

EXHIBITION

# BALLOONS AND THE ART OF AERIAL NAVIGATION

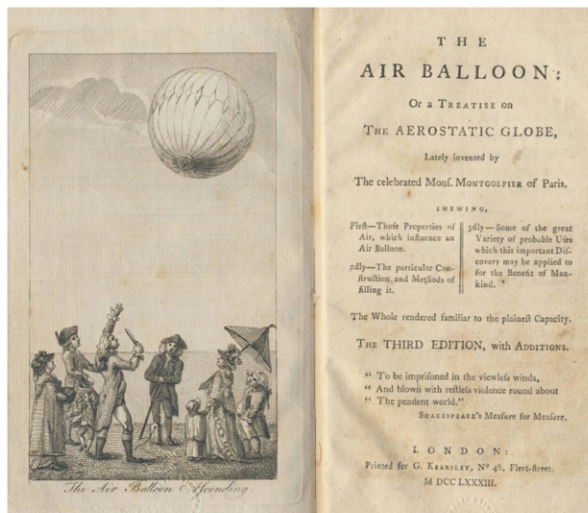
ENTRANCE HALL OF THE ACADEMY OF SCIENCES LIBRARY,  
NÁRODNÍ 3, PRAGUE 1, MONDAY–FRIDAY, 9 AM–7 PM, ENTRANCE FREE

October 31, 2014–March 31, 2015

The exhibition presents literature about ballooning from the Academy of Sciences Library collection. A significant set of books collected by Eduard Langer (1852–1914) became part of the ASL. Although the works on aeronautics represent a mere fraction of the original Langer's collection, they are the most comprehensive set of works on this topic in the Czech Republic and bear comparison with foreign collections.



↑  
A photograph of Eduard Langer.



↑  
The English treatise on balloons came out in a third edition in 1783.

The collection consists of 67 works in five languages, mostly in French and Italian. It includes reports of the first ascents, poems celebrating the balloons, dissertations, treatises on aeronautics and testimonies to the balloon mania. More than half the books came out before 1800, of which 25 in the first two years of ballooning (1783–1784).

# PIONEERS

The Montgolfier brothers were not the first to try to conquer the skies. They were preceded by many others who sought inspiration in bird flight. Man finally got into the air by using the relatively simple principle of the balloon – a fixed exterior filled with a gas lighter than air.

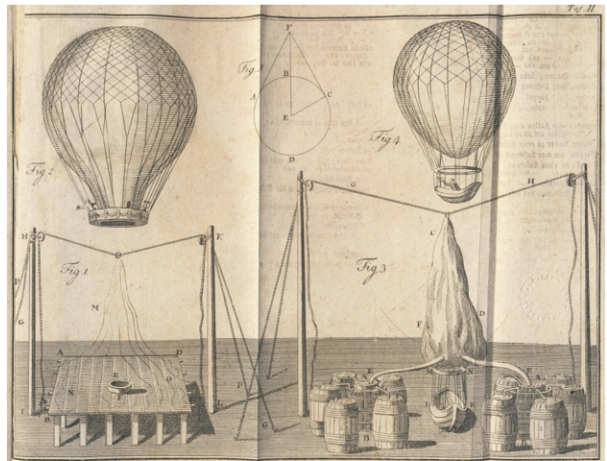


↑  
Lana de Terzi's dissertation, Brescia 1703.

Experiments with a small hot-air balloon at the beginning of the 18th century are recorded in Portugal. The Englishman Tiberio Cavallo conducted experiments with bladders filled with flammable gas at the beginning of 1782, though he proved unable to find a way of preventing the gas escaping from the bladders.

The Montgolfier brothers later found a better solution to this problem.

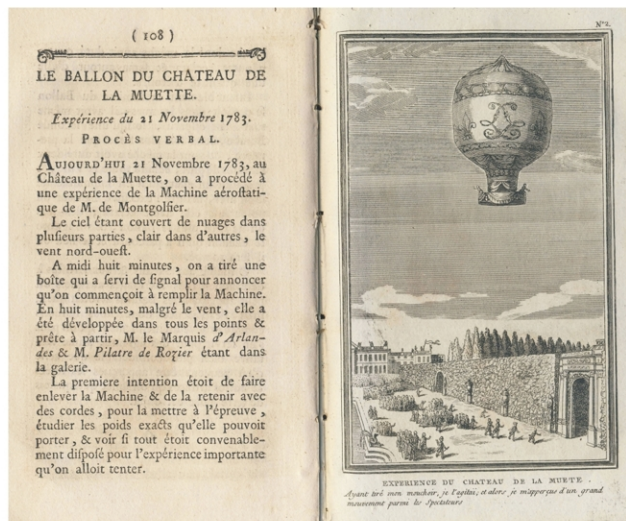
The Italian Jesuit Francesco Lana de Terzi described in his work *Prodromo* in around 1670 the aerostatic aircraft with hollow spheres filled with a vacuum. Lana is also mentioned in two dissertations produced in the Czech Lands in 1673 and 1748 by Caspar Knittel and Joannes Flaschner. A depiction of Lana de Terzi's flying ship can be found in both works.



↑  
Illustration from *Geschichte und Praxis der Aerostatik* by Tiberius Cavallo, Leipzig 1786, depicting the method of filling the balloon.

# THE YEAR OF THE BALLOON

The first successful public unmanned balloon flight took place in Annonay on 5 June 1783. It was performed by the brothers Jacques Étienne and Joseph Michel Montgolfier. Three animals – a ram, a duck and a cockerel – made an ascent in the balloon during an attempt in Versailles on 19 September 1783. A month later, on 19 October 1783, a manned ascent was made in a fixed balloon in Paris. The climactic event of the year came on 21 November 1783 when a free manned balloon flight lasting almost half an hour was made at Château de la Muette in Paris.



← The ascent of 21 November 1783.

The second manned balloon flight was made by the Montgolfiers' competitor Jacques Charles (who used hydrogen rather than hot air to fill his balloon) in Les Tuileries in Paris on 1 December 1783.

The first successful balloon flights in public spaces were watched by large audience and caused a sensation. They were followed immediately by further attempts. Some ended in tragedy, such as the flight from Calais to Dover of 15 June 1785 during which the balloon crashed and two aeronauts died.

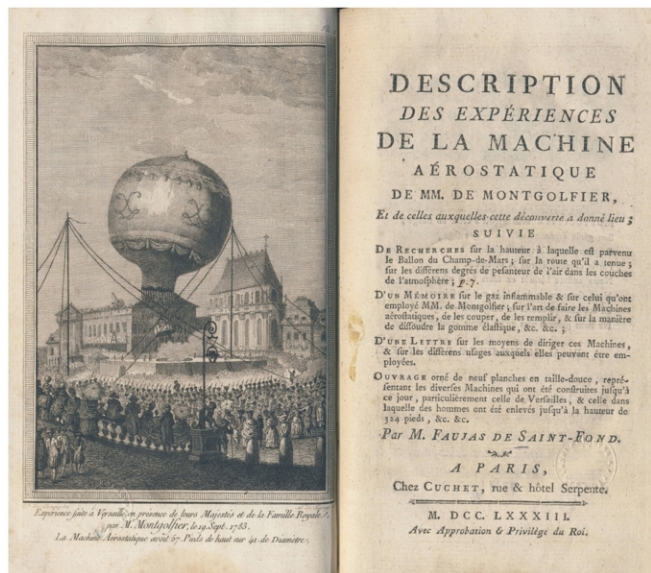


The flight of 1 December 1783.



# REPORTS ON THE FIRST ASCENTS

The French scientist Barthélemy Faujas de Saint-Fond, an enthusiastic promoter of ballooning, gave an eyewitness account of the first attempts at balloon flight. His two-volume report on the first attempts including a theoretical treatise on



aeronautics came out in Paris in

1783–1784. Faujas's treatise begins with a description of the first attempts by the Montgolfier brothers and ends with a report on the manned balloon ascent in Paris on 19 October 1783.

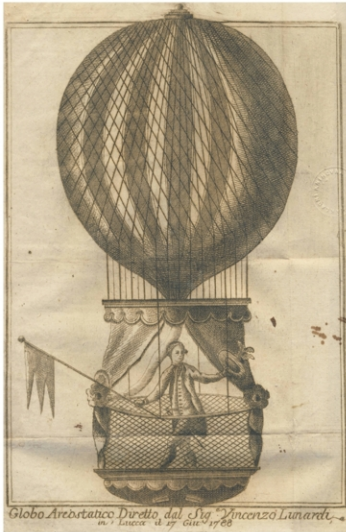
← The ascent with a crew of animals in Versailles on 19 September 1783.

Faujas's report was reprinted in Belgium in 1784, a German translation (Leipzig) and an Italian translation (Venice) came out the same year. The speed with which this treatise was printed and translated into three languages is remarkable and testifies to the lively interest in balloons.

The frontispiece of  
*An Easy Way of Making  
 an Aerostatic Machine*  
 depicting the filling  
 of a balloon.



# THE MEN IN THE BALLOONS



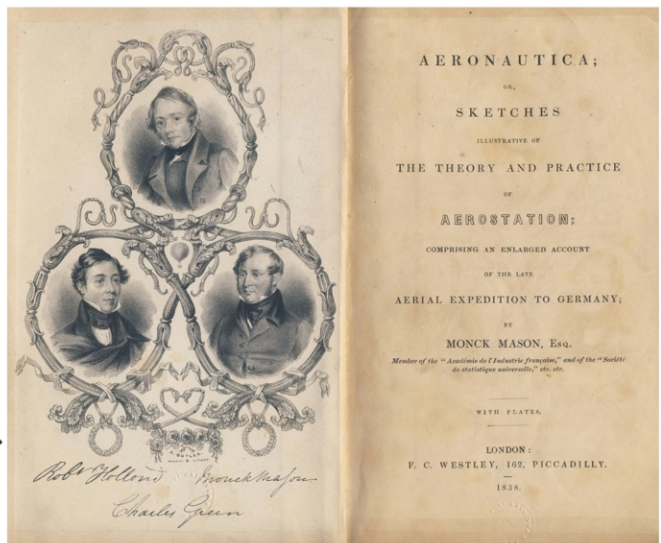
↑

Vincenzo Lunardi in his balloon in Lucca, Tuscany on 17 June 1788.

In 1836 English aeronauts Robert Hollond and Charles Green accompanied by Thomas Monck Mason undertook an expedition from London to Weilburg in Germany. This was the longest balloon flight undertaken to that time. The balloon set a new distance record of around 770 km without landing. Their flight was described by Monck Mason in his *Account of the Late Aeronautical Expedition from London to Weilburg, London 1836*.

Portraits of the participants in the longest aeronautic expedition of its time.

→



The first balloon flights were rapidly followed by others. The collection presented contains a dozen period reports on successful (with two exceptions) balloon flights in France, Italy and England.

The Italian aeronauts the Gerli brothers made a flight in Milan on 25 February 1784 notable for two ballooning firsts. It was the first flight in Italy and also the first flight in the Habsburg hereditary lands. Vincenzo Lunardi, Secretary to the Neapolitan Ambassador in London, gained his fame in Great Britain where he undertook the first successful flight on 15 September 1784.

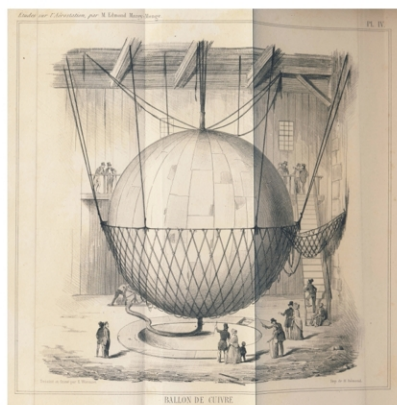
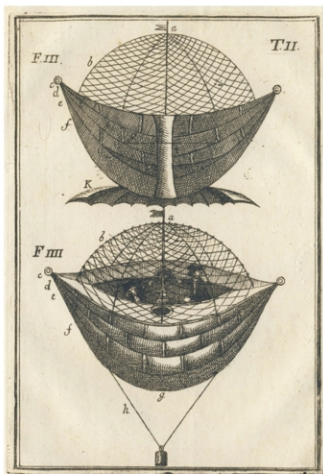
# THE PEOPLE UNDER THE BALLOONS

Aeronautics helped expand scientific knowledge in various fields. It is no surprise that we find the names of scientists and inventors among the authors of works on ballooning. Scientists studied theoretical issues associated with aeronautics and many other topics – composition of the gases used to fill balloons, exploration of higher layers of the atmosphere, its chemical composition, temperature, pressure and air density. Constructors focused on the search for balloons with the best possible shape.

Architect Pietro Antonio Zaguri in his *Report on an Aerostatic Invention and its Development*, Padua 1804, depicted an aerostat working on the principle of a vessel filled with gas.

Illustration of the aerostat designed by Zaguri.

→



The French inventor Edmond Marey-Monge was engaged in the construction of a balloon with a copper mantle. He described it in his *Studies of Aeronautics*, Paris 1847, completed with detailed technical drawings.

← The balloon designed by Marey-Monge.

The exhibiton was prepared for 14th year of the festival Week of Science and Technology (1.–15. 11. 2014).

Author of the exhibition: Andrea Jelínková, Academy of Sciences Library

Graphics: Marina Krahulcová, Academy of Sciences Library

<http://www.lib.cas.cz/kvo/en/exhibitions>