Jorge Juan

The legacy of a scientific seaman

MINISTERIO DE DEFENSA

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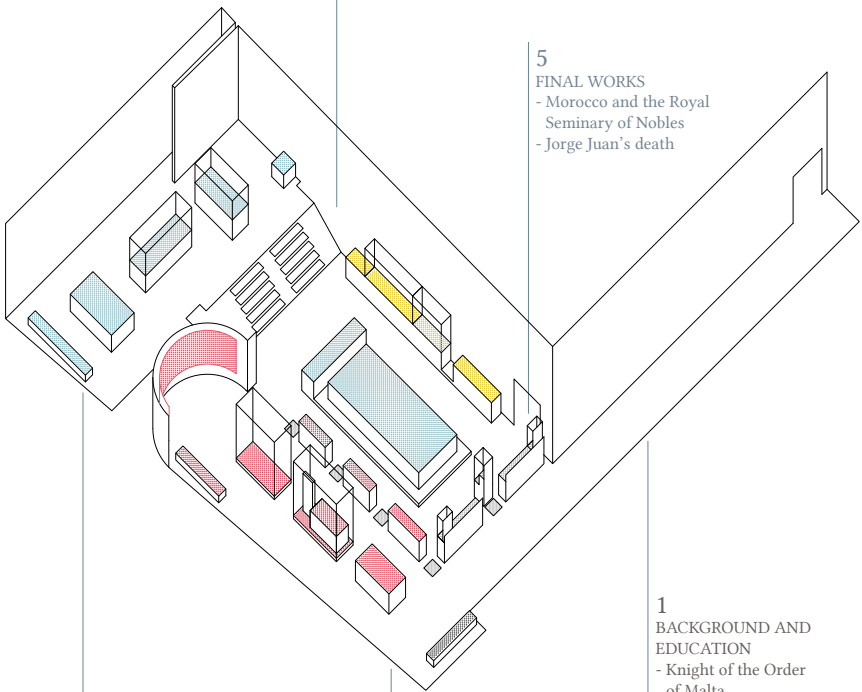

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This exhibition was a challenge, because of the difficulty involved in encapsulating in a single space the extraordinary endeavors that Jorge Juan undertook throughout his life. The brilliance of his work in every task he undertook would make it possible to plan as many exhibitions as were the fields in which he worked. The commemoration of the two hundred and fiftieth anniversary of his death allows us today to remember a man whose achievements were recognized during his lifetime and to vindicate his vast influence in the history of Spanish science.

Throughout the five areas of the exhibition, the indelible mark left by Jorge Juan in fields as diverse as politics, economics, history, nature, geography, and especially mathematics, astronomy, shipbuilding and naval teaching will be disclosed. The 114 pieces on display— most of them contemporary to our protagonist and borrowed from both national and international institutions— reveal a journey that will show all sides and facets of Jorge Juan's prolific and intense life. Through on these pieces, a story is told that will allow us to discover the international projection of one of the most renowned Spanish seamen, whose extensive and outstanding work earned him the nickname of *el sabio español* ("the wise Spanish"), by which he was known in his time.

1. BACKGROUND AND EDUCATION

Jorge Juan was born in Novelda (Alicante) on January 5, 1713. When he was only three years old, he lost his father. However, his paternal uncles took care of his education. He did his early studies at the Jesuit School in Alicante. Then he moved to Zaragoza to continue his education and at the age of 12 he was sent to Malta, where he joined the Order of Saint John and served as a page to the Grand Master of the Order. His naval training began there, as the young knights were to embark on the Order's galley navy, which fought against the Turkish and Berber corsairs in the Mediterranean. His designation as a Knight of the Order of Saint John compelled him to respect the vow of celibacy, which meant that Jorge Juan did not marry or have offspring.

In 1729, at the age of 16, Jorge Juan returned to Spain to join the Royal Academy of Midshipmen in Cádiz to begin his career in the Navy. The Academy had been founded in 1717 as part of the policy undertaken by the new Bourbon administration to promote the renewal of the Navy and improve the scientific training of future officers. In the curriculum, special attention was given to mathematical training and to subjects related to navigation, such as astronomy and shipbuilding. The theoretical training was completed with practical experience on board a ship, which led Jorge Juan to take part in the capture of Oran in 1732.

Portrait of Grand Master Antonio Manoel de Vilhena with some pages. Malta Heritage - Grand Master's Palace, Valletta, Malta.

2. THE EXPEDITION TO MEASURE THE MERIDIAN ARC

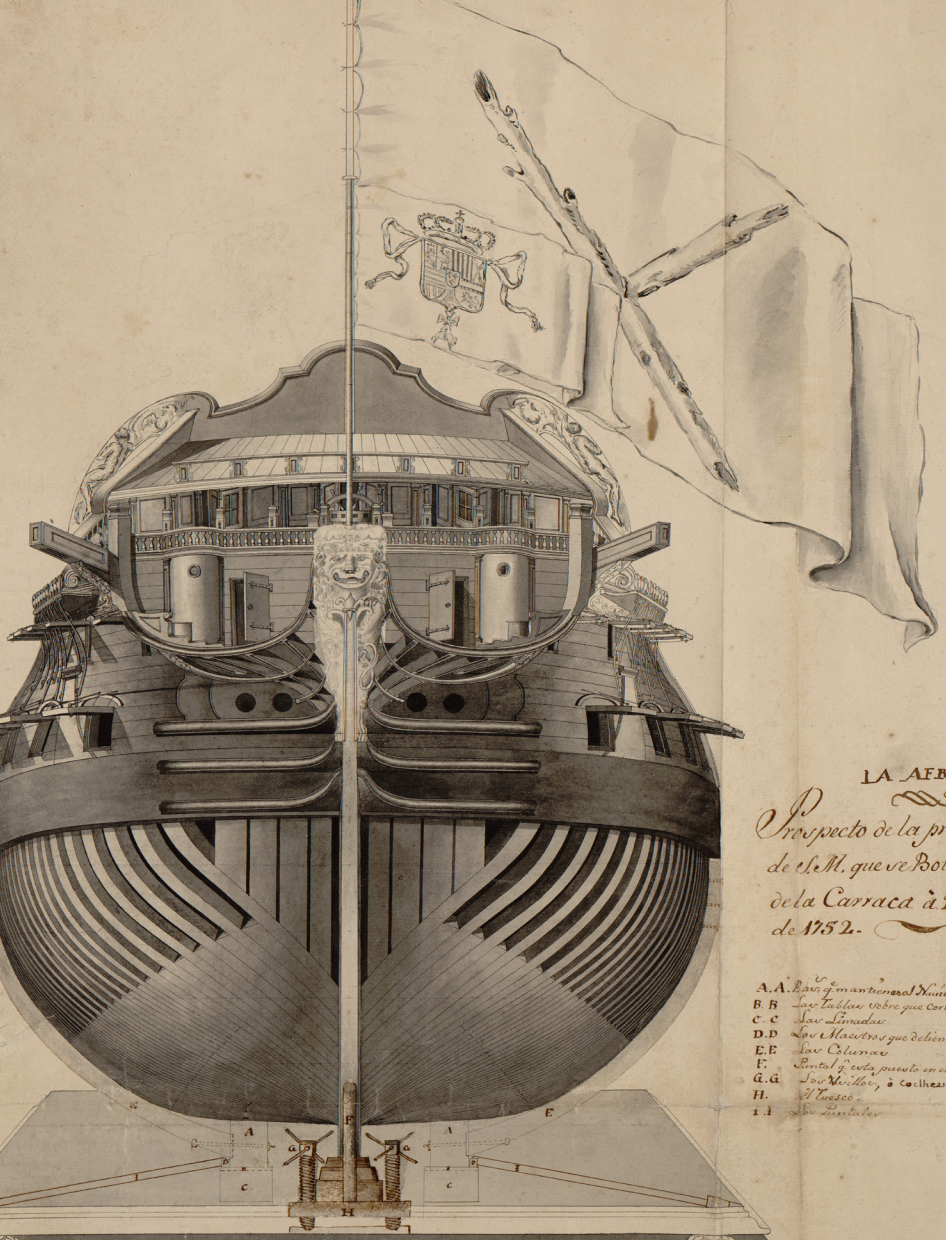
In 1733, the French Academy of Sciences decided to organize two expeditions to determine the true shape of the Earth and to put an end to the dispute between English and French scientists. In order to settle the argument, two expeditions were sent, to Lapland and Quito, to measure the length of a degree of meridian at the pole and the equator. The expedition to Quito required the authorization of the Spanish Crown, which gave its approval to the project, but demanded the participation of two young midshipmen: Jorge Juan and Antonio de Ulloa.

The expedition was equipped with the most sophisticated scientific instruments of the time, which made it possible to calculate the meridian arc length with surprising accuracy, despite the difficulties posed by the rugged orography. The data collected resolved the scientific dispute and confirmed that the Earth was a sphere flattened at the poles.

The results of the geodesic expedition were compiled in several works published by the members of the mission on their return to Europe. Jorge Juan and Antonio de Ulloa recorded their experiences in two main works: *Observaciones astronómicas y físicas hechas de orden de S.M. en los Reynos del Perú* and *Relación Histórica del Viage a la América Meridional* (*Astronomical and physical observations made by order of HM in the Kingdoms of Peru, and Historical Relation of the Voyage to South America*).

In parallel to their scientific mission, Jorge Juan and Antonio de Ulloa had to assume military duties that required them to travel throughout much of the region. Those trips allowed them to draw up detailed maps of the American coasts and the islands of the Pacific, and to learn first-hand about the civilizations and ways of life of the inhabitants of the Viceroyalty of Peru.

Allegories of Science, Astronomy, Physics and Geometry. Biblioteca del Museo Naval.



LA AFRICA

Prospecto de la proa
de S.M. que se Botó en
de la Carraca à
de 1752.

A.A. Para q.e mantengan el Nivele
B.B Las Tablas sobre que corren los
C.C Las Limadas
D.D Los Macizos que deliénen los
E.E Las Columnas
F. Puntal q. esta puesto en el Torno
G.G. Los Veillos, ò Cochleas. que
H. El Tresco
I.I Los Puntales

3. SHIPBUILDING

In 1749, Jorge Juan was sent to England on an industrial espionage mission whose main objective was to study the shipbuilding techniques used in Britain's shipyards. Under the pseudonym of Mr. Josues, he managed to gather valuable information about the English shipbuilding system and the characteristics of British shipyards. One of the main successes of his mission was the recruitment of dozens of master builders, whom he managed to take out of England incognito and send to Spain.

Upon his return in 1750, the Marquis of Ensenada entrusted Jorge Juan with the design and supervision of the construction works of the shipyards of Ferrol, Cartagena and La Carraca (Cadiz). He devoted the next 12 years of his life to this task, during which he travelled constantly between these three shipyards, supervising the works, and resolving the construction problems that arose during the building process.

In parallel to this work, he developed a shipbuilding model based on the English system, known as the "Jorge Juan system". The "Velasco", "San Genaro" and "Real Carlos", as well as the series of ships known as "the Twelve Apostles", were designed under this shipbuilding system. Jorge Juan applied his extensive knowledge of mechanics, ship theory and infinitesimal calculus to the development of his shipbuilding system, which is illustrated in his work *Examen marítimo theorico práctico (Theoretical and Practical Maritime Examination)*.

The vessel "África". Archivo Histórico de la Armada.

4. A VERSATILE GENIUS

In 1751 Jorge Juan was designated captain of the Midshipmen's Company, where he designed the training of future naval officers. In those years he encouraged the modernization of the Academy by renewing the teaching staff and introducing modern scientific manuals, among which his work *Compendio de navegación para el uso de los cavalleros guardias-marinas. (Compendium of Navigation for the Use of Midshipmen)* stood out, all of this meant a change in the training of officers in benefit of a more technical and scientific profile. As part of this new approach, Jorge Juan pointed out the importance of astronomy as an auxiliary science to navigation and promoted the creation, in 1753, of the Royal Observatory of Cadiz, which was located in the Castle of the Midshipmen's Academy, as an annexed institution designed to improve the training of a new generation of scientific seamen.

In parallel to his teaching work, Jorge Juan developed a tireless activity that resulted in his participation in a wide range of projects. In 1753, he presented a plan for the creation of an Academy of Sciences, which in the end was never established. To fill this void, he created "La Asamblea Amistosa Literaria" (Literary Friendly Assembly), a scientific gathering of mathematicians and doctors connected with the Army and Navy, which met in his house in Cadiz. His recognition was such that the Crown regularly requested his advice on matters requiring higher technical knowledge, as were the cases with the quicksilver mines of Almaden and the recovery of three ships sunk in the port of Havana.

Allegory of the new scientist educated at the Academy of Midshipmen of Cadiz. Biblioteca del Museo Naval.

EL Ex.mo S.r D. JORGE JUAN.

5. FINAL WORKS

In 1762 Jorge Juan suffered from a "Convulsive, nervous colic that brought him close to death". Despite his health problems, in 1767 he was appointed Ambassador Extraordinary to Morocco, and spent six months travelling around this country on a mission to sign a peace agreement. In 1770, he was named Director of the Royal Seminary of Nobles in Madrid, an institution which he brought up to date in just a few years, achieving a significant increase in the number of students. During this final stage of his life, he worked on the publication of his last work, the *Examen marítimo theorico práctico (Theoretical and Practical Maritime Examination)*, in which he compiled all his knowledge of shipbuilding and navigation.

Jorge Juan died on June 21, 1773, in Madrid and was buried in the now disappeared St. Martin's Church, located in the Descalzas Square. When the church was demolished, his remains were moved to the basements of the old Madrid City Hall, where they were forgotten until 1854, the year when they were placed in the Pantheon for Illustrious Seamen in San Fernando. His death at the age of 60 put an end to a life dedicated to science, which earned him the recognition of the European scientists of his time. Jorge Juan was a member of the Royal Academy of San Fernando, the Paris Academy of Sciences, the Royal Society of London and the Berlin Academy, institutions that recognized his outstanding contribution to the scientific development of his time and the importance of his figure on an international level.

Jorge Juan. Biblioteca del Museo Naval.


CARTA
DE LA PROVINCIA DE QUITO
Y DE SUS ADIACENTES.
OBRA POSTHUMA
DE DON PEDRO MALDONADO
Gentilhombre de la Camara de S.MAG.
y Governador de la Prov. de Esmeraldas.
HECHA
Sobre las Observaciones Astronomicas, y Geograficas
de los ACADEMICOS REALES
de las CIENCIAS de PARIS, y de las GUARDIAS Mar. de CADIZ
y tambien de los RR.PP. MISSIONEROS de Maynas.
En que
la Costa desde la Boca de Esmeraldas hasta Tumaco
con la Derrota de Quito al Marañon,
por una senda de à pie de Baños à Canelos,
y el curso de los Rios
Bobonaça y Pastaça
van delineados
sobre las proprias demarcaciones
del difunto Autor.
Sacada à luz
por orden,
y à expensas
de su
MAGESTAD.
M.DCCL.
Cabo de S.Francisco
EQUADOR
LINIA
EQUINOCIAL
GOLFO DE GUAYAQUIL
Serranias
Valles
Desiertos

Curators and coordination
José María Moreno Martín
Blanca Sazatornil Pinedo

Museographic design
Estudio Ángela Juarranz / SIT Arte

Graphic design
Lara Carolina Izquierdo (SIT Arte)

Construction, assembly and coordination
SIT Arte

Transport
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Chart of the Province of Quito and adjacent areas. Archivo Histórico de la Armada.

MUSEO NAVAL
Paseo del Prado, 3.
28014. Madrid.
Tel. 915 23 85 16
museonavalmadrid@fn.mde.es
https://armada.defensa.gob.es/museonaval

Dates
November 23, 2023.
March 31, 2024.

Opening hours
Tuesday to Sunday from 10:00 to 19:00.
Closing days: Monday. December 24, 25 and 31. January 1 and 6.
The hall will be cleared 15 minutes before closing time.

Place
Exhibition Hall of the Naval Museum.

Fees
Free admission.

Free guided tours
Tuesday to Friday at 11.30.
Maximum 15 people.
Booking: reservas_museonaval@fn.mde.es / Tel. 91 523 85 16.

External groups with their own guide
Tuesday to Friday: 11.00, 12.30, 13.00, 16.00, 16.30, 17.00.
Saturdays and Sundays: 10.00, 10.30, 11.00, 13.00, 16.00.
Maximum 15 people.
Booking: reservas_museonaval@fn.mde.es / Tel. 91 523 85 16.

Capacity
The capacity of the exhibition hall is limited to a maximum of 70 people.

Activities
The program of activities organized in parallel to the exhibition can be found on the museum's website.

App
The Museo Naval Guide App can be downloaded from Google Play and App Store.

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SECRETARÍA GENERAL TÉCNICA
SUBDIRECCIÓN GENERAL DE PUBLICACIONES Y PATRIMONIO CULTURAL

MUSEO NAVAL

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