

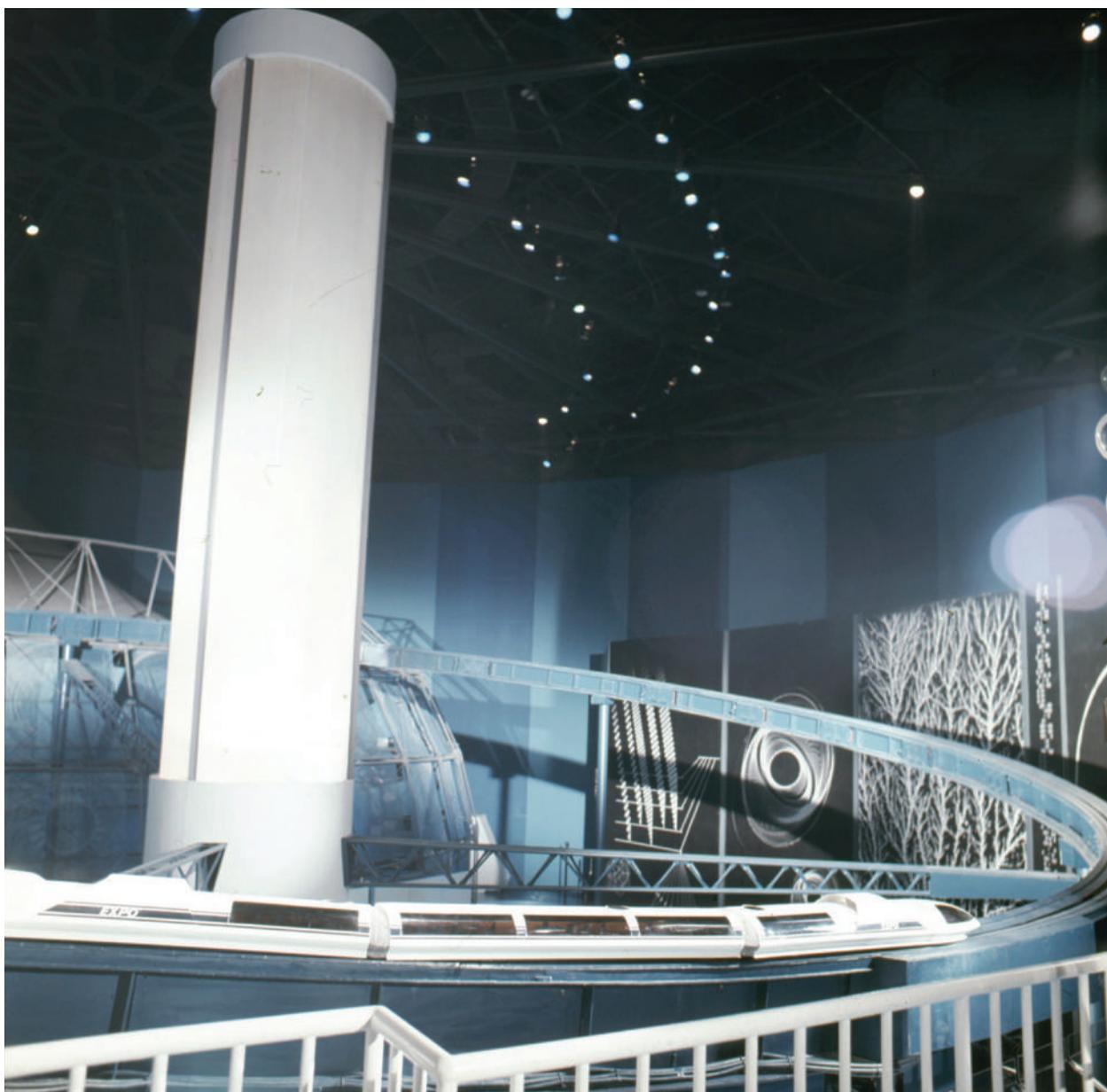
# Behind the Exhibit

DISPLAYING SCIENCE AND TECHNOLOGY AT WORLD'S  
FAIRS AND MUSEUMS IN THE TWENTIETH CENTURY

*Edited by Elena Canadelli, Marco Beretta, and Laura Ronzon*

STUDIES IN THE HISTORY OF  
SCIENCE AND TECHNOLOGY

artefacts



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*Cover image:* Model of a maglev, a magnet-levitated train, displayed at the Japanese Pavilion during the Japan World Exposition in Osaka in 1970. Courtesy of the Osaka Prefectural Expo 1970 Commemorative Park Office.

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# Science versus Technology

## The Exhibition of Universal Science in E42 Rome and the Museum of Science and Technology in Milan

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*The Esposizione Universale di Roma* (EUR, Universal Exposition of Rome), the 1942 world's fair of Rome commonly known as "E42," is pivotal to understanding the great interest in science and technology exhibitions and museums that spread throughout Italy during the 1930s. Despite its cancellation, E42 represents a fundamental piece of a more complex puzzle: the use and interpretation of science and its history during the Fascist regime, against the background of the international museological debate of the time. As expressed in the exposition's subtitle, "Olympiad of Civilization," it endeavored to be a

sound cultural enterprise that had originated within a spirit of internationalism among nations<sup>1</sup> as well as a monumental celebration of the imperial ambitions of Mussolini. As stated in the 2015 book *World's Fairs on the Eve of War*, E42 tried to introduce "a brilliant fusion of the past and the scientific future," a "blend of modernity and tradition,"<sup>2</sup> even in the monumental architecture of its edifices. Thus, the Fascist regime planned an entire new suburban district in Rome, with monuments and buildings designed to last and host permanent museums after the closure of the world exhibition—a fairly unusual decision for this kind of temporary mass event. EUR gave shape to the "paradoxes of Fascist modernism,"<sup>3</sup> blending together the patriotic celebration of a glorious past of ancient Rome with a successful science- and technology-based present and future.

Indeed in E42, science and its applications were intended to be shown as part of human culture and civilization, and they played a crucial role. Scientific artifacts would have been displayed in many of the planned exhibits (Figure 1), starting from the ambitious Exhibition of Universal Science, which would later have been transformed into a permanent science museum hosted in the Italian capital city. Science and technology were also to be featured in exhibits that dealt with other historical topics, including the Exhibition on Italian Civilization and the Exhibition on Roman Civilization. Both were in line with the great number of more or less politicized temporary exhibitions organized in Italy during the 1930s about Italian achievements and records (*primati*) in science, technology, and industry. The Exhibition on Italian Civilization (Figure 2) should have included some focus on scholars such as Leonardo, Galileo, Cesalpino, and Realdo Colombo to represent Italian science in the history of civilization in connection with art, philosophy, and literature of a certain period.<sup>4</sup> In the Exhibition on Roman Civilization, some sections were to be dedicated to the history of Roman civil and military engineering as well as to science and medicine, similar to what was actually seen in the majestic Mostra Augustea della Romanità exhibition in Rome from 1937 to 1938. Many of the E42 exhibitions, including the Exhibition on Popular Italian Traditions, which eventually opened in 1956 in the EUR site, should have become permanent museums. Though the Museum of Italian Civilization and the Science Museum in Rome were never realized, the Museum of Roman Civilization opened at the EUR site after the Second World War, in 1955. The redundancy of many scientific topics among these exhibits is striking, even more so when one realizes that an entire section of E42 would have been devoted to the field of industry and science applications in relation to autarky.<sup>5</sup> In actuality, one wonders how the organizers of the Universal Exposition of Rome would have managed the coexistence of all these exhibitions in terms of the artifacts on display.

The E42 planning committee involved many Italian academics and politicians, from Senator Vittorio Cini, the general director of the fair, to Giuseppe Bottai, the influential minister of national education from November 1936 to February 1943, governor of Rome, and one of the Fascist party's chief ideologues. Bottai in particular is a key figure in understanding Italian debates during the 1930s about how to disseminate science and scientific education and how to protect Italian cultural heritage. In the same years that E42 was being planned, from approximately 1936 until 1943, Bottai organized an exhibition on technical education in the present and the past that was displayed in Rome from 1936 to 1937; established the Day of Technology in 1940; and introduced the important law for the preservation of Italian cultural–historical heritage named *Tutela delle cose d'interesse artistico o storico*, which passed in 1939 but did not include protections for historical scientific instruments.<sup>6</sup> As minister of national education, Bottai was also deeply involved in the realization and support of the main rival project to the Exhibition of Universal Science, the Museo Nazionale della Scienza e della Tecnica Leonardo da Vinci (Leonardo da Vinci National Museum of Science and Technology). The museum was ultimately established in Milan under the auspices of Guido Ucelli, an influential engineer working as general manager at Riva, a renowned factory assembling turbines and water pumps in Milan.<sup>7</sup>





**Figure 2.** The Palace of the Italian Civilization under construction around 1940. Its words welcomed Italians as a “people of poets, artists, heroes, saints, thinkers, scientists, sailors, and migrants.” Courtesy of Central Archives of the State, Rome, EUR, Photographic Archive.

Almost the entire Italian scientific community was called to cooperate in the extensive project of the Exhibition of Universal Science; the committee included scientists—mostly professors at major Italian universities and fellows at prestigious Italian scientific academies—but not historians of science, as clearly emphasized by the Italian scholar Paolo Galluzzi.<sup>8</sup> Even though the exhibition and the science museum it was to produce have never been realized, it is possible to retrace the general plans for the exhibition thanks to the extraordinary number of EUR documents and reports preserved at the Central State Archive in Rome. Formally established at the end of 1937, the committee was composed of 19 members, including, as president, Francesco Giordani, a chemist at the University of Naples, and, as vice president, Sabato Visco, a physiologist at the University of Rome. It also included the industrialist Ucelli.<sup>9</sup> In order to plan the exhibition, nine subcommittees were created to address physics, electromagnetic waves, mathematics, chemistry, biology, geology, astronomy, geography, and technical applications in construction. Many of the scientists involved—including astronomer Giorgio Abetti, physiologist Filippo Bottazzi, and physicist Antonino Lo Surdo—were to be present at the Exhibition on Italian Civilization. Others, such as Ucelli, were to be at the exhibitions on electrical industries or land reclamation. Scientists aimed to organize an educational enterprise, a “living” visual and material handbook of the history of basic sciences—as well as their discoveries, phenomena, and

laws—through selected artifacts and exhibits. These were to include mostly models, replicas, dioramas, photographs, diagrams, film footage, and reproductions of instruments. This approach was much like that of other temporary exhibitions of this kind, such as the aforementioned *Mostra Augustea della Romanità*, which consisted mainly of casts of statues and reliefs; large-scale dioramas of Roman engineering; realistic models of bridges, buildings, catapults and siege engines; reproductions of surgical instruments; and large-scale models of astronomical instruments. In addition, for the first time in Italy, scientists had the opportunity to publicly demonstrate scientific laws in front of the general audience in the halls of an exhibition.

To understand the choices made by the committee, it is important to emphasize that the planning of E42 perfectly overlapped the realization of relevant national and international fairs that focused on different aspects and histories of science and technology, especially the *Exposition Internationale des Arts et Techniques dans la Vie Moderne* in Paris in 1937 and the *New York World's Fair* in 1939, each of which offered a different model that could be followed or ignored by the Italian committee in terms of topics, organization, style of exhibits, and scientific artifacts on display. Paris emphasized the scientific thought examined in this volume by Bergeron and Bigg, while the *New York World's Fair*, themed the “World of Tomorrow,” was basically perceived as a commercial.<sup>10</sup> As clearly demonstrated by several detailed EUR reports preserved in the central state archives in Rome, the organizers of E42 looked at what was happening abroad: at the visits of different Italian delegates not only to Paris and New York, but also to the *Brussels International Exhibition* of 1935; the *Glasgow Empire Exhibition* of 1938; and the *San Francisco World's Fair*, the *International Water Exhibition* in Liège, and the *Switzerland National Exhibition* in Zürich, all held in 1939.<sup>11</sup> In the reports are not only the carefully described practical arrangements and overall organization of the exhibitions, but also the impressions aroused in the visitors by each fairs' pavilions and exhibits. This shows the close relationships and influences among these popular international mega events. Furthermore, it is necessary to consider that, during the planning of E42, many temporary exhibitions organized throughout Italy—which were more or less politicized by the Fascist regime—covered topics somehow related to the history of science, technology, and industry. This set a standard and a precedent for other exhibitions, from *Leonardo da Vinci* and the *Italian Inventions* that opened in Milan in 1939 to the *autarkic Exhibition of Italian Minerals* held in Rome during 1938 to 1939.<sup>12</sup> These ideological exhibitions were intended for the general public and offered opportunities to gather artifacts and other materials that could be used later to establish or expand collections for permanent museums. However, at the same time the very idea of museums was being questioned.

It is impossible to understand the overall concept of the *Exhibition on Universal Science* and the intention to transform it into a permanent institution without analyzing this project in the context of the lively Italian and international scenes during this time. On the one hand, E42 was a response to the attempts of establishing in Italy, as in other Western countries, a national science and technology museum, which did not exist until then. On the other hand, it had the ambition to offer an alternative to the models existing at the time, such as the *Deutsches Museum*

in Munich and the brand-new Palais de la découverte in Paris. Although it is basically a history of failures, since E42 was never realized due to the Second World War, this case study provides an in-depth understanding of the relationships between national and international exhibitions and permanent science museums during the interwar period, and outlines the many-sided Italian debate, which after many years finally led to the foundation in 1953 of a national museum of science and technology, albeit in Milan rather than in Rome. This debate involved different communities, ranging from scientists and engineers to historians of science and industrialists, which for some years acted in parallel and represented different demands. During the 1930s, the discussion in Italy could be seen as a miniature version of a wider and differentiated debate happening abroad regarding the fate of science museums, the public use of scientific artifacts in the context of nationalistic narratives focused on identity and *primati*, and the introduction of new kinds of interactive and manufactured exhibits to display science and its history to a general audience.

## The Quest for the “Living Museum” and the Italian Exhibition Mania

The Exhibition on Universal Science acted in the Italian panorama as a turning point in an ongoing debate regarding the foundation of an Italian national science and technology museum and the very idea of a “museum” as a living institution. When plans for the exhibition and the science museum of Rome began, the debate already had been taking place since at least the end of the 1920s. The E42 stimulated discussion among different antagonists while at the same time responded to the need for new and more effective exhibits to disseminate science.

In the Italian context, a prominent role had been played by the Institute and Museum of History of Science, which had been established in Florence in 1930, one year after the pioneering National Exhibition of the History of Science (see Barreca, this volume). The museum was engaged in the preservation, protection, and study of the Italian scientific heritage. In Rome, on the occasion of the Italian participation in the Century of Progress International Exposition, a world’s fair held in Chicago from 1933 to 1934, the National Council of Research (CNR) started the *Documentario dei primati scientifici italiani* (Italian scientific achievements documentary) project. Led by chemist Giulio Provenzal, who was also involved in the E42, the project was composed of artifacts and documents and focused on the recovery and glorification of Italian scientific achievements.<sup>13</sup> Meanwhile, Ucelli—supported by a strong community of engineers and industrialists—sought to establish in Milan a museum of labor, industry, and engineering to advance the technical education of general audiences and to document the history of technology. These efforts in Florence, Rome, and Milan all held the same goals: science dissemination, historical research, public education, heritage preservation, and celebration of the Italian scientific tradition. Sometimes, in the absence of sufficient resources, these objectives were intentionally confused—for “opportunistic reasons”—even though they were the expressions of distinct communities driven by different motives. The Institute and Museum of the History of Science in Florence, for example, responded to different kinds of needs compared to the museum in Milan,

even though the protagonists preferred to emphasize similarities over differences in order to gain the support of the authorities.<sup>14</sup> The same happened with the two museums in Milan and Rome, which had their identities adjusted or swapped to fit different needs. For example, the museum in Rome was considered a museum of industry when the E42 committee wanted the support of Confindustria (the Confederation of the Italian Industry)<sup>15</sup> as opposed to a museum of basic science, a label used by the committee when it wanted to differentiate the museum in Rome from that of Milan.

The foundation of an Italian national science museum was already an issue before the strong impetus resulting from the Florentine exhibition in 1929 and the Chicago World's Fair in 1933. On 1 January 1928, in a message to Guglielmo Marconi, the well-known physicist and inventor who had just become president of the recently reformed CNR, Mussolini's personal commitment to the creation of "living museums where progresses of science, technology, and industry" was made clear. He wrote, "A country does not spend effort in vain in these works of progress."<sup>16</sup> Mussolini believed that his country should have a museum intended for science education and dissemination in a time of political and economic autarky promoted by its regime. The press immediately emphasized that "models and machines in museums should not only be proudly displayed or simply evoke the memory of a glorious past,"<sup>17</sup> but instead had to teach and entertain, stimulating the interest of young generations and driving the working class toward science and technology. The realization of the museum soon became one of the objectives of the CNR, the same institution involved in the creation of the *Documentario* project, displayed in 1937 in the CNR's new building in Rome. In June 1928, the secretary Giovanni Magrini contacted several European museums, including the Science Museum of London, to gather information to establish an institution of this kind in Rome, but in the end Marconi preferred to support the initiative led by Ucelli and the municipality of Milan.<sup>18</sup>

It is likely that the message of Mussolini was the result of a previous debate regarding, on the one hand, the history of science and, on the other hand, technical education. In the former case, many science historians had been asking for a national museum as a solution to the fragmentation and preservation of historical and scientific heritage on Italian territory. For example, Aldo Mieli closed his 1921 report on the Deutsches Museum wondering, "Why don't we join efforts and try to build a great institution, able if not to outdo, at least to equal the new museums in Munich, Paris, London and Washington?"<sup>19</sup> Mieli sought to establish in Rome a leading institution for the study of the history of science, with the support of the influential philosopher and minister of public education Giovanni Gentile. Also in Rome, science historian and mathematician Federigo Enriques had established the National Institute for the History of Physics and Mathematics in 1923. In Florence in 1927, the Institute and Museum of the History of Science had been founded thanks to the efforts of the Group for the Preservation of Italian Scientific Heritage, which included physicist Antonio Garbasso, physician Andrea Corsini, and senator Piero Ginori Conti.

In the latter case—technical education—in 1926, the engineer Giuseppe Belluzzo, at the time minister of national economy and very close to Mussolini, wrote his article entitled "*Scienza*

*e tecnica per l'avvenire economico dell'Italia fascista.*" He underlined the educational objectives of displaying machines in action, turbines, engines, and cannons such as those seen at the Deutsches Museum, and the importance of science and industry museums for the formation of an "industrial conscience of the people."<sup>20</sup> Belluzzo recalled his tour of the European scientific museums in 1905 and the unsuccessful proposal to establish such a museum in Milan following the Universal Exhibition in 1906. The article closed with the request to install a permanent pavilion of physics, chemistry, and their industrial applications in the industrial city of Milan, an idea later successfully developed by Ucelli, one of Belluzzo's friends and most brilliant disciples at the Polytechnic University of Milan.

Following Mussolini's 1928 message, the debate intensified during the 1930s, which had significant consequences on the planning of E42 Exhibition of Universal Science. Many scholars spoke of needing "living museums," both in terms of renovating existing museums and founding new and more instructive ones. The use of the adjective "living" referred mostly to ways of engaging visitors through more effective and amusing displays, such as dioramas or functioning models accentuated by sound and film. In 1930, Francesco Mauro, an engineer and keen mineralogist who was active in Milan and very close to Ucelli, published a report concerning his visit to some American museums, including the American Museum of Natural History in New York and the Field Museum of Natural History in Chicago. Comparing Italy to the United States, he pointed out that the main aim of a public museum should be the education of the people through dynamic exhibits rather than being "*musei chilometrici* [very large museums], of a total frigidity in winter and summer, good only to humiliate the soles of the feet."<sup>21</sup> For example, the dioramas of the African Hall of the American Natural History Museum or the comparison of mineral samples and industrial products in the Field Museum impressed visitors more than the many specimens and instruments displayed without any interpretation in an endless sequence of shelves or glass cases. Showing processes and comparing phenomena was thus considered more effective and instructive than having visitors merely looking at objects, even if the artifacts were of great relevance. As in the United States, Italy had to put an end to the fixed pair "museum and dust"<sup>22</sup> that was favored by many Italian scholars of the time. These included biologist Gustavo Brunelli, who emphasized the role of dioramas for natural history museums, and zoologist Giovanni Battista Trener, director of the Natural History Museum of the Tridentine Venice that was established in Trento in 1930, who stressed the importance of a museum being "alive" as a center of promotion of scientific research and education. In favor of creating an Italian National Museum of Natural History (which was never realized),<sup>23</sup> Trener discussed the use of the word "museum" to describe his newborn institution, since many in Italy considered it a "compromised" and "dusty" term. In terms of science and technology museums, Ucelli also wondered about and discussed with ministers and Mussolini himself what to call the nascent museum in order to transmit an idea of dynamism and liveliness: "Polytechnic Institution," "Center of Documentation and Propaganda for the History of Technology," and "Polytechnic Documentary of Science, Arts and Industries," were all considered, but in 1943, he finally opted

for “museum.” And in particular, in opposition to the E42 project that focused on basic science, he chose to call it “Museum of Technology and Industry.”

At the same time, temporary exhibitions organized in Italy during the 1930s influenced the style, design, and topics of scientific and technological artifacts to be displayed in public—whether they were originals or, more often, replicas and models. I am referring to mass events organized in different Italian cities under the auspices of the regime, such as the *Mostra dell’Aeronautica Italiana*, inaugurated in 1934 in Milan in the *Palazzo dell’Arte*, or to the aforementioned *Mostra Augustea della Romanità*. In many of these exhibitions, the achievements of fascist Italy were connected to the idea of a glorious scientific past in order to highlight the successful autarkic politics promoted by fascism. A symbol of this trend was the imposing *Mostra di Leonardo da Vinci e delle Invenzioni Italiane* (Exhibition on Leonardo da Vinci and the Italian Inventions), which opened during the organization of E42. It comprised two exhibits that celebrated the genius of one of the most famous Italian artists and scientists in connection with Italian scientific tradition and the achievements of the regime in the fields of science, invention, and industrial applications. Some of the most relevant Italian industries of the time participated in the event: the *Officine Galileo* for optics, *Pirelli* for chemistry, *Fiat* for the automobile industry, in addition to universities and the ministries of the army, navy, and air force. As stated in the event brochure, the two exhibits “are not two distinct things, but a whole organic project ideally connected through the centuries: the common purpose is to provide perfect and up-to-date documentation of the advances made by science and technology from the sixteenth century to the present.”<sup>24</sup> In addition, Gerolamo Oldofredi, general director of the executive committee of the Exhibition on Italian Inventions, declared that Galileo memorabilia, Galvani’s notebook, Volta’s battery, Pacinotti’s ring, Meucci’s telephone, and Marconi’s transmitters should be seen in continuity with the work of Leonardo in presenting the Italian contribution to human civilization.<sup>25</sup> Many exhibitions devoted to Italian self-sufficiency in industry and economy included a historical focus. This included the *Mostra Nazionale delle Bonifiche*, which opened in Rome in 1932 and had a section devoted to Leonardo and the Exhibition of Italian minerals, which was held in Rome from 1938 to 1939. The latter featured a section called *Research and Inventions* that was headed by the CNR and offered a retrospective on the history of the use of minerals and the mining industry since the Etruscans, including dioramas, machines, and instruments of miners; a relief of a furnace; and original manuscripts of engineer and politician Quintino Sella, metallurgist Vannoccio Biringuccio, and physician Andrea Cesalpino.<sup>26</sup> Again and again, historical and current research were connected in one exhibition, in one narrative.

## A Palais de la Découverte in Rome, a Deutsches Museum in Milan?

In the Italian multilayered debate on whether living museums were needed to disseminate science, the Exhibition on Universal Science had to stress its individuality in comparison to exhibitions and museums in Florence and Milan and the *Documentario* project in Rome. It was

designed as a gallery of scientific principles, a review of the history of scientific thought from ancient civilizations to the present day. It was not intended to become a museum of original instruments, like Florence, or a museum of technical and industrial devices, like Milan, but rather mostly a museum of manufactured exhibits concerning the universal history of scientific discovery looked at through the history and development of disciplines until the present state of the art.

On an international level, the brand-new Palais de la découverte (see Bergeron and Bigg, this volume) in Paris, inaugurated during the 1937 Exposition Internationale, had a great influence on E42 in terms of exhibits and contents. In Milan, Ucelli led an opposing project inspired by the Deutsches Museum in Munich. The German museum was aimed at educating and disseminating technical and industrial knowledge as well as documenting and studying the so-called progresses of technology and production. At the time, the Deutsches Museum was among the best-known museums of this kind in Italy, to the extent that the architects of E42 also looked first at its exhibitions.<sup>27</sup> As Ucelli wrote in 1941, these museums “must not only be of interest to scholars, they have also to make clear and understandable to the masses, to the community, the ideals of science, the general problems of the availability and processing of raw materials, the specific problems of agriculture and industry, the real problems of production and organization; they have to celebrate the nobility of work, facilitating professional guidance; they also have to give the maximum possible technical culture to the people to promote progress and individual self-development.”<sup>28</sup> From the very beginning of the planning of E42, the parallel attempts of Rome and Milan developed in mutual and constant dialogue and in opposition to each other, giving voice to different protagonists and demands existing at the time in Italy in the field of museum practice. Both projects were trying to interpret and respond to Mussolini’s mandate. The correspondence between Ucelli and Vittorio Cini, the general director of E42, started in October 1936, when Ucelli asked to be involved in the project. He wanted to deal with the technical section, following “in a livelier way” the examples of the museums in Munich, London, Chicago, Vienna, and Paris, which he had personally paid visits to since the early 1930s.<sup>29</sup>

Before planning for E42 began, the pursuit of establishing a science museum already involved both Milan and Rome. Ucelli’s attempts dated back to 1930, when he chaired a commission the municipality of Milan had appointed to realize a Museum of Art and Industry. In February 1931, he gained the support of Marconi, with whom Ucelli collaborated on the occasion of Italy’s participation in the Chicago World’s Fair. In June 1933, Ucelli informed the municipality that the secretary of the CNR, Giovanni Magrini, while giving priority to Milan, was evaluating various options: “1) the creation in Rome of a museum of science and industry; 2) the creation of two distinct museums, one of science in Rome or in Florence, the other of industry in Milan; and 3) the creation of a national museum and of several regional industrial museums in different cities of Italy in order to document and display typical regional productions.”<sup>30</sup> One year later, the situation had not changed much, as pointed out by Ucelli: “In recent times, various hostilities have arisen in the directorate of the CNR against the project of the museum of Milan, since several members view this as an opportunity to found the new institution in Rome. It would

seem, however, that Marconi and Magrini together with others want to entrust Milan with the industrial museum, leaving to Rome the museum of science (which in the past others had wanted to be established in Florence).<sup>31</sup>

With the start of the work for E42 and the death of Marconi, the negotiation for the science and industry museum was taken over by Bottai, who as the minister of national education presided over both initiatives. With Florence slowly leaving the national scene, the debate narrowed to choosing between Milan and Rome, with both sides negotiating behind the scenes. In 1936, Ucelli, in association with the engineer Mauro and the architects Enrico A. Griffini, Piero Portaluppi, and Giovanni Sacchi, proposed creating a polytechnic institution (Figure 3) to be built in close proximity to the Polytechnic University of Milan and designed not as a center of “dead documentation but of living and ‘speaking’ instruments, capable of an effective propulsive action (machines in movement, films, phonographs).”<sup>32</sup> On 29 December of the same year, a copy of the project was given by Ucelli to Cini in order to coordinate the two initiatives, while at the same time Bottai, the main supporter of the E42 science exhibition, stated that an influential group still wanted to establish the museum in the capital and not in Milan. At this stage, Ucelli’s project had not been realized due to economic difficulties, which left room for E42— so much so that during a meeting with Mussolini on 15 July 1937, Ucelli asked and obtained permission to proceed with his plan only after assuring Mussolini that his project would not interfere with the Exhibition on Universal Science. Cini gave the same assurances on various occasions.<sup>33</sup> Therefore, E42 had the effect of accelerating the negotiations led by Ucelli, who aimed at gaining the support of the government for the museum, particularly once Milan hosted the successful Exhibition on Leonardo da Vinci and the Italian Inventions in 1939. Ucelli saw this exhibition as an opportunity to assemble the first nucleus of collections of the nascent museum.



**Figure 3.** A sketch of the great gallery of machines designed for the polytechnic institution in Milan. From Mauro, Griffini, Portaluppi, Sacchi, and Ucelli, *Schema di progetto per una istituzione politecnica in Milano*, 1936. Courtesy of Leonardo da Vinci National Museum of Science and Technology, Library.

Inasmuch as Ucelli looked for the most part at the Deutsches Museum for inspiration, the concept behind the Exhibition on Universal Science remained vague for a while. Ucelli was involved in both projects (formally from 16 May 1939); in 1938, he had expressed his opinion to Cini on the design of the Exhibition of Universal Science. His idea resembled the CNR's *Documentario* project in that it stressed the relevance of Italian scientific tradition:

I think that a universal science exhibition in the E42 should necessarily largely repeat, albeit improving on them, the programs of the Chicago, Paris, New York world fairs, not to mention the achievements of the museums of Monaco and London. In my opinion, a universal documentation is hardly likely to have the character of novelty and originality, while, on the other hand, in an international context it would be impossible to give particular importance to the scientific contribution of Italy. For all these reasons, I would like to recommend an exhibition of the Italian genius to make known and to celebrate the contribution made by Italy in all fields of science and technology to progress and civilization.<sup>34</sup>

In answering him, Cini reminded him that this idea was precisely the core of another E42 initiative, the Exhibition on Italian Civilization. They had to plan something else. In October 1937, the minister of popular culture, Dino Edoardo Alfieri, had already suggested to Cini to aim at something similar to that of the Palais de la découverte, even though “this glorification of Research and Discovery should be something more and better in Italy, and above all it should be realized with other intentions: it should be a synthesis of our current scientific knowledge, with the demonstration of all the ways they have opened to technology and to modern civilization, realized by making a great effort to bring it to the understanding of the masses. Not a didactic museum, but a living parade of our conquests, shown to our people.”<sup>35</sup> Bottai—who in those days was working at the Exhibition of Scientific Education in Rome—had his own ideas of what the exhibition should be. He thought it should be a museum of science, technology, and pedagogy, the “representation of human labor and the triumphs of genius, . . . showing the role of technology in society and of school in the education of new generations.”<sup>36</sup> His idea more closely resembled Ucelli's project than the scheme later prepared by the organizers of E42.

The objectives and design of the Exhibition on Universal Science remained confused until the committee vice president, Sabato Visco, published the planning outline of the exposition in March 1939. His report was pivotal to understanding the overall framework of the exhibits, even if it lacked practical instructions for the distribution of space or the coordination of the works of the subcommittees. Comparison with foreign museums played a central role in defining the shape of the Italian initiative. Visco was not thinking in terms of an exhibition focused on technical applications of science, as in the Deutsches Museum or in the Science Museum of London. Instead, he was oriented toward the new Palais de la découverte, where scientific laws were demonstrated in front of the visitor. The experience of the Palais was well known in Italy. For example, it was reviewed in the CNR's journal *La Ricerca Scientifica* by Edoardo Lombardi, who had personally visited the exhibition. In his article he focused on the beauty and originality

of some of the exhibits: “In many sections, the organizers wanted the public to experiment with their own hands by pressing buttons, maneuvering flyers according to the instructions written on special tables. Other demonstrations, instead, followed one another cyclically and automatically, repeating at intervals throughout the day, often associated with phonographically recorded explanations.”<sup>37</sup> Nevertheless, according to Visco, Paris lacked the provision of a synthetic and universal vision of science, emphasizing entertainment more than education. It resembled too much “a fair where more or less interesting demonstrations are made, arousing the curiosity of the audience without contributing to its education.”<sup>38</sup> On the contrary, the encyclopedic exhibition of Rome sought to explain how humankind has deciphered nature throughout the centuries, claiming the importance of basic science and the role played by scientists in a regime that preferred applied scientists and engineers. This is not surprising considering that the organizers were almost entirely scientists rather than engineers or technicians, as was the case in Milan. On the one hand, the topics of the Florence Museum and E42 were similar in that both were related to the history of science; on the other hand, the exhibits were completely different, as Florence preserved and displayed relevant original items, such as the microscope of Giambattista Amici or the instruments of the Accademia del Cimento, and not replicas and models.<sup>39</sup> Moreover, in Rome the main goal was displaying scientific enterprise and discovery rather than history.

Visco was aware of the ongoing debate regarding science and natural history museums in Italy and abroad. Therefore, as Mauro pointed out some years before pleasing the visitors as well as educating them in a sort of “edutainment” ante litteram was important. “It is not enough for the documentation to be clear and understandable,” argued Visco in his planning outline of the Exhibition of Universal Science. “The visitor should not be bored, because boredom causes tiredness, distracting attention and eventually leads to the visitor going through the exhibition without paying attention, obtaining nothing more than a chaotic memory of incomprehensible instruments, complicated machines, and inexplicable applications.” Scientists had to work together with technicians, artists, decorators, electricians, and sculptors to achieve a satisfying result, which was a “living” and “dynamic” exhibition where the presence of an object had to be immediately understandable to the general public. Emotionless and outdated heaps of machines, instruments, and documents on shelves and in glass showcases should be completely avoided. On the contrary, Visco wrote, “light games, working models, lighting schemes, animated projections, working devices, [and] ‘living’ reproductions of animal organisms” awakened the visitor’s attention and were thus recommended. In particular, he added, the exhibition “should avoid the abuse of photographs and photomontages that should only be reserved for very large reproductions of manuscripts, book pages, or panoramic backgrounds. If they are unavoidable, they could be used as subsidiary means from time to time, even if it must be noted that they are generally unsuitable for a science exhibition.”<sup>40</sup> In his opinion, the exhibition on Leonardo in Milan was, as he wrote in a letter to Cini, “burdened with several rooms that claimed to reproduce the environments in which Leonardo lived and worked, with many halls overloaded with books, paintings, busts, and other objects.”<sup>41</sup>

Cini confirmed that the Exhibition on Universal Science should be an Italian interpretation of the Palais de la découverte and of the scientific departments of the Deutsches Museum. Furthermore, the engineer Giovanni Gallarati, in charge of editing the final draft of the project, agreed with Visco that the exposition should be something new compared to the Deutsches Museum and the Palais de la découverte. Gallarati stated that whereas “the Germans have realized an impressive encyclopedia for didactics and science dissemination,” and “Jean Perrin and his collaborators have organized what they called a ‘Louvre of Science,’” the two models appeared insufficient: “Anachronistic and outdated is the celebration of Science, devoid of any light and poetry, seen only as a valued and feared means for the conquest of wealth, fortune and power.” On the contrary, E42 sought to display a summary of the history of scientific thought depicted as a cultural enterprise of human spirit in its more significant moments. Indeed, according to Gallarati, science represented first of all an “artistic and religious enterprise,” an unselfish observation of nature.<sup>42</sup> If New York 1939 World’s Fair had been dedicated to the “world of tomorrow,” for Gallarati, E42 should focus on the “past of tomorrow,” on how science developed throughout the centuries and on the truths of the past that had been revealed as mistakes in the present.

Oscillating between Milan and Rome and between Paris and Munich, the debate over the Italian museum of science and technology began gathering momentum in 1941. The relationship between Ucelli and the E42 committee became more tense. One of the reasons was the disappointment of the Confindustria, the General Confederation of Italian Industry, which in 1939 had funded the construction of the Science Palace at EUR with the intent to establish a national museum of industry and technology instead of an institution dedicated to theoretical science. In 1942 the annoyance of Confindustria’s president, Balella, came to the surface, as shown in the correspondence exchanged between November and December 1942 among Ucelli, Cini, and Balella. The latter did not believe in Cini’s reassurance that the two ongoing projects of Milan and Rome would not overlap.<sup>43</sup> In a letter of 7 July 1942, Cini remarked on the differences between the two initiatives in terms of objective and concept: On the one hand Milan had “a national profile and completely didactic and technical-industrial aims.” On the other hand Rome had an “international and universal profile, with historic, scientific and cultural characteristics.”<sup>44</sup> Technology was then considered a national matter, whereas science was interpreted as a universal enterprise. Nevertheless, as claimed by historian of science Geert Somsen, stressing universal science was always part of the propaganda strategy of the Fascist regime; likewise the rhetoric on Italian science and culture displayed at E42 Exhibition of Italian Civilization. Thus, displaying the spiritual and universal side of science contributed from a different perspective to promoting to the world the fascist conception of civilization and world order.<sup>45</sup>

As a matter of fact, despite the complaints of Giordani, the president of the committee of the Exhibition of Universal Science, Bottai attended an official meeting in Milan in June 1942 to support the project sketched out by Ucelli in December 1941. With the approval of Bottai and Mussolini, the foundation named National Museum of Technology and Industry came to life between October and November.<sup>46</sup> Before Mussolini’s fall in July 1943, this gave Ucelli a

considerable advantage in the frenetic negotiations that involved ministers like Bottai, the organizers of E42, and a new protagonist—the permanent pavilion of technology constructed at the Mostra d'Oltremare, a fair established in Naples in 1940. In December, the committee of the Exhibition of Universal Science asked for a clarification,<sup>47</sup> and on 12 January 1943 a commission headed by Giordani was appointed to coordinate and balance the three projects, showing how complex and multilayered the situation was because E42 had not yet been officially cancelled. In Ucelli's vision, the Exhibition of Universal Science and the pavilion of Naples would be two appendages of the national museum of Milan, with the focus on pure science in Rome, and on science and technology as related to import and export in Naples in the colonies. But the other groups involved had different plans.

Moreover, dividing science and technology was not a simple matter. A technology museum should in any case respond to a synthetic vision: "Documentation of technology cannot exclude documentation of science because technology is nothing more than science's application. The continuous technical developments, which will be the core of the living museum proposed by il Duce, will descend from future applications of scientific research and inventions."<sup>48</sup> In some notes, Ucelli complained that Giordani sought to demonstrate that most of the topics pertained to science rather than technology. In Giordani's view, even the study of the human factor in production had to be considered in connection with topics such as physiology, biology, the study of human fatigue, professional education, and organization of production—pertaining to science more than to technology and industry.<sup>49</sup> In the meeting of 22 January 1943, even civil engineering projects such as irrigation were claimed as pertaining to science, which Ucelli denounced. On 4 March of the same year, Bottai invited Ucelli to pursue his project, ignoring Giordani whom he disregarded as a "Neapolitan."<sup>50</sup> Most likely, at that point Ucelli's project seemed more concrete and achievable to Bottai.

Eventually, the project of the Exhibition of Universal Science was abandoned due to the fall of the Fascist regime, whereas the efforts of Ucelli survived these dramatic events. Soon after the war, during the first general conference of the International Council of Museums (ICOM) held in Paris from 28 June to 3 July 1948, the international community of science museums still discussed the challenges of "dividing science from technology, concluding that it was necessary to leave the choice to single institutions of each country according to their specific characteristics." Ucelli explained, "It can be estimated that at the Science Museum in London two-thirds is devoted to technology and one-third to science: For example, in some areas like electricity, weights and measures, the supremacy of science is clear; however, it would be almost impossible to have exhibitions of pure science or pure technology, considering their interdependence."<sup>51</sup> In 1946 Ucelli resumed his activities until in 1953, when the Leonardo da Vinci National Museum of Science and Technology, which featured displays that resembled the interactive exhibits of the Deutsches Museum, opened its doors in Milan (Figure 4). From 1946 to 1952 Ucelli attempted to acquire the preparatory materials produced by the commission of both the Exhibition of Universal Science and the Exhibition of Italian Civilization, as at that



**Figure 4.** During the 1950s, some of the exhibits at the Museum of Science and Technology in Milan encouraged interaction. Courtesy of Leonardo da Vinci National Museum of Science and Technology, Photographic Archive.

point the museum had to include technology as well as science,<sup>52</sup> but his attempt failed and the documents remained in Rome.

## The Exhibition of Universal Science: A Visual Encyclopedia for the History of Science

In the ideal division of tasks between Milan and Rome, Ucelli took advantage of the delay of E42. The nine subcommissions—composed of around 230 university professors from all over Italy—worked primarily between 1939 and 1940 to follow Visco’s outline, and in the end produced 124 reports that needed to be summarized in one final document. According to archival materials, only the subcommittees on mathematics, astronomy, physics, geophysics, and meteorology became a final draft, even though the information at our disposal is sometimes contradictory. On 29 October 1941, Cini complained with Giordani about the serious delays of the committee: “I asked, I insisted, I begged . . . and still I have received nothing!”<sup>53</sup> Cini had promised to deliver the final program to Bottai by October and to Mussolini by December. Because both Visco and Giordani were unable to systematically deal with the job, despite their repeated promises, Cini asked them to find at least “a diligent even though mediocre person”<sup>54</sup> in charge of producing a summary from the reports. Likely, the engineer Giovanni Gallarati

was chosen to be the author of what ended up being an incomplete scheme for the first part of the exhibition, as based on the notes of Visco and Giordani. The project followed a chronological order up to the birth of so-called “modern science,” continuing with the chronological development of each discipline.

The organizing committee released an anonymous draft in February 1943 that followed Gallarati’s recommendations: divide the exposition into 13 halls, each covering a particular topic, which ranged broadly from archaeological excavations of Ur to works of Galileo. Then followed other reports about some of these topics: geodesy would be subdivided into 10 halls; geography had only brief information; chemistry was organized into 21 halls; geology and mineralogy had only four halls and very few details; and astronomy was organized in 15 halls according to subjects such as the stars, the planets, or the moon. In the draft, next to the description of the contents, the anonymous author also indicated what and how objects should be displayed. Most of the exhibits featured replicas, functioning models, portraits, casts, and duplicates accompanied by maps, charts, drawings, diagrams, schemes, films, mottos written on the walls, and practical demonstrations. For each exhibit, committee members had to fill in preprinted forms, specifying: (1) the observation, discovery, invention under examination; (2) name of the scientist being featured and subsequent discoveries; (3) the scientific law on which the discovery was based; (4) the instruments related to the observation, discovery or invention and exhibits required to display them; (5) how the phenomenon could be explained to the public, such as through diagrams or films; (6) the museums or universities that preserve the objects; (7) producers, funds, and estimated time required for construction; and (8) other related documentation. For example, to explain the circulation of blood, exhibitors could show film of cardiac arrest, brought about by nerve stimulation activated by the Weber brothers. According to its organizers, E42 should have had its own workshop equipped with carpentry, glassmaking tools, and chemical supplies, where the assembly and repair of instruments could take place during the world’s fair.

Architects Luigi Brusa, Gino Cangelotti, Eugenio Montuori, and Alfredo Scalpelli were in charge of the realization of the Palace of Science, which was to host the Universal Exposition of Science, on the right side of the Piazza Imperiale, in front of the ethnographical Exhibition on Popular Italian Traditions. They designed a monumental palace divided into two buildings, which were to be connected by a bridge (Figures 5, 6).<sup>55</sup> Giordani laid out a floor-by-floor scheme, as the main aim of the exhibition was “leading the visitor, through a logical thread, to the gradual knowledge of the contribution of scientific thinking to modern civilization.”<sup>56</sup> At the main building’s basement level there were to be exhibits on geology, mineralogy, and speleology. The ground floor would have documented origins of scientific thinking up to the time of Leonardo. Following a visitor’s path from right to left, the first floor would have opened the path to the modern physical sciences with Galileo, while medicine and biology would have been displayed on the second floor. The ground floor in the second building would host a conference hall and a library. Another small pavilion was to be devoted to astronomy.



**Figure 5.** The Palace of Science under construction, 18 July 1940. Courtesy of Central Archives of the State, Rome, EUR, Photographic Archive.



**Figure 6.** A view of Piazza Imperiale from the Palace of Italian Civilization in January 1942. Courtesy of Central Archives of the State, Rome, EUR, Photographic Archive.

The plan for decorating the Palace of Science was extensive, aimed at conveying the glorious idea that scientific discovery is a tool of progress in human civilization. Artist and commissioner Cipriano Efisio Oppo was in charge of choosing artists, to whom Visco had to provide examples of scientific iconography. The plan included the mosaic *Le professioni e le arti* by Fortunato Depero on the external wall, paintings by Valerio Frascchetti about the school of Galileo and the technical applications of science in the entrance hall, stained-glass windows depicting scenes from the development of astronomy by Giulio Rosso (Figure 7), and inlaid flooring with decorations representing science by Mario Tozzi (Figure 8).<sup>57</sup> Only a few of these decorations were actually completed before the war interrupted.

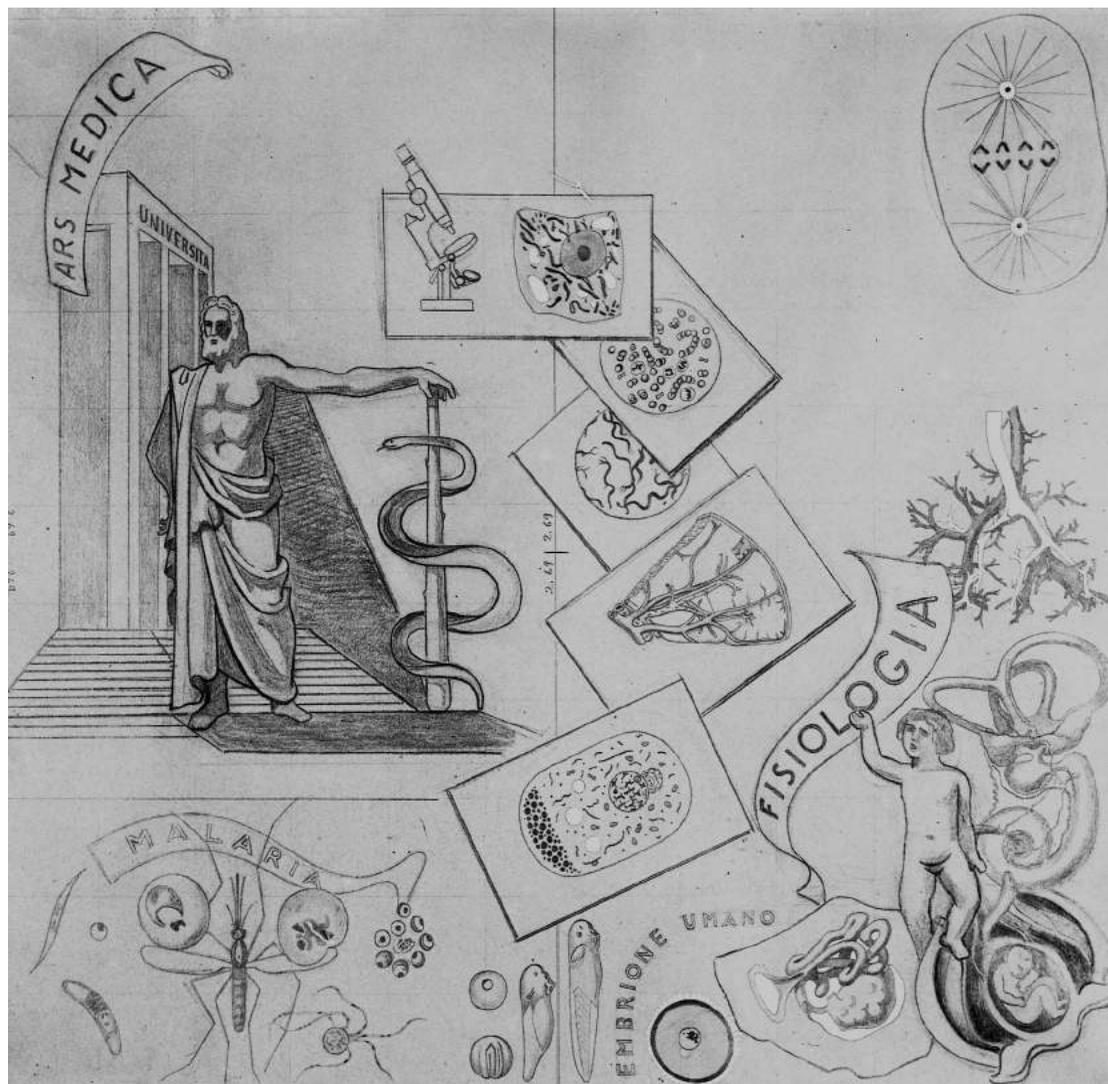
In searching for a balance between entertainment and education, show and culture, how did scientists interpret and give shape to the suggestions made by Visco and Giordani? The answers were disparate depending on personal tastes and interests of each scientist—a fact that made it even harder to plan a coherent project for the exhibition. Even if not all the participants could visit the Palais de la découverte in person, its extensive catalog was circulated among the organizers and served as a crucial source for academic professors who became museum curators. The chain of command was strict. For the subsection of animal ecology, for example, the biologist Umberto D’Ancona had to send his proposal to zoologist Alessandro Ghigi, responsible for the ecological commission, who had to transmit them for approval to Visco, head of the biological commission. D’Ancona suggested the use of dioramas as in natural history museums, marine animals made with blown glass, photos of marine environments, and several film clips. Even though on 22 January 1940, Ghigi informed D’Ancona that the supervisors “do not want dioramas, neither charts, nor models, but devices, footages, and diagrams, Visco eventually agreed to the creation of a small number of dioramas that could be exhibited as relaxing areas for the visitor.”<sup>58</sup> On the other hand to a biologist like D’Ancona, some exhibits seemed too “frivolous and more suitable for a fair than for a didactic science exhibition designed to become a permanent museum.”<sup>59</sup> If D’Ancona asked for scientific accuracy, Visco complained about the extent of the drafts, which too closely resembled a biology textbook than an outline of the main achievements and discoveries in biology.

In the subcommittees’ reports regarding recent scientific fields, the focus was more on the present state of the art and on explanations of scientific laws than on history. For instance, in the oceanography section the main objective was to explain phenomena like tides; in the genetics halls the aim was explanation of hereditary laws. Next to artifacts and interactive exhibits, scientists would be on stage, demonstrating their own science and performing phenomena in front of the visitors, like in the Palais de la découverte. Felice De Carli, a chemist of the University of Bologna, referred explicitly to the catalog of the Palais, suggesting that the exhibition should include “the work of an experimenter explaining the phenomenon that the experience wants to reproduce as well as the meaning of it. This can be done at certain hours of the day and can be supplemented by movies and cartoons.”<sup>60</sup>

In the subcommittee on chemistry, Giovanni Malquori, the head of the Institute of Pharmaceutical Chemistry of the University of Naples, imagined an exhibition that made the sequence



**Figure 7.** Sketch of stained-glass window with scientific motifs by Giulio Rosso for the Palace of Science vestibule. Courtesy of Central Archives of the State, Rome, EUR, Photographic Archive.



**Figure 8.** Sketch *Ars medica* and *Physiology* by Mario Tozzi for the floor of the central hall of the Palace of Science. Courtesy of Central Archives of the State, Rome, EUR, Photographic Archive.

and evolution of chemical knowledge as evident as possible. As he wrote to Provenzal, the aim of the exhibition “is not to make a museum like the Deutsches Museum, but to display the evolution of scientific thought in broad terms.”<sup>61</sup> Following these suggestions, Provenzal planned a total of six halls that would cover the history of science from the time of pre-Roman and Roman Antiquity, passing through alchemy, to the chemistry of Lavoisier. In the entrance hall devoted to Greek and Latin philosophy, he invoked the collaboration of artists in order to give an “artistic representation of fundamental concepts: for example, in the upper spheres should be inserted a huge quantity of atoms of various sizes and with special forms in accordance to the vision of Lucretius; an illumination given by a sun, a moon, and a Saturn; and a ray of light that illuminates the atmospheric dust.”<sup>62</sup> He also mentioned a copy of an Etruscan furnace, statues, portraits, instruments, a reconstruction of an alchemical laboratory, and Lavoisier’s laboratory; for which

he suggested using students as guides. The final draft of the chemical section of the Exhibition of Universal Science increased to 28 halls.

## Conclusion

The widespread debate around E42 sheds light on what a scientific or technical museum would have been like during the Fascist regime, including what artifacts would have been chosen and how they would have been displayed to the public. It also places the Italy of the interwar period into a broader international debate about museums and universal exhibitions. It would be impossible to understand the Exhibition of Universal Science without taking into consideration the museum project of Ucelli, or vice versa.<sup>63</sup> With regard to the Italian debate about the need for living museums of science and technology, during the 1930s in Italy there was not just one museum that strove to become national but at least three: the Institute and Museum for the History of Science in Florence, the National Museum of Science and Technology in Milan, and the never-realized science museum in Rome. They represented three different ideas of museums and three distinct research communities: historians of science, engineers, and scientists, respectively. The E42 had the effect of accelerating an ongoing debate. Despite its failure, the Universal Exposition of Science did give birth to a permanent museum in Milan—the National Museum of Science and Technology—though that museum was the exposition's rival.

## Notes

1. On E42, science, and internationalism, see also G. Somsen, "Science, Fascism, and Foreign Policy: The Exhibition "Scienza Universale" at the 1942 Rome World's Fair," *Isis* 108 (2017): 769–791.
2. R. H. Kargon, K. Fiss, M. Low, and A. P. Molella, *World's Fairs on the Eve of War: Science Technology and Modernity, 1937–1942* (Pittsburgh: University of Pittsburgh Press, 2015), 136, 125.
3. Kargon et al., *World's Fairs on the Eve of War*, 111. On EUR, see also chapters 7 and 8 of A. Kallis, *The Third Rome, 1922–1943: The Making of the Fascist Capital* (New York: Palgrave Macmillan, 2014) and V. Vidotto, ed., *Esposizione Universale di Roma: Una Città Nuova dal Fascismo agli Anni '60* (Rome: De Luca Editori d'Arte, 2015).
4. See E. Garin, "La civiltà italiana nell'Esposizione del 1942," in *E42: Utopia e scenario del regime*, vol. I, *Ideologia e programma dell'Olimpiade delle Civiltà*, ed. T. Gregory and A. Tartaro (Venice: Marsilio, 1987), 3–16 and appendix, 118–120. The exhibition also focused on minor Italian scholars and scientists.
5. V. Castronovo, "La città italiana dell'economia corporativa," in *E42: Utopia e scenario del regime*, vol. I, 17–25.
6. For an overview on the Italian legislation over historical scientific heritage see E. Canadelli, "I musei scientifici," in *Storia d'Italia, Annali 26, Scienze e cultura dell'Italia unita*, eds. F. Cassata and C. Pogliano (Turin: Einaudi, 2011), 867–893.
7. During its history the museum had many names. From its inauguration in 1953 to 2000, the Italian name was Museo Nazionale della Scienza e della Tecnica Leonardo da Vinci di Milano, and then "Tecnica" changed to "Tecnologia." The English translation used is Leonardo da Vinci National Museum of Science and Technology. See *Guido Ucelli di Nemi: Industriale, umanista, innovatore* (Milan: Hoepli, 2011) and E. Canadelli, "Le macchine dell'ingegnere umanista: il progetto museale di Guido Ucelli tra Fascismo e Dopoguerra," *Physis* 51, 1–2 (2016): 93–104.
8. Galluzzi, "La storia della scienza nell'E42," in *E42: Utopia e scenario del regime*, vol. I, 53–69.
9. For the other members of the committee, see Galluzzi, "La storia della scienza nell'E42," 58.
10. In the Italian journal *Sapere*, several articles on New York have been published: A. Podestà, "Il 'mondo di domani' New York: Esposizione 1939," July 1938: 8–10; G. Lo Duca, "'New York World's Fair 1939' critica di una esposizione," December 1939: 488–490; and the interview with the president of the exhibition, Grover Whalen, November 1939: 342–343.
11. See the reports in Archivio Centrale dello Stato, Rome (hereafter, ACS), Ente Autonomo Esposizione Universale di Roma-E42 (hereafter, EUR), Servizi organizzazione mostre (hereafter, SOM), box 126, folder 687, on Paris 1937, folder 694, on Glasgow, folder 696, on New York and San Francisco; box 127, folder 696, on New York; box 129, folder 700, on Zurich and Liegi; box 129, folder 696, on New York, with a list of all the ongoing exhibitions worldwide in August 1938; box 128, on New York; box 130, folder 711, on Bruxelles 1935, Paris 1937, New York and Zurich; box 130, folder 705, on Portuguese centenary celebrations of 1939 and 1940. See also E. Godoli, "L'E42 e le esposizioni universali," in *E42: Utopia e scenario del regime*, vol. II, *Urbanistica, architettura, arte e decorazione*, 147–155.

12. A. Russo, *Il fascismo in mostra* (Rome: Editori Riuniti, 1999). See also J. Schnapp, *Staging Fascism: 18 BL and the Theater of Masses for Masses* (Stanford, Calif.: Stanford University Press, 1996).
13. See G. Provenzal, *Il Documentario dei primati scientifici e tecnici italiani*, offprint *Atti SISP 1938* (Rome: Scuola Tipografica Pio X, 1939); *Il Consiglio Nazionale delle Ricerche nella sua nuova sede* (Rome: Società Italiana Arti Grafiche, 1937), 45–46.
14. G. Baroncelli and M. Bucciantini, "Per una storia delle istituzioni storico-scientifiche in Italia: L'Istituto e Museo di storia della scienza di Firenze," *Nuncius* 5 (1990): 5–52.
15. See ACS, EUR, SOM, box 1011, folder 970 and Archivio Storico del Museo Nazionale della Scienza e della Tecnica, Milan (hereafter, MNST Archive). On the 16 July 1942 the general manager Balella attached to his letter to Cini a letter from Volpi dated 12 July 1939, where Volpi had written: "The science palace should contain the achievements of science applied to industry and will then be transformed, with subsequent developments and refinements, into a museum of industry, in an institution that is similar to the ones existing in some of the largest industrial countries."
16. *Il Consiglio nazionale delle ricerche: Compiti e organizzazione* (Venice: Officine grafiche Carlo Ferrari, 1929), 5. Canadelli, "I musei scientifici," 884.
17. "Notiziario," *La scuola superiore* 3 (1928): 32.
18. See ACS, Cnr, Presidenza Marconi, box 11, folder *Musei tecnici e scientifici stranieri*.
19. A. Mieli, "Il Deutsches Museum," *Archivio di storia della scienza* 3 (1921): 189. See also Canadelli, "I musei scientifici," 879–884; Barreca, this volume; and M. Beretta, "Andrea Corsini and the Creation of the Museum of the History of Science in Florence (1930–1961)," in *Scientific Instruments on Display*, ed. S. Ackermann, R. L. Kremer, and M. Miniati (Leiden: Brill, 2014), 1–36.
20. G. Belluzzo, "Scienza e tecnica per l'avvenire economico dell'Italia fascista," *Rassegna Italiana* 102 (1926): 727.
21. F. Mauro, "Per un museo naturalistico dell'Africa orientale italiana," *Natura* 29 (1938): 26. See also F. Mauro, "L'organizzazione dei musei di storia naturale, l'educazione del popolo ed il progresso della scienza," *Natura* 21 (1930): 130–156.
22. G. B. Trener, "L'organizzazione scientifica dello Stato moderno," *Atti della Società italiana per il progresso delle scienze (SISP)*, 19a Assembly, 1 (September 1930): 844. For the debate on the "living museum" in the United States, see K. A. Rader and V. E. M. Cain, *Life on Display: Revolutionizing U.S. Museums of Science & Natural History in the Twentieth Century* (Chicago: University of Chicago Press, 2014).
23. E. Canadelli, "Il museo nazionale italiano di storia naturale: Storia di un'idea," *Rendiconti Accademia Nazionale delle Scienze detta dei XL Memorie di Scienze Fisiche e Naturali* 132 38 (2015): 121–154.
24. "La Mostra delle 'Invenzioni Italiane,'" in *Mostra di Leonardo da Vinci e delle invenzioni italiane*, Palazzo dell'Arte, Milan, 9 Maggio–30 Settembre 1939, 10, [http://www.museoscienza.org/voci-della-scienza/documento.asp?doc=113#document\\_open](http://www.museoscienza.org/voci-della-scienza/documento.asp?doc=113#document_open) (accessed 10 May 2017).
25. G. Oldofredi, "Spirito e connotati della rassegna," in *Catalogo ufficiale della mostra delle invenzioni* (Milan: Palazzo dell'Arte, 1939), 26.
26. PNF, *L'autarchia del minerale italiano: Guida della mostra* (Rome: [1938]), 81–86.
27. See the detailed report of 10 June 1938 by the architect Marcello Piacentini on the Deutsches Museum, in ACS, EUR, Servizi architettura, parchi e giardini (hereafter, SAPG), box 905, folder 7888.
28. G. Ucelli, *Il Museo industriale di Milano*, 10 December 1941, preserved in the library of the National Museum of Science and Technology (MNST) in Milan.
29. ACS, EUR, SOM, box 1011, folder 970, letter of 19 October 1936.
30. MNST Archive, *Museo industriale*, Corrispondenza, box 13, Ucelli to Nicodemi, 8 June 1933.
31. MNST Archive, *Museo industriale*, Corrispondenza, box 13, Ucelli to Nicodemi, 29 March 1934.
32. F. Mauro, E. A. Griffini, P. Portaluppi, G. Sacchi, and G. Ucelli, *Schema di progetto per una istituzione politecnica in Milano* (Milan: [s.n.], 1936), no page.
33. ACS, EUR, SOM, box 1011, folder 970, letter from Cini to Ucelli. See also letter from Ucelli to Cini, 12 October 1939.
34. ACS, EUR, SOM, box 86, folder 412, 2 February 1938.
35. ACS, EUR, SOM, box 1009, folder 9770, 11 October 1937 and the answer of Cini of the 22 October.
36. "Città della scienza," in *E42: Utopia e scenario del regime*, vol. I, 106.
37. In *Ricerca scientifica* (March 1938): 253–254.
38. S. Visco, *La mostra della scienza universale*, 22 March 1939, in EUR, SOM, box 1007, folder 9770.
39. See the article by S. Timpanaro senior, in *Ambrosiano*, 2 March 1934.
40. Visco, *La mostra della scienza universale*.
41. ACS, EUR, SOM, box 1010, folder 9770, letter of Visco to Cini, 14 August 1939.
42. ACS, EUR, SOM, box 1011, folder 9770.
43. See ACS, EUR, SOM, box 1011, folder 970. See also Somsen, "Science, Fascism, and Foreign Policy," 786–790.
44. ACS, EUR, SOM, box 1011, folder 970, letter of Cini to Balella, 7 July 1942.
45. Somsen, "Science, Fascism, and Foreign Policy," 778–781.
46. MNST Archive, *Museo industriale*, Corrispondenza, box 11. During the meeting of 13 November, Mussolini, probably unaware of the entire discussion, suggested also including science, but Ucelli answered that "in the museum, science would have been displayed only in its basic principles."

47. ACS, EUR, SOM, box 1011, folder 970, 16 December 1942, a document entitled *La mostra della scienza all'EUR e il Museo nazionale della tecnica di Milano*. See also the preparatory notes for the meeting dated 11 January 1943.
48. MNST Archive, *Museo industriale*, Esposizioni, box 21, "La Mostra della Scienza all'EUR e il Museo Nazionale della Tecnica di Milano" [12 January 1943].
49. MNST Archive, *Museo industriale*, Esposizioni, box 21, post 22 January 1942.
50. MNST Archive, *Museo industriale*, Corrispondenza, box 11, folder Ministero educazione nazionale.
51. MNST Archive, *ICOM*, Strumenti scientifici, box 3, Report by Ucelli, 12 July 1948.
52. ACS, EUR, SOM, box 86, folder 412. From 1946 to 1952, Ucelli sought to obtain all the preparatory materials, but he failed.
53. ACS, EUR, SOM, box 1007, folder 9770, 29 October 1941.
54. ACS, EUR, SOM, box 1007, folder 9770, 29 October 1941.
55. ACS, EUR, SAPG, box 905, folder 7888, Brusa, Cancellotti, Montuori, Scalpelli, "Relazione". As examples of scientific exhibitions, they mentioned the Palais de la découverte and the technical exhibitions at Circo Massimo in Rome.
56. Mentioned in ACS, EUR, SOM, box 1011, folder 9770, "Mostra della scienza."
57. In *E42: Utopia e scenario del regime*, vol. II, 404, and also 402–418. For the correspondence between Oppo and some of the artists, see also ACS, EUR, Servizi Artistici, box 920, folder 8170 (Rosso); box 921, folder 8179 (Felice Casorati); box 933, folder 8589 (Depero).
58. Accademia Galileiana, Padova, *Archivio D'Ancona*, "Manoscritti vari 1938–1949," box 30, folder 9, Esposizione '42, 22 January 1940.
59. Accademia Galileiana, Padova, *Archivio D'Ancona*, "Manoscritti vari 1938–1949," box 30, folder 9, Esposizione '42, 28 gennaio 1940.
60. MNST Archive, *Raccolta documentaria dei primati scientifici italiani–CNR*, Esposizione E42 Relazioni diverse, De Carli to Giorani, 5 January 1940.
61. MNST Archive, *Raccolta documentaria dei primati scientifici italiani–CNR*, Esposizione E42 Relazioni diverse.
62. MNST Archive, *Raccolta documentaria dei primati scientifici italiani–CNR*, Esposizione E42 Relazioni diverse.
63. Somsen asks in his article "Why did the 'spiritual' conception of the science exhibit prevail? How was it that Italian industry, with all its financial power and the entire tradition of world's fairs on its side, lost out to an academic focus on ideas and on science as an intellectual pursuit?" ("Science, Fascism, and Foreign Policy," p. 790). In addressing this, I think we should look at the Italian politics on scientific museums as a whole. The most convincing explanation could be in fact that in the creation of the museum in Milan, Ucelli had the support of most of the Italian industrial community as well as that of Bottai. To avoid duplicate contents, Rome had to choose another path.

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