There has long been a suspicion of the role of technology in art and the sense that somehow technology is incompatible with artistic creativity. Many of us think of the artist as a creative genius (by default male) who communicates his thoughts directly to the paper with his pen or to the canvas with his brush. Technologies may exist in this story—the pen, the printing press, brushes and the chemical agents of color—but they are merely a vehicle to express the particular talent and skill of the artist. For many, the advent of mechanical and electronic technologies, like the camera and the computer that introduce automated elements into art, seem to undermine the creative agency of the artist. How can they be a vehicle of genuine art? This idea of the creative artist and the attitudes to technology that inform it is firmly a product of the 18th-century European imagination and culture. It is one that this exhibition contests. If there is one idea that we would like you to take away from *Art Machines*, it is that technology is not an impediment to the making of art but a condition of its possibility. And the proliferation of new technologies, above all the computer, has afforded an ever-widening repertoire of material and symbolic forms from which art can be created.

In the West, prior to the 18th century, the term “art” had a very broad meaning which was not fundamentally opposed to that of technology or applied science. For classical Greek and Latin writers, the term “art” referred to skill in a craft or science, not to some separate “aesthetic” domain. Poetry and painting were arts that had to be learned, as in a craft like pottery or geometry. By the medieval period a distinction was recognized between two kinds of complementary practices: the intellectual, “liberal arts” and the practical, “mechanical arts.” The “liberal arts” comprised grammar, rhetoric, logic, geometry, arithmetic, astronomy and music. The term “mechanical arts,” in contrast, referred “to the skillful practice of a particular practical discipline or handicraft, including the work of machines” and included wood carving, weaving, clock-making, cartography, navigational devices, and the military arts, as well as painting, sculpture and architecture.[1] Leading Renaissance figures like Leonardo da Vinci (1452-1519) were also engineers (figs.1, 2). The very idea of the Renaissance man was that he was both

人們一直對科技在藝術世界的角色感到半信半疑，總認為科技與藝術創意南轅北轍。藝術家被視為創造天才（預設為男性），大筆一揮，便能夠在白紙或畫布傳達意念與思緒。在此，所謂的科技大概是指那枝筆、印刷機、畫筆、顏料，然而它們僅為展現藝術家獨特才華與技藝的媒介。相機和電腦等機械與電子科技的出現，為藝術創作帶來了自動化元素，不少人視之為削弱藝術家創意的洪水猛獸，這種東西怎能盛載真正的藝術？這種看待藝術家的創意和科技的態度，毫無疑問是十八世紀歐洲想像與文化的產物。而我們期望通過本次展覽「藝術機器」向你闡明：科技並非藝術創作的絆腳石，而是成就其誕生的條件。電腦等新科技的廣泛普及，為藝術創作提供了愈發豐富的物料和符號形式。

十八世紀以前的西方世界，「藝術」一詞定義甚廣，本質上並非對立於科技或應用科學。古典希臘及拉丁作家筆下的藝術，意指熟稔的工藝或科學知識，而非獨立的「美學」範疇。詩歌與繪畫都是需要習得的藝術，與陶藝、幾何等技藝和知識無異。直至中世紀，兩種互為補足的實踐開始分庭抗禮：智性的「自由技藝」，以及實用的「機械技藝」。自由技藝涵蓋文法、修辭、邏輯、幾何、算術、天文及音樂，而機械技藝則意指「某種實用領域或手工藝的熟練技巧，包括機器操作」，涵蓋木雕、紡織、鐘錶製作、製圖、導航儀及軍事技藝，亦包羅繪畫、雕塑及建築。[1] 達文西（1452–1519）等文藝復興翹楚都是工程師（圖 1，2）。所謂文藝復興人，是指兼具藝術和科技知識的傑出之才，從般哥展覽館的近期展覽中可見一斑。

然而到了十八世紀，西方文化下的藝術與科技關係遽變，對藝術的理解亦分裂出兩大方向：歐洲貴族精英所推崇的嶄新概念「美術」，以及工藝與工業範疇的「機械技藝」。文藝復興時期的人文學者，早就對中世紀的自由技藝分類體系提出挑戰，加入歷史、希臘語、道德哲學及詩學，構成漸受觸目的人文學科，並確立繪畫、雕塑及建築（嶄露頭角的「視覺藝術」）與

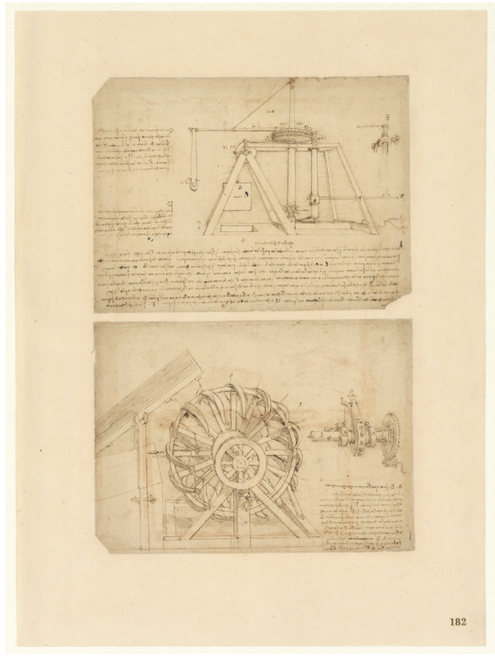


Fig. 1. Leonardo da Vinci, *Large Sling Engine and Repeating Crossbow*, C.A. folio 182 recto, pen, ink, wash, c.1485-92, Veneranda Biblioteca Ambrosiana, Milan
圖 1.〈大型彈弓機器及連發十字弓〉，《大西洋古抄本》對頁 182 之右頁，鋼筆及墨水、淡彩，約 1485 至 1492 年，米蘭昂布羅修圖書館，米蘭

Fig. 2. Leonardo da Vinci, *Studies for a Flying Machine*, C. A. folio 860 recto, dark ink, black pencil, 1478-80, Veneranda Biblioteca Ambrosiana, Milan
圖 2.〈飛行器研究〉，《大西洋古抄本》對頁 860 之右頁，深色墨水、部分覆以黑色鉛筆紙本，浮水印「鵝」，1478 至 1480 年，米蘭昂布羅修圖書館，米蘭

a master of art and a master of technology, as was demonstrated in the recent exhibition at the Indra and Harry Banga Exhibition Gallery.

However, in the 18th century, the relationship of art to technology in Western culture changed when the sense of what art was bifurcated between a newly furbished idea of the “fine arts,” developed by the European aristocratic elites, and the “mechanical arts” of craft and industry. Renaissance Humanists had already challenged the medieval classification of the liberal arts by adding History, Greek, Moral Philosophy and Poetry to form the *Studia Humanitatis* of an emergent humanities curriculum, and by claiming for painting, sculpture and architecture (the emergent “visual arts”) the same status as that of poetry and music. This paved the way for the consolidation of the “fine arts” in the 18th century as human practices devoted to the creation of beauty which manifest the inspiration, imagination, and genius of the artist who created them. In contrast, “mechanical arts” were conceived as an essentially imitative, rules-based activity with a fundamentally practical orientation, and therefore of lesser value.[2]

In the 19th century, two complementary developments intensified the contrast between the “fine arts” and the “mechanical arts” but also shifted the terms in which this contrast was understood. The 19th century saw the growth of the industrial revolution in Europe and the development of high-quality machine-made products. New schools of design focused on training designers to create models or templates for industrial manufacturing, effectively eliminating the need for the craftsman, while writers like Andrew Ure (1778-1857) and Charles Babbage (1791-1871), inventor of the programmable computer, celebrated the superiority of the machine-made over the hand-made.[3] In response, writers like John Ruskin (1819-1900) and William Morris (1834-1896), concerned about the loss of traditional skills and worried about the baleful effects of the industrial system, sought to valorize the hand-made over the manufactured and to defend the aesthetic value of arts and crafts as “decorative arts,” a new cousin of the fine arts.[4] The general application of the term “art” to craft and industry that characterized the “mechanical arts” was abandoned, creating an opposition between

詩歌、音樂的同等地位。這促成了「美術」的概念在十八世紀確立，皆因人類致力於創造美，這一過程凸顯了藝術家之創造靈感、想像力及天賦；相對而言，「機械技藝」被視為是本質上趨向實用而以模仿、循規則而行為根基的實踐，因此價值較低。[2]

十九世紀，兩種互補的發展加大「美術」與「機械技藝」的分野，同時改變人們對這兩個分類概念的理解。十九世紀歐洲工業革命如日方中，機器生產出優質產品，全新的設計學府專門訓練設計師，為工業生產創製模型或模版，大大減少對工匠的需求。作家如安德魯・尤爾（Andrew Ure，1778–1857）以及可程式化電腦的發明者查爾斯・巴貝奇（Charles Babbage，1791–1871），皆大讚機器生產勝於手工製作。[3] 對此，作家如約翰・拉斯金（John Ruskin，1819–1900）及威廉・莫里斯（William Morris，1834–1896）則憂慮傳統技藝的消逝，以及工業生產制度帶來的種種威脅，而提出手工製作的價值高於機器生產，以美術的新近親「裝飾藝術」之名，捍衛技藝與工藝的美學意義。[4] 過往在工藝和工業中全面使用「技藝」一詞來凸顯「機械技藝」特徵的策略已不再沿用，構成了手工製作的「美術」與設計、機器生產器物的對立關係。

要理解這種機器為本的藝術，必先挑戰僵化的二元對立觀點，一如二十世紀的現代主義。建築師設計建築物，本身可視作藝術。設計作為一種創造出某物的模型或模版的實踐，一直都是藝術的核心。想想那些雕塑家，他們會先畫出草稿，以陶泥塑型，最終以青銅鑄造；又或是那些被用來製作雕版印刷品的繪圖。今次展覽展出的大多以機器為本的藝術作品，以及所有以電腦製作的作品，均為設計而成，而非人工製作的。以電腦藝術作品為例，除了裝置及螢幕等實物，所謂的設計是由概念或計劃組成，它們以編碼機制和電腦算法生成視聽效果，儘管這些編碼和算法不一定由藝術家本人編寫。藝術品之所以為藝術品，不在於是人手抑或機器製作，而是創作背後的意圖。如果這

“fine art” and the handmade on the one side, and the designed, machine-made, object on the other.

To understand machine-based art, this rigid dichotomy must be challenged, as it was by 20th-century Modernism. The architect is a designer of buildings that may themselves be considered art. Design, in the sense of creating a model or a template for something, has long been central to art. Think of sculptors who may first draw their work and then model it in clay before it is moulded in bronze; or the drawing that becomes the basis for an engraving which is then printed. Many of the machine-based works of art that are displayed in this exhibition, and all of those that depend upon the computer, are designed rather than handmade works. In the case of computational art, aside from the physical objects comprising the installation and screen, the design consists in the conception or plan that is then realized in coding protocols, algorithms, which may or may not be written by the artists themselves, and which then generate what you see and hear. What makes a work of art is not whether it is handmade or machine-made, but the intentions that inform its creation. Its unique value lies in the success and coherence with which these intentions are communicated through the materials from which it is made.

Of course, machines complicate the role of intention in art. This was apparent when photography arrived to challenge the distinction between art and machine-based creation. Whereas, in an art like painting it seems as if the artist controls everything we see, with photography the artist relies on an element of chance.[5] This can be controlled, or even eliminated, in constructed photographs and digital compositing, but it is also arguably a part of many successful photographs, whether analogue or digital. Randomness or unpredictability within constraints is also a constitutive part of Computational Art, as will be evident from many works in this exhibition, especially when they rely on machine learning, the precise outputs of which cannot be known in advance by the coder. This kind of machine-based art involves a particular kind of intention: to cede control to chance within the parameters set by the artist.

些意圖能透過製作物料成功地傳達出來，以及賦予作品獨特的意義，兩者之間能成功地貫徹始終，便是作品的獨特價值所在。

當然，機器使藝術創作的意圖變得更為複雜。在攝影面世、挑戰藝術與以機器為本的創作之間的分野時，這種複雜性尤為明顯。藝術家彷彿能在繪畫中控制我們所見的一切，攝影師則要倚仗偶然因素。[5] 雖然在擺拍及數碼合成的照片中，攝影師能夠控制甚至消除這些偶然因素，但它們大概亦是造就不少成功照片的要素之一，無論這些照片是菲林還是數碼相機拍攝的。一定範圍內的隨機性與不可預料，亦是電腦藝術的要素，這在今次展覽展出的不少作品中也顯而易見，尤其是那些借助機器學習製作的作品，編程者往往無法事先得知最終精準運算後的結果。這種以機器為本的藝術具備一種特定的意圖：在藝術家設定的規則內，不斷將對作品的控制放手予偶然隨機。

Fig. 9. Dziga Vertov, *Man with a Movie Camera*, still from film, 1929
圖 9. 狄嘉 · 維多夫，《持攝影機的人》，電影劇照，1929 年

Machine-based art did not begin with Modernism. Mechanical automata have been in existence since ancient time, but the 18th century spawned an extraordinary range of sophisticated clockwork moving mannequins, often female, as well as musical machines with which mannequins were often combined; and automata remained popular throughout the 19th century.[6] Furthermore, the project of industrialization, which proceeded at breakneck speed in countries like France and Germany in the last quarter of the 19th century, led artists like Eugène Buland (1852-1926) and Adolf Menzel (1815-1905) to depict the pride of industry and the dignity of labor in their works. Nonetheless, the advent of Modernism transformed the relationship between art and the machine.

Certain historical conditions prepared the ground for this transformation.[7] By the first decades of the 20th century, machines had become domesticated in the form of bicycles, sewing machines, radios, gramophones, vacuum cleaners, toasters, automobiles, electric lighting and the like—at least for the moneyed classes. Furthermore, while steam trains and traction engines had been around for a while, now the clanging and movement of trams, elevated railways, seaport cranes and subway trains, celebrated in the "City Symphony" films of the 20s and 30s, such as *Berlin: Symphony of a Great City*, 1927, and *Man with a Movie Camera*, 1929 (fig. 9) were part and parcel of everyday urban experience. In addition, the 19th-century division between arts and crafts and manufacture was slowly dissolved, as the heirs of the arts and crafts movement embraced industrial methods of production. For example, while the "industrial arts" curriculum in the early-20th century adopted the rhetoric of the arts and crafts movement, it trained students for industry and manufacture. Yet the change brought by Modernism was profound and unprecedented: across Europe and then the United States artists sought radically new ways of making art that were a direct response to the changes in society wrought by industrial modernity and the machine.

以機器為本的藝術並非隨現代主義興起。機械自動機自古存在，但十八世紀，製作精巧的發條機械人偶（多是女性）大行其道，琳瑯滿目，還有和人偶結合的音樂機器；自動機於十九世紀持續流行。[6] 在十九世紀最後的二十五年，工業化在法德等國勢如破竹，藝術家尤金 · 布蘭德（Eugène Buland，1852–1926）及阿道夫 · 門采爾（Adolph Menzel，1815–1905）等有感於次，在作品描繪出對工業生產的驕傲與勞工的尊嚴。然而，現代主義的到來卻改變了藝術與機器的關係。

某些特定的歷史條件為變革打下了基礎。[7] 二十世紀的首個十年間，單車、縫紉機、收音機、留聲機、吸塵機、多士爐、汽車、電燈等機器以家居用品的形式進入富裕家庭。蒸氣火車和牽引引擎早已不陌生，更添上電車、高架鐵路、海港起重機及地下鐵路，叮噹作響飛馳而行，成為了都市生活必不可少的日常經驗，備受 1920 以及 1930 年代「城市交響樂」電影系列如《柏林：城市交響樂》（*Berlin: Symphony of a Great City*，1927）和《持攝影機的人》（*Man with a Movie Camera*，1929）（圖 9）的推崇。此外，隨着工藝運動的繼承者採用工業生產的模式，上個世紀中藝術、工藝與生產的分野逐漸消弭。舉例來說，二十世紀早期的「工業藝術」課程吸納了工藝運動的主張，訓練學生投身工業生產。現代主義帶來的改變空前絕後，歐陸以至美國的藝術家紛紛尋索破格的創作新法，直接應對工業現代化及機器帶來的社會變革。

In the first decade of the 20th century, the Cubism of Pablo Picasso (1881-1973) and Georges Braque (1882-1963) revolutionized depiction by breaking up the representation of bodies and objects in space into a series of simultaneous views from different perspectives, turning the surface of paintings into an aggregation of geometric forms. Before World War I, the Futurists in Italy and the Vorticists in England wedded cubistic techniques to a celebration of the mechanized and mobile world of an industrial modernity that seemed to render cultural tradition obsolete. Italian Futurist F.T. Marinetti (1876-1944) wrote in 1909:

> "We affirm that the world's magnificence has been enriched by a new beauty: the beauty of speed. A racing car whose hood is adorned with great pipes, like serpents of explosive breath—a roaring car that seems to ride on grapeshot is more beautiful than the *Victory of Samothrace* [a classical sculpture]." [8]

二十世紀首個十年，畢加索（1881–1973）及喬治 · 布拉克（Georges Braque，1882–1963）的立體主義掀起了一場繪畫革命，把身體與物件在空間中的具象形態，分解為不同角度下共時視角的碎片呈現，令畫面成為幾何形狀的聚合。第一次世界大戰之前，意大利的未來主義者及英國的漩渦主義者運用立體派的技巧，頌揚工業現代性帶來機械化的移動世界，改變不合時宜的文化傳統。意大利未來主義者菲利波 · 托馬索 · 馬里內蒂（F.T. Marinetti，1876–1944）於 1909 年寫道：

> 「我們確信，為世界的宏偉增添異彩的是速度之美。賽車引擎蓋下的優質喉管，宛如一條吞吐萬里的巨蟒，汽車呼嘯如炮彈推進，遠比《薩莫特拉斯的勝利女神》（傳統雕塑）更美麗動人。」[8]

賈科莫 · 巴拉（Giacomo Balla，1871–1958）在《超速汽車》（*Speeding Automobile*，1912）（圖 3）中嘗試捕捉機器的動態，而這一未來主義美學呼應了俄羅斯藝術家納塔莉亞 · 岡察洛娃（Natalia Goncharova，1881–1962）的作品《單車手》（*Cyclist*，1913）（圖 4）。在這幅教人心領神會的畫作中，車手騎着簡便的單車高速行駛，對他經過的商店櫥窗毫不在意。漩渦主義支持者雅各 · 艾普斯坦（Jacob Epstein，

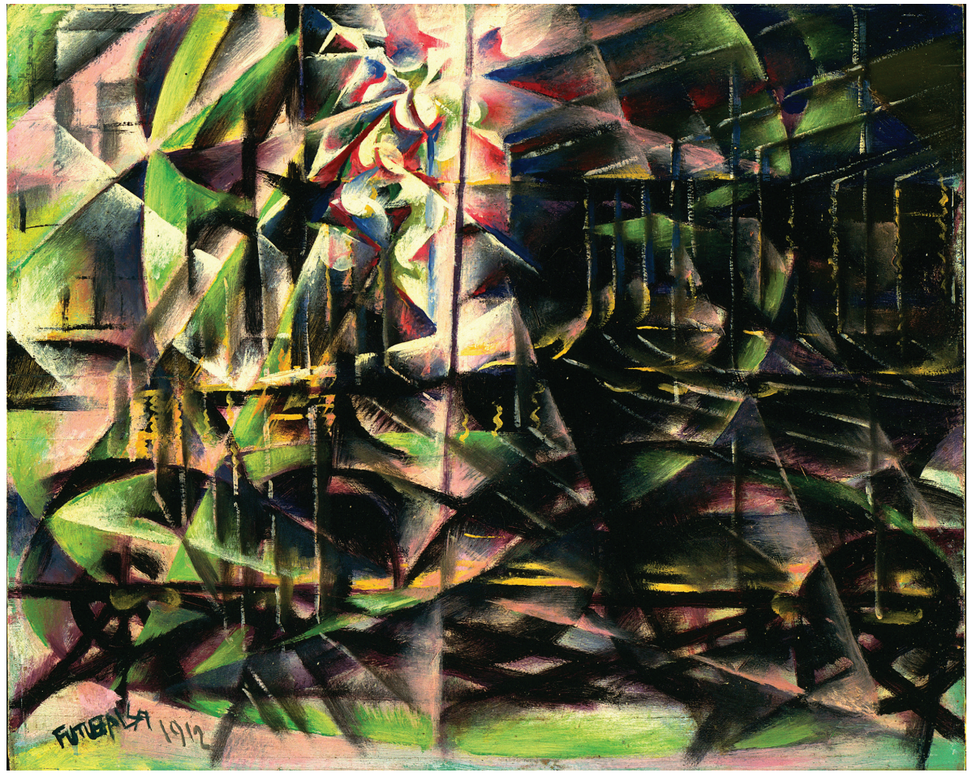
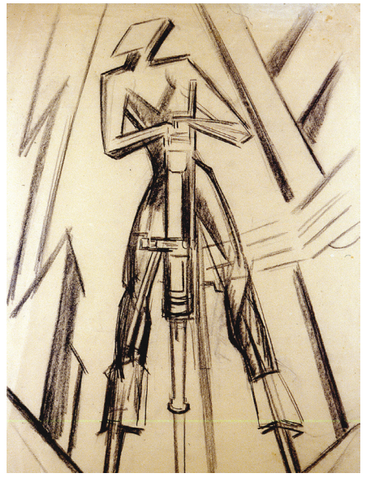


Fig. 3. Giacomo Balla, *Speeding Automobile*, oil on wood, 1912, The Museum of Modern Art, New York
圖 3. 賈科莫．巴拉，《超速汽車》，油彩木本，1912 年，紐約現代藝術博物館

Fig. 4. Natalia Goncharova, *Cyclist*, oil on canvas, 1913, State Russian Museum
圖 4. 納塔莉亞．岡察洛娃，《單車手》，油彩布本，1913 年，俄羅斯國家博物館

Fig. 5. (left) Jacob Epstein, *Rock Drill*, bronze, 1913, Tate Gallery, London
圖 5.（左）雅各．艾普斯坦，《鑽岩機》，青銅，1913 年，泰特美術館，倫敦

Fig. 6.(right) Jacob Epstein, *Drawing for Study for Rock and Drill*, charcoal drawing, 1913, New Art Gallery Walsall
圖 6.（右）雅各．艾普斯坦，《鑽岩機草圖》，炭筆畫，1913 年，沃爾索新藝術畫廊



One sees this attempt to capture the movement of the machine in *Speeding Automobile*, 1912 (fig. 3), by Giacomo Balla (1871-1958), and this Futurist aesthetic is echoed in the witty painting *Cyclist*, 1913 (fig. 4), by Russian artist, Natalia Goncharova (1881-1962), where the machine is a simple bicycle whose rider rushes headlong, oblivious to the shop window displays he passes by. A more direct expression of the machine aesthetic, made by Vorticist fellow-traveler, Jacob Epstein (1880-1959), is the extraordinary *Rock Drill* (1913) (figs. 5, 6) that incorporated pieces of a real rock drill onto a tripod to which he later added an angular torso with a head shaped like a welder's helmet.

World War I at once upended the *anciens régimes* of Europe and unleashed the terrifying power of mechanized warfare that the Italian Futurists enthusiastically embraced. In Russia, where wartime disintegration led to social revolution, artists of the avant-garde, rejecting the "bourgeois" forms of traditional art, sought to become artist-engineers

1880–1959）的超凡作品《鑽岩機》（*Rock Drill*，1913）（圖 5，6），在三腳架上架設了一台貨真價實的鑽岩機，然後再加上一個稜角分明、頭部如焊工頭盔的軀體，更直接地呈現出機器的美學。

第一次世界大戰為歐洲的舊制度帶來翻天覆地的改變，令人戰慄的機械化武器盡情湧現，備受意大利未來主義者熱烈推崇。一戰期間沙俄帝國的瓦解促成了社會革命，前衛藝術家拒絕採用傳統藝術的布爾喬亞形式，矢志為工業化改造新社會的事業而成為藝術工程師。他們渴望培養出新蘇維埃人，其能力在科技與科學化管理下大大提高。弗拉基米爾．塔特林（Vladimir Tatlin，1885–1953）的《第三國際紀念碑》（*Monument to the Third International*，1919–1920）（圖 7 為模型）又被稱為「塔特林塔」，正是俄國構成主義的典範之作。這座高達四百米的大型建築結構令艾菲爾鐵塔相形見絀，高聳入雲的螺旋

Fig. 7. (left) Vladimir Tatlin, *Reconstructed Model of Monument to the Third International* (1919-1920), Royal Academy of Arts, London, 2012
圖 7.（左）弗拉基米爾．塔特林，《第三國際紀念碑重塑模型》(1919-1920)，倫敦皇家藝術學院，2012 年

Fig. 8. (right) Konstantin Medunetsky, *Spatial Composition (Construction no. 557)*, tin, brass, painted iron, steel, 1919, Yale University Art Gallery
圖 8.（右）康斯坦丁．梅杜涅茨基，《空間構圖（建築第 557 號）》，錫、黃銅、繪製鐵、鋼，1919 年，耶魯大學美術館

in the cause of building a new society transformed by industrialization. They hoped to create a new Soviet man whose capacities would be augmented by technology and scientific management. Russian Constructivism was epitomized in a work by Vladimir Tatlin (1885-1953) called *Monument to the Third International*, 1919-1920, a massive structure 400m high, dwarfing the Eiffel Tower, whose upward thrusting spiral form embodied the spirit of the revolution (fig. 7 is a reconstruction). It contained a central stack of rotating rooms, the lower, rotating once a year, the middle, once a month, and the upper, once a day. On top of the structure were radio antennae and an apparatus to project moving images upon the clouds. More modest, but wholly realized, were the machine-tooled sculptures created by Konstantin Medunetsky (1899-1935), like *Spatial composition (Construction no. 557)*, 1919 (fig. 8) and *Man with a Movie Camera*, 1929 (fig. 9), by the pioneer documentary and newsreel director, Dziga Vertov (1896-1954), which echoes the spirit of Constructivism.

形態象徵了革命精神。塔中間設有可旋轉的房間，底層每年旋轉一次，中層每月一次，高層則每天一次，頂部設有無線電天線，並配置儀器把影片投射到雲端。相比之下，康斯坦丁．梅杜涅茨基（Konstantin Medunetsky，1899–1935）由機器驅動的雕塑雖顯得平實，卻能真正實現出來，例如《空間構圖》（*Spatial Composition*，1919）（圖 8）。先鋒紀錄片及新聞片導演狄嘉．維多夫（Dziga Vertov，1896–1954）的作品《持攝影機的人》（*Man with a Movie Camera*，1929）（圖 9），響應構成主義的精神。它頌揚生產線以及其有助提升人類能力，並反映在相機的機械之眼賦予操作者的強大視覺效果中。

其時，法國藝術家費爾南．雷捷（Fernand Léger，1881–1955）聯同建築師勒．柯比意（Le Corbusier，1887–1965）及阿米迪．歐贊凡（Amédée Ozenfant，1886–1966）秉承戰後的樂觀主義精神而奉行純粹主

Fig. 10. Fernand Léger, *Animated Landscape (Paysage animé 1er état)*, oil on canvas, 1921, National Gallery of Art
圖 10. 費爾南．雷捷，《動態風景》，油畫布本，1921 年，美國國家藝廊

Fig. 11. Fernand Léger, *Machine Element*, oil on canvas, 1924, Centre Pompidou, Paris
圖 11. 費爾南．雷捷，《機器元素》，油畫布本，1924 年，龐畢度藝術中心，巴黎

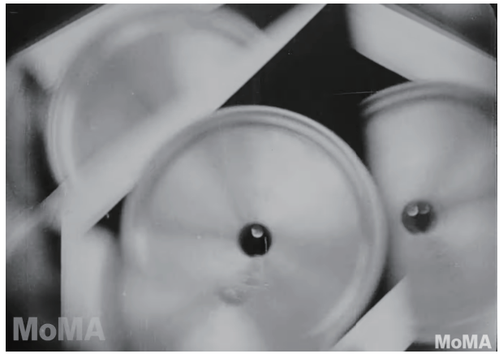


Fig. 12. (left) Fernand Léger , *Ballet méchanique* [Mechanical Ballet], still from film, 1924
圖 12.（左）費爾南 · 雷捷，《機械芭蕾》，電影劇照，1924 年

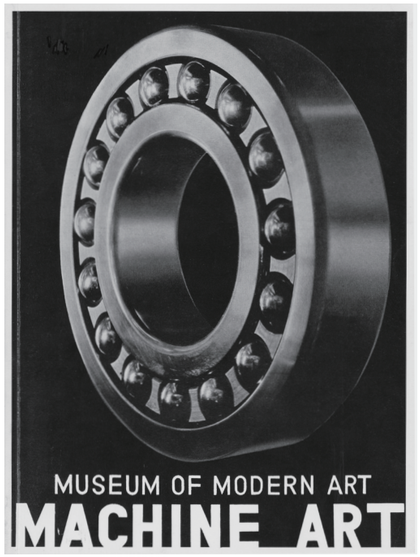


Fig. 13. (right) Josef Albers, *Cover of the Exhibition Catalogue "Machine Art,"* print, 1934, The Museum of Modern Art, New York
圖 13.（右）約瑟夫 · 亞伯斯，《「機器義術」展覽目錄封面》，印刷品，1934 年，紐約現代藝術博物館

Its celebration of machine manufacture as an augmentation of human capabilities is mirrored in the enhanced powers of seeing that seem to be possessed by the camera's mechanical eye.

Meanwhile in France, the artist Fernand Léger (1881-1955) joined with architects Le Corbusier (1887-1965) and Amadée Ozenfant (1886-1966), to launch Purism in a spirit of post-war optimism. Purism advocated a rational art that would reveal the organized, ordered, geometric patterns that underlay the changing appearances of nature, and which were a source of classical beauty. For Léger, the machine or manufactured object, insofar as it embodied the balance and order of classical aesthetics, was the privileged exemplar of beauty in modernity.[9] In *Animated Landscape*, 1921 (fig. 10), geometric form expresses the organic integration of the industrial and rural landscape far from the concerns of modern environmentalism, while in *Machine Element*, 1924 (fig. 11), one of many similar paintings, industrially

義。純粹主義主張理性藝術，將瞬息萬變的自然面貌和傳統美學的根源，隱藏在秩序井然的幾何圖案下。雷捷認為機器或工業產品體現了古典美學的平衡與秩序，正是現代之美的高尚模範。[9]《動態風景》（*Animated Landscape*，1921）（圖 10）以幾何方式展示工業與鄉郊風景的有機結合，與現代環保主義者的憂慮相去甚遠；在《機器元素》（*Machine Element*，1924）（圖 11）（大量類似畫作的其中一幅）中，工業素材則結合成抽象的幾何圖案。1924 年，雷捷與達德雷 · 馬斐（1897–1968）協力製作的《機械芭蕾》（*Ballet méchanique*）（圖 12）是多個鏡頭剪接而成的關聯式蒙太奇。1934 年，紐約的現代藝術博物館展出「機器藝術展覽」（*Machine Art Exhibition*）（圖 13）中，擺滿三層樓的工業生產實用工具如藝術品般展示，展覽頌揚機器產品之美，與雷捷的美學同出一轍。

Fig. 14. Raoul Hausmann, *Mechanical Head (Spirit of our Times)*, mixed media, 1919, Centre Pompidou, Paris
圖 14. 拉烏爾 · 豪斯曼，《機械頭顱（我們的時代精神）》，混合媒介，1919 年，龐畢度藝術中心，巴黎

fabricated elements morph into abstract geometric shapes. In 1924, in collaboration with Dudley Murphy (1897-1968), Léger made *Ballet méchanique* [Mechanical Ballet] (fig. 12), which consisted of shots edited together into an associative montage of machine parts.The beauty of machine-made objects was celebrated in a Légerian vein in MoMA New York's *Machine Art Exhibition* of 1934 (fig. 13), where three floors of manufactured utilitarian objects were put on display as artworks.

For the artists of the Dada movement, the destruction of the war demonstrated the bankruptcy of industrial modernity and the values of the bourgeois class who had most profited from it—a class which they were nonetheless a part of. They rebelled, most of all, against reason, propriety and restraint, both in art and life. Although the Dada collagists paid homage to Tatlin in their 1920 exhibition, "The Machine as Seen at the End of the Mechanical Age," in a collage and sculpture by Raoul Hausmann (1886-1971), *Tatlin at Home*,

達達主義藝術家則認為，戰爭的毀滅性顯示了現代工業的破敗、從中獲利最瘋的資產階級價值的消亡，儘管他們本身亦屬於這個階級。他們絕大部分人在生活與藝術上拒絕理性，抗拒得體，亟欲突破限制。儘管達達主藝拼貼藝術家在 1920 年的展覽「機械世代終結下的機器」向塔特林致敬，但拉烏爾 · 豪斯曼（Raoul Hausmann，1886–1971）的拼貼作品《塔特林在家》（*Tatlin at Home*，1920），《機械頭顱》（*Mechanical Head*，1919）（圖 14，15）以及宣告「藝術已死 – 塔特林新機器藝術萬歲」的告示（圖 16）並非為了歌頌機器，而是一種策略與隱喻，用來顛覆傳統藝術觀念，並且推倒應當備受尊崇的資產階級理想。他們創造了「機械形態學」畫作，驚世骸俗地以機器展示人類的性關係，例如把女人構想成一台機器的弗朗西斯 · 畢卡比亞（Francis Picabia，1879–1953）畫作《這裏有一個女人》（*Voilà La Femme*，1915）（圖 17）；另外還有馬克斯 · 恩斯特（Max

Fig. 15. (upper) Raoul Hausmann, *Tatlin at Home*, print, 1920, Centre Pompidou, Paris
圖 15.（上）拉烏爾．豪斯曼，《塔特林在家》，印刷品，1920 年，龐畢度藝術中心，巴黎

Fig. 16. (below) *Grosz and Heartfield Holding First International Dada Fair Banner "Art is Dead – Long Live Tatlin's New Machine Art,"* photograph, 1920
圖 16.（下）《葛羅茲及哈特費爾德手持首屆國際達達藝術展橫額「藝術已死－塔特林新機器藝術萬歲」》，相片，1920 年

1920, and *Mechanical Head*, 1919 (figs. 14, 15), and in a sign proclaiming "Art is Dead – Long Live Tatlin's New Machine Art" (fig. 16), their engagement with the machine was not celebratory but was strategic and metaphoric, a way of subverting conventional ideas of art and the bourgeois ideals it supposedly enshrined. They created "mechanomorphic" paintings, in which human sexual relations were expressed subversively in the form of a machine, for example in *Voilà La Femme* [Here is Woman], 1915 (fig. 17), by Francis Picabia (1879-1953), which conceives the woman as a machine, and in an extraordinary collage by Max Ernst (1891-1976) entitled *Elephant Celebes*, 1921 (fig. 18), where a grotesque mechanical elephant, with a phallic trunk of industrial tubing, whose crown forms both a bull's head and a woman's torso, pursues a headless nude who seems to be beckoning. The most renowned and enigmatic work in this vein is *La mariée mise à nu par ses célibataires, même* [The Bride Stripped Bare by Her Bachelors, Even] (fig. 19), by Marcel Duchamp (1887-1968), an early conceptual artwork, which the

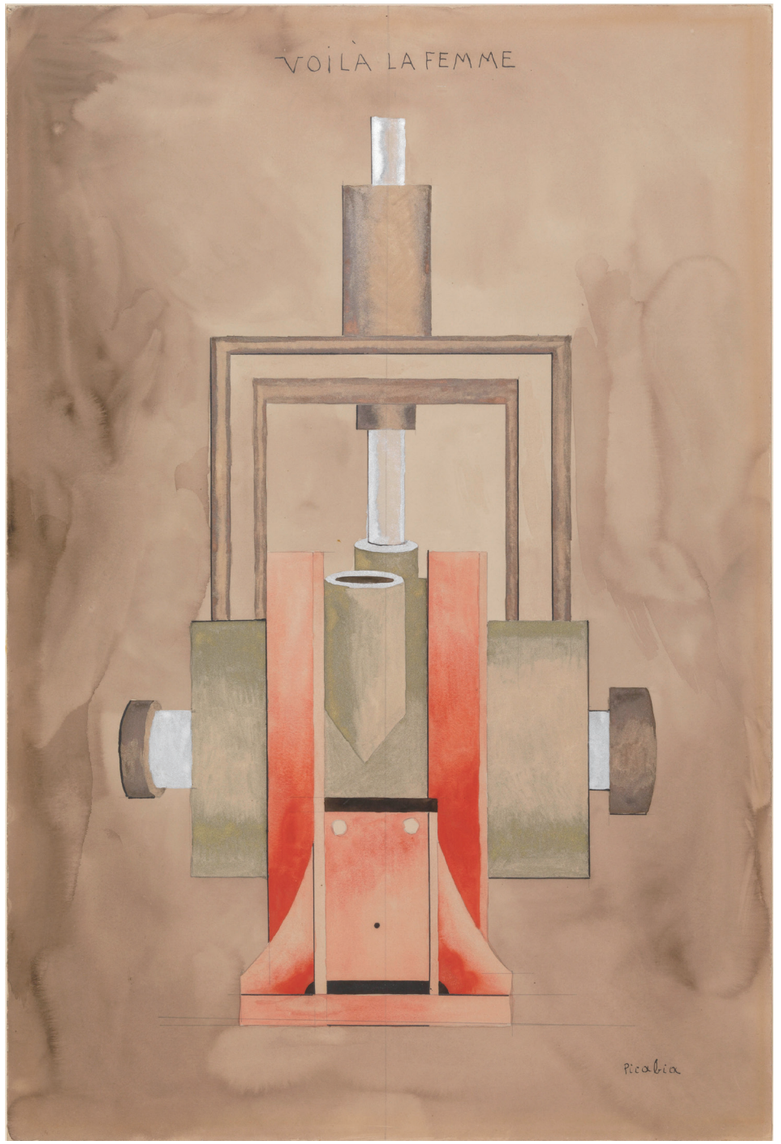


Fig. 17. Francis Picabia, *Voilà La Femme* [Here is Woman], gouache, water colour and oil paint, paper, 1915, Centre Pompidou, Paris
圖 17. 弗朗西斯．畢卡比亞，《這裏有一個女人》，水粉、水彩及油彩紙本，1915 年，龐畢度藝術中心，巴黎

Fig. 18. Max Ernst, *Elephant Celebes*, oil on canvas, 1921, Tate Gallery, London
圖 18. 馬克斯．恩斯特，《大象西里伯斯》，油畫布本，1921 年，泰特美術館，倫敦

Fig. 19. Marcel Duchamp, *The Bride Stripped Bare by Her Bachelors, Even*, oil, varnish, lead foil, lead wire, dust, two glass panels, 1915-1923, Philadelphia Museum of Art
圖 19. 馬塞爾．杜象，《新娘甚至被光棍們扒光了衣服》，油彩、光漆、鉛箔、箔線、塵埃、兩塊玻璃板，1915 至 1923 年，費城藝術博物館

artist laboured on for several years between 1915 and 1923. It consists of two transparent glass surfaces, subsequently shattered, held together in a metal frame, upon which various flat objects are arranged, made out of materials such as lead foil, fuse wire, and dust. The upper panel depicts the “Bride” in a large cloud-like abstraction and the lower segment shows the “Bachelors,” represented by nine diminutive abstract figures, at once separated from the “Bride” and dominated by various mechanical artifacts, including a chocolate grinder. We might also include in “the work” the extensive explanatory notes Duchamp supplied to accompany it, that allude to the Bachelor Machine, a symbol of mechanical, onanistic eroticism.

Ernst，1891–1976）的出色拼貼之作《大象西里伯斯》死（*Elephant Celebes*，1921）（圖 18），一隻怪誕醜陋的機械大象，配上一柱宛如陰莖的工業喉管，冠上牛頭與女性軀幹的合體，追逐一具彷彿正在招手的無頭裸體像；而最為知名而神秘的同類作品莫過於馬塞爾・杜象（1887–1968）的《新娘甚至被光棍們扒光了衣服》（*La mariée mise à nu par ses célibataires, même*）（圖 19），這件早期概念藝術之作完成於 1915 至 1923 年間，由兩塊透明玻璃組成，後來玻璃粉碎後以鐵框固定。玻璃上有由鉛箔、保險絲、塵埃等構成的扁平物件。上方的玻璃般以一大團抽象的雲狀物展現「新娘」，下方的則以九個矮小的抽象人影代表「光棍」，與「新娘」隔開，玻璃板中由多種機械器具佔據，包括一個巧克力研磨器。在杜象附帶的詳盡筆記中，解釋到下方的玻璃板為單身漢機器，是隱含自慰意味的機械情色。