dragon claw pagoda tree in front of the Gallery of Crimson Snow and the white pine in front of the Hall of Imperial Peace, and all have seen the world change over the centuries.

箭亭

Archery Pavilion

近年来，故宫零废弃项目依托故宫博物院的馆藏书画作品，在箭亭广场东侧营造出生态堆肥花坛新景观，构建既符合中式美学又兼具生态功能的微型生态系统。花坛从宫廷花鸟画作品定格的花鸟场景中提炼生物多样性等要素，打造了“三季有花、四季常青”的自然式景观。超过 50 种乡土植物与景石、荷花缸以及堆肥箱、蚯蚓塔、昆虫屋等生态设施，为故宫博物院中的鸟类、蚯蚓、昆虫提供食源、水源及栖息地，将生态理念与人文情怀紧密联结，大大丰富了故宫博物院的生物多样性。

故宫博物院一向重视生物多样性保护，曾推出多个与此相关的公众体验活动，如“在故宫邂逅灵动飞羽”“我在故宫观鸟”“共绘生物长画卷”等，体现了中国世界文化遗产地秉承绿色理念、应对气候变化、保护大自然的决心。

In recent years,the ‘Zero-Waste Palace Museum’ project has produced an ecological compost flower bed landscape, forming a miniature ecosystem blended with Chinese aesthetics. The upgraded ‘Flower and Bird Scroll’ drawing from the cultural attributes of flowers and birds in court paintings, the bed features over 50 native plant species, stones, lotus tanks, compost bins, worm towers, and insect houses. These elements provide food, water, and habitats for birds, worms, and insects within the Palace Museum, integrating ecological concepts with cultural sentiments and greatly enriching the museum's biodiversity.

The Palace Museum has always valued biodiversity protection, and during past Biodiversity Days has offered public activities like ‘Encountering Lively Birds in the Palace Museum’, ‘Birdwatching in the Palace Museum’, and ‘Drawing a Biodiversity Scroll’. These initiatives reflect the commitment of Chinese World Heritage Sites to green principles, climate change response, and conservation.

Postscript

It is worth noting that the green practices of the Palace Museum, and increased public awareness of environmental protection and green development, are of great benefit to the historic buildings of the Forbidden City.

In the 21st century, climate and environmental risks, and the harms they cause, bring significant challenges to the conservation of the Forbidden City's historic buildings. Extreme changes in temperature and humidity, increased freeze-thaw cycles, surface radiation, and air pollution severely damage the materials and structural safety of these buildings, accelerating aging, weathering, deformation, cracking, and detachment. Extreme weather like sandstorms, heavy rains, and snowstorms can cause irreversible damage. The consequences of climate change often result in secondary harms, such as the degradation of protective structures and key areas, leading to the gradual loss of control over indoor environments.

Ultimately, addressing these challenges requires a comprehensive approach within the framework of sustainable development. Only through such integrated efforts can the impacts of climate change be fundamentally mitigated, thereby reducing the damage to the historic buildings of the Forbidden City.

后记

值得一提，故宫博物院的绿色实践，全民环保与绿色发展意识的提升，对紫禁城古建筑有百利而无一害。

进入 21 世纪，各类气候环境风险和其导致的系列病害的产生，使紫禁城古建筑保护工作面临较大挑战。温湿度剧烈变化、冻融循环频率提升、地表辐射及大气污染等对古建筑材料及结构安全危害极大，会加速古建筑老化、风化、变形、开裂、脱落等；而大风（沙尘暴）、暴雨、暴雪等极端天气事件则可能对古建筑造成不可逆的瞬时破坏。上述气候变化的危害，往往又产生了诸多次生危害，例如建筑的整体围护结构和关键部位受损，导致室内环境逐渐失控。

归根结底，只有在可持续发展的框架内加以统筹，气候变化才可能得到根本解决，最终降低紫禁城古建筑受到的损害。

故宫博物院
THE PALACE MUSEUM

万科公益基金会
VANKE FOUNDATION