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Rethinking the Design of Garden Museums and Libraries from a Naturalistic Perspective: A Review of the Research Literature

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Abstract

The rapid growth of urbanization, the diminishing interaction between humans and natural environments, and the increasing demand for human-centered cultural spaces have highlighted the need to rethink architectural and environmental design approaches. In this context, garden museums and libraries, as cultural, educational, and social spaces, play a significant role in enhancing users' experiences and have considerable potential to incorporate the principles of naturalism to create dynamic, restorative, and sustainable environments. This study aims to rethink the design of these spaces from a naturalistic perspective by reviewing and analyzing the existing body of research. It examines the principal theoretical foundations, design approaches, and findings of previous studies. The research adopts a descriptive–analytical methodology based on a comprehensive review of library resources, scholarly publications, and related studies. The findings indicate that the integration of natural elements, including daylight, vegetation, water features, landscape, natural ventilation, and environmentally compatible materials, not only enhances spatial quality but also promotes psychological well-being, concentration, social interaction, and user satisfaction. Furthermore, the literature reveals that previous studies have largely examined garden museums and libraries independently. At the same time, relatively few have investigated these two cultural environments within an integrated theoretical framework grounded in naturalism. Therefore, this paper emphasizes the importance of interdisciplinary research and the development of integrated, human-centered, sustainable, and restorative design models for the future of cultural spaces.

Keywords: Naturalism, Garden museums, Libraries, Human-centered design, Cultural spaces, Literature review.

1 | Introduction

In recent decades, rapid urbanization and the increasing disconnection between humans and natural environments have positioned biophilic design, or naturalistic design, as one of the leading approaches in

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contemporary architecture. Rooted in Edward O. Wilson's Biophilia Hypothesis, this approach argues that human beings possess an innate tendency to seek connections with nature as a consequence of their evolutionary heritage. Within this context, public cultural facilities such as garden museums and libraries provide valuable opportunities for implementing naturalistic design principles, as their primary mission is to promote learning, well-being, cultural engagement, and social interaction.

The integration of nature into the architectural design of these cultural spaces extends beyond aesthetic considerations. It contributes to stress reduction, cognitive restoration, and enhanced user performance while creating healthier and more engaging environments. Garden museums strengthen the relationship between cultural heritage and natural landscapes. In contrast, libraries increasingly incorporate daylight, vegetation, and outdoor connections to create restorative environments that support reading, learning, and community engagement. Recent studies have demonstrated that the incorporation of natural elements not only improves users' experiences but also contributes to the environmental and social sustainability of cultural buildings.

Despite the growing body of research on biophilic architecture, the literature remains fragmented. Most studies have examined either garden museums or libraries independently, with limited efforts to synthesize their shared design principles within a comprehensive naturalistic framework. Accordingly, this study reviews the theoretical foundations of naturalism and critically examines previous research on garden museums and libraries to clarify the role of naturalistic design in cultural environments. It further seeks to address the following question: How can the integration of architecture and nature optimize the educational, cultural, and recreational functions of garden museums and libraries?

2 | Problem Statement

In recent years, alongside the advancement of sustainable architecture, naturalistic and biophilic design has emerged as a central concept in the planning and design of public spaces. Existing research has consistently highlighted the positive relationship between natural elements and users' psychological well-being, cognitive performance, and overall environmental satisfaction. However, when this concept is examined within two distinct categories of cultural spaces—garden museums and libraries—the existing knowledge reveals considerable conceptual fragmentation.

Although numerous studies have independently investigated the role of green landscapes in garden museums as environments that integrate cultural heritage with nature, and others have explored the effects of daylight, vegetation, and environmental quality in libraries as settings that support learning and concentration, relatively few studies have comparatively analyzed these two building types within a unified naturalistic perspective. Consequently, a comprehensive understanding of the common principles and design strategies applicable to both environments remains underdeveloped.

A further challenge lies in the conventional perception that garden museums are inherently nature-oriented while libraries are predominantly enclosed and artificial environments. Contemporary architectural research, however, suggests that this distinction is gradually diminishing as libraries increasingly adopt biophilic design strategies and garden museums evolve into multifunctional cultural spaces. Nevertheless, the absence of an integrated literature review has limited the development of coherent design frameworks capable of translating naturalistic principles into practical architectural solutions for both building types.

Therefore, conducting a comprehensive review of the existing literature is essential not only for addressing the theoretical gap concerning the relationship between nature and architecture in cultural spaces but also for identifying evidence-based design principles that can inform future practice. By reviewing, synthesizing, and categorizing previous studies, this paper seeks to identify the dominant research trends and theoretical perspectives on naturalistic design in garden museums and libraries and to demonstrate how these findings can contribute to the development of more human-centered, sustainable, and restorative cultural environments.

3 | Research Methodology

This study adopts a Systematic Literature Review (SLR) methodology to identify, evaluate, and synthesize existing research on naturalistic approaches in the design of garden museums and libraries. The review follows a structured process to ensure the reliability and transparency of the findings.

The research procedure consists of the following stages:

- I. Defining the eligibility criteria: Establishing the inclusion and exclusion criteria, including research topics, publication period, publication type, and language.
- II. Comprehensive literature search: Conducting systematic searches across major scientific databases using carefully selected keywords related to naturalism, biophilic design, garden museums, libraries, and cultural spaces.
- III. Study selection: Screening titles, abstracts, and full-text articles according to the predefined eligibility criteria.
- IV. Data extraction: Collecting key information from the selected studies, including research objectives, methodologies, principal findings, and design recommendations.
- V. Content analysis: Classifying and analyzing the extracted data to identify recurring themes, research trends, and conceptual frameworks.
- VI. Synthesis and interpretation: Integrating the findings to provide a comprehensive overview of the current state of knowledge, identify research gaps, and propose directions for future studies.

4 | Definition of Garden

The term garden originates from the Persian language and has long been used in both Persian and Middle Persian (Pahlavi). Although some scholars consider it a shared lexical element between Persian and Arabic, others argue that it is fundamentally a Persian word that was later incorporated into Arabic. Historically, the concept of the garden in Persian culture extends beyond a simple cultivated green space; it represents an organized landscape in which architecture, vegetation, water, and spatial order are harmoniously integrated. Consequently, the Persian garden has long served as a symbol of beauty, tranquility, ecological balance, and the close relationship between humans and nature, profoundly influencing landscape architecture and garden design across many regions of the world.

The term garden is also associated with the word “Pardis” (Paradise), which originates from the Median language and refers to an enclosed garden or cultivated landscape. The term “Paradeiza” in the Pahlavi language was used in the sense of paliz (garden or orchard). Although today the word paliz commonly refers to agricultural fields where crops such as watermelon, cucumber, and vegetables are cultivated, its historical meaning was closely related to landscaped gardens and cultivated environments.

During the Achaemenid period and subsequent eras, Iran was characterized by numerous extensive and magnificent gardens. Persian gardens were considered unique in their time, as comparable examples were rarely found in other civilizations, and their grandeur attracted visitors and admiration from different parts of the world. As a result, the original Persian term for garden was adopted and transmitted across various cultures. Today, the Greek word “Paradeisos” refers to a garden. At the same time, the English and French terms “paradise” and “paradis” have evolved to represent the concept of heaven, reflecting the historical and cultural influence of Persian garden traditions [1].

4.1 | Types of Gardens

4.1.1 | Eastern gardens

Japanese Garden

The Japanese garden represents a distinctive style of garden design and construction that emphasizes the harmonious integration of natural elements within the surrounding environment. In this type of garden, existing natural components are utilized in a highly refined and symbolic manner. The landscape design commonly incorporates diverse and colorful plants, while architectural elements are arranged in a natural and aesthetically balanced composition. For example, bridges are traditionally constructed using natural materials such as wood and stone, and artificial ponds containing various plants are incorporated into the garden space to enhance its visual and ecological qualities.

One of the most renowned examples of Japanese gardens is the Zen rock garden, which is characterized by the minimalistic arrangement of stones, gravel, and carefully designed spatial compositions. The earliest Japanese gardens emerged in the mountainous region of Yamato (present-day Nara) during the 6th century CE. These early gardens were inspired by natural landscapes, particularly oceanic scenes, and featured large ponds, sandy and rocky shorelines, and small islands that symbolically represented maritime environments [2].

Chinese garden

In China, poetry and painting have played significant roles in shaping the development and orientation of architectural arts and urban design. In both paintings and poetic descriptions of gardens, Daoism has consistently been one of the central themes. These representations often illustrate the ideal forms of rural communities or the secluded dwellings of hermits, situated beneath trees or on mountain peaks, where individuals could live in complete harmony with nature.

The Chinese poet Xie Lingyun (385–433 CE), one of the prominent poets of the fifth century, described an imaginary garden in his poetic works as follows:

"I have banished all the sorrows of the world from my garden. Here exists a pure and untainted space. I have chosen this place under the protection of the mountains to the north, while the windows of the building open toward the south. I have redirected the stream and created a pond. I have planted beautiful roses in front of the windows, beyond which distant and magnificent hills can be seen."

This poetic description reveals various aspects of Chinese garden design, including the use of flowers, the relationship between buildings and their natural surroundings, the presence of flowing water, the creation of natural and artificial ponds, the importance of distant views and landscapes, and the symbolic role of mountains and rocks. These elements demonstrate that garden design in China was regarded not merely as a functional practice but also as an artistic discipline.

Chinese painters were also deeply inspired by the composition of rocky landscapes and attempted to recreate symbolic representations of nature in their miniature paintings through the arrangement of layered stones, water features, and natural vegetation, particularly evergreen and coniferous trees. Therefore, mountainous rock formations became one of the most significant foundations of Chinese garden design [3].

An analysis of Chinese paintings that influenced garden designers reveals that whenever water was incorporated, it was intended to reflect the surrounding sky, mountains, and rock formations, creating a visual connection between different elements of the landscape. In traditional Chinese scroll paintings, which are often vertically composed from top to bottom, winding paths and dynamic movements through space are prominently represented.

Similarly, in garden design, pathways are used to challenge and transform the viewer's perception of the landscape. Instead of experiencing a single fixed view of nature, visitors move alongside lakes and mountains, cross bridges, pass through walls, and encounter a sequence of interconnected, diverse, and sometimes contrasting scenes. Through this spatial progression, Chinese gardens create a dynamic experience in which separate yet harmonious landscape compositions are gradually revealed to the observer [4].

4.1.2 | Western gardens

French garden

The French garden style is not considered an entirely new approach in landscape design; rather, it represents a continuation and refinement of the garden traditions that existed during the Renaissance period. In earlier centuries, the division and organization of gardens were relatively simple; however, during the Renaissance, gardens expanded in scale and incorporated a greater variety of trees arranged with more precision and order than in previous periods.

French gardens were typically enclosed by thicker and higher walls and often featured tall wooden fences. During this period, designers sought approaches that were more economical, simple, and adaptable to different spatial conditions. Flower arrangements were commonly designed in rectangular and square patterns, with an emphasis on large-scale geometric forms. (From the beginning of the eighteenth century onward, the overall size of gardens gradually became smaller.) In the architecture and construction of these gardens, decorative aspects and attention to detailed design were considered essential elements.

Today, many aspects of the French garden style continue to be applied, either through the use of specific historical details or through the adaptation of traditional principles. These approaches are generally recognized as French gardens or French-style garden design [5].

The Garden of Versailles

One of the greatest achievements of André Le Nôtre in landscape design, and perhaps his most significant contribution, was the creation of the renowned Garden of Versailles. Construction of this garden began in 1661 and was completed in 1689, when Louis XIV prepared a guide for visitors to the garden.

The Garden of Versailles is distinguished by its remarkable harmony, strict organization, and adherence to carefully defined design principles. Upon entering the garden from the main hall of the palace, visitors encounter a central axis accompanied by water basins on both sides, followed by a series of elevated terraces. Beyond this area lies the extensive garden landscape, containing numerous pools and carefully arranged decorative elements, including sculptures, fountains, and precisely shaped trees (topiary) organized according to a strict geometric order.

Continuing along the main axis, a descending avenue extends through the garden, forming a major vertical axis with gardens and planted areas on both sides. Beyond this space is an expansive open area containing sculptures depicting human and equestrian figures. A large water canal, intersected at regular intervals by public avenues, incorporates fountains with carefully designed compositions. Another section of the garden includes an area surrounded by sculptures, where musical performances and fountain displays were held, representing a new artistic expression combining music and water features. Due to its innovative design and grandeur, the Garden of Versailles became a model that inspired numerous imitations throughout Europe.

Several renowned designers and architects contributed to the development of French garden art, including André Le Nôtre, Jacques Boyceau, and Claude Mollet, whose masterpieces have survived, despite various modifications over time. One of Le Nôtre's earliest major achievements was the Garden of Vaux-le-Vicomte, where theatrical performances by Molière were presented during the reign of Louis XIV. This garden incorporated sculptures, small fountains, and pathways arranged in relation to the main axis of the building.

Another significant work by Le Nôtre was the restoration of the Tuileries Garden, originally designed by Jacques Boyceau, André Mollet, and Claude Mollet during the reign of Louis XIII. Through his modifications and interventions, Le Nôtre transformed the garden into a remarkable masterpiece, portions of which remain today.

The Luxembourg Garden, another important work associated with French garden design, demonstrates Boyceau's approach to axial organization. In this design, the main axis was carefully aligned with the central axis of the building. At the same time, terraces were created around the structure to form a transitional space

between the garden and the architecture. Boyceau and his collaborators designed flowerbeds using combinations of squares, rectangles, and curved forms, while also emphasizing intersecting pathways.

Boyceau further explored the relationship between straight avenues and curved networks of garden paths, introducing the transformation of rigid geometric patterns into more fluid and rounded forms, which became an important development in the evolution of French landscape design [6].

André Mollet, in the art and engineering of garden design, emphasized the concept of axial gardens. He proposed the use of curved secondary pathways intersecting the main avenues and terminating in sculptures or small fountains, creating visual focal points within the garden composition.

The influence of this renowned garden design can be observed in many gardens created afterward, as subsequent designers and artists adopted various aspects of its planning principles. Among the gardens that were developed almost entirely through imitation of this design approach, the gardens of Ludwigsburg can be mentioned, as well as several examples in Austria.

In the designs associated with Le Nôtre, various elements were introduced, including gazebos of different sizes, the preservation of low-pruned and carefully shaped trees, the placement of individual trees and grouped plantations, all of which contributed to the formation of a distinctive design style. His approach also included elongated border flowerbeds, raised landscape features, and avenues leading toward wooded areas.

Today, efforts have been made to preserve Le Nôtre's original design principles in the Garden of Versailles. However, some areas of the garden have undergone restoration processes that have introduced combinations of regular and irregular geometric patterns, and in some cases, asymmetrical arrangements.

Throughout history, the Garden of Versailles has experienced numerous minor and major modifications by monarchs and landscape specialists. Following the death of Louis XIV, Louis XV introduced changes within the palace and constructed additional small buildings within the garden. During this period, the botanical garden at the Trianon was also established, which was later expanded by architects and designers, including Gabriel.

During the reign of Louis XVI, many lime trees were planted throughout the garden. Later, a significant number of these trees were removed and replaced with species such as maple, plane trees, and cedar. It should also be noted that Count de Caraman transformed part of the garden into an English and Chinese-style garden, an intervention that gained the appreciation of Marie Antoinette. In addition, the Temple of Love within the Garden of Versailles was designed by Richard Mique.

Following the French Revolution and the collapse of the monarchy, the Garden of Versailles suffered neglect, resulting in the deterioration and loss of many trees and lawns. Fortunately, the original geometric structure and parterre designs of the garden remained largely unchanged.

Today, the Garden of Versailles is regarded as one of the masterpieces in the history of garden design. It represents the profound influence of Italian garden art on French landscape traditions. It can be considered a pioneering model whose design principles have inspired numerous landscape compositions and garden layouts in contemporary times [4].

English garden

Generally, the development of garden design in England began in 1519. In early English garden styles, designers attempted to create the illusion of extensive woodlands and numerous lakes through visual techniques and optical effects. In these traditional classical designs, narrow pathways bordered by rows of trees on both sides were common, as was the placement of solitary trees within large open spaces [7].

The prevailing garden style remained relatively stable until the end of the reign of Elizabeth I, with limited significant changes. However, a distinct approach to garden construction emerged in England during the reign of James I (1603–1625). In this style, pathways became more significant design elements, while the use of flower planting was reduced. The first botanical garden established in England was created in 1620 at the

University of Oxford. Later, smaller gardens were developed near residential buildings, where flowers were occasionally planted alongside garden beds [4].

Persian garden

Persian gardens are considered among the most significant garden traditions in the world and have been extensively mentioned in Greek historical texts. Agriculture and the creation of numerous gardens held great importance in ancient Iran. Following the adoption of Islam by Iranians, this cultural perception became further developed, and Persian garden design continued to evolve within the Islamic world.

The term “Pardis” refers to a garden, orchard, paradise, or enclosed cultivated landscape. Pardis represents the symbolic similarity between the garden and paradise. The term Pardis or Paradise is considered to have Iranian (Median) origins, referring to an enclosed area or a surrounding space; therefore, it was used to describe gardens located around Median residences. Although limited physical evidence remains from the gardens of the Medes and Achaemenids, ancient religious and historical texts provide valuable descriptions of their quality, structure, and spatial organization.

According to Greek historians, the surroundings of Iranian residences were filled with beautiful gardens known as “Paradeisos.” The root of this term is derived from the Persian word Paridaiza, which in the Avestan language consists of two elements referring to enclosure and being surrounded. Thus, it described cultivated spaces and planted areas surrounding dwellings. The term Paradise, meaning heaven, also developed from this concept and became associated with the ideal garden.

Ancient religious texts, including the Torah, refer to the concept of the ancient paradise gardens of Khuzestan and eternal gardens. In the inscription of Artaxerxes II, the term Pardis is used in the meaning of garden, and in the Avesta, it appears twice in the form of Paridaiza. The Quran also refers twice to the term Firdaws (Paradise).

Similar to the widespread influence of Persian gardens across different cultures and geographical regions, Japanese-style gardens have also gained significance in Iran. Today, the concept of gardens has undergone considerable transformation due to several factors:

- I. The primary purpose of creating gardens is no longer limited to economic benefits and agricultural production; rather, gardens are increasingly valued for recreational, cultural, and aesthetic purposes.
- II. Advances in irrigation technologies have reduced dependence on traditional irrigation methods and have made it possible to cultivate trees and vegetation even in uneven and challenging landscapes.
- III. Although various irrigation techniques have been developed, the importance of successful water management remains a fundamental principle in garden design.
- IV. Due to improved security systems and expanded urban infrastructure, concerns regarding garden protection have become less restrictive, allowing the use of semi-transparent boundaries instead of traditional solid walls.

Nevertheless, Persian gardens continue to maintain diverse applications due to their cultural and identity-related significance. Their influence has expanded globally, leaving a lasting conceptual legacy through the word “Paradise,” which represents the ideal image of heaven in many cultures. Today, Persian gardens have become an important cultural identity marker, and applying their distinctive principles in contemporary parks and recreational environments contributes to the preservation and continuation of this valuable heritage [8].

Characteristics of Persian gardens

Enclosure and inward orientation: Persian gardens are typically surrounded by walls or boundaries, resulting in an introverted spatial organization that creates a distinct internal environment.

Geometric spatial order: The spatial organization of Persian gardens is based on geometric principles. Geometric patterns can be observed throughout the garden, including in the arrangement of trees and

planting schemes. This characteristic clearly contrasts with the more naturalistic approaches found in Japanese and Chinese gardens.

Entrance gateway as an architectural element: Persian gardens typically feature a built entrance gateway. The entrance passages are often designed in a corridor-like form and integrated within strong enclosing walls. Entrance structures are commonly designed as two-story buildings that establish a formal transition between the outside environment and the internal garden space.

Presence of towers: Towers are among the architectural elements observed in many Persian gardens, contributing both functional and visual qualities to the overall composition.

Linear pathway and avenue design: The circulation system in Persian gardens is generally organized along straight lines and formal axes, emphasizing order, symmetry, and visual continuity.

Axial water features: Water elements, including pools and fountains, are typically arranged along the main axes of the garden, reinforcing the geometric structure and enhancing the visual connection between different spaces.

Central architectural structure: Persian gardens usually contain a central building, such as a palace (Kakh), pavilion (Kushk), or Kolāh Farangi, which serves as the focal point of the garden composition.

Geometric flowerbeds: Garden beds are commonly designed in quadrilateral or rectangular forms and are richly planted with flowers and vegetation, contributing to the aesthetic and symbolic qualities of the garden [5].

Geometry of Persian gardens

Persian gardens were generally constructed either on flat and level lands or on sloped terrains where water could flow naturally and create cascades. Gardens located on sloping sites often contained a greater number of trees and offered more visually diverse landscapes, such as the Bagh-e Takht Garden in Shiraz.

Geometric principles played a fundamental role in the design of Persian gardens. Among various geometric forms, the square was particularly significant, as it was used to define the spatial relationships and proportions between different components of the garden. The emphasis on geometric order established a clear structure and harmony between architectural elements, vegetation, water features, and circulation paths.

An important characteristic of Iranian garden design is that these gardens are generally arranged in the form of elongated rectangles. In front of the main garden area, a long and extensive space is often provided, functioning as the primary visual axis and landscape view of the garden. In these areas, low-growing trees were commonly planted to maintain an attractive appearance throughout different seasons while preventing excessive obstruction of views. The ground surface of the garden was traditionally covered with plants such as alfalfa to preserve a continuous green appearance; however, in contemporary gardens, this function is often replaced by lawn planting.

Some Persian gardens also consisted of multiple sections, including a secondary outer garden (Bagh-e Biruni) in addition to the main garden. This outer section served as a more public space through which visitors passed before entering the private inner garden. An example of this spatial organization can be observed in Dowlatabad Garden in Yazd.

In some Persian gardens, a forecourt (Jolokhan) was located at the entrance area. However, a common feature among these gardens was the presence of a rectangular open space in front of the main building, where a pool or water basin was constructed. In fact, this element was considered an essential component of the Persian garden composition.

Generally, Persian gardens included not only the main architectural structure but also additional buildings and entrance pavilions that functioned as spaces for receiving and hosting guests. These structures were usually designed with considerable aesthetic attention, and a perforated screen wall (Mashrabiya) was often placed in

front of the entrance to prevent direct visibility into the inner garden while maintaining visual connection and ventilation [9].

Other garden buildings included separate structures designed for different seasons, such as summer and winter residences. Functional facilities such as water reservoirs and bathhouses were also considered important components of Persian gardens. In Persian garden architecture, two fundamental principles can be identified: the organization of three elongated spaces arranged parallel to each other, and the division of the garden into regularly arranged square sections. These principles date back to earlier periods when agricultural lands were also organized according to similar spatial patterns. In addition to square and rectangular geometries, octagonal and diamond-shaped forms were also employed in Persian garden design [4].

4.2 | Definition of Garden Museum

According to the definition provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which is considered one of the most comprehensive definitions, a museum is:

"A permanent institution that does not pursue profit-making objectives and is accessible to all members of society without limitation. It serves the development of society by conducting research into human heritage and the evidence of human interaction with the environment, collecting, preserving, studying, and providing opportunities for education and cultural enrichment [10]".

Based on this definition, a garden museum can be understood as a cultural institution that combines the preservation and interpretation of natural landscapes, historical gardens, architectural heritage, and cultural values. It represents an integrated environment in which natural elements and human-made structures interact to provide educational, historical, aesthetic, and recreational experiences for visitors.

The following topics are also included as extensions of the above definition of museums:

- I. Institutions established for the preservation and protection of cultural objects, including exhibition halls and archival facilities for displaying, documenting, and storing collections.
- II. Archaeological, natural, anthropological, and historical sites and collections that possess significant value due to their activities related to the collection, conservation, research, and exhibition of cultural heritage.
- III. Institutions such as zoological and botanical gardens, as well as exhibitions of terrestrial animals and marine organisms, which represent and introduce different forms of living species.
- IV. Natural reserves that preserve ecological and environmental values.
- V. Scientific centers and space exhibitions that contribute to public education and the dissemination of scientific knowledge [3].

4.3 | Concept and Definition of Museum

The term "museum" began to be used in the English language from the early eighteenth century, referring to a "study room" or "private library." One example is the expression Ashmolean Museum, a renowned building in Oxford, England, which was among the earliest applications of this term.

The origin of the word can be traced back to the Latin term *museum* and the Greek word *μουσείον* (Mouseion). In ancient Greek, this term referred to a "Temple of the Muses." The Muses were the nine goddesses of poetry, arts, culture, and education in Greek mythology, each associated with a specific field of knowledge and artistic expression. In ancient Greece, the term was also used to describe places such as schools, centers of art, and reading rooms.

The Greek term was later transformed into the Latin *museum* (pronounced *museōum*) and subsequently entered various other languages. The size and spatial requirements of a museum building depend on several factors, including its type, function, operational requirements, available budget, and the architectural concept proposed by the designer.

One of the most important considerations in museum design is the creation of a spatial organization that ensures appropriate access to public areas and collection storage spaces. The architectural design of a museum generally includes the following components:

- I. Spatial organization and zoning.
- II. Relationships between spaces, rooms, and functions.
- III. Museum diagrams and circulation patterns.
- IV. Design objectives and conceptual framework.
- V. Estimation of construction costs [5].

4.4 | History of Museums in the World

The development of collections appears to be deeply connected with human nature, as people have been collecting various objects since the beginning of history, including different types of stones, shells, and animal remains. At later stages of human development, collecting became associated with religious beliefs, cultural identity, and social values.

In ancient Iran, valuable objects were preserved in temples and religious sanctuaries. During the Middle Ages, throughout different parts of the world, possessing valuable objects represented social status and wealth. Religious institutions, similar to those in ancient Iran, also served as places for preserving valuable artifacts.

During the Renaissance, fundamental intellectual and cultural transformations in Europe changed the perception of private collections. Collectors gradually recognized the cultural and historical significance of their possessions and began displaying them in dedicated halls for public viewing. As a result, collectors were regarded not only as wealthy individuals but also as patrons of culture and art.

During the Renaissance and particularly after the Industrial Revolution, specially designed public institutions known as museums were established, allowing members of society to visit and engage with collections. The first national museum, which originated from a private collection, was the Ashmolean Museum in Oxford, England [1].

4.5 | History of Museums

As previously mentioned, the creation of collections is deeply rooted in human nature, and this tendency has been evident throughout history. The museum in its contemporary form first emerged at the end of the third century BCE through the establishment of the Mouseion of Alexandria by Ptolemy I Soter. However, during the Middle Ages, due to the dominance of the Church over social and intellectual life, museums gradually lost their educational character and functions.

With the beginning of the Renaissance and the advancement of various fields of knowledge, museums, like other scientific and cultural institutions, experienced significant development. During the nineteenth and twentieth centuries, the expansion of museums contributed to the strengthening of their educational mission and led to the emergence of additional cultural and artistic activities.

At the end of the eighteenth century, the growth of scientific knowledge and increased public engagement with scientific activities encouraged greater interest in archaeology. This development contributed to the establishment of some of the earliest universities and museums, which provided environments for research, experimentation, and scientific education.

It is widely accepted that political, social, and cultural transformations have had a close relationship with the evolution and development of museums. These transformations played a significant role in accelerating the growth of museums in various countries. During periods of social change, artists often drew inspiration from museum collections and used preserved works as sources for creative expression.

At the end of the nineteenth century, several European countries sought to utilize museums as educational resources for younger generations. In this context, Italy incorporated art history education into school curricula in 1923, which subsequently contributed to significant developments in educational materials and guidebooks for primary and secondary school teachers in France.

Throughout the twentieth century, education and training remained among the fundamental objectives of museums. However, following the Second World War, economic and political transformations significantly changed the role and identity of museums. Having strengthened their educational responsibilities, museums began to provide broader educational facilities and programs. Furthermore, international conventions emphasized the role of museums as educational institutions and recognized their importance as spaces for public learning and cultural development [1], [8].

4.6 | Classification of Museums

Today, numerous museums exist throughout the world, each responsible for preserving and protecting valuable cultural, historical, and scientific objects. However, classifying museums according to their objectives and functions can be challenging due to the diversity of their roles and collections.

Currently, one of the most common approaches to museum classification is based on their subject matter. Accordingly, museums can generally be categorized into three main groups:

- I. Art museums.
- II. History museums.
- III. Science museums.

Nevertheless, other types of museums also exist, including central museums, national museums, and public museums, which differ in terms of their organizational structures, activities, and the variety of collections they contain.

According to the description provided by the International Council of Museums (ICOM), a museum represents a natural, cultural, economic, or social entity. Since museums in each region reflect the cultural characteristics, history, and identity of their communities, they also function as important spaces for introducing and understanding local cultures. Consequently, museums contribute to strengthening social cohesion and cultural connections within communities.

The collections preserved in historical museums represent the evolutionary process of a region, city, province, or country over a specific period or across successive historical eras. Therefore, historical museums can be considered the largest category of museums. This category includes several subgroups, such as ethnographic museums, archaeological museums, historic house museums, residences of prominent cultural, artistic, and political figures, and museums dedicated to the history of various scientific disciplines.

Furthermore, in order to organize museum activities more effectively, improve the utilization of collections, facilitate the distribution and management of artifacts, and prepare materials for research purposes, museums can be classified into the following ten categories based on their subject matter, characteristics, objectives, and scope of activities:

- I. National museums.
- II. Regional museums.
- III. Local museums.
- IV. Specialized museums.
- V. Thematic museums.
- VI. Research museums.

- VII. Museums of national figures and heritage personalities.
- VIII. Donated property museums.
- IX. Private museums.
- X. Palace museums [3].

The legal framework established for museums in France makes a clear distinction between private and public museums. In private museums, the primary objective is generally associated with economic benefits and revenue generation. In contrast, public museums operate under the supervision of non-governmental directors or administrative bodies and are divided into two main categories: Classified museums and controlled museums.

The main difference between these two categories lies in their management and administrative structures. Classified museums are directly managed under governmental supervision, whereas controlled museums consist of two groups that are categorized according to the value and significance of their collections.

Collectively, these museums constitute an important part of France's cultural heritage and are organized according to national legislation, particularly regulations concerning the principle of inalienability of museum collections. This principle means that objects incorporated into museum collections cannot be returned, transferred, or removed from the institution.

The second category includes collections that may be transferred or sold under specific conditions; however, in such cases, they must be replaced through the acquisition of equivalent artifacts or the establishment of alternative museum resources. Therefore, museums under governmental oversight can generally be divided into two groups according to their legal status and administrative position: classified museums and controlled museums [8].

4.7 | Functions of Museums

The statutes of the ICOM describe museums as institutions that serve as spaces for social and cultural activities. Therefore, examining museum functions from social, cultural, educational, political, and economic perspectives is essential for understanding their broader roles in society.

4.7.1 | Cultural and educational function

From the perspective of contemporary society, museums are regarded as important cultural institutions that play a significant role within the cultural environment of regions and nations. Studying the role and position of museums in preserving valuable and significant cultural artifacts can contribute to the advancement of public education, as well as the improvement of cultural awareness and social development.

However, achieving this objective requires first understanding the concept of cultural development. If culture is considered the result of human actions throughout history and the collective achievements of societies, then cultural development can be understood as the process of discovering, recognizing, and reconnecting with past experiences and achievements. Establishing a relationship with this heritage strengthens cultural identity and promotes respect for language, art, traditions, and other cultural elements, thereby providing a stronger foundation for future development.

Nevertheless, cultural development cannot be achieved merely through declarations or symbolic actions. It requires strong institutions capable of presenting historical experiences and cultural achievements to contemporary society through appropriate educational programs. Therefore, the preservation and development of arts, architectural heritage, libraries, historical artifacts, and museums are essential components of cultural progress.

From another perspective, cultural development, similar to other forms of development, requires appropriate tools and infrastructure. Museums and other scientific, artistic, and historical institutions represent important instruments for achieving such development. Museums are therefore considered social institutions that enable

individuals to understand their historical and cultural identities. Accordingly, part of cultural development strategies should be devoted to establishing educational and research facilities within museums, expanding educational visits for school students and university learners, and applying professional museological knowledge in the restoration and revitalization of museums.

Such approaches contribute to creating suitable learning environments for society while supporting financial sustainability, economic growth, and other diverse functions of museums [5].

Due to their significant role in cultural development, museums are not only considered national assets but also represent part of humanity's global cultural and civilizational heritage. In contemporary society, museums are recognized as important cultural institutions that occupy a special position within the development programs of civilizations.

4.7.2 | Economic function

Focusing exclusively on one aspect of museum performance has sometimes resulted in museums being viewed as consumer-oriented spaces. Consequently, emphasizing their economic potential and recognizing that investments in cultural sectors can generate long-term returns have become increasingly important. However, financial support for museums is still largely dependent on governmental resources [11].

Although cultural artifacts do not always directly generate income, alternative approaches can enhance the economic potential of museums and other cultural sectors. Many museums around the world employ various strategies to achieve financial sustainability, including:

- I. Receiving financial support from donors and charitable organizations as a major part of museum budgets.
- II. Obtaining private-sector sponsorships and donations of funds or museum objects.
- III. Participating in fundraising activities and public financial initiatives.

These approaches contribute to reducing financial dependency and strengthening the economic sustainability of museums.

4.7.3 | Social function

The activities and functions of museums are often derived from social values, cultural contexts, collective memories, and human creativity throughout history and the present era. Museums present their content through a unique medium: The language of objects. This method possesses strong communicative power because visitors who may not have literacy skills can still establish meaningful connections with museum objects. Furthermore, museums provide a three-dimensional and experiential environment for other visitors, particularly those who may find traditional visual or textual methods repetitive or less engaging.

From another perspective, ethnographic museums, archaeological museums, and regional museums represent the interests, identities, and capabilities of specific communities. These museums demonstrate various dimensions of social, political, religious, cultural, artistic, and scientific achievements. Through visitors' interpretations and responses, museums can also provide insights into the cultural interests and values of communities. Therefore, museums not only serve society but also contribute to introducing and representing communities.

At one level, museums serve a global audience, particularly major museums located in capitals and large cities, such as national museums. At another level, museums may serve smaller communities, including regional museums, specialized museums, and local museums that primarily attract residents, researchers, and individuals interested in specific fields [9], [11].

From another perspective, museums preserve values that may have disappeared from contemporary societies and highlight natural and cultural resources that are currently endangered or insufficiently recognized. Museums protect these values and introduce them as part of the heritage of a nation or region—heritage that plays a crucial role in maintaining cultural continuity.

The valuable elements preserved within museums provide a visual representation of religious, historical, ecological, and ethical values. Museum visitors initially encounter a tangible and three-dimensional interpretation of the world and gradually develop opportunities to critically reflect on national heritage, cultural values, and the identities of other societies and nations.

4.8 | History of Museums in Iran

4.8.1 | The Royal Museum (Museum-e Homayouni)

In Iran, the institutional development of museums began with the establishment of the palace museum of Naser al-Din Shah Qajar in the Golestan Palace. Naser al-Din Shah ordered the demolition of part of the northern buildings, which were used for storing gifts received from foreign monarchs, and instructed that a museum, library, and related facilities be constructed in their place.

Etemad al-Saltaneh described the museum as follows:

"In cultural terminology, a museum is a place that contains a collection of ancient, valuable, and precious works. Scholars and researchers gain knowledge and benefit from the memories preserved within this treasury and become familiar with the events and traditions of different historical periods. It can also be considered a means of measuring human understanding, intelligence, and awareness. Difficult questions that cannot easily be answered may find solutions in such a place, and historical knowledge can be expanded through it."

He further described the Royal Museum as a treasury containing precious jewels, valuable artistic works, products of creativity and thought by rulers, famous paintings, products of renowned factories producing porcelain and glassware, and unique decorative objects [8].

Regarding the library, he stated that it was located adjacent to the Royal Museum and contained several thousand printed and handwritten books from different periods, both old and modern. Although various types of objects were preserved in this collection, it could not be fully categorized as a museum in the modern sense; rather, it represented a collection of decorative arts and valuable objects. Nevertheless, the museum at Golestan Palace was rich in artistic works, while its library contained highly valuable books, documents, and historical records. Following a theft incident during the reign of Naser al-Din Shah, the valuable jewels originally kept there were transferred to the Central Museum located at the National Bank for security reasons [4].

4.8.2 | The national museum

In 1916 (1295 AH), the National Museum of Iran was established by the Ministry of Education and Arts and Crafts. Initially, it appears that the museum was located in a single room at Dar al-Funun School. After some time, the collection was transferred to another building. Later, following the establishment of the Museum of Ancient Iran, the collection consisting of approximately 280 objects was moved to the newly established museum.

4.8.3 | The military academy museum

This museum was established at the Military Academy in Tehran with the purpose of educating students about weapon use and introducing them to the history of firearms. Its central collection consisted of weapons belonging to Naser al-Din Shah Qajar. It also displayed several weapons that had been presented as gifts to the Qajar monarch by foreign rulers.

After the Islamic Revolution, this collection was transferred to the Sa'dabad Palace complex, where several objects related to the Sacred Defense period were also added. The museum was subsequently renamed the Military Museum [1], [8].

4.8.4 | The Museum of Art and Industry

Initially, the late Ali Mohammad Heydarian Taherzadeh established an art school known as the School of Ancient Industries. The works of contemporary artists, students, and instructors of the school were preserved and displayed there.

Today, this collection is housed in the Negarestan Building and is known as the National Museum of Arts. The works of contemporary artists related to traditional Iranian arts are exhibited in this museum. After the establishment of the National Museum, this institution continued its activities under its supervision.

4.8.5 | Tehran anthropology museum

The Anthropology Museum of Tehran, which was initially known as the Museum of Anthropology, was part of the Antiquities Collection under the supervision of the Ministry of Endowments and Fine Arts. The museum was located in a suitable building on Bou Ali Street in Tehran.

The museum began its activities with a collection of objects gathered from religious sites, including takyehs and mosques, as well as items donated by individuals. Approximately thirty years later, the museum was relocated to the Abyaz Palace within the Golestan Palace complex. From that time onward, it continued its activities under the supervision of the General Directorate of Museums.

4.8.6 | Museum protection and security

Without exception, all museums are equipped with alarm systems in different sections of the building. These alarm systems are connected to the security office as well as the nearest police station. The system is designed so that when an alarm is activated, all internal and external doors are automatically locked.

In larger museums, electronic surveillance systems are also used to provide greater protection. These systems monitor all movements and entrances within exhibition halls and other museum areas and transmit information to monitoring screens located in the security room.

Other security methods include rotating warning lights, which automatically record the time and location of visitors' movements and transfer the collected information to the security office 7. Museum as a Cultural Space

It should be recognized that environments such as museums, theaters, concert halls, exhibition spaces, and art galleries are not merely designed for cultural activities; rather, they also provide opportunities for the proper expression of architectural concepts and design values. Buildings that were once considered insignificant within the social hierarchy have increasingly become spaces that compete with one another to attract public attention. Their primary energy and identity are generated through the interaction between internal architectural qualities and external cultural influences.

Before the establishment of art exhibitions in their contemporary form, the success of cultural institutions was often evaluated based on the number of visitors they attracted. Regarding cultural organizations, this shift in focus was both populist and economically motivated. This transformation contributed to the emergence of a new era of large-scale financial support and the concept of sponsorship in exchange for recognition or benefits. Consequently, attracting donations and financial assistance from philanthropists became an essential component of achieving commercial marketing objectives.

On the other hand, artistic spaces gradually became instruments for democratization. In many cases, they assumed specific social responsibilities that had previously been overlooked and attempted to attract broader audiences by creating more accessible cultural experiences.

During this period, some artists and their supporting institutions began to distance themselves from this commercial approach. They searched for alternatives to what they perceived as a formally restricted culture and criticized what they considered an excessively self-conscious form of populism. Institutional efforts to

make art completely transparent and eliminate uncertainty often conflicted with the fundamental nature of art itself, which is inherently complex, challenging, and sometimes disruptive.

As a result, most cultural institutions—except those that are highly committed to artistic principles—face a continuous dilemma between compromise and confrontation: They must attract audiences and investors while simultaneously preserving their artistic credibility.

In particular, contemporary art museums have encountered significant challenges in gaining public attention. Consequently, they began exhibiting new forms of artwork, a development that generated considerable debate. Ultimately, artists' ambitions created tensions between artistic expression and philosophical interpretations of art.

At one end of this spectrum are cultural institutions that emphasize artistic autonomy, while at the other end are institutions that appear to reject conventional forms of cultural engagement and attempt to create a connection between art and everyday life.

In general, cultural environments during the past two decades can be classified according to institutional philosophy and conventional design approaches into several categories. The first type tends toward neutrality and is primarily used for displaying artworks presented in open spaces. The second type is inclined toward organized and structured spatial models, while the third type tends to create spaces that are independent yet interconnected.

In these approaches, interior spaces represent the most significant components, while the institutional identity is considered secondary. Philosophically, these spaces follow the concept of “art for art’s sake.” The intermediate spaces discussed in this context aim to establish appropriate relationships between artworks, visitors, and architectural environments. These spaces require a suitable context for interaction rather than simple elimination, and they are often the result of fundamental interactions within the art environment, with education considered one of their primary purposes [1], [8].

4.9 | Garden Museum

The gardens located in Iran possess characteristics that distinguish them from other recreational spaces. Iranian gardens are not only places for leisure and relaxation but also environments that encourage positive thinking, reflection, and balanced human behavior. The spatial qualities of Iranian gardens create a sense of empathy, positive interaction, happiness, and tranquility among individuals, thereby contributing to aspects of social mental well-being.

The traditional urban architectural approach in Iran has historically been based on the concept of garden cities, one example of which is the urban design of Isfahan. Today, if expanding this concept is not fully possible, the minimum effort that can be undertaken is the preservation and maintenance of existing gardens and the design of new spaces inspired by the architectural principles of Iranian gardens. Such spaces can simultaneously perform the function of green areas while ensuring the transmission of spiritual concepts rooted in Iranian-Islamic traditions.

One of the contemporary spaces in which the principles of Iranian garden architecture can be applied is the garden museum.

A garden museum is a combination of the architectural pattern of a garden and a museum building. A museum is a permanent cultural and social institution that operates without commercial objectives, remains open to the public, and serves society and its development. A garden museum is a space designed based on the artistic principles of Iranian garden architecture, combining the ecological functions of green spaces with the preservation and expression of cultural and spiritual concepts derived from Iranian traditions.

The integration of garden architecture with museum buildings is highly valuable due to the diverse scientific and cultural dimensions involved. This combination enables people to experience biological, environmental, and natural aspects more directly and creates a closer relationship between humans, culture, and nature [9].

4.9.1 | Comparison between museum and garden museum

A museum is considered a place that preserves valuable and historically significant works created by artists and reflects the intellectual and cultural achievements of societies throughout history. Museums contribute to increasing historical knowledge and understanding by preserving these valuable collections.

Human beings entrust their past and present to museums so that they can continuously refer to them and reflect upon their future. Due to the transformations that occur throughout different historical periods, museum practices have evolved and adopted new approaches compared with the past. However, their fundamental objective remains the preservation and protection of valuable heritage inherited from previous generations.

By examining the historical development of museums and various perspectives regarding museum design and operation, the distinctive characteristics and functional differences of garden museums compared with traditional museums are presented in the following table.

Table 1. Comparison between museums and garden museums [1], [12].

Category	Exhibition Subject	Time Perspective	Objective	Space	Scope of Activity
Museum	Objects	Past	Preservation and presentation of objects	Building (indoor space)	Limited
Garden museum	Objects, elements, traditions, customs, and cultural aspects related to the subject	Past, present, and future	Preservation and presentation of objects, elements, traditions, customs, and culture within a natural environment	Open space, including a collection of buildings, circulation networks, and the surrounding natural environment	Diverse

4.10 | Definition of Library

“A library is a social institution that contributes to the development of creativity and the flourishing of human abilities through the collection, organization, and dissemination of human knowledge. As the process of learning and knowledge acquisition continues to expand, libraries have become the most suitable places for preserving knowledge and providing easy access to it for members of society. They also serve as environments for sharing diverse ideas and perspectives.

In the past, libraries were mainly used for storing books. They gradually became storage spaces lacking meaningful activities, and librarians were often reduced to custodians responsible only for managing collections rather than interacting with users. However, significant developments have occurred in the field of library science in recent years. Today, libraries include various services and facilities designed to support and assist users in accessing information and utilizing library resources [9].

According to Ranganathan, a library can be described as follows: It is a place for preserving and sharing books, where collections are made available to those who need them. Libraries also encourage individuals within a community to become readers and develop an interest in books. Therefore, a library is considered a public institution from which society expects knowledgeable and informed individuals to emerge.”

4.10.1 | Types of libraries

Libraries can generally be classified into various types. Although their fundamental purpose is similar, they differ in structure, objectives, and methods of operation. These differences naturally influence their organizational systems and functions.

This classification can be based on the way libraries operate. Clearly, a small library managed by an individual differs significantly from a large-scale library that employs advanced technologies and modern electronic systems. Therefore, libraries can be categorized into different groups as follows [5].

4.10.2 | Educational libraries

This category includes libraries located in schools. If the only objective of education in schools is limited to learning textbook content, libraries would have little significance within educational environments. Fortunately, changes in educational approaches during recent decades have led to the establishment of numerous school libraries and the development of specific objectives for them.

The most important objectives include:

- I. Meeting the educational needs of teachers and students.
- II. Providing necessary resources and services to support intellectual development.
- III. Creating positive motivation and interest in reading among students, enabling them to make appropriate decisions in different aspects of life.
- IV. Establishing cooperation with other libraries and contributing to the continuation of educational activities.
- V. Participating in educational processes and maintaining effective communication with teachers and school administrators.

Overall, the method of organization and operation of a school library reflects the educational approach of that institution. In these environments, students learn methods of acquiring knowledge independently as well as through interaction with teachers and librarians, which plays an important role in the development of intellectual abilities [3].

4.10.3 | University libraries

Libraries located in universities, faculties, and educational institutions vary according to their size, academic disciplines, and specific requirements. Generally, each educational institution establishes its library based on internal regulations and carries out its activities within a formal framework. However, these libraries share several common characteristics.

A university library can effectively fulfill its educational responsibilities when it is supported by professional librarians who possess sufficient knowledge of educational philosophies and relevant teaching methods. Since the beginning of the contemporary era, these libraries have experienced significant growth due to increasing emphasis on individual study and research.

Recent changes in the management and organization of university libraries have occurred due to various factors, including:

- I. The emphasis on new learning methods, including three-dimensional and interactive educational approaches, has led to the incorporation of various electronic devices, specialized educational equipment, and technological systems into library spaces. Moreover, the application of advanced machines and digital tools has become an important factor in enhancing educational functions and improving library services.
- II. The expansion of the concept of educational resources, which gradually replaced the traditional role of libraries, began at the secondary school level and later extended to universities. This significant transformation contributed to the development of libraries and resulted in their increased equipment through various language laboratories and electronic presentation spaces.

However, several challenges have emerged during this process, making university libraries increasingly complex. Some of these challenges are described below:

- I. The rapid increase in the number of students, which has resulted in a faster growth rate of demand for educational resources and library services.
- II. The rapid expansion of knowledge and scientific developments, along with the growth of newly published materials, which has created difficulties in the process of collection development and resource management.
- III. The continuous increase in the cost of library equipment and required resources.

- IV. The emergence of new academic disciplines and the expansion of existing fields of study at higher educational levels.
- V. The introduction and development of new educational methods, along with greater emphasis on individual study and independent learning.

Until several decades ago, university libraries generally consisted of a central library along with separate libraries within each faculty. However, today additional organizational structures have been developed. In some universities, each faculty has established an independent building equipped with the necessary resources and services for its students. Meanwhile, the central library has focused its services primarily on postgraduate students and academic staff.

One of the issues that has always been subject to analysis and discussion is the question of centralization or decentralization of libraries within universities [1].

4.10.4 | Specialized libraries

The number of specialized libraries increased significantly after the Second World War due to the rapid growth of science and technology. These libraries are usually affiliated with larger organizations and, in terms of their administrative structure, are generally managed under a central organization similar to other types of libraries discussed previously. However, specialized libraries are primarily engaged in research activities rather than educational functions; therefore, they are sometimes referred to as research libraries or information centers. The considerable growth of these libraries in Western countries after World War II reflects the emergence of new governmental, industrial, and commercial institutions [4], [5].

Users of specialized libraries usually belong to specific professional groups and have expertise in particular fields. Therefore, these libraries do not generally face the organizational complexities associated with university libraries. Despite their great importance, specialized libraries are often small in scale, with a limited number of staff members. Due to the nature of the services they provide, some professionals such as translators, abstractors, and subject specialists may also work within these libraries.

4.10.5 | Public libraries

Public libraries provide services to all individuals regardless of age, religion, gender, nationality, or social status. They are also required to provide specific services and necessary facilities for people who are unable to use conventional resources. For example, they should provide appropriate materials for different language groups (even when these groups are small in number), hospitalized individuals, people with disabilities, and all age categories. Furthermore, their services should include both modern technologies and traditional resources in a balanced manner. These services should not be subject to any form of censorship [11].

In general, public libraries have two major benefits for society: education and entertainment. They should provide high-quality reading materials and appropriate recreational resources while utilizing all human abilities and talents to encourage individuals to enjoy reading. Public libraries should pursue the following objectives:

- I. Creating motivation for reading among children and encouraging reading habits.
- II. Supporting both self-learning and formal education equally.
- III. Providing opportunities for the development of individual creativity.
- IV. Enhancing imagination among children and adolescents.
- V. Increasing awareness of the value of national cultural heritage and appreciation of scientific achievements and artistic works.
- VI. Providing access to cultural concepts and information related to performing arts.
- VII. Increasing awareness of cultural differences and encouraging dialogue about them.
- VIII. Supporting traditions and customs.

- IX. Providing all necessary information required by members of society.
- X. Supplying information services needed for economic and commercial investments.
- XI. Facilitating the development of computer literacy and information skills within society.
- XII. Participating in various educational programs and events for all age groups [9].

4.10.6 | National libraries

Most countries around the world have a national library operating under the supervision of national resources. These libraries are responsible for publishing national bibliographic lists and managing national bibliographic services. They generally collect and preserve publications produced within their countries and attempt to facilitate access to internationally recognized books and resources whenever possible.

The National Library of France in Paris and the British Library in London are among the most well-known national libraries in the Western world. Other significant national libraries include the Russian State Library in Moscow, the National Library of China in Beijing, and the National Diet Library in Tokyo [11].

4.10.7 | History of libraries in the world

In the traditional concept, a library consists of a collection of books gathered for reading, research, and educational purposes. Since the establishment of the earliest libraries, they have served as places for preserving the historical, economic, and religious heritage of nations. During the twentieth century, libraries evolved into centers for providing convenient access to required information. In some cases, this function no longer depended on the existence of a physical building. The rapid development of computer science, long-distance communication systems, and other modern technologies has made it possible to preserve and transfer information through various methods using only computers and communication devices.

Although libraries have undergone significant transformations throughout history, they have maintained their fundamental cultural mission. Today, they continue to be responsible for collecting, organizing, and distributing books and other publications, thereby meeting the educational, research, and recreational needs of their users. The following section discusses the history of libraries and their development from ancient times to the present.

In ancient periods, libraries and scriptoria (places for copying manuscripts) were not significantly different from one another, and it can be argued that libraries originated from these early centers. A temple located in the city of Babylon contained rooms where clay tablets were stored and systematically archived. Similar tablets were also discovered at Tell el-Amarna in Egypt. Ashurbanipal, the last great king of Assyria, who ruled from 668 to approximately 627 BCE, possessed a collection of around 25,000 tablets containing texts and writings that had been systematically gathered from temples throughout his empire.

Euripides, the great Greek tragedian, was known as one of the earliest collectors of private book collections. However, the first significant formal libraries in Athens were established in the fourth century BCE, simultaneously with the development of major philosophical schools. Their contents were written on animal skins, and copies of these works were produced and distributed. The Stoics, who did not possess a dedicated school building, also lacked a library. Libraries existed in Plato's Academy and Epicurean schools, and they had a considerable influence for centuries afterward. Nevertheless, the most famous library belonged to the school founded by Aristotle, which systematically operated under his supervision to support scientific research.

Ptolemy I developed the library of Aristotle in the third century BCE, and his son Ptolemy II implemented his father's plan with the assistance of scholars and advisors. It is believed that the collection contained hundreds of thousands of Papyrus scrolls and manuscripts.

In Asia Minor, the only library capable of competing with Alexandria was established in Pergamon. It is believed that the use of animal parchment for recording texts began there. This development occurred after Ptolemy prohibited the export of papyrus from Egypt, which created difficulties in copying and preserving

written works. Parchment was much more durable than papyrus, making this innovation an important step in the advancement of scientific and literary practices. These libraries, along with the entire kingdom of Pergamon, were conquered by the Romans in 133 BCE. According to Plutarch's writings, Marcus Antonius gifted approximately 200,000 volumes from this collection to Cleopatra, and these works later became part of the Library of Alexandria [6], [13].

In ancient Rome, private libraries were commonly found in the homes of prominent individuals. Julius Caesar also planned the establishment of a public library. He assigned this project to Marcus Terentius Varro, a renowned writer and scholar who had written a treatise on libraries (which has since been lost). Although Caesar died before completing the project, the public library was established five years later through the efforts of Asinius. Pliny described this achievement with the famous statement: "He transformed the genius of men into a common resource." Later Roman emperors, including Tiberius, Vespasian, and Trajan, also founded libraries throughout the empire. The Ulpian Library, established by Trajan around 100 CE, remained active until the fifth century and also functioned as Rome's archive.

In the eastern part of the Roman Empire, the development of libraries began in Constantinople. Various libraries, including royal, scholarly, and religious libraries, were established there. Their true importance was their role in preserving the intellectual heritage of Athens, Alexandria, and Asia Minor for nearly a thousand years through the efforts of scholars, scribes, and editors. As a result, a large portion of classical Greek literature survived and was later transferred to European schools and universities.

Following the emergence of Islam and the expansion of Muslim territories, the establishment of libraries for preserving religious texts, particularly in mosques such as those in Damascus, contributed to the intellectual growth of Islamic civilization. Muawiya, inspired by the Library of Alexandria, transformed his personal collection into a formal library model, which was later expanded by his successors. Al-Walid ibn Abd al-Malik, the sixth Umayyad caliph, was the first to appoint an official responsible for books, known as "Sahib al-Masahif." The Umayyad library at that time contained hundreds of works on astronomy, alchemy, medicine, and military sciences.

During the reign of Al-Mansur, the second Abbasid caliph, many classical Persian and Greek works were translated into Arabic. Shortly afterward, the acquisition of paper-making techniques from China led to a rapid increase in written works among Muslims, which contributed to the expansion of libraries. Baghdad and Córdoba became among the largest book markets in the world during the early tenth century CE, and Christian scholars and monks frequently traveled to Córdoba to purchase new works.

In Europe, until the end of the Middle Ages, religious institutions and newly established universities served as the primary places for preserving books. At that time, books were considered valuable and expensive objects accessible only to a small number of people. However, between the thirteenth and fifteenth centuries, private libraries expanded considerably in Europe. Philip the Good, Duke of Burgundy, and French kings Louis IX and Charles V—who are considered founders of the Royal Library of Paris, later transformed into the National Library—were among the major book collectors [6].

Cosimo de' Medici, ruler of Florence in the fifteenth century, established the Marciana Library in the monastery of San Marco based on the collection of his scholar and librarian. The magnificent Laurentian Library, founded by his grandson Lorenzo de' Medici, became a public library in 1571 in the beautiful building designed by Michelangelo. In 1808, this library merged with the Marciana Library and continues its activities today. During the sixteenth century, many other rulers established important libraries, including the library of Matthias Corvinus of Hungary and the Escorial Library in Madrid (founded in 1557) based on the collection of Philip II. The establishment of the Vatican Library also dates back to this period.

During the Protestant Reformation in Europe, many libraries, particularly those located in monasteries, were destroyed because new religious teachings replaced previous traditions. However, Martin Luther himself valued books and reading highly and encouraged the establishment of libraries. This movement resulted in

the creation of libraries such as those in Hamburg (1529) and Augsburg (1537), as well as university libraries in Königsberg, Jena, and Marburg, which were developed from former monastic collections.

German libraries suffered severe damage during the Thirty Years' War (1618–1648). For example, the Palatine Library at the University of Heidelberg, founded in 1386, was taken as war booty by Maximilian I of Bavaria and later presented to Pope Gregory XV. Gustavus Adolphus of Sweden also transferred parts of German library collections to Sweden, placing many of them in the University Library of Uppsala, which he founded in 1620.

Some private libraries belonging to famous individuals became so extensive that special organizational methods were required. Traditional methods, such as chaining books to shelves, gradually disappeared. In this system, chains connected books to shelves, and books were arranged with their spines facing inward, which appears unusual from a modern perspective. Examples of chained books can still be found in some libraries, including those in Grantham, Lincolnshire, and Wimborne Minster in England. In Marsh's Library in Dublin, which remains in its original building, readers were once confined within enclosed study spaces instead of books being chained.

The modern method of arranging books with their spines facing outward was probably first introduced in France in the private library of Jacques-Auguste de Thou, a French statesman, lawyer, and historian. Gabriel Naudé, a French scholar and director of the Mazarin Library, wrote the first modern treatise on libraries entitled *Advice on Establishing a Library* (1637). One result of this work was the establishment of Samuel Pepys's library, the English diarist, who spent the final fourteen years of his life organizing his collection and later donated it to Magdalene College, Cambridge [14].

Naudé's ideas regarding a scientifically organized library capable of representing all available knowledge eventually became practical. These ideas also influenced the German philosopher Wilhelm Leibniz. He proposed an organizational system through which scholars could easily access all recorded information related to a specific subject.

During the seventeenth and eighteenth centuries, book collecting expanded significantly. Throughout Europe and North America, many private libraries were established, which later became the foundation of major modern collections. Humphrey Chetham, a merchant from Manchester, established specialized libraries in Bolton and Manchester in 1653, including the public library of Manchester, which still operates in its original building. The Mazarin Library became open to the public in 1691 after moving to a new building. It remained one of France's largest libraries until the French Revolution, when it merged with other collections, including the Royal Library, becoming part of the National Library of France.

The collections of some English aristocrats also formed the basis of the British Museum Library. This library expanded greatly after receiving the Royal Library of England, which contained books collected by English monarchs from Edward IV to George II.

Revolutionary and anti-religious movements in Europe also changed the fate of many church and monastery collections. Such libraries were confiscated in France in 1789, Germany in 1803, and Spain in 1835. In France, books were collected in centers known as "book depots." The accumulation of excessive numbers of books created many challenges but also contributed to the development of modern library management systems.

The National Library of France received approximately 300,000 volumes, and new libraries were established in many major cities. In Bavaria, the State Library became extremely rich after incorporating materials from more than 150 confiscated libraries. Similarly, Austria established new reading libraries in Linz, Klagenfurt, and Salzburg, while university libraries in Graz and Innsbruck were transformed and the Vienna National Library acquired valuable resources.

The University Library of Göttingen was a remarkable exception. Johann Georg, its first librarian, worked closely with university administrators and applied Leibniz's principles. Through extensive efforts, he created a library covering all fields of knowledge, with carefully selected resources and broad public access. His

successor, Christian Gottlob Heyne, continued these principles, resulting in Göttingen University Library becoming one of the best-organized libraries in the world.

Antonio Panizzi was another influential figure who introduced major reforms in libraries. An Italian political refugee, he joined the British Museum Library in 1831 and served as its principal librarian from 1856 to 1866. Panizzi believed that libraries should function as instruments of research and learning accessible to everyone. Through his design of the British Museum Reading Room and book storage system, he demonstrated how libraries could effectively serve modern societies. His ideas influenced research libraries for many years, particularly the Library of Congress in Washington.

By the mid-nineteenth century, the idea that public libraries should be managed by local authorities and funded through public resources became widely accepted. Panizzi emphasized that the facilities of major libraries should also be available to poor students so that they could pursue their intellectual curiosity.

Outstanding early examples of using new materials in library construction can be observed in the designs of Henri Labrouste in Paris. His designs for the Sainte-Geneviève Library and the Bibliothèque Nationale introduced significant developments in nineteenth-century steel architecture and became models for architects seeking to use modern construction technologies [8].

The Sainte-Geneviève Library, designed and constructed between 1842 and 1850, was among Labrouste's first major projects using iron and cast iron combined with traditional materials. In this library, the beams, arches, and roof structures of the reading halls were designed in complete harmony, creating a unified visual experience.

Labrouste attempted to combine thick stone walls with iron columns and beams in a way that avoided the heaviness and rigidity of classical architecture. The reading halls consist mainly of two vaulted spaces separated by rows of slender cast-iron columns. The Corinthian-style iron columns support iron roof arches decorated with Renaissance-inspired ornamental motifs.

The Bibliothèque Nationale of Paris, designed and constructed between 1858 and 1868, is considered a complete masterpiece. It is recognized in architectural history as one of the greatest achievements of industrial-era architecture. One of its most important elements is the reading hall, designed as a square space supported by sixteen exposed columns. The hall recalls the design principles of Sainte-Geneviève Library. The metal structure is covered with thick walls, while the tall, slender columns—approximately 10 meters high and 30 centimeters in diameter—create elegance and lightness.

The book storage area is separated from the reading hall by glass walls. It consists of four floors and a basement with a glass roof. Designed according to its function, the storage hall has a cubic form with an open vertical space connecting all floors. Books are arranged around each level and connected through horizontal metal staircases. These stairs not only serve functional purposes but also contribute to the visual grandeur of the space. The perforated cast-iron floors, inspired by steam engine structures, allow daylight to pass through different levels and create attractive patterns of light and shadow. Except for wooden bookshelves, most elements of this.

4.10.8 | History of libraries in Iran

There is no reliable historical information available about libraries in Iran before Islam. The only clear fact is that during the Sassanid period, reading books, especially religious texts, attracted considerable attention.

According to several historical documents, the library of Merv during the Islamic period contained books that had remained from the collections of the Yazdegerd era and had been transferred there. In describing the Library of Merv, Yaqut al-Hamawi states that he would often take nearly two hundred thousand books to his home, whose estimated value was about two hundred dinars, without paying any money for them. At that time, other cities such as Khorasan and Transoxiana also had extensive libraries. The information currently available about some private libraries demonstrates their high status and importance. When Nuh ibn Mansur, the Samanid ruler, invited Sahib ibn Abbad to become his minister, one of Sahib's excuses for refusing the

position was that he could not transport his belongings, since more than 400 camels would be needed only to carry his books. The catalogue of his library alone consisted of ten volumes. However, all the libraries located in the city of Ray were destroyed during conflicts between Shiites and Sunnis [2].

Many libraries assisted their visitors in various ways, including providing accommodation, food, paper, and ink. Ibn Hayyan established a library in Nishapur and also provided suitable facilities and financial support for travelers who visited that region.

The library located in the Castle of Alamut was another famous ancient library. There was also a library in Ardabil known as the Library of the Shrine of Sheikh Safi al-Din. It contained books written not only in Persian but also in Turkish and Arabic. Unfortunately, during conflicts between Iran and Russia, this collection was seized as war booty by a Russian individual and transferred to Saint Petersburg, where it remains today.

During the Safavid period, great importance was also placed on books and libraries. Libraries existed in the royal court, and historical sources indicate that Shah Abbas owned Arabic religious and jurisprudential books. He donated these works to the Astan Quds Library and presented his poetry books, along with valuable manuscripts, to the Shrine of Sheikh Safi al-Din.

The Astan Quds Razavi Library is currently considered the oldest library in Iran. There are also other important libraries, including the central library collections of the Municipality of Isfahan [7].

4.10.9 | Philosophy of librarianship

In order for humans to achieve a correct understanding of phenomena, they need organization and management of their information. This subject can be explained through two concepts: science and philosophy. Science describes the components of knowledge, while philosophy creates an overall structure and examines knowledge through that framework.

In other words, science first divides a subject into its components and analyzes the relationships between them, whereas philosophy interprets the whole. Stated, science investigates how, while philosophy examines why. These two concepts complement each other. Therefore, to achieve an appropriate philosophy of librarianship, it is necessary to examine the reasons and principles behind it. In the field of library science, its functions are studied, while in the philosophy of librarianship, librarianship itself is analyzed as a real and meaningful phenomenon.

After analyzing writings related to librarianship and reviewing the theories of various scholars, it can be concluded that no precise and complete philosophy of librarianship has yet been developed. Therefore, even at advanced academic levels, there is not a specific subject dedicated entirely to this topic.

From a physical perspective, librarianship, with the help of the latest technologies and modern information networks, can provide required information accurately and quickly. From a conceptual perspective, through comprehensive research into knowledge, dividing it into different categories, and organizing and classifying available resources, information can become more accessible.

The great Indian librarian, philosopher, and mathematician Ranganathan [15] proposed five laws of librarianship regarding service to people and society, which can be considered as the foundation of the scientific philosophy of librarianship:

- I. Books are for use.
- II. Every reader has their book.
- III. Every book has its reader.
- IV. Save the time of the reader.
- V. A library is a growing organism.
- VI. [10], [11].

4.10.10 | Relationship between nature and library architecture

Human beings have always had an inseparable relationship with nature and have attempted to control and utilize natural resources according to their needs. Throughout history, this type of relationship can be observed. In other words, since humans began using natural elements in constructing their homes, they have analyzed these elements and incorporated nature as an important component in their designs.

During the Islamic period, this harmonious relationship between humans and nature can also be observed. Buildings constructed during Islamic civilization, like those of other ancient civilizations, show considerable compatibility with nature. For example, the construction of wind catchers in important buildings in cities such as Kashan, Kerman, and Yazd (also known as the city of wind catchers) demonstrates appropriate use of natural resources. These structures not only possess aesthetic beauty but also provide high efficiency and represent a balanced relationship with nature.

The positive outcome of this relationship, beyond material benefits, is a deeper understanding between humans and their surrounding environment. As a result, human utilization of natural resources increases, and instead of relying on external energy sources, natural energies such as sunlight, water, and wind are used. Unfortunately, today these types of renewable energies receive less attention. However, efforts are being made to strengthen this relationship because it contributes to the development of positive behaviors and personalities [11].

Importance and position of nature in library architecture

Architecture is essentially the combination of science and art to create an ideal environment that responds to human needs. Considering that the natural environment around us is filled with emotions, beauty, and sensory experiences, and recognizing that humans naturally desire a connection with nature, human-made structures should always be inspired by and coordinated with the natural environment.

A library is a human-made structure whose main purpose is serving society, and its existence contributes to cultural development [3]. Therefore, it should be fully compatible with its surrounding natural environment so that, in addition to satisfying users' information needs, it increases their enthusiasm and creates an inspiring atmosphere.

If this relationship does not exist, users' lack of interest in the library environment may increase. Therefore, when the design of a library space is aligned with ordinary human needs and harmonized with the surrounding nature, it creates a pleasant environment while also reducing energy consumption and preventing waste.

Consequently, to understand the importance of nature in libraries, different approaches regarding this relationship should be analyzed. After recognizing each approach, the most suitable one can be selected according to human needs.

Advantages of integrating nature with library architecture

The benefits of using natural elements in architecture are significant in two main aspects: first, from an aesthetic perspective and its psychological effects on users; and second, from an economic perspective through cost reduction and energy saving.

From an aesthetic and psychological viewpoint, using natural materials and incorporating green spaces to establish a proper relationship between the interior and exterior environments of a library building can be highly effective. This approach helps create social interactions, increases users' motivation and creativity, enhances their sense of vitality and satisfaction, and ultimately encourages greater use of the library.

Creating beautiful and pleasant green spaces in front of libraries stimulates users' sense of beauty and enjoyment. It also creates a feeling of calmness and silence within the library environment, while establishing an appropriate separation from external spaces and reducing outside noise.

As experience has shown, lighting has a significant impact on users' satisfaction. Therefore, the best method for providing proper lighting is the use of natural light, because unlike artificial lighting, it reduces eye fatigue and helps protect books from damage.

All of these factors have a positive effect on users' psychological state, attract them to the library environment, and significantly reduce costs.

For example, the use of wind-catcher designs in building spaces enables the utilization of natural energy in a completely natural way. In addition to enhancing the aesthetic quality of the environment, wind catchers play an important role in providing proper ventilation and cooling for libraries.

In other words, traditional architecture rarely included large glass windows that allowed excessive heat and external noise to enter the building, forcing the use of additional energy sources for cooling, which themselves increase noise levels. Therefore, it can be concluded that the best method for reducing costs is achieving compatibility with the surrounding environment.

In other words, if a building is designed from the beginning according to its climatic conditions and natural principles are utilized, there will be no need for additional energy sources for heating or cooling the space. As a result, less noise pollution will be created within the environment, and considerably lower costs will be required compared to conventional methods.

Role of public libraries in developing reading culture

In today's world, where modern technologies are used to collect wider sources of information and increase people's scientific knowledge, creating sufficient information resources and improving the speed of information distribution are considered strengths of a society. These strengths lead to cultural development, followed by political and economic progress.

In advanced countries and civilizations, emphasis on scientific growth and public awareness has always been considered one of the main factors of success.

Organizations responsible for information development play a fundamental role because they have three major responsibilities:

- I. Identifying cultural needs.
- II. Collecting appropriate information resources according to these needs.
- III. Providing the best information to those who require it.

Generally, when a society has a need and desire for reading, public libraries are among the most valuable resources for achieving this goal.

The Library of Alexandria, from the third century BCE to the fourth century CE, was considered the main scientific center of Egypt's civilization. However, during conflicts between Greek civilization and Roman domination, it was attacked and destroyed.

The House of Wisdom (Bayt al-Hikma) in Baghdad was the first and most complete library of the Islamic world, but it was destroyed after the Mongol invasion of Baghdad.

During the Middle Ages, social conditions had a direct impact on libraries. Under the dominance of the Church, library access became restricted, and people could only borrow books by providing valuable objects as security [14].

Thus, from ancient times until today, libraries have been established according to people's needs. With population growth and social expansion, their variety has also increased. Properly responding to social changes is one of the main objectives of library science. As a result, diverse libraries with different subjects have been created according to society's needs.

For example, after the Islamic Revolution of Iran and in the following years, many people became interested in historical and religious books and demanded access to such resources.

4.11 | Nature

4.11.1 | Nature in linguistic meaning

According to Moein Dictionary, nature refers to a part of the surrounding environment that humans have not created. Dehkhoda Dictionary defines it as the innate disposition according to which humans are created and as the source and symbol of water and essence.

The word Nature originates from the English term "Nature," derived from Nat, meaning "to be born." It indicates that the fundamental characteristic of nature is creation and continuous renewal. Therefore, the processes and laws of natural growth should be analyzed, which leads humans to learn from nature as the greatest source of creation [14].

4.11.2 | Nature in philosophy

The importance and high value of nature have caused philosophers throughout history to focus on this subject and consider its characteristics as a foundation for philosophical discussions.

Such analyses are not limited to a specific civilization or region; different perspectives on nature can be found throughout history in various cultures. Therefore, theories of different thinkers regarding nature are presented to achieve a better understanding of this concept.

4.11.3 | Nature according to Western thinkers

From the perspective of Western thinkers, the world was initially considered a complete system composed of countless predictable material particles. However, over time, this theory changed, and thinkers concluded that a kind of continuous movement and development exists within living beings.

Descartes believed that the entire universe could be explained through mathematics and physics. His famous statement was: "Give me matter and motion, and I will build the world."

Descartes' belief that the universe functions like a machine reflects his mechanical view of nature.

Similarly, John Stuart Mill argued that the perfection of nature acts as a barrier preventing attempts to improve it and therefore considered human imitation of nature an irrational act [14].

4.12 | Nature According to Islamic Thinkers

Nature, like a book, has a clear purpose, and humans can recognize the infinite power of God through observing and reflecting upon it.

Therefore, the Quran repeatedly encourages humans to look at nature realistically and interact with it correctly. Many verses emphasize that humans can benefit from nature by understanding the principles governing its elements.

Muslim scholars have stated that nature has a single purpose: guiding beings toward the correct path, helping them achieve perfection, and removing obstacles along this path.

4.13 | Necessity of Understanding Nature

From the beginning of creation until today, humans, like other living beings, have continued their existence within nature. However, unlike other creatures, humans have learned from their environment and established a mutual relationship with it.

Although survival in nature may initially be instinctive, over time it became dependent on knowledge and understanding. Therefore, humans needed to understand nature better in order to use it effectively.

Understanding nature became so important that many scientists, philosophers, and religious texts have emphasized it. Nature is considered full of signs and valuable principles through which humans can achieve knowledge.

The stronger humans' understanding of nature becomes, the higher their quality of life will be.

Francis Bacon, emphasizing that knowledge is power, stated that scientific ability enables humans to apply technical capabilities to nature. Many famous scholars, including Avicenna, Jabir ibn Hayyan, and Al-Razi, emphasized the importance of understanding nature because nature is humanity's greatest teacher [6].

4.14 | Types of Human Interaction with Nature Throughout History

To understand the natural relationship between humans and nature and its influence on societies, four models can be identified:

Organic model

The Organic Model is associated with the hunting period of human life. It represents the lowest level of human needs, namely security.

During this period, nature dominated human life, and survival was completely dependent on natural resources. Humans only performed activities necessary for satisfying basic needs such as food, shelter, clothing, and worship.

Since their needs were provided directly by nature, their gods were often natural elements such as the sun. Humans did not construct permanent houses but selected natural shelters such as caves and trees. Materials used included animal bones, skins, and wood.

Hyper-organic model

The Hyper-Organic Model is divided into mobile and settled forms. In this stage, humans sought not only security but also comfort.

Humans maintained a close relationship with nature and paid greater attention to the land and its abilities, which led to the discovery of agriculture.

Although humans became somewhat less dependent on nature, it remained the most valuable element of life. Humans used nature while also contributing to its renewal.

High technological model

The High Technological Model is associated with the industrial period. Humans sought not only comfort but also prosperity and luxury.

Therefore, they attempted to maximize the use of natural resources, which often resulted in environmental damage.

The relationship between humans and nature became one-sided, where humans benefited from nature without maintaining balance. Scientific advancement sometimes caused natural principles to be ignored.

During this period, humans also developed transportation systems to achieve their goals. Besides architecture, other arts such as painting and music gained importance.

Techno-organic model

In the Techno-Organic Model, humans continue to seek a prosperous lifestyle, but they recognize that environmental damage will eventually threaten their own existence.

Therefore, they attempt to cooperate with nature rather than exploit it. This awareness has led to new developments in scientific and artistic fields.

The four mentioned models are briefly classified in the following table.

Table 2. Models and characteristics of human–nature interaction throughout history [14].

Category	Organic	Hyper-Organic	Domination over Nature	Techno-Organic (Industrial)
Title	Hunting	Pastoralism	Agriculture	Industry
Level of need	Security	Comfort	Welfare	Controlled welfare
Concept of God	Natural deities with symbolic forms	Formation of religions with extensive laws and an abstract definition of God	No God	No God
Concept of human	A part of nature	Harmonizing nature with human needs while respecting its principles	Dominant and opposed to nature	Dominant but forced to cooperate with nature
Relationship with nature	Wild	Functional	Industrial, consumptive, and pleasure-oriented	Critical of industrial approaches
Relationship with animals	Hunting	Domestication and breeding	Domination	Domination and coexistence
Relationship with plants	Gathering/hunting	Cultivation	Cultivation and control	Domination and coexistence
Characteristics of art	Life practices, dances, and games	Based on the needs of nomadic life	Symbolic representation	Invention rather than discovery
Time period	Stone age	Approximately 10,000 years ago	Approximately 8,000 years ago	Beginning of the Industrial Revolution

4.15 | Human Interaction with Nature from the Perspective of the Quran

When we thoughtfully examine the creation of human beings and their way of life, we realize that human existence is not only completely dependent on nature but has also become deeply integrated and connected with it, to the extent that without nature, human life and creation would be impossible. Appropriate and proper utilization of the surrounding natural environment results from sufficient knowledge and understanding of natural phenomena. From a monotheistic perspective, it is completely clear that human life on this planet should be directed toward serving God. In other words, the purpose of life should be the realization and flourishing of human potential.

For example, when a flower comes to life and blooms, its fragrance spreads through the environment and fills the surroundings with its pleasant scent, creating a sense of vitality among people. By following this path, it achieves the ultimate purpose of its creation. If we have a correct understanding of our surroundings, we become obligated to use nature properly and responsibly.

The Western world has achieved great success in utilizing nature and satisfying material needs. However, insufficient understanding of the relationship between nature and the environment, along with an excessive emphasis on material aspects, has caused this utilization to become inappropriate in some cases and has created various problems.

As previously mentioned, Ayatollah Amoli describes the relationship between humans and nature as a relationship based on “subjugation” rather than forced domination. It means that human actions should not occur without knowledge, understanding, and consideration of natural principles. For example, if a stone moves upward, this action is against its natural tendency and occurs due to an external force. Subjugation takes place when an action occurs in accordance with the nature and characteristics of a phenomenon. For instance, water in a garden is under the control of the gardener, but when it moves upward as a fountain, this movement is contrary to its natural direction.

In reality, nature is a sign of divine verses and clearly demonstrates the knowledge, power, and wisdom of God Almighty. The Quran also beautifully emphasizes this concept in several verses.

Human beings can benefit from nature in two different ways:

- I. Material utilization.
- II. Spiritual utilization.

In order to properly benefit from these divine signs, it is necessary to develop good moral qualities within ourselves so that the required foundation is created within our existence [3].

4.16 | Types of Utilization of Nature

4.16.1 | Material utilization of nature

Some of human needs can only be fulfilled through the surrounding natural environment. We know that certain material needs are so essential and valuable that life would be impossible without them, such as water, food, shelter, and similar necessities.

The Quran, as our holy book, has also addressed this subject through various verses and has discussed different aspects of humanity's relationship with nature. God has provided the Earth for humans so that they can fulfill their needs through it; however, they must also protect it from damage and destruction.

4.16.2 | Spiritual utilization of nature

One of the issues strongly emphasized by religion is reflection and contemplation on the signs presented to humans in various forms. In fact, establishing an intellectual relationship with the surrounding environment is considered one of human responsibilities.

This contemplation pursues two important goals:

- I. After gaining complete knowledge of natural phenomena and discovering the relationships between them, humans can effectively use them to satisfy their needs.
- II. Through deep reflection on the signs of creation, humans become more familiar with the purposes of creation and recognize the principles of monotheism and resurrection.

The Quran mainly emphasizes the second aspect because it was revealed for human guidance, and this guidance begins with belief in God and the afterlife. When humans observe nature with a thoughtful and purposeful perspective, they can recognize the origin of creation and understand that Almighty God is the reason behind existence.

As a result, humans discover the relationships among different beings and understand through knowledge that all creatures are dependent and that all dependent beings require a single creator. Therefore, it becomes clear that all nature and the surrounding world originate from an infinite existence. Consequently, this world belongs to God, and He deserves worship. Human beings have no duty other than serving Him and should not turn away from divine guidance toward wrongdoing.

Humans, as beings capable of choosing their actions freely, must accept that while their physical body develops in this world, their spiritual dimension also grows. Since they choose their means and tools voluntarily, they must select these tools carefully and wisely. Based on these principles, the teachings of the Quran and the experiences gained through observing and contemplating nature can provide an appropriate path and method for human life [9].

4.16.3 | Naturalism and the use of landscape

Iranian culture does not view humans as separate from nature; rather, humans are considered an inseparable part of nature along with other natural elements. Connecting with nature and using natural landscapes are regarded not only as a way of recognizing divine signs but also as a source of visual pleasure and psychological vitality.

Therefore, Iranian architecture is strongly nature-oriented. This principle in Persian gardens has led to the creation of semi-open spaces such as *ivan* and *kushk*, which act as connecting elements between natural spaces (such as gardens and landscapes) and built environments.

The common characteristics of Iranian gardens can be summarized as follows:

- I. Division of the garden generally into four sections.
- II. Presence of a pavilion or building at the center or highest point of the garden.
- III. Use of a main water channel.
- IV. Use of large pools as mirrors reflecting the landscape in front of the pavilion.
- V. Close relationship with nature.
- VI. Planting fruit trees throughout large parts of the garden.
- VII. Avoidance of unnecessary green spaces.
- VIII. And other features [6].

4.16.4 | Naturalism in architecture

In recent years, specialists in the field of construction have paid increasing attention to superior natural structures, including mountains, trees, animals, and ultimately humans.

The stability of mountains is due to their shape and form, while the strength of trees allows them to resist lateral forces such as wind despite their high slenderness ratio. Living organisms, especially humans, achieve balance and stability through numerous joint connections.

One of the main factors contributing to structural stability, besides static laws, is the level of intelligence embedded within a structure. For example, when a person stands inside a moving bus, they increase the distance between their feet to maintain balance and hold onto a support bar to prevent lateral movement, effectively strengthening their lateral support system [11].

According to the principle that forces in structures follow stiffness, forces generated within the human body are absorbed by areas with greater contraction and stiffness. Since the total amount of forces remains constant, softer areas receive less force.

Perhaps a structure that combines the form of a natural structure with intelligent behavior has not yet been fully achieved scientifically.

Nevertheless, nature has always been considered both a model and a source of inspiration. The Quran, in many verses, directs human attention toward nature and introduces it as a source of inspiration. For example, in verse 101 of Surah Yunus, it is stated:

"Say: Observe what is in the heavens and the earth with the eyes of reason and insight, so that you may see many signs of God's unity and evidence of his power."

Nature provides the raw materials for the formation of fundamental architectural concepts, and architectural forms have developed from these principles. Although human activities for centuries have often moved away from nature and relied unthinkingly on rigid formulas, the source of inspiration provided by nature is endless and extraordinarily rich.

Today, even after centuries of human study, nature continues to inspire new scientific fields such as biomimetic engineering, a concept introduced by Leonardo da Vinci in the fifteenth century. Nature still contains many secrets and lessons, and as science and technology advance, humans increasingly discover that nature provides the best solutions for various fields: The best medicine, the best food, the best living conditions, and ultimately the best buildings.

For this reason, this divine creation has always attracted attention, and different approaches toward it have emerged throughout history.

In general, nature possesses fundamental principles for creating diverse and innovative forms, including:

- I. Optimal and economical use of materials.

- II. Increasing the volume of available enclosed spaces.
- III. Improving the strength of building structures.
- IV. Achieving the highest strength-to-weight ratio.
- V. Using stress and strain as the basis of structural performance.
- VI. Creating energy-efficient environments with good insulation and comfort without external energy sources.
- VII. Designing forms that improve air circulation.
- VIII. Using locally available materials.
- IX. Applying curved forms for better force distribution.
- X. Increasing aerodynamic efficiency through structural forms.
- XI. Avoiding the production of toxic and harmful materials for the environment.
- XII. Designing structures that can be created naturally by a single organism [8], [12], and [17].

5 | Conclusion

The examination of the discussed topics demonstrates that gardens, museums, and libraries have never been merely functional spaces throughout their historical and cultural development; rather, they have always carried meanings beyond their direct purposes. In various civilizations, especially within Eastern and Iranian traditions, gardens have symbolized order, tranquility, balance, beauty, and the connection between humans and nature. In contrast, Western gardens, despite being shaped by different perspectives and organizational approaches, also demonstrate that the presence of nature in architecture has always been one of humanity's fundamental needs. Among these examples, the Persian garden, with its coherent geometry, presence of water, defined axes, symmetry, shade, and precise spatial organization, represents an outstanding manifestation of the relationship between rationality, aesthetics, and naturalism.

The museum, as a cultural, historical, and educational institution, is not merely a place for preserving objects and historical artifacts; rather, it is a space for transferring meaning, identity, collective memory, and public education. Therefore, contemporary museums are no longer limited only to displaying collections but have evolved into dynamic, interactive, and experience-oriented environments. Within this context, garden museums hold a special position because they combine cultural spaces with natural environments and provide visitors with a deeper, calmer, and more human-centered experience. A garden museum is essentially an attempt to connect cultural heritage with its natural context, where the space itself becomes part of the museum experience rather than simply serving as a background for displayed objects.

Libraries have also transformed throughout history from simple repositories for storing resources into social, educational, and cultural spaces. Different types of libraries, including educational, academic, public, national, and specialized libraries, each respond to specific social needs; however, they share a common fundamental goal: providing access to knowledge, strengthening reading culture, and supporting human intellectual and social development. In this regard, libraries designed with a nature-oriented approach can function beyond traditional study spaces and become environments that promote relaxation, inspiration, and concentration. The presence of natural light, vegetation, green views, proper ventilation, and visual connections with nature are among the elements that can significantly improve users' perception and experience.

From a conceptual perspective, nature in this research is not considered merely as the external environment or biological elements; rather, it has been examined as a fundamental principle in understanding the relationship between humans and the world at linguistic, philosophical, religious, and cultural levels. This examination indicates that humans have always sought a form of return to nature and have attempted to benefit from it to satisfy their physical, psychological, spiritual, and aesthetic needs. Therefore, naturalism in architecture should be considered a response to one of humanity's deep and lasting needs—a need that has

become increasingly significant in contemporary times due to urban expansion and the growing separation between humans and nature.

The review of the history and typology of gardens, museums, and libraries shows that these spaces, when properly designed, can exceed their traditional functions and become environments for interaction, learning, relaxation, meaning, and identity formation. Garden museums and nature-oriented libraries, especially in today's conditions where cities face challenges such as density, pollution, stress, and disconnection from nature, can play an important role in improving quality of life and promoting public culture. These spaces not only provide more pleasant and human-centered experiences but also gain restorative and therapeutic capacities through the presence of nature.

Overall, it can be concluded that the nature-oriented approach in designing garden museums and libraries is not merely a decorative or aesthetic choice; rather, it is a conscious response to the cultural, psychological, educational, and social needs of contemporary humans. Combining natural elements with cultural functions can lead to the creation of spaces that simultaneously possess identity, tranquility, attractiveness, efficiency, and durability. Therefore, attention to nature in the design of these spaces not only enhances architectural quality but also plays an important role in strengthening the relationship between humans and their environment, increasing the sense of belonging, and shaping a deeper experience of culture and knowledge.

6 | Research Recommendations

Conducting comparative studies between garden museums and nature-oriented libraries

Future research is recommended to examine the spatial, functional, and perceptual patterns of garden museums and libraries through comparative studies in order to clarify their similarities and differences in utilizing natural elements.

Investigating the impact of natural elements on user behavior and experience

Field studies should be conducted to examine the effects of elements such as natural light, water, vegetation, landscape, color, and natural materials on users' relaxation, concentration, satisfaction, and duration of presence within these spaces.

Focusing on indigenous and traditional patterns in contemporary design

Future studies can explore Persian gardens, historical cultural spaces, and traditional design patterns in contemporary libraries and museums to provide opportunities for integrating local identity with modern requirements.

Analyzing the role of garden museums and libraries in improving community mental health

One important research direction is investigating the influence of these spaces on stress reduction, concentration improvement, enhancement of urban experiences, and strengthening users' psychological well-being.

Studying sustainable design approaches and biophilic design in cultural spaces

It is recommended that future research examine the relationship between naturalism, sustainable architecture, and biophilic design in cultural projects to provide strategies for improving efficiency, comfort, and environmental adaptability.

Developing design frameworks for future cultural spaces

Based on future research findings, design frameworks and criteria can be developed for contemporary garden museums and libraries. These frameworks should address not only aesthetic aspects but also functional, social, and psychological needs of users.

In conclusion, garden museums and nature-oriented libraries should not be considered merely as spaces for exhibition or reading; rather, they represent platforms for creating a multilayered experience involving culture,

nature, and humanity. Therefore, addressing these spaces through theoretical and applied research can play a significant role in improving the quality of cultural architecture and enhancing the livability of contemporary cities.

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