FOREWORD

INVENTION is one of the greatest arts. In its broadest sense it embraces all of the arts. It is the bringing together of known elements into new relationships. The elements may lie in the fields of ideas, mechanical arrangements and chemical compounds, visual and musical arts, literature and social institutions . . . to mention but a few.

An invention is the product of imagination and human aspiration achieved through hard work. Its purpose is to improve the way of life, both physical and spiritual.

Leonardo da Vinci, interpreted through his paintings, studies, scientific investigations and inventions, brings before us a worthy example of a man exercising to the fullest extent his capacities to think, feel and create in service of his fellow men.

Today, thousands of individuals are dedicating themselves to invention—seeking the same kind of beneficial results that Leonardo sought. Our tribute to these people and to Leonardo—to all inventors—is for us to devote ourselves to the proper use of the product of their vision and work. This leads us also to support those institutions, such as the United Nations, which have been invented for the purpose of assuring the world a better and universally peaceful way of life by making the progress in one nation available to all the world.

Thos. J. Watson

ACKNOWLEDGMENTS

FOR THEIR generous cooperation in planning and arranging this catalogue grateful acknowledgment is made to Dr. Elmer Belt of Los Angeles for the use of his great Library of Vinciana and especially for the untiring help of Kate Trauman Steinitz and Margot Archer, Librarians. For the technical parts of the catalogue use was made of the catalogues *An Exhibition of the Scientific Achievements of Leonardo da Vinci,* New York Museum of Science and Industry, 1940, and *The Dawn of Modern Science,* an exhibit for the California Institute [of Technology] Associates, April 14, 1949.

The reproductions of drawings in the Royal Library of Windsor Castle are included by gracious permission of H. M. King George VI.

Listed below are the editions of Leonardo da Vinci's notebooks used in this catalogue, and following each title is the abbreviation used to identify it.

Dell' Anatomia Fogli A. Paris, Rouveyre, 1898.	Fogli A
Dell' Anatomia Fogli B. Paris, Rouveyre, 1901.	Fogli B
Quaderni d'Anatomia. Christiania, Dybwad, 1911-1916	Quaderni I-VI
Il Codice Atlantico. Milano, Hoepli, 1894-1904. 35 Fasc	Codex Atlanticus
Codice Sul Volo Degli Uccelli. Paris, Rouveyre, 1893.	Sul Volo
Il Codice di Leonardo da Vinci della Biblioteca di Lord Leicester in Holkham Hall. Milano, Cogliati, 1909.	Codex Leicester
Il Codice Arundel 263 nel Museo Britannico. Roma, Danesi, 1923-1930.	Codex Arundel
Il Codice Forster nel "Victoria and Albert Museum." Roma, Danesi & Libreria del Stato, 1930-1936.	Codex Forster I-III
Il Codice B (2173) nell'Istituto di Francia. Roma, La Libreria dello Stato, 1941.	Ms. B
Mss. H, E, L, G and Ashburnham 2037 in the Bibliothèque de l'Institut de France, published by Charles Ravaisson-Mollien, Paris, Quantin, 1881-1891.	Ms. H; Ms. E; Ms. L; Ms. G; Ms. 2037
The drawings of Leonardo in the Royal Library of Windsor Castle.	Windsor

The translations of quotations from Leonardo da Vinci's notebooks are taken from Edward MacCurdy, *The Notebooks of Leonardo da Vinci,* New York, Reynal & Hitchcock, 1938, and Jean Paul Richter, *The Literary Works of Leonardo da Vinci,* London, Oxford University Press, 1939.

The models in this exhibition have been built by ROBERTO A. GUATELLI and assistants. The interpretation follows as closely as possible the original drawings of Leonardo da Vinci, emphasizing Leonardo's ideas of construction.

Since most of Leonardo's designs were meant for machinery of gigantic proportions it was not always possible to use exclusively the type of building material of Leonardo's days.

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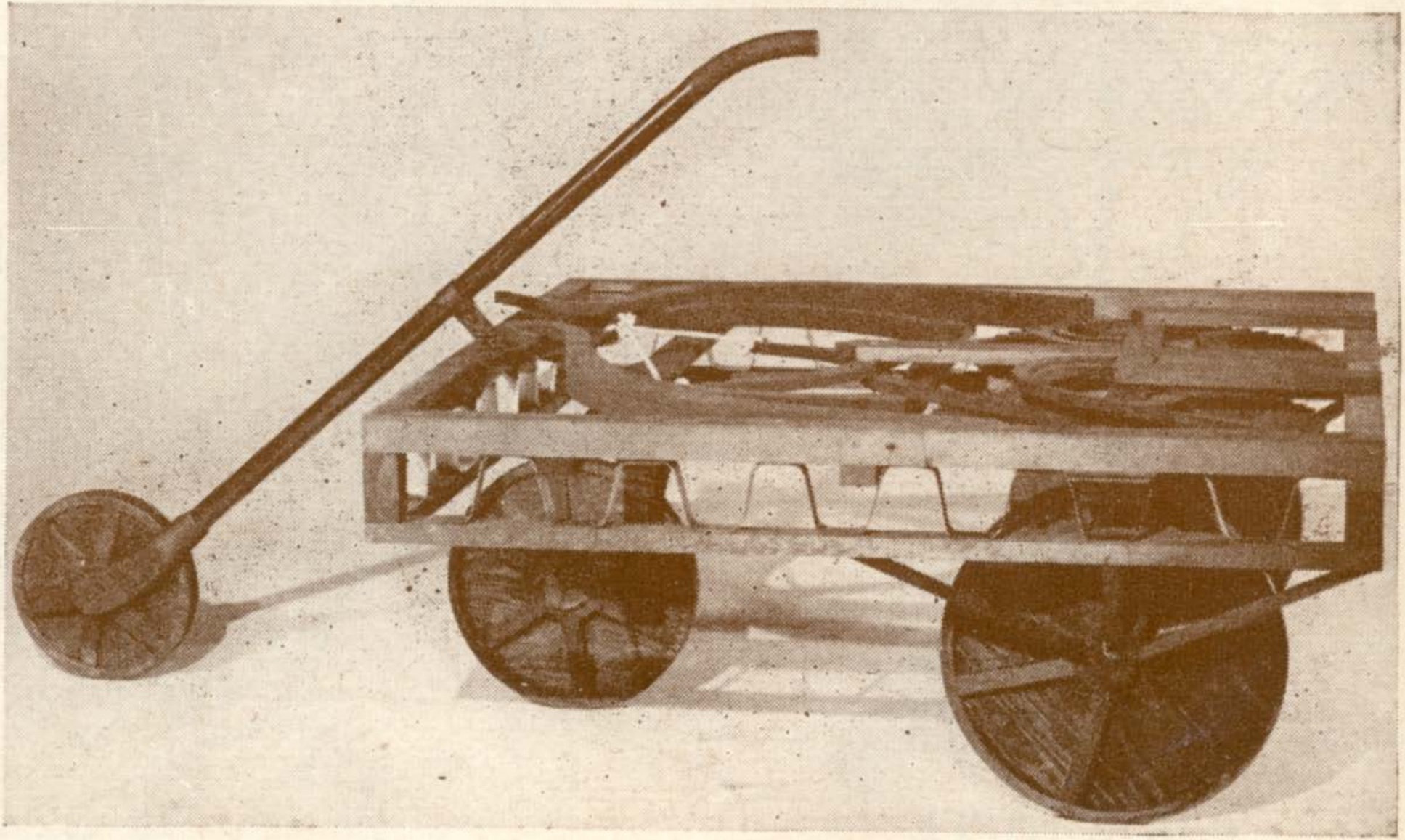
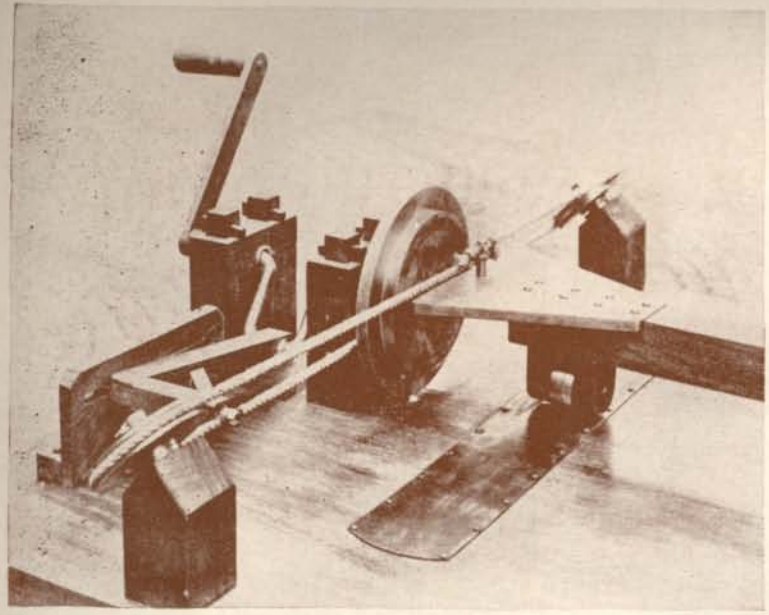
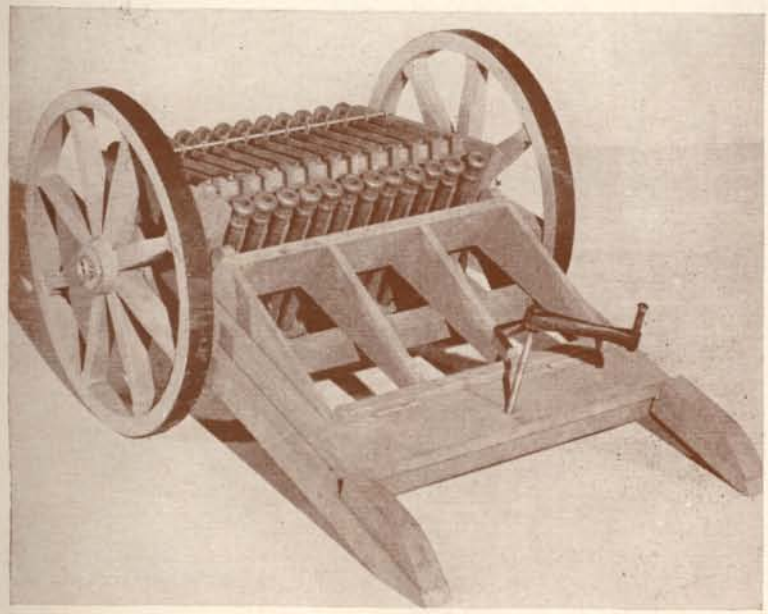


LEONARDO DA VINCI

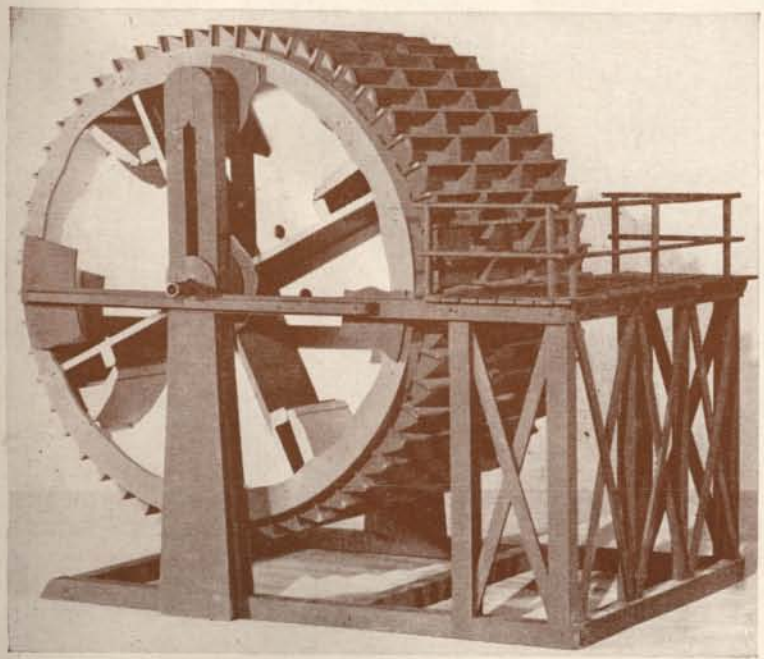


LENS GRINDER. An oscillating abrasive arc was pressed against a rotating disc. (*Codex Atlanticus, 396 v f*)



MACHINE GUN. Three tiers of twelve barrels each. One tier was to be fired while a second was being loaded and the third was cooling. (*Codex Atlanticus, 56 v a*)

VENTILATOR. Model of air-conditioning unit built for the boudoir of Beatrice d'Este, wife of Leonardo's patron. (*Ms. B, 82 r*)



THE LIFE AND WORK O

Leonardo was born in 1452. He grew up in Vinci, and at Florence, the center of cultural life in Italy of this period. His talents came to light very early in the workshop of Andrea Verrocchio, the famous artist and craftsman. Leonardo was his most gifted pupil in painting, sculpture and in technical fields. For several years after his apprenticeship he remained Verrocchio's co-worker. Around 1477 he set up his own studio in Florence for five years. Among the paintings of this Florentine period the most important are the angel in Verrocchio's *Baptism of Christ*, the *Annunciations* in the Uffizi and in the Louvre, the unfinished panels of *St. Jerome* in the Vatican, and of the *Adoration of the Magi* in the Uffizi.

In 1482 he entered the service of the Duke of Milan, staying there for almost two decades. Many and various commissions were given to him, but only a very few of his works survived, of which the *Virgin of the Rocks*, 1483, and the *Last Supper*, 1495 to 1497, are the most famous. Leonardo had a large workshop and his influence on the Milanese painters was remarkable.

The main purpose of Leonardo's call to Milan was the great equestrian statue of Francesco Sforza, the founder of the Sforza dynasty. However, the monument was never finished. Leonardo was also occupied with technical problems. He built the stage for theatrical representations. He took part in the competition for the dome of the cathedral in Milan, and designed fortifications for the cities of Lombardy. He also made a study of canals and locks which formed the large traffic system in Italy's busiest province.

Leonardo's notebooks began to be filled with observations on painting, architecture, anatomy, botany, on mechanics and geophysics, all in his minute and accurate left-handed mirror writing. His countless drawings illustrate every kind of phenomenon in the wide field of art and science.

In 1500, Leonardo went back to Florence where he remained for six years. During this period he did the four paintings which in addition to the *Virgin of the Rocks* and the *Last Supper* made him one of the greatest painters of all times: the *St. Anne*, the *Mona Lisa*, the *Battle of Anghiari*, and the *Leda*. The last two, unfinished, are preserved only in copies. These works mark the beginning of the great figure compositions of the High Renaissance, the beginning of a pictorial style.

In 1502 Leonardo became the chief military engineer of Cesare Borgia. He traveled through the battle zone of

SPRING-DRIVEN CAR. First known design for a self-propelled vehicle. (*Codex Atlanticus, 296 v a*)