"Art and Industry" at the Parc des Buttes Chaumont

Ann E. Komara

B.A., The Pennsylvania State University, 1980
M.L.A., The University of Virginia, 1984

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I. Introduction

"I charge him to embellish what I have made clean and healthful."[1] Baron Georges Haussmann

The Parc des Buttes Chaumont was one of two large new parks created during the city-wide building program overseen by the Prefect of the Seine, Baron Georges Haussmann (1809-1891), under the reign of Emperor Napoléon III (d. 1873).[2] [Fig. 1] The Parc reflected and supported Napoléon III's political, social, economic and aesthetic agendas in two ways: it contributed to the overall improvement and image of the city and it constituted France's only permanent exhibition of "Art and Industry" for the 1867 Exposition Universelle. Located in Paris' 19th arrondissement—one of the recently annexed working class areas—the sixty-two acre Parc materialized between 1864 and 1867 on a former quarry site.[3] [Fig. 2] Jean-Charles Adolphe Alphand (1817-1891), a landscape designer and the city's Chief Engineer of Buildings and Roads, headed the design team at the Parc des Buttes Chaumont. His colleagues included the horticulturist

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[1] Baron Georges Haussmann, in reference to J. C. A. Alphand and their work in Paris.

[2] The Emperor Napoléon III ruled between 1851 and 1870, when his regime fell to the Communards. In those years, several new parks were created, and the existing royal game parks of the Bois de Boulogne and the Bois des Vincennes, the Jardins de Luxembourg and the Parc Monceau were redesigned. The two large new parks were the Parc des Buttes Chaumont and the Parc Montsouris. The former was begun in 1864 and completed in 1867, with Davioud's Tempietto completed in 1869, and improvements and refinements continuing over the next ten years. Parc Montsouris was begun in 1868 and completed under the Third Republic in the mid-1870s. Haussmann accomplished the urban design campaign projects in three "*réseaux*" which were not topographically described but rather were based on different methods of financing and secondarily, on the exigencies of program. Both the Parc des Buttes Chaumont and the Parc Montsouris were part of the *Troisieme réseaux*. See David H. Pinckney, *Napoleon III and the Rebuilding of Paris* (Princeton: Princeton University Press, 1958) pp. 151-173; Sigfried Giedion, *Space, Time and Architecture, the growth of a new tradition* (Cambridge, MA: The Harvard University Press, 1943) pp. 472, 478.

[3] The 19th arrondissement was annexed by Decree on 16 June 1859. The annexation and incorporation of the outlying suburbs encompassed the areas between the wall of the Fermiers Généraux and the wall of 1850; it increased the area of the City of Paris by over 150% and added nearly 400,000 to the population.

Jean-Pierre Barillet Deschamps (1821-1873) and the architect Gabriel Davioud (1824-1881). The results of their collaboration produced not only the Parc des Buttes Chaumont, but also numerous projects throughout the city: significant buildings and monuments, verdant parks and squares, and tree-lined boulevards. [See "Appendix A" for a list of the projects accomplished during Alphand's tenure.]

Surrounding the construction of the Parc des Buttes Chaumont are nineteenth-century debates and tensions regarding such issues as: mass production versus art and craft; urbanism versus nature; industrialization versus the pastoral; the invention of new urban and building typologies; and the ideological role of design used to express national agendas. This thesis focuses on ways in which the Parc responded to an increasing French emphasis on industrial and commercial sectors of its economy and reflected aesthetic concerns attendant to the redesign of Paris. Alphand's use of the Picturesque style to design the Parc engaged the lineage of French picturesque landscape design theory and offered him an opportunity to emphasize qualities of the quarry site. His work responded to contemporary debates on "urban nature." In Paris, as elsewhere, landscapes became a mediating venue for cultural responses to industrialization and its attendant social and economic affects.[4] Alphand embraced new technology and industrial materials to redefine the typology for an urban park; through using the Picturesque style, his projects engaged the nineteenth-century visitor in an evolving discourse with an "acceptably familiar"

See Roger Kain, "Urban Planning and Design in Second Empire France," *Connoisseur*, vol. 199, no. 802, (December 1978) 236-46.

[4] Nicholas Green. *The Spectacle of Nature: Landscape and Bourgeois Culture in Nineteenth-Century France* (Manchester, G. B. and New York: Manchester University Press, 1990). Green's discussion cogently explained the origins, structure and ideology of this nineteenth-century shift in the "consumption"

image of nature that was "deceptively unfamiliar" in its means of production and maintenance.

Like the 1867 Exposition Universelle with which it was directly linked, the Parc des Buttes Chaumont can be understood as a sophisticated marketing tool. Aligned by the theme of "Art and Industry" both offered fitting images for Napoléon III's reign and both promoted France's design flair and technological élan. At the Parc des Buttes Chaumont, the application of tools, techniques and materials from the Exposition celebrated the marriage of "Art and Industry." The Parc offered an image of urban nature that awakened the visitor to the positive potential of industry and technology upon which France's trade economy and status were increasingly dependent.

Alphand's rendering of the Parc des Buttes Chaumont in a picturesque manner challenged apprehensions about industrialization; "technological nature" was engaged and celebrated rather than distanced and feared. This approach tacitly furthered the political and financial needs of Napoléon III's administration and the cadre of financiers and investors who sought to accelerate France's industrial capital.[5] As seen at both the Exposition and the Parc, progress was exciting, yet to date no scholarship has adequately accounted for any

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of nature within the Parisian urban milieu and identified tensions extant between technology and the picturesque.

[5] This parallels the view expressed by Grumbach and re-stated in Schenker: "... the lesson of the Buttes Chaumont is that the only true nature is the false one." Quoting Grumbach, Schenker continued: "Technology played an important role in the conception of the park, but it was a behind-the-scene presence. 'Nature' was intended to set the tone of the Paris parks, in a highly stylized rendition, a stage on which modernity, in the form of industrial capital, could play." Heath Massey Schenker, "Parks and Politics During the Second Empire in Paris," *Landscape Journal*, v. 14 n. 2 (Fall 1995) p. 215, quoting Antoine Grumbach, "The Promenades of Paris," *Oppositions*, v. 8 (Spring 1977) p. 66.

relationship between the Parc and the Paris Exposition Universelle.[6] Given the exact coincidence of their 1st of April 1867 opening date, overlapping roles within the design team, repetition of design imagery and construction techniques, and probable links in thematic propaganda, tourism and financing, the links between the two warranted a deeper investigation. Furthermore, although several scholars have linked technology and the Buttes Chaumont, additional scholarship is needed to detail and explain this significant aspect of the Parc. In fact, it will become clear that the "cutting edge" technological presence exhibited at the Exposition was used to create, inform and thus influence the visitor's Parc experience.

The methodological approach for this paper weaves social, political, economic and aesthetic threads to push an interpretation of the Parc that is predicated on two points. First is the notion that the radical potential of art lies within the innovations of artistic form. In the case of this inquiry, the artistic form is the design of the Parc wherein the translation of the picturesque from a private residential idiom to an urban public one offers a particularized landscape produced and sustained by the technological capabilities of the era. Second, culled from work by the cultural geographer Denis Cosgrove, is the idea of the landscape as a thickened text; it is a site of historical and physical time within a social

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[6] J. C. (Jean-Charles) Adolphe Alphand, *Les Promenades de Paris* (Princeton: Princeton Architectural Press, 1984) Facsimile reprint of the 1867-73 Paris publication. Alphand linked the Parc and the Exposition, no doubt a basis for contemporary scholars acknowledging the technological presence at the Parc. In the literature on the park and the Exposition, it is not uncommon to find such uncited statements as, "... [the park] became one of the principal attractions of the Paris world exhibition in 1867." Roger Kain, "Urban Planning and Design in Second Empire France," *Connoisseur* v. 199, n. 802, (December 1978) p. 244. Schenker mentions such a link, but the clearest connections remain in the work of Marceca. See Schenker, "Parks and Politics ...," p. 215; Maria Luisa Marceca, "Reservoir, Circulation, Residue: J.C.A. Alphand, Technological Beauty and the Green City," *Lotus* v. 30 (1981) pp. 57 – 63.

climate of reception that assigns value to the landscape as a cultural product.[7] Initially, this suggests that the location, history and form of the specific site contribute to the production of meaning for the Parc. More importantly, it leads to the thematic lens of this paper, the link of "Art and Industry." By engaging the intentional illusion of natural scenery produced through the use of innovative materials and techniques, visitors to the Parc and the Exposition became part of the cycle which pushed the acceptance of the new images and technologies that made visible and viable the economic needs of the industrializing city.

This cultural materialist approach is very clearly developed in Chandra Mukerji's work, with a summation expressed as, "... economic processes depend on cultural meanings associated with things. ... Consumption is as much a cultural and physical act as an economic one. You cannot make economically successful commodities that have no cultural meaning to people."[8] By extension, this suggests that the Exposition and the Buttes Chaumont were intended to develop a market for new materials, products and construction technology; it was a space of propaganda and consumption. By applying these developments, particularly at the Parc, the public was provided an exciting – and palatable – vision of progress. Napoléon III and the upper echelon of financiers, industrialist, and developers in the Capitol thus validated their efforts to push the nation into a new realm of production and consumption. As promoted, the marriage of art and

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[7] Dennis Cosgrove and Stephen Daniels, *The Iconography of Landscape, Essays on the symbolic representation, design and use of past environments* (Cambridge and New York: Cambridge University Press, 1988). See also Clifford Geertz, "Thick Description: Toward an Interpretive Theory of Culture," *The Interpretation of Cultures* (New York: Basic Books, Inc., Publishers, 1973) pp. 3-30.
[8] Chandra Mukerji, *Territorial Ambitions and the Gardens of Versailles* (New York: Cambridge University Press, 1997) pp. 300-301.

industry brought into the public realm the innovative and beautiful use of structural and decorative concrete, cast iron, suspension bridges, hydraulic machinery, civic street lighting, irrigation and drainage systems, and exotic and hothouse plants, to name the most obvious.

Literature on the Parc des Buttes Chaumont originates with Alphand's treatise, *Les Promenades de Paris* (1867-1873).[9] Subsequent mention of the Parc generally falls into three categories: guidebooks and general descriptions; critiques and overviews of the work of Haussmann or Alphand; and critiques of the Parc within a broader context such as the urban design program initiated under Napoléon III. As overseen by Haussmann, the urban design campaign during the Second Empire (1852-1870) was enacted with dedication, focus and vision. Based on the scholarship, it would be a mistake to suggest that there is a single reason behind this larger effort that spawned the Parc. The literature points out a constellation of ideas, influences and urges surrounding the urban design campaign. By extension the Parc is variously based on martial, economic, sanitary, social, and aesthetic agendas. Examples include Napoléon III's desire to maintain order and a visible government presence; the incentive to clean up the slums and bring "green lungs" producing healthy air for the city; and the aesthetics and image of the city. Few articles focus directly on the Parc des Buttes Chaumont, although Marceca and Meyer emphasize it and most sources mention it as one of the great achievements of the era.[10] While all of

[9] Alphand, *Les Promenades*. Supplementing the review of current scholarship on Alphand and the Buttes Chaumont contained here, see the succinct overview of critical literature in Schenker, "Parks and Politics ...," p. 202.

[10] Marceca, "Reservoir, Circulation, Residue ..."; Elizabeth K. Meyer, "The Public Park as Avante - Garde (Landscape) Architecture: A Comparative Interpretation of Two Parisian Parks, Parc de la Villette (1983-

these sources offer degrees of information and insight into the Parc's design and creation, many of them are variations on broad urban design themes or those generated from sanitary, political or aesthetic grounds. Within the context of this paper, the most relevant are those offering insights into Alphand and the forces underpinning the creation and design of the Parc des Buttes Chaumont.

The Parc des Buttes Chaumont offers additional topics for inquiry stemming from those begun in this thesis. For example, one could pursue a careful comparative study of the landscape treatises of nineteenth-century France – from Morel, Thouin and Boitard to Alphand, André and Ernouf; the Parc's designers embraced technology and design innovations within the context of these theories. More work could be focused on the contents and structures of the Exposition to more thoroughly establish a basis of comparison with the industrial products shown there and used at the Parc. Finally, one could examine in greater detail the Parc itself and the varied graphic and textual renditions it has received. The plethora of images, especially maps and photographic postcards, could become another thesis, as could a detailed discussion of the relationship of this Parc to broader cultural interests in geology and topography and the mapping of these realms.

Following a description of the history of the Parc site in this chapter, subsequent chapters will explore the marriage of art and industry. Chapter 2, "The 1867 Exposition Universelle," examines the background and key players, relevant political, economic and financial aspects, and the innovations and exhibition contents of the Exposition building

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1990) and Parc des Buttes - Chaumont (1864-1867)," *Landscape Journal*, vol. 10, no. 1 (Spring 1991) pp. 16 - 26.

and grounds. This overview establishes the link between the Exposition and the Parc des Buttes Chaumont and sets the stage for the chapters that focus on the Parc itself. Chapter 3, "Art: Picturesque Revelations at the Parc des Buttes Chaumont" acknowledges a relationship between the picturesque and technology and suggests plausible design precedents and influences underpinning Alphand's transformation of the picturesque paradigm from a residential to an urban expression. A key point is the conscription of the conceptual ideals intended to serve the regime's political and economic ends. Chapter 4, "Industry: Technology and Design Innovations at the Parc des Buttes Chaumont," explores in detail the innovative materials and technology present at the Parc. Of particular note are the use of reinforced and precast concrete and "stucco cement," decorative cast iron, suspension cables, the water works and drainage systems, plants, and the variety of machinery and tools used to create and maintain the illusion of picturesque naturalism.

Through the inclusion of primary source descriptions that highlight contemporary attitudes, opinions and impressions of the Parc, versions of the nineteenth-century experience of the Parc emerge. Visitor's encounters with the Parc rendered it as an exemplar of art and industry offering a tasteful, even exciting, visions of fabricated, technological nature. Views beyond the Parc's borders to factories and railroads – the industrial highlights – link the chapter back to the economic imperatives inherent in the Exposition – the marriage of "Art and Industry."

History and Description of the Buttes Chaumont site

This introductory description covers the site's physical and cultural history as a necessary precursor to understanding the transformation of the quarried landscape into the Parc des Buttes Chaumont. Recorded on maps and in texts as early as the thirteenth century, the buttes of Mont Chauve—the bald-pated mountain—lay to the northeast of Paris. Located at the northern end of the heights of Belleville, the Buttes lay beyond the Fermiers Généraux custom's wall (1784-91), but within the outlying defensive fortifications constructed between 1840 and 1845. The future Parc site boasted one of the highest points in the series of hills and ridges surrounding the lower basin of the Seine and the Isle de la Cité, as seen on the topographic maps. [Fig. 3 and Fig. 4] The heights, which were in the thirteenth-century the location of the Montfaucon gallows, provided in the fifteenth century an excellent location for windmills, some of which are depicted in period views of the buttes. [Fig. 5] To the west, just inside the wall and set on the plains of the Seine River, lay the Hôpital St. Louis, shown on the 1670 map by Bullet and Blondel.[11] [Fig. 6] Many historic maps show the Buttes proximity to town of La Villette to the north, across from what would become in 1802 the Canal de L'Ourcq.

Historic maps also confirm the site's land uses; several depict carrières, or quarries, in places around the city including, Montmartre, Vaugirard and at the Buttes Chaumont site. [Fig. 7] The limestone and gypsum geologic formation of the buttes sustained quarrying operations for many years, beginning in the fifteenth century.[12] East of the Parc site was the American Quarry that furnished stone for buildings in Paris as well as for cities in the

[11] The Hôpital St. Louis provided a constant reference point in my study of the historic maps. Working backwards from Alphand's urban plan depicted in *Les Promenades*, the relatively fixed point of the Hôpital allowed me to track the various depictions of the Buttes as I struggled to discern early street patterns and graphic "commentaries" on the area topography and the site's quarried landscape.

United States.[13] In addition to stone, the quarry at the Buttes Chaumont provided much of the gypsum used in plaster of Paris until 1860.[14] This landscape of extracted rock and residue received note in *Galignani's New Paris Guide (1861)*, which indicated that sometime in the previous century the residual quarry spaces became a dump for the city's refuse and "night soils."[15] Nearby were horse rendering plants and pits filled with charnel. [Fig. 8]

This use is substantiated in Donald Reid's history of the Paris sewers and sanitation, where he stated that in 1761, "... municipal authorities designated Montfaucon, northeast of Paris, as the city's primary dump. To mollify inhabitants of the neighborhood, it moved the existing Montfaucon dump three hundred meters to the foot of the Buttes-Chaumont. In 1781 the city closed other refuse heaps, leaving Montfaucon as the city's sole dump."[16] Montfaucon closed in 1849.

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[12] Alphand, *Les Promenades*, pp. 198-202.Alphand described the history of the site.

[13] Harold P. Clunn, *The Face of Paris; The record of a century's changes and development* (London: Simpkin, Marshall, Ltd., 1933) p. 179. Extant remains and site traces of the American Quarry can still be noted on a variety of maps. It gives its name to one of the four quartier of the arrondissement: de la Villette, de Pont de Flandre, d'Amerique and du Combat.s

[14] *A History of Technology, The Industrial Revolution c. 1750 – c. 1850* (Vol. IV) eds. Charles Singer, E. J. Holmyard, A. R. Hall, Trevor Williams (London: Oxford University Press, 1958) p. 449. Plaster of Paris is "... a material widely used instead of lime as the basis of a plaster for walls and ceilings made by driving off part, but not the whole, of the water combined with calcium sulphate in the mineral gypsum. Beds of this material were worked in the Middle Ages at Montmartre and it was widely used in Paris, hence the name." Regarding the extractable material: Gypsum [(CaSO4)2H2O] is a widespread, colorless, white, or yellowish mineral used in the manufacture of Plaster of Paris, various plaster products and fertilizers. Calcined gypsum is slightly soluble in water and in acid. Rock gypsum is massive coarsely crystalline to fine-grained gypsum occurring in sedimentary beds. Gypsum plaster or gypsum cement is made from the pulverized rock that is made anhydrous. To create plaster, it must then be re-hydrated to the desired consistency. The Buttes Chaumont quarry provided lime (stone) and gypsum, building materials extensively employed throughout the city.

[15] *Galignani's New Paris Guide* (Paris: A. and W. Galignani and Co., 1861) p. 260.

[16] Reid, Donald, *Paris Sewers and Sewermen, Realities and Representation* (Cambridge: Harvard University Press, 1991) p. 11, quoting Boudriot, "Essai sur l'ordure," pp. 519-520; referencing A.

This ravaged, marginalized land must have seemed quite unsuitable for profitable industrial or residential development. The site's dubious reputation undoubtedly resulted from the enduring history of Montfaucon as the receptacle for the bodies of executed and tortured criminals. The foul smell and unhealthy atmosphere further contributed to the general perceptions of the site as unsafe and dangerous.[17] Reflecting local perceptions and echoing information on the Parc widely distributed in guidebooks since the 1860s, Harold Clunn summarized in 1933 that,

> Sanitary and aesthetic considerations prompted the transformation of this squalid and sordid district at a cost of L140,000. The disused stone quarries, which have been partially filled, had previously been a favorite rallying-place for the disaffected members of society. They had also provided a night refuge for a large number of destitute people, who also came here to cook their humble meals. Although criminals occasionally mixed with these people in the hope of finding shelter free from the nocturnal visits of the police, the reputation which this neighborhood held as an abode of cut-throats and thieves was greatly exaggerated. Otherwise, the vicinity of the quarries would have rendered the suburbs of Paris between Montmartre and Charonne too unsafe for law-abiding citizens.[18]

The historic land uses of the site no doubt factored into Haussmann and Alphand's decision to redevelop the land in their campaign to "clean up" and "make healthy" the

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Alphand, *Note du directeur des travaux de Paris. La situation du service des eaux et égouts. Le mesures à proposer au conseil municipal* (Paris: A. Chaix, 1879), p. 60.

[17] A history of the site was common in the contemporary guidebooks, such as Galignani and Baedeker. Nearly every guidebook consulted, spanning from 1844 to the web site posted in 2001, alluded to the site's "unsavory" or derelict history. In addition, see "Parc des Buttes Chaumont," Publication of the City of Paris, 19th Arrondissement (2000) p. 1. This pamphlet, part of a small exhibition on the history of the park located in a temporary pavilion within the park, explained ongoing restoration projects in the Parc. It described the site in the fifteenth century as follows: "Restauration une décharge d'ordures, dépôt de vidange et de résidus d'équarissage, infestée de rats. Il sert de refuge aux vagabonds, brigands, clochards, voleurs de grands chemine." It described the site "sous le nom de 'Carrières du Centre', sert à l'extraction du gypse pour la fabrication du plâtre, sur 45 mètres de profondeur, en un réseau de trois galeries superposées d'environ 15 mètres de hauteur."

[18] Clunn, *Face of Paris*, p. 179. A thorough history of the site is provided in Robert Hénard, *Les Jardins et Les Squares* (Paris: Librairie Renouard, 1911) pp. 175-183.

city.[19] Sometime in the early 1860s, the administration began to consider the quarry site for a new park to benefit the industrializing areas northeastern section of the city.[20]

On 22 July 1862, the City of Paris, in a Décret de Conseil d'Etat, declared the use of public funds to acquire the site and the purchase was completed by the end of 1863. In November of 1863, Alphand and his team began designing the Parc. By 1864, earth moving and site construction began shaping the features and forms of the Parc, including the circulation routes and water systems.[21] Planting commenced late in 1865, at which time Napoléon III made an inspection of the progress. [Fig. 9] By early in 1867, construction of the reservoir for the water supply was finished and last minute preparations were hastily completed for the Parc's inauguration on 1st April 1867. The result, still evident in contemporary images, was a "picturesque park" whose features and layout celebrated the physical vestiges of this unique site.[22] [Fig. 10]

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[19] Reid, *Paris Sewers*, pp. 10-12; 71-83. Using the sewers as his medium, Reid beautifully articulated relationships between class structure, culture and the city.

[20] See Schenker, "Parks and Politics ...." She provided a topical discussion of the social issues surrounding the park noting that its development in a working class section of the city was rife with political overtones. A social history focused on the Parc itself, and not on the whole of Parisian parks, would be a worthwhile addition to the scholarship. Consideration could be given to the people engaged in the Parc's construction as well to the reception and use of the Parc by the local constituents of the 19th and 20th arrondissement. A careful study of the changes in the buildings and demographics directly adjacent to the Parc would also be interesting, given the generally true real estate tenet that parks raise property values.

[21] In creating the new park entrances and circulation routes, Alphand worked with some pre-existing street patterns. In particular, the rue Fessart atop the Buttes leads to a new entrance and park road that basically follows the original route down into the quarry to sweep below an underpass and then exit the park at the avenue Sécretan.

[22] The description of the park as "picturesque" originates in the period and has been applied consistently since then.

II. 1867 Exposition Universelle

"World's fairs are the very soul of propaganda in its most constructive form ... they are psychologically important in the collective thought of a nation because they define an epoch."[1]

Napoléon III's "... transformation of Paris was the centerpiece of imperial politics and the one policy [he] pursued relentlessly."[2] His vision for Paris quickly took form under Haussmann's administrative skills; by the mid-1860s the French capitol boasted improved water and sewer systems, new railroad lines and stations, and many new buildings, boulevards and squares, as well as the newly redesigned parks of Boulogne and Vincennes. [See Fig. 2] The Exposition Universelle of 1867 provided the perfect opportunity to show the glory of Napoléon III's France to thousands of anticipated visitors. Sustained efforts to complete a significant amount of the urban design work in time for the Exposition Universelle confirmed the political importance and significance of this work. Parisians in the late winter and early spring of 1867 witnessed prodigious efforts and expenditures that were focused on the hurried completion of numerous beautification projects. Foremost on the list were the Exposition building and grounds on the Champs de Mars. These were closely followed by the Trocadéro hill, located across the Seine River from the Exposition grounds, and the Parc des Buttes Chaumont. The intense flurry of construction and preparation continued right up to the opening ceremonies held on Monday, the 1st of April 1867 for both the Exposition Universelle and

[1] Mitchell Wolfson, "Introduction," in Stephen Neil Greengard, *The Great World's Fairs and Expositions* (Miami, FL: Haff-Daugherty Graphics, Inc., 1986) no page.
[2] David P. Jordan, *Transforming Paris, The Life and Labors of Baron Haussmann* (New York: The Free Press, 1995) p. 177.

the Parc des Buttes Chaumont.[3] These simultaneous openings were not a coincidence; Alphand, Head of Public Works and a principal organizer of the Exposition, wrote in *Les Promenades* that "... it was intended that the Parc's opening coincide with that of the Universal Exposition."[4] The two projects formed parts of an interconnected whole: united under the thrust of the Exposition's message, both projects were intended to "... bring into notice all the resources which industry can create for satisfying the wants of mankind."[5]

The alignment of the Exposition and the Parc des Buttes Chaumont crystallizes under the Exposition's theme. The "Art and Industry" theme provided the umbrella for orchestrating the ten divisions deemed essential to best "... represent everything connected with the industry of a people."[6] [See "Appendix B" for more detail on the classification system] Explicating the alliance between the Parc and the Exposition validates the use of this theme; it provides an historical framework to examine the Parc. The Exposition will be considered as an element within Napoléon III's urban design campaign. The roles of some of his trusted advisors and designers -- Haussmann, Chevalier, Alphand and Barillet-Deschamps -- will be mentioned along with relevant economic and financial issues, particularly as they supported Napoléon III's political agenda. The bulk of the chapter is devoted to a summary of the Exposition's background, buildings, and significant contents, structures, and features. This

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[3] Henry Morford, *Paris in '67; or, The Great Exposition, Its Side-shows and Excursions* (New York: Geo. W. Carleton & Co., Publishers, 1867). This contemporary report of the Exposition opening events included commentary on numerous topics such as the extent of completion, views and scenes, dignitaries, ceremonies and events. Of the sources I consulted on the opening, Morford alone noted the presence of workers, particularly those finishing the Trocadéro park.

[4] Alphand, *Les Promenades*, p. 203. Author's translation: "Cet enterprise considérable [the Parc] fut commencée en 1864 et terminée au commencement de 1867: on volut que l'ouverture du parc coïncidât avec celle de l'Exposition universelle."

[5] *The Builder* (London), "Classification of the French Exhibition," vol. XXIV, December 8, 1866, p. 907.

background leads to an examination of the Parc, which echoed the innovations and displays found in the Exposition building and grounds and celebrated their "real world" application.

Inaugurating the Exposition and the Parc on the same day conveyed a message that all of Paris was equally on display. The propaganda promoting France's achievements in "Art and Industry" infused the entire city. Exposition publications and contemporary guidebooks suggested particular tour routes and sights to see throughout the city, offering as highlights the boulevards and parks and the "magnificent" sewers.[7] Glorification of France and its Emperor coalesced in the experience and spectacle of Paris. The Emperor's personal support for both the Exposition and his urban design program was rooted in his economic, political and cultural agendas. "Art and Industry" reflected the Exposition's thrust as a cultural and commercial enterprise. Aimed at increasing recognition of French taste and design just as surely as it was aimed at increasing French trade and industrial development.

Like all previous international expositions of the nineteenth-century, the intentions behind the Exposition Universelle were grounded in the competitive desire for prestige through a display of commercial and cultural achievements. Improved trade and economic profit (most directly from tourism) and agendas of propaganda and nationalism

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[6] Idem.

[7] Pinckney, *Napoleon III*, p. 143, quoting Adolphe Joanne, *Paris illustré en 1870 et 1877*, 3rd ed. (Paris: n.d.) p. 1038; Karl Baedeker, *Paris and its Environs* (Leipzig, 1876) pp. 251-252. Pinckney wrote, "The Paris system of collectors [sewers] was unequalled in any other city in the world, and they attracted widespread interest. During the year of the Exposition of 1867 many visiting princes as well as lesser

also informed the reasons behind expositions.[8] Unlike the previous exhibitions of which this comes in direct lineage (those of London 1851, 1862 and Paris 1855), the Paris 1867 version was physically larger, it had more exhibitors and innovations, and it operated with a different, and highly successful, financial basis.[9] Commenting on the preceding 1862 London Exposition, Kenneth Luckhurst noted that, "... an excellent feature ... was the support which it received from foreign exhibitors."[10] The positive foreign reception and success of that Exposition led French exhibitors and financial backers to lobby almost immediately for another French international exposition. Subsequent approvals by the Emperor spurred the cause; planning commenced a mere six months after London's closed. On the 22nd of June 1863, an Imperial Decree announced the 1867 Exposition Universelle.[11]

The short-term economic aspects of the undertaking were enormous. Haussmann himself, in the wake of financial grumbling surrounding an 1864 bond issue, had decided to limit seeking additional financing and "... recommended no acceleration of the program except to satisfy the Emperor's wish that the streets of the second network be finished before the opening of the Exposition scheduled for 1867."[12] Ostensibly to help

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persons inspected them. Guidebooks recommended them to tourists, and Belgrand provided facilities for 400 visitors on stated visiting days and still did not satisfy the demand."

[8] Julie Wosk, *Breaking the Frame – Technology and the Visual Arts in the Nineteenth Century* (New Brunswick: Rutgers University Press, 1992) pp. 22-25. Wosk noted that, "During the nineteenth century, tension heightened regarding the production of imitations of upper class goods. This provided a strong catalyst for the manufacturers and design reformers who worked to unite art and industry and to present the technological products as works of aesthetic merit on their own terms."

[9] For additional information on the earlier expositions, see Kenneth Luckhurst, *The Story of Exhibitions* (London: The Studio Publications, 1951).

[10] Ibid., p. 131.

[11] *The Art Journal Illustrated Catalogue of the Universal Exhibition*, "Introduction," by the Reverend Charles Boutell, M. A. (London and New York: Virtue and Company, 1868) p. 72.

[12] Pinckney, *Napoleon III*, p. 187.

Haussmann meet the budget requirements for the roads, the Emperor "... personally authorized another 20,000,000 francs, for 'expenses,' an arbitrary move that did not please a parliament already complaining of its lack of control over Haussmann's spending."[13] Completion of these streets and boulevards facilitated not only an overall positive impression of the City but also increased mobility and hopefully, profits from tourism throughout the quartiers.

Napoléon III advocated government involvement in the 1867 Exposition Universelle; it was funded by the "... state exchequer and the city of Paris [who] each made an outright grant of approximately one-third of the estimated cost, while the final third was covered by private guarantees. The proceeds from entrance charges, sale of concessions and so on, were more than sufficient to cover this latter amount and the guarantors, instead of having to put their hands into their pockets, shared the profits with the city and state."[14] The Exposition, "a magnificent and moneyed success," was matched by the praise and enthusiasm for its magnificent advertisement of the productions of France.[15] The vested interests of financiers, exhibitors and the government were amply rewarded: total receipts were $2, 047, 506.[16]

The shared financial basis supported by the Emperor may well reflect the ideas of Michel Chevalier, a key advisor and outspoken proponent of the 1867 Exposition. A leading

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[13] Idem. Referencing Archives Nationale, C 1102, Corps législatif, Session 1865, Dossier No. 55, 45 AP 19, memorandum, Fould to Emperor, Jan. 1865, note on Paris finances by Fould 1865; *Moniteur*, July 1,2, 1865 (no page).

[14] Luckhurst, *Exhibitions*, p.132. See also *Art Journal Illustrated Catalogue*, p. x. Boutell noted that, "... the number of the visitors were proportionately greater, and the sums that flowed into the exchequer of the Imperial Commissioners were such as to leave in their hands a very considerable surplus."

figure in the expositions of the period, Chevalier had served on the committee for the 1855 Paris exposition and he headed the French delegation to London in 1862 and authored France's official report of that Exposition.[17] His report noted, "It is impossible ... [that] two peoples who voluntarily show so much mutual regard, who have so many ideas and interests in common, can be permanently otherwise that allied in close friendship."[18] This undoubtedly echoes sentiments codified in the Cobden-Chevalier Treaty (1860) of commerce with Great Britain, which he authored. That accomplishment secured his role as an influential economist and political advisor to the Napoléon III. He advocated industrial exhibitions as a means to further economic agendas and he supported the alliance of business and government to attain this end.[19]

Chevalier presided over the international jury for the 1867 Paris Exposition, working closely with his friend Frédéric Le Play."[20] Le Play, a well-known engineer and social economist who had also been responsible for the 1855 Paris Exhibition, served as the Commissaire Général of the 1867 Paris Exposition, a role of great influence and prestige. They took seriously their charge, summarized in the *Art Journal Illustrated Catalogue of the Universal Exhibition*:

> We call upon the Imperial commissioners to fulfil [sic] their administrative duties with becoming magnanimity. Their own dignity,

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[15] Morford, *Paris in '67*, p. 128.
[16] Greengard, *Great World's Fairs*, p. 5. Receipt amount is given in equivalent U.S. dollars for 1867.
[17] *Historical Dictionary of the French Second Empire 1852-1870*, ed. William E. Echard (New York: Greenwood Press, 1985), p. 89. Chevalier was rewarded with promotion to commander of the Legion of Honor for his role in 1855.
[18] Luckhurst, *Exhibitions*, p. 131. Quoting Chevalier's report (no citation given for source).
[19] *Historical Dictionary ... 1852-1870*, p. 89. The entry on Chevalier notes his philosophical allegiances to J. B. Say (1767-1832), Frédéric Bastiat (1801-1850), and Saint-Simonianism. It points out that Chevalier "praised industry as the motor of human progress, advocated public works built by an alliance of private enterprise and government, ... and combated socialism, workers' trade unions, and strikes."
[20] Idem.

> no less than the importance of the charge entrusted to them, demands from the Commis-sioners a dignified, comprehensive, and truly noble course of action -- such as will reflect fresh honour upon France, because it will promote the best and dearest interests of mankind.[21]

The vast array at the Exposition and the surrounding civic improvements glorified the Emperor and France with their aesthetic merit and technical élan. That nearly all of the work and improvements transpired through Haussmann's Prefecture of the Seine only strengthens the connection between the Exposition and the City and between "Art and Industry." Not surprisingly, there was within the Prefecture of the Seine a strong technical emphasis. Numerous projects were directed with a serious attitude towards technology; the sanitary and water engineer Eugene Belgrand's projects to provide a steady supply of fresh drinking water and extend and improve the sewer system come readily to mind.[22]

Indeed, Haussmann linked the aesthetic image of Second Empire to the technological realm when he charged Alphand "... to embellish what I have made clean and healthful."[23] Applying this dictum engaged Alphand and Barillet-Deschamps directly in the events of 1867. They worked not only on the Exposition layout, garden design and installation, but also on a major project across the river on the former heights of Passy: the Place du Roi de Rome and the Trocadéro. Alphand briefly cites the work on the Exposition, noting that its inclusion "... may be of some future value for others to study

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[21] *Art Journal Illustrated Catalogue*, p. 76.
[22] For supplemental information on these projects see: Eugène Belgrand, *Les Travaux souterrains de Paris* (Paris: 1873-1877) 5 vols. text, 5 atlases; and Donald Reid, *Paris Sewers and Sewermen, Realities and Representation* (Cambridge, MA: Harvard University Press, 1991).
[23] Antoine Grumbach, "The Promenades of Paris," *Oppositions*, vol. 8 (Spring 1977) p. 51, quoting Haussmann, *Mémoires* (no pages cited).

such a vast and elaborate layout."[24] Despite the ephemeral nature of the Exposition, the "Plan Général de Paris" in *Les Promenades* clearly indicated the locations and layout for the Exposition on the Champs de Mars and the Trocadéro. [Fig. 11] Alphand provided a keyed plan of the entire one-hundred and sixty-five acre site that located the signature oval exhibition building and the multitude of accompanying structures and site features, as can be seen in the view published by the *Arts-Journal Illustrated Catalogue* of the Exposition.[25] [Fig. 12]

The work at the Exposition grounds was matched by the work at the Trocadéro. Alphand wrote that the site had been for a long time abandoned and filled with rubbish and filth. Because the site was in plain view from the Exposition, a decision was made to clean it up and make it presentable. The result was a large sloping amphitheater tucked into the heights of Passy from which visitors could observe the activity at the Exposition across the river.[26] It proved an immensely popular spot; Morford devoted several passages to

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[24] Alphand, *Les Promenades*, p. 230-231. This key for the Exposition plan was included on these pages describing the work. Most general references on Alphand assign him responsibility for the grounds, or park as it is more often termed. Marceca's essay elaborated on his role a bit more than others, but she still only drew from *Les Promenades*. Alphand's statement of his role was a subset of his more focused description of the work he did on the heights of Passy (also referred to as the Buttes de Chaillot) at the Trocadéro across the river from the Champs de Mars. In that portion of text, he detailed earthwork calculations, costs, and materials. See Marceca, "Reservoir, circulation, Residue ...."

[25] Morford, *Paris in '67*, p. 139. As was the case with most of the nineteenth-century, the Exposition Universelle's grounds and buildings were ephemeral. Aside from the Parc des Buttes Chaumont, there is one other extant feature: the Pavilion erected by the Bey (ruler) of Tunisia. Renowned during the Exposition for it elegant, exotic beauty, this building was relocated to its present prominent spot in the Parc Montsouris sometime before 1880. Morford's correspondent considered it the only structure at the Exposition grounds that rivaled the splendor of the Emperor's Pavilion. His description of the "handsome and picturesque" Tunisian Pavilion follows: "Light, airy, and exceedingly beautiful in architecture, is this markedly Saracen erection, its central mosque dome-spired, crescented, and banner-rolled, while two smaller domes of the same shape relieve the squareness of the ornamented eaves, and tall large windows seem to cut it into an upright lattice, and curved high stairs add to the lightness of appearance ...."

[26] Alphand, *Les Promenades*, pp. 229-232. His design terminated the axial thrust across the river on the Pont d'Iéna from the Exposition's main entrance. Alphand calculated the Trocadéro work as 65,000 m. of lawn, 18,709 m. of tree masses and parterres, and 118,583 m. of roads and walkways, for a total cost of 3,228,250 francs. He did not provide similar data for the Exposition.

describing the bustle of work being completed at the Trocadéro, as well as of the opening day festivities seen from this vantage point.[27] Numerous images of the scene were also produced, including Pinot and Sagire's print and Edouard Manet's "View of the Universal Exposition of Paris, 1867." [Figs. 13 and 20]

Finishing both the Exposition grounds and the Trocadéro in time for the opening must have been demanding. Throughout 1866, regular installments in *The Builder* tracked the progress at both locations: In March, a commentator marveled at the amount of earthwork and the ingenious use of steam powered tram trains to haul materials; in June the works progressed "at a uniform rate" and there was no doubt of their "being completed in proper time"; by December, the "... portion of the park near the Military school is behind hand, compared with the rest, as regards laying out and planting; but now all the efforts of the gardeners are concentrated on that spot ...."[28] The photograph by P. Petit showed the state of affairs as of June 27, 1866. [Fig. 14] An American correspondent noted that in March of 1867, preparations on the Champs de Mars consisted of "... piled lumber, heaps of iron, packing boxes and bloused workmen ... about equally in plenty," and that workers were busy planting flowers at the Trocadéro on opening day morning.[29]

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[27] Morford, *Paris in '67*, pp. 93-100.
[28] *The Builder* (London), "Paris Exhibition, 1867," vol. XXIV, December 1, 1866, pp. 889-890.
_____, "Paris Exhibition of 1867," vol. XXIV, March 17, 1866, p. 192.
_____, "Paris Exhibition of 1867," vol. XXIV, September 22, 1866, p. 705.
_____, "Paris Universal Exhibition, 1867," vol. XXIV, February 10, 1866, p. 105.
_____, "Trocadero and the Exhibition of 1867," vol. XXIV, June 16, 1866, p. 453.
[29] Morford, *Paris in '67*, p. 85. Commentary in London's *The Builder* magazine conveyed much excitement about the preparations throughout Paris. A. Orth, a correspondent, referenced this when he

Dignitaries from throughout Europe attended, many for the opening ceremonies and others throughout the months until it closed on the 31st of October 1867. Visitors included: Czar Alexander II of Russia and his son, Alexander III; King William of Prussia; Otto Von Bismarck; and the kings of Sweden and Italy.[30] The Exposition showcased the work of thirty-two participating nations and 60,000 exhibitors.[31] Jean-Baptiste Krantz (1817-1899), the chief building engineer, and his assistant Gustave Eiffel (1832-1923) designed the principal structure. The Exposition structure was a vast oval a mile in circumference at its outer edge containing seven concentrically arranged halls, each housing a different type of product, with an open garden at its center, as seen in the cross-section and view.[32] [Fig. 15] The acclaimed "Galerie des Machines" occupied one of the outermost rings; its space, seen filled to the ceiling in the photograph by the Bisson Brothers, was 115 feet wide and 85 feet tall, with the expanse achieved structurally in single span of iron arch.[33] [Fig. 16]

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stated that, "... l'intensité des travaux Parisiens avant l'Exposition Universelle de 1867 est soulignée également dans les nouvelles de Paris donées dan *The Builder*, XXIV, of 1866."

[30] Napoleon III held many grand dinners in the Salle des Maréchaux at the "New Louvre" for the visiting heads of state and dignitaries, including a very famous one now called the "Dinner of the Three Emperors." In the habit of giving these guests gifts, Napoleon III had given King William a copy map of his plans for the city improvements. A fire at the Hôtel de Ville (City Hall) in1871 destroyed the original as well as a few copies made by Haussmann. Thus, the Prussian copy is the only known, documented record of Napoleon's intentions. Regarding its veracity for the changes and planning that ensued, see Pinckney, *Napoléon III*, p. 26.

[31] Erik Mattie, *World's Fairs* (New York: Princeton Architectural Press, 1998) p. 19.

[32] Designed by Kranz, an engineer of bridges and roads like Alphand, and probably built under Eiffel's supervision, the Exhibition Building is structurally derived from the Crystal Palace of 1855. It stands out as an innovation because of the conceptual idea for arranging the displays: in circulating around the oval, one would see a particular type of exhibit content; moving radially between the garden and the outside ring (the Galérie des Machines) one would find entries of a single nation. The idea is often credited to Napoléon III, but Luckhurst attributes the origin of the idea to George Maw and Edward Payne in London in 1862. The oval shape, which responds so well to the elongated rectangle of the Champs de Mars, is credited to Frédéric Le Play and Prince Napoléon, the Emperor's nephew. See Mattie, *World's Fairs*, p. 20; Luckhurst, *Exhibitions*, pp. 132-134; *Historical Dictionary ... 1852-1870*, pp. 310-313.

[33] *The Builder*, "Paris Universal Exhibition, 1867," p. 105. This article described the Gallery and its specific attributes for displaying and viewing the machines.

The immense iron and glass edifice, sometimes referred to as merely a "vast shed" rather than as a significant piece of architecture, demonstrated innovations and explorations with materials and construction techniques.[34] Joseph Paxton's Crystal Palace at the 1851 London Exposition was no doubt a precedent, but so to was the new iron and glass market structure at Les Halles undertaken at the Emperor's behest (1853-58, Baltard, Callet and Davioud).[35] [Fig. 17] Other contemporary structures created from combinations of structural cast and wrought iron and glass included: Jean-Louis-Charles Garnier's Opéra (begun 1861); the Passages des Princes off the Boulevard des Italiens (1860); and several of the new train stations, such as Jacques Ignace Hittorf's 1863 Gare du Nord.[36] Other notable examples of delicately engineered structural iron arches include Henri Labrouste's libraries, the Bibliothèque Ste. Genevieve (1844-1850) and the Bibliothèque Nationale (1858-68).[37]

In addition to the building's unique conception of form based on the display agenda and contents, the Exposition Universelle was innovative in other respects. The arrangement of exhibitions related to the new classification system adopted by the Imperial Commissioners which differed "... entirely from and hitherto devised and forms a special

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[34] Morford, *Paris in '67*, pp. 114-115. Morford described it as "a combination of railroad-station .and bazaar – what is not refreshment room being shop."

[35] *Historical Dictionary ... 1852-1870*, p. 173. The entry stated that, "In 1855 Davioud was named *sous-inspectuer*, under Victor Baltard (1805-1874), of construction of the new central markets, the Halles Centrales, and a little later was promoted to chief architect *des promenades et plantation de Paris*."

[36] Norval White, *The Guide to the Architecture of Paris* (New York: Charles Scribner's Sons, 1991) pp. 165, 179. White describes the Passage des Princes, originally the passage Mirès, as "the last of the great covered passages, here built under Napoléon III ... [with] the original glass and ironworks still there, the ironwork wrought into curls." Hittorf's Gare du Nord is located on the rue Dunkerque at the place Napoléon III. It's neo-classical exterior shields "a radical iron and glass interior: the architecture of the traditional boulevard joining the city, the architecture of the future (iron) joining the iron horses and their rails."

[37] White, *Architecture of Paris*, pp. 9, 79. Labrouste's contribution at the Bibliothèque Nationale is the main reading room.

feature of the Exhibition."[38] This included a new exhibition category on "the history of labour," an idea credited to Le Play.[39] Classifications addressed ten categories that were "... considered by the French authorities to represent everything connected with the industry of a people." Two categories hold direct relevance: the apparatus and processes used in the arts; and articles exhibited with the view of improving the physical and moral condition of the people. These inform the image offered in the *Art-Journal*, which places into context imagery and techniques relevant to the Parc: landscape and art, and machines and technology. [Fig. 18]

General impressions of the contents in the Exhibition halls viewed them as successful displays of "Art and Industry" evidenced by the participating entrants and nations:

> The component elements, that is to say, of this Universal Exhibition, when considered collectively, were quite as numerous, as varied, and as characteristic and significant as we had expected they would be; and so high were our expectations, that we are not able to employ any more emphatic form of approval.[40]

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[38] *The Builder*, "Classification of the French Exhibition," p. 907.

[39] Mattie, *World's Fairs*, p. 25; Luckhurst, *Exhibitions* , p. 133; *Historical Dictionary ... 1852-1870*, pp. 329, 363-364, 459, 678. The history of labor section included displays of cheap goods and examples of workers' housing. This sub-theme of the Exposition reflected the government's labor reform efforts. Parallel counter activities in response to this theme emanated from an 1854 law requiring a livret d'ouvrier – an industrial worker's passbook that recorded employment history, debts owed, and certification of completion of work obligations. There arose an interpretation of them [livrets] within the city as 'essentially a police measure' and resistance increased after 1860. ... Delegates of several trades to the international exposition of 1862 and 1867 demanded its abolition." (*Historical Dictionary ... 1852-1870*, pp. 363-364) Strong advocacy for workers came from the Palais Royale Group, represented at the 1862 and 1867 expositions by the printing worker Chabaud. Further advocacy came from other sources and individuals, for instance Eugene Varlin (1839-1871) a bookbinder, Parisian labor activist, organizer of cooperatives, and member of the Paris Commune. Varlin "quickly emerged as the bookbinders' leading spokesman, representing them at the London Exposition of 1862 and the Paris Exposition of 1867, as well as landing them in two strikes in 1864 and 1865, the first successful and the second a failure." *Historical Dictionary ... 1852-1870*, p. 678.

[40] *Art-Journal Illustrated Catalogue*, p. xi.

A partial list of innovative contents includes: artificial limbs, Pasteur's process for food preservation, the hydraulic elevator, the rocking chair, the vélocipède, watering hoses and machines, works of cast and molded iron and steel and reinforced concrete.[41] The latter innovations pertained directly to the construction of the Parc des Buttes Chaumont. The hydraulic elevator designed by Léon Edoux (1827-1910) "... lifted visitors from ground floor to roof where there were walkways offering splendid views." Significantly, hydraulic technology enabled the installation and operation of the Parc's pumps and waterworks.[42] Those works within the Exhibition that were impressive enough to garner awards received Medals graced with a profile of Emperor Napoléon III crowned with a laurel wreath, a proud reminder of the Imperial agenda.[43] [Fig. 19]

This Exposition Universelle was the first to feature events outside on its grounds and many considered this to be the real novelty of the affair:

> The Park which surrounded the Exhibition Building, with its numerous and varied edifices, and their strangely diversified contents, and the Reserved Garden with its conservatories and aquaria, were happy conceptions happily carried out: and they will always be remembered as having contributed in a remarkable manner to the peculiar and characteristic attributes of the Exhibition of 1867, by which it distinguished itself from all its predecessors.[44]

To offer these grounds for their fullest enjoyment, it was the first fair to remain open in the evenings. This timing allowed the latest in public "street" lighting to be noticed and

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[41] Mattie, *World's Fairs*, p.19; *Historical Dictionary ... 1852-1870*, pp. 55, 311, 468. Pasteur's process for preservation garnered him a Grand Prix Medal. Paris coachmaker Pierre Michaux (1813-1883) and son Ernst (1849-1889) exhibited the vélocipède.

[42] *Historical Dictionary ... 1852-1870,* p. 311.

[43] *Art Journal Illustrated Catalogue*, p. xii. The "Medal of Honor" was a medallion with a profile of Napoléon III recto and an exposition seal with space for the recipient's name verso.

[44] Ibid., p. ix.

appreciated. The grounds included thematic pavilions and national restaurants, and offered the novelties of an amusement park and sideshows.[45] A visitor wrote that an "... intelligent and observant stroller through the wonderful grounds ... [would] have felt, seen, and understood the indescribable enchantment."[46]

The park grounds ringing the oval gallery structure contained many walking paths woven between numerous smaller exhibition buildings and displays. They were entered through six large gateways, one at each corner and two terminating each end of the main central axis, with the official entrance at the river directly from the Pont d'Iena, clearly shown in the engraving by Pinot and Sagire. [Fig. 20] Created largely by Barillet-Deschamps, the park grounds were accented with several water features and rills and with elaborate, sweeping planted beds. He called upon the nurseries and growers of Europe and planted "... some hundreds of magnificent shrubs, including superb magnolias from Angers."[47] The "... grounds, in shrubbery, flowers and foliage, and in the scarcely less difficult regard of verdure ..." were even compared to the "royalest of royal grounds."[48]

The Parc Français, with the most significant French gardens and pavilions, was located prominently at the southwest corner of the Exposition grounds. With the purchase of an entry ticket, a visitor gained admission into a fabulous garden that hosted the Emperor's Pavilion, several conservatories and a host of other supporting features, all constructed at "evidently unlimited cost." At the Parc Français, the "... science of *delicate landscape*

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[45] Mattie, *World's Fairs*, pp. 20-25; Luckhurst, *Exhibitions*, p. 134.
[46] Morford, *Paris in '67*, p. 147.
[47] *The Builder*, "Paris Exhibition, 1867," p. 889.
[48] Morford, *Paris in '67*, p. 131.

gardening (*i. e.*, landscape gardening in a close way and for new view), for which the French are deservedly applauded by all of the rest of the world, comes into play and supplies a rival to the wonders of Versailles."[49] Certain elements echoed what was found at the Parc des Buttes Chaumont: "... walks edged with iron-bowed borderings skillfully made into the semblance of wooden withes," and "shrubbery judiciously placed as well [as] kept."[50]

The Greenhouse, another glass and iron structure, contained an extensive collection of exotica "of peculiar size and magnificence" that Barillet-Deschamps culled from the botanical gardens of Europe to attain a complete and established effect. The Palm-House also contained an impressive collection and featured a full-size statue of the popular Empress Eugenie, her presence recalling the Imperial role.[51]

Of great significance as a parallel to the construction at the Butte Chaumont were certain aspects of the Aquarium d'Eau Douce and the Aquarium Maritime. In the latter, filled with "... all of the wonders of the sea excepting whales and sea-serpents," one encountered,

> ... in the caverns below, which might skirt some wild northern coast, the science of laborious illusion seems to have been carried even farther than in that ruined tower with its ivy skirting the grand entrance. Beneath rough crags, that seem to have been corroded and hollowed by the tide-wash of centuries, [the visitor proceeds] into a succession of subterranean caverns, in the very midst of which the aquarium dimly shows its scaly denizens, and where the rough sides, encrusted with artificial spar, and hardened by the real drip of water artistically sup-plied, the whole just enough torch-lighted to make

[49] Ibid., p. 149.
[50] Idem.
[51] Ibid., p. 154.

> the sense of reality perfect, give evidence of the fact that the Emperor and his satellites resolve to carry out a project [regardless] of expense.[52]

These grottoes, constructed of concrete *stuc ciment*, match work done at the Parc and described in that section under "Industry." *Stuc ciment* was highlighted as a significant technological innovation at the Exposition that received notice in contemporary descriptions of the Exposition contents as well as by later assessments. *Stuc cimenteurs* garnered high praise. A great rivalry ensued between those working at the Exposition and at the Parc, with each group trying to outdo the other by creating examples that demonstrated the different modes and techniques to visitors.[53] The Grand Aquarium's stalactites and stalagmites reproduced in Edouard André's 1879 treatise showed the fruition of their inventiveness. [Fig. 21]

Such marvels and spectacles were seen by nearly eleven million visitors, more than 200,000 of them foreign, who paid to see the resplendent wonders of art and industry on display.[54] Maria Luisa Marceca wrote in her 1981 essay that,

> Park and exhibition are a single great spectacle, an identical great machine ... At bottom there is no contradiction between the artificial environment of the immense yard built by Haussmann [the Exposition grounds] during the 'Grands Travaux' and that of the park, but only
> a relative diversity of techniques and materials. Common to both in fact is the idea of spectacle, 'of magnificent expense.'[55]

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[52] Ibid., p. 155; *Historical Dictionary ... 1852-1870*, p. 311; Greengard, *Great World's Fairs*, p. 5. Greengard offered a smaller attendance figure: 6, 805,000. The corroboration of most sources puts the attendance closer to the eleven million.

[53] *Le XIXe Arrondissement – Une Cité Nouvelle*. Ed. Jean-Marie Jenn (Paris) p. 68. Author's translation: "... l'exposition de 1867 à incité les stucateurs ciment à une stimulante rivalité en vue de montrer et de proposer aux visiteurs les differents emplois susceptibles d'être faits de la 'rocaille ciment.'"

[54] Luckhurst, *Exhibitions*, p. 134.

[55] Marceca. "Reservoir, Circulation, Residue," p. 61. Marceca forwarded an argument construing Alphand's parks as models of technological beauty, constructed within a new paradigm of urban space and

The Parc des Buttes Chaumont, a sight that "Strangers should not omit to visit," played an essential role in the context of Paris during the Exposition.[56] Both the Exposition and the Parc sprang from the same political, economic and nationalist urges and embraced the aesthetic and technological agenda. Employing the "Art and Industry" theme as a critical lens advances not only the contextual reading of the Parc but also provides a framework for explaining its means of production. The concomitant emphasis on image and technology – defined for our purposes as the means and products of industrialization – makes possible a re-conception of the picturesque in the context of the urban park as specifically grounded in the Second Empire's urban design campaign. The convergence of timing, people, and intentions as well as the aesthetic and technical outcome achieved at the Exposition give credence to the thematic lens of "Art and Industry" which guides the next sections devoted to the Parc des Buttes Chaumont.

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spectacle. However, she neither detailed nor explained the technology used, nor substantiated the relationship between the Exposition and the Parc beyond suggesting a convergence, an "extraordinary parallel," between them. She wrote, "Common to both in fact is the idea of spectacle, 'of magnificent expense.' The Paris of the Second Empire must offer itself as a show, it is made to be looked at and enjoyed; the public space is merchandise and the crowd is audience and customer. The whole of Paris coincides with the public space."

[56] *Galignani's New Paris Guide* (Paris: A. and W. Galignani & Co.,1868) p. 452.

III. Art: Picturesque Revelations at the Parc des Buttes Chaumont

"To analyze the creations of the past, to separate out the obsolete parts, and to recognize the elements that can enter modern art: such must be the object of concern of the artist who dedicates himself to the study of gardens."[1]
J. C. A. Alphand

The preceding chapter established alignments between the Exposition Universelle and the Parc des Buttes Chaumont and summarized key political and economic motivations accompanying the desire to show off French accomplishments in design and industry. Recall that not only the Exposition building, grounds and contents, but also current architectural and engineering works throughout the City highlighted contemporary industrial and technological advances and reflected trends in contemporary architectural theory.[2] It is reasonable to assume that this emphasis equally could have directed Alphand's work in the urban design campaign. The picturesque illusions achieved at the Parc resulted from a unique merging of technology and image that set its conception and production into the context of the other contemporary civic projects. Using the 1867 Exposition Universelle's theme as a critical lens, the Parc des Buttes Chaumont will be examined in this chapter and the next as the convergence of "Art" and "Industry." This chapter presents some thoughts on why the Picturesque style and nomenclature were so

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[1] Alphand, *Les Promenades*.

[2] See Eugène-Emmanuel Viollet-le-Duc, *Lectures on Architecture*, trans. Benjamin Bucknall, 2 vols. (New York: Dover Publications, Inc.) 1987. Chapter X, "Architecture in the Nineteenth Century -- Importance of Method," and Chapter XII, "The Construction of Buildings -- Masonry continued, -- Methods of Execution - Simultaneous employment of Stone, Brick and Iron -- Economy in the Outlay," are of particular relevance. It is possible to thread a relationship between Alphand and the influential work of architectural theorist Eugène-Emanuel Viollet-le-Duc (1814-1879). Viollet-le-Duc's theory of structural rationalism implied the acceptance of structural iron and advocated the role of engineering, and of new techniques and materials. The Exposition building certainly fit the theory; arguably, so did the Parc.

readily applied to the design, production and reception of the Parc, and then describes the Parc as an application of "Art" via Picturesque theory.

For the purposes of this inquiry, "Art" is understood as a result of a focused design process in landscape architecture that materialized at the Parc des Buttes Chaumont as a transformation of the theoretical ideals of the "Picturesque." This interpretation is in concert with Alphand's own attitude that the design of gardens -- and by extension parks -- constituted an art of the highest order and his conviction that designer should not be hesitant to embellish and make more beautiful the conditions of nature found on the site.[3] This chapter seeks to provide a basis for understanding picturesque landscape design theory as rendered in the built form and contemporary experience of the Parc des Buttes Chaumont. This inquiry neither reconstructs the nineteenth-century debates questioning whether landscape design is art, nor deals with the fine arts hung in the exhibition halls of the Exposition, although there are interesting parallels between the built landscape and the many entries in the genre of landscapes and urban scenes.[4]

To address "Art" at the Parc within this framework, it is important to consider what nineteenth-century visitors might have encountered in light of the agenda determined for

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[3] Alphand, *Les Promenades*. Alphand stated, "Un jardin ne doit pas être une copie exacte de la nature [mais] une oeuvre d'art." This sentiment – that a garden should be different from wild nature and recognizable as a work of art – influenced many landscape gardeners in the nineteenth-century. It is interesting that the Scottish landscape theorist and designer J. C. Loudon (1783-1843), an ardent supporter for the development of urban public parks in Great Britain, used the sentiment as the philosophical support to justify his taste for "regular" gardens. See *Oxford Companion to Gardens*, p. 345.

[4] The contents and background for the works of the Salon and within the halls of the Exposition Universelle are admirably covered in a number of books, the most useful being T. J. Clark, *The Painting of Modern Life, Paris in the Art of Manet and his Followers* (Princeton: Princeton University Press, 1984) and Patricia Mainardi, *Art and Politics of the Second Empire: The Universal Expositions of 1855 and 1867* (New Haven: Yale University Press, 1987).

the Exposition. In 1868, William Robinson called it "... the boldest attempt at what is called the Picturesque style that has been attempted either in Paris or London."[5] The newly created park was clearly within the public domain and stood as a parallel version of innovations and accomplishments shown at the Exposition. The Parc reflected a sensibility regarding "Art" offered by organizers and exhibitors that the Exposition would offer the "... final acceptance of that most excellent treaty of close alliance between Art and Manufacture, by which alone both can be raised to their highest dignity."[6]

In short, the Parc was an opportunity for Alphand to employ and celebrate new techniques and materials to produce a inventive park that conveyed a particular message. Understood as the convergence of "Art and Industry," the Parc can be interpreted as a cultural product that rendered technology acceptable: a familiar image of "nature" -- the Picturesque -- was forged anew, sustained by the innovative techniques and materials of the era. The Parc des Buttes Chaumont is not unique in this effort to use landscape design to mediate the by-products and cultural resistance to industrialization. Instances range from a grotto constructed of industrial slag waste in Blaise, England to Olmsted's use of engineering to simulate the historic cleansing process for the brackish water flowing into the Boston Fens. Alphand employed the Picturesque style to invent the Parc because it reflected Napoléon III's influence; it was a familiar visual nomenclature and part of a general cultural climate; it acknowledged a prevalence of precedents conveyed via built works, images and treatises; and it was part of the design team's background.

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[5] William Robinson, *The Parks, Promenades and Gardens of Paris, described and considered in relation to the wants of our own cities* (London: John Murray) 1869, p. 66; and William Robinson, *The Parks and Gardens of Paris* (London: Macmillan & Co.) 1878, p. 59.
[6] *Art Journal Illustrated Catalogue*, p. 69.

Cited in an 1882 guidebook as "... a creation of the last few years, by which an unhealthy corner of Paris has been converted into an agreeable place of recreation," the Parc des Buttes Chaumont drew acclaim as a significant "natural space" within the City.[7] In the broadest sense, the desire to introduce designed urban parks into the City dated at least forty years earlier, when Hippolyte Meynadier had insisted that "... what the capital required was an open space the size of London's Hyde Park; what it *needed* was a 'real countryside in the town.'"[8] Elaborating on this, the scholar Nicholas Green explained that,

> ... in the state planned parks of Haussmann's administration from the 1850s and 1860s ... gardens like the Buttes Chaumont were laid out to *re*-present nature ... but, as with so many aspects of metropolitan ideology, this was no sudden inspiration of Napoleonic centralism. Nor, as garden historians have argued, can it be put down to the adoption of the eighteenth-century and aristocratic *jardin anglais*. Rather, the way to understand this creation is as official legitimation of the wholesale reinvention of nature which had been distinctively articulated in and around the Paris of the 1830s and 1840s.[9]

I suggest, however, that it is important not to neglect Napoleon's influence. His focus on the design and creation of parks directly engaged in this reinvention of urban nature. Prior to Napoléon III's era, the Picturesque style primarily existed in gardens on private estates; the notable exception was the "jardin anglais" constructed in the 1790s in the public Jardins Luxembourg.[10] Reflecting an admiration he developed for urban park spaces seen while he was in exile in London, the Emperor embraced the Picturesque as an

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[7] *Bradshaw's Guide Through Paris and its Environs* (London: W. J. Adams & Sons) 1882, p. 85.
[8] Nicholas Green, *The Spectacle of Nature: Landscape and Bourgeois Culture in Nineteenth-Century France* (Manchester, G. B. and New York: Manchester University Press) 1990, p. 69, quoting H. Meynadier, *Paris pittoresque et monumental,* 1843, pp.105-106.
[9] Idem.

ideal model for urban parks and encouraged its use for his new and redesigned parks.[11] For Napoléon III and his immediate staff, emulating Great Britain's urban public spaces symbolized something. While there certainly may have been the desire to outshine British precedents, it may equally be a conciliatory gesture for earlier deep-seated, anti-British sentiments. In the 1860s, trade alliances were critical for France's economic stability and growth: Chevalier's Cobden Treaty, explained in the previous chapter, was but one important gesture.

Regardless, the Picturesque garden style was not unknown in nineteenth-century French landscape nomenclature. In addition to its original popularity in Great Britain, the Picturesque had French precedents in built works, images and treatises that Nicholas Green assessed:

> The concept of the picturesque in France has been applied and is applied to three distinct phenomena. First, to those élite private gardens accompanying grand maisons de campagne, which from the 1750s were modeled according to 'Chinese' and 'English' principles to achieve a more naturalistic effect. Then, it has been used to describe the vogue for exploring France after 1815; for rediscovering the wealth of historical monuments and sites, the richness and variety of local customs as revealed by a multitude of travel publications. On a quite different plane, the picturesque has also been employed from the eighteenth century onwards to classify landscapes which in some sense looked like pictures. This usage could vary from a generalized and abstract invocation of pictorialism – composition, balance, and so on – to a detailed package of rules and prescriptions.[12]

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[10] Green, *Spectacle of Nature*, p. 68. Green summarized the history of the Luxembourg gardens, which were replanted around 1801. He emphasized contemporary assertions that being in the English styled area of the gardens fostered for the visitor the ready comparison with being in "the real countryside."

[11] Numerous sources allude to Napoléon III's interest in the British precedent. See: Françcoise Choay, "Haussmann et le Système des Espaces Verts Parisien," *Revue de L'Art* no. 29 (1975) pp. 83 -99. See also Dominique Jarrassé, "Le bouquet de Paris, Les jardins publics Parisiens au XIX siècle," *Monuments Historiques* (Paris) vol. 42 (Dec-Jan 1985-1986) pp. 55-60.

[12] Green, *Spectacle of Nature*, p. 95. He referenced scholars Dora Wiebenson and William Howard Adams; the critic Adhémar; and François Boitard's treatise. A seminal point in Green's excellent work which dovetails with the thrust of this thesis is that, "All these definitions play some part in this account. But our

The private gardens – the built works – provided examples of the picturesque that stood in contrast to the "jardin régulier" lineage of Le Nôtre. In *The Picturesque Garden in France*, Dora Wiebenson traced historic French treatment of the Picturesque and noted its differences from the English paradigm in conception and built form.[13] Nineteenth-century excursionists desiring an intimate experience with nature sought these picturesque estates within the environs of Paris, for instance, Enghien, Montmorency, Méréville, Ermenonville, or the forests of St. Cloud.[14] [Fig. 22]

Supplementing the influence of built works and images were a number of treatises that defined and informed the development of the Picturesque style, particularly as it might have been understood and employed by Alphand at the Parc des Buttes Chaumont. These theoretical treatises range from eighteenth-century British works surrounding the ideas of the sublime, the beautiful, and the picturesque, to a selection of nineteenth-century French and German works that codified particular conceptual and stylistic approaches and attributes. Since the Parc des Buttes Chaumont will be examined based on how it expressed Picturesque theory, introducing some key contributors to the debates will help establish the groundwork and define the term.

Seminal British theorists of the Picturesque were William Gilpin (1724-1804); Richard Payne Knight (1750-1824); Uvedale Price (1747-1829); and to a lesser extent, Sir

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intention is less to explore the picturesque as an idea of style than in terms of its circulation as a set of commodities – produced, marketed, consumed."

[13] Dora Wiebenson, *The Picturesque Garden in France* (Princeton: Princeton University Press) 1978.

[14] Green, *Spectacle of Nature*, pp. 80-89; Clark, *Painting of Modern Life*, pp. 145-204.

Humphrey Repton (1752-1818).[15] While it is not clear that Alphand relied on their works it is important to summarize their positions because they underpin subsequent French adaptations of the style. Gilpin defined the term "picturesque" as "that kind of beauty which would look well in a picture" and he advocated the picturesque tour, wherein a traveler sought "rough and varied" scenes.[16] Knight furthered the assumption that landscapes were potent mnemonic references for Picturesque imagery that the tourist reinforced through written and sketched notations.[17] For Knight, the Picturesque was a "function of the imagination" in which the garden responded to the *genius loci* and offered "mental variety" through stimulating opportunities to react, engage, and form associations.[18] Price, according to John Dixon Hunt, was "... committed to making the picturesque aesthetic precise and definite" and his "Essay on the Picturesque" (1794) engaged concepts of the sublime and articulated his position that picturesque qualities resided within the object rather than in the spectator's eye and imagination.[19] As derived from their work, the particular qualities admired and sought within the scope of the Picturesque included "roughness of texture, irregularity, asymmetry, variety, partial concealment, the unexpected, and particularly the impression that everything was of

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[15]John Dixon Hunt and Peter Willis, *The Genius of the Place, The English Landscape Garden* 1620-1820 (Cambridge, MA: The M.I.T. Press) 1988, pp. 337-367.

[16] Hunt and Willis, *Genius of the Place*, pp. 337-338. Gilpin was prolific with his tour guides, which included "Observations on the river Wye, and Several Parts of South Wales ..." (1782). Much of his theory is also codifiedin "Remarks on Forest Scenery" (1791).

[17] See Malcolm Andrews, *The Search for the Picturesque* (Stanford, CA: Stanford University Press) 1989, for a more developed explanation of this important aspect of the Picturesque; the relationship with tourism is a link to Nicholas Green's work, as well as to the notion of tourism associated with the Parc des Buttes Chaumont during the tenure of the Exposition and thereafter.

[18] Hunt, *Genius of the Place*, p. 342. Knight's major works were "The Landscape, A Didactic Poem" (1794) and "An Analytical Inquiry into the Principles of Taste" (1805).

[19] Hunt, *Genius of the Place*, p. 351.

natural occurrence, even though it might be artfully contrived."[20] Their ultimate criterion of excellence was a "just congruity of parts combined."[21]

Humphrey Repton (1752-1818), whose work in Great Britain drew the criticism of Price and Knight, tempered the sublime and terrible with ideas of "... 'agreeable surprise' and by the comfortable assurance of social values and utility."[22] John Merivale compared the work of Repton and Alphand in order to discern those features and attitudes that distinguish their respective interpretations of picturesque design. He particularly considered the intended use of the space and the increased importance of paths in Alphand's designs. I agree with his conclusion that Alphand not only shifted the importance of the elements to fit into contemporary French ideas about the promenade, but that he also accommodated the broader nineteenth-century "... business of landscape design to maintain at least some connection with an image of primitive nature." [23]

French practitioners and theoreticians contributing to the conception for the "style pittoresque" included Claude-Henri Watelet (1718-1786), Jean-Marie Morel (n.d.), Pierre Boitard (1789?-1859), and Gabriel Thouin (1747-1829). Watelet, a friend of the painters François Bouchard and Hubert Robert and a painter himself, designed the gardens of Moulin Joli and wrote *Essai sur les jardins* (1774). That treatise echoed aspects of Whately, whose works he introduced from Great Britain, by functioning partly as a

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[20] Jay Appleton, "Some Thoughts on the Geology of the Picturesque" *Journal of Garden History* (1986) vol. 6, no. 3, p. 279.
[21] Ibid., p. 280.
[22] Hunt, *Genius of the Place*, p. 358.

"...classification of gardens according to their character (*ferme ornée*, Picturesque, Poetic, Romantic)" and as a "... plea for simplicity and naturalness in gardens."[24] Morel's text, *Théorie des jardins*, was first published in 1776 with a second edition in 1802. In 1813, Salvalette de Fortaire summarized Morel's beliefs:

> Morel conceived both the overall scheme and the details of the garden in relation to its site with such skill and ingenuity, and disguised its artificiality with such artistry that even the far horizon seemed to be part of his plan and his plan to be indispensable to the surrounding landscape. The elements of his design -- woodland, torrents, lakes, rocks, shrubs, rivers -- were so perfectly arranged as to seem an integral part of the whole, linked in some subtle and indefinable way by means of a scheme which allowed them to reveal themselves in turn in a carefully planned sequence of images and reflections, leading both the eye and the step from one to the other in a series of natural and invisible transitions.[25]

Gabriel Thouin's treatise, *Plans raisonnés de toutes les espèces de jardins* (1819-20), apparently broke with Morel's attention to site while Boitard's treatise, *L'Art de composer et décorer les jardins* (1834), focused on garden ornaments and furniture as key aspects to achieve the proper "scene" of the garden.[26] Thouin's influential folio essentially classified and systematized a "geometricized" version of the Picturesque garden for French landscape engineers and his "... codification of the jardin anglais determined its development throughout the 19th century in France."[27]

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[23] See John Merivale, "Charles-Adolphe Alphand and the Parks of Paris," *Landscape Design*, no. 123 (August 1978) pp. 32, 34. Merivale provided a brief summary of the style as it grew to be applied to the public versus private milieu and noted the importance of J. C. Loudon's work.

[24] *Oxford Companion to Gardens*, p. 597. Entry by Kenneth Woodbridge.

[25] Georges Teyssot, "The Eclectic Garden and the Imitation of Nature," *The Architecture of Western Gardens*, eds. Monique Mosser and Georges Teyssot (Cambridge: The MIT Press, 1991) p. 360, quoting de Salavette Fortaire, no citation.

[26] Gabriel Thouin, *Plans raisonnés de toutes les espèces de jardin* (Paris: Madame Veuve Bouchard-Huzard, L'impremerie Lebègue) 1823. 3rd Édition 1828.

[27] *Oxford Companion to Gardens*, p. 555. Dennis Lambin's entry for Thouin stated, "In his search for a practical method he concerned himself with well-planned paths related to a large circular allée, secondary paths being functional. He gave attention to the co-ordination of scenes within the garden, making great lawns up to the approaches of the house, with groups and clumps of trees, interior viewpoints, and long coulées (paths) between clumps which, despite the intended intimacy of the whole, sometimes run off towards the landscape outside."

My impression is that Alphand's work at the Buttes Chaumont pushed Morel's theoretical beliefs into Napoléon III's requisite public application. Using almost exactly the same elements, Alphand produced a landscape that expressed his deep sensitivity to the site. Based on an examination of the text and plates of Thouin's treatise, Alphand was *not* very original at all regarding the carefully geometric layout of the sweeping paths and the sense of linking vistas and follies around these smooth circuits. Where Alphand deviated from these earlier works is in his careful attention to topographic issues and how he inscribed the geometric paths onto the topographic "canvas." In this sense, I speculate that his skill and intention rest in his civil engineering training which emphasized a technical understanding of sites and solutions.

Additional inspiration for the Parc came from the work of the Bavarian Hermann Ludwig Heinrich, Fürst von Pückler-Muskau (1785-1871), whose treatise, *Hints on Landscape Gardening* (1834), was translated into French by 1847. In it, Pückler-Muskau emphasized the necessity "... to utilize what was already there, to elevate and enrich in the same spirit, but not to violate its locality and history," tenets he applied to his work on the picturesque Parc Muskau, shown in a plan from *Les Promenades*.[28] [Fig. 23] The work was widely referenced and presumably Alphand knew it well. Alphand likely met Pückler-Muskau when he visited the Emperor during construction of the Bois de Boulogne. That he respected his position is clear: in *L'Art des Jardins*, Alphand and co-

[28] Norman Newton, *Design on the Land* (Cambridge, MA: The Belknap Press of Harvard University Press) pp. 233-245. Newton summarized Pückler-Muskau's tenets for picturesque landscape design: unity, inwardness, outwardness, simplicity, man as nature, house-garden unified, ecology for humans, variety and educational values.

author Alfred August Ernouf introduced their chapter on the "jardins irréguliers" with a direct citation of Pückler-Muskau's definition of the art: to produce a concentration in the whole of the natural countryside idealized and poetic.[29]

The Parc des Buttes Chaumont thus owed some of its conceptual intent to the landscaped gardens of Great Britain that Napoleon III had seen, as well as to the proliferation of built picturesque gardens and the body of treatises interpreting the "style pittoresque." This thesis is not the venue for fully extrapolating the content and distinctions between these selected treatises and theorists. In general, these works established a sensibility and set of parameters for picturesque design that placed that style in counterpoint to the tradition of the "jardins réguliers" and offered particularized expressions of "nature" and "site" that Alphand embraced at the Parc.

The series of treatises converged with Alphand's work, but it is important to note that other French designers, particularly Edouard André and the Baron Ernouf, followed closely behind him to confirm and detail the theory and practices Alphand and Barillet-Deschamps popularized. Alphand codified the work he accomplished in *Les Promenades de Paris*, which Napoléon III distributed to heads of state throughout Europe and North America. In addition to the folios, loose plates with images of the Parc and the Exposition were produced directly from one of the 487 woodcut plates or the eighty steel engraving

[29] Dominique Jarrassé,"Des jardins à l'allemande, L'influence du prince Pückler-Muskau," *Monuments Historiques* (Paris) vol. 42 (Dec-Jan 1985-1986) p. 61. Author's translations of the quote: "*L'Art des Jardins* d'Ernouf et Alphand lui emprunte en overture du chapitre sur les jardins irréguliers une définition de cet art: 'concentration d'un ensemble de paysages naturels, idéalisés, poétisés.'" The influences of Pückler-Muskau are also referenced in Françoise Choay, "Haussmann et le Système des Espaces Verts ...," pp. 86, 98.

plates used for *Les Promenades*. The distribution of his treatise with its hundreds of landscape views – from details to panoramas – is arguably part of the nineteenth-century plethora of landscape images available for purchase described by Nicholas Green as a "... dealer boom in landscape pictures and travel prints."[30] One particularly popular image is Grandsire's engraving of the Tempietto atop the island of the Buttes Chaumont as seen from the eastern rockwork "grotto." [See Fig. 1]

In addition to images of his own work in Paris, Alphand included in the "Introduction" a selection of designed landscapes culled from the history of the discipline. The scope of this section of the treatise demonstrated what Alphand knew and deemed important for the development of his theoretical design position. He paid due attention to the French traditions of the Middle Ages and the Renaissance, especially the work of Andre Le Nôtre, the progenitor of the quintessential "French" style. He covered in some detail eighteenth-century English landscapes and their examples of this style found in France. He also included Pückler-Muskau's primary project and contemporaneous examples of urban parks in Great Britain before he concluded with examples of his public parks and squares. This section of *Les Promenades* is critical to understanding Alphand's position regarding finding the appropriate style of design to adopt based on what the site conditions suggested. It is also where he laid out the language and terms that distinguished two distinct stylistic threads that affected his work: the "jardins réguliers,"

[30] Green, *Spectacle of Nature*, p. 98-106. Green suggested that this boom began in the early part of the nineteenth-century catalyzed by woodcuts, engravings, newspapers, and paintings. I might add that it continued to the turn-of-the-century; the advent of photographic postcards in the 1880s catalyzed a whole new wave of "images" of designed and natural landscapes for ready consumption and their distribution was facilitated by the birth of the centralized postal system. Additional information on French picture postcards

also called the "jardins français" and the "jardins irréguliers, ou agreste (rustic)" which he also called "jardins anglais" and equated to "le style pittoresque."[31]

Furthermore, in the "Introduction" Alphand developed the principles of his work and codified his design process based on the premise that the whole garden can be split into three constituent parts: topography (le relief), plants (les plantations), and roads and footways (les allées), with primacy accorded to the topography because it gave direction to all that followed.[32] It is clear that Alphand's theoretical position not only reflected his understanding of the lineage of garden history and the Picturesque treatises but also his strong technical background. As "... the principal engineer by whose design these happy results have been achieved," he adapted all of this to produce his rendition of the Parc des Buttes Chaumont as a "jardins irréguliers."[33] His technical training began in 1834 when he first ventured to Paris in 1834 in order to complete his advanced studies at the Lycée Charlemagne. The following year he entered the École Polytechnique. Upon matriculating in 1838, he entered into his specialized training for civil and structural engineering at the École des Ponts et Chaussées (est. 1744). The influential head of the school during Alphand's time was Gaspard François Prony (1755-1839), who formerly associated closely with the engineer Jean Rodolphe Peronnet (1708-1784) in the design and construction of some of his finer bridges. As a result, Alphand's training engaged

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is found in Naomi Schor, "Cartes Postales: Representing Paris 1900," *Critical Inquiry*, vol. 18, No. 2 (Winter 1992) pp. 188-243.

[31] Alphand, *Les Promenades*, p. XXXVIII-XLVIII. See also Jordan, *Transforming Paris*, p. 408. Jordan called the Introduction "learned and well illustrated."

[32] Alphand, *Les Promenades*, p. XLVIII. See also Alfred August Ernouf *L'Art des Jardins* (Paris) 1880) p. 132. Ernouf's description for the design of a landscape park followed the same order advocated by Alphand: "Les études pour le tracé d'un jardin irrégulier ou agrest peuvent être décomposées en trois parties principales: Le relief du terrain; les plantations; les allées."

[33] *Bradshaw's Guide Through Paris and its Environs* (London: W. J. Adams & Sons) 1882, p. 85

the most up to date technology and design theory for bridges. Another influential faculty member was C.L.M. Navier, whose textbook, *Leçons sur l'application de la mechanique* (1826), provided Alphand with a solid foundation is mechanics and hydraulics – skills he employed throughout his career.[34] He rose quickly through the ranks of the civil administrative service, emerged as the Director of Parks after the fall of the Second Empire, and at the time of his death at Paris in1891, had substantially transformed many acres of the city.

Many designers were involved in the numerous projects within the urban design campaign and are thus allied with the success of these accomplishments. The work of horticulturist Jean-Pierre Barillet-Deschamps and the architect Gabriel Davioud can be documented. Others played lesser roles, such as the engineer A. (or J.?) Darcel, who is credited with designing the suspension bridge.[35] As a key collaborator, Barillet-Deschamps was in charge of the planting design for a number of projects with Alphand, including the gardens at the Exposition Universelle and the Parc des Buttes Chaumont. Barillet-Deschamps trained at the Jardins des Plantes and then set himself up as a landscape architect at Bordeaux where he established greenhouses and a winter garden.[36]

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[34] See Ann Komara, "Jean Charles Adolphe Alphand," *Encyclopedia of Garden History*, eds. Candace Shoemaker and Steven La Rue (Chicago: Fitzroy Dearborn Publ., 2001). Alphand's life is relatively opaque and there is no biography published. It is interesting to note that two other major park designers of the era, Joseph Paxton and Frederick Law Olmsted, both had technical backgrounds, if not even direct training as engineers.

[35] White, *Guide to the Architecture of Paris*, p. 395; Jarassé, "Le Bouquet de Paris," p.57. Jarassé wrote: "Alphand était secondé par deux ingénieurs d'arrondissements, J. Darcel et Grégoire, chargés respectivement de l'ancien et du nouveau Paris, ..."

[36] Information on the life and works of Barillet-Deschamps is extremely slim. One of the most provocative versions appears in Denise and Pierre Le Dantec, *Reading the French Garden, Story and History* (Cambridge: The MIT Press, 1990) pp. 176-190.

Alphand brought him to Paris around 1860, and they worked closely together on many projects.

Gabriel Davioud was, "... with Jacques Ignace Hittorf (1792-1867), a favorite architect of Haussmann, enriching the latter's avenues and boulevards with fountains, urban furnishings, and structures."[37] He designed many buildings, such as the theaters of the place du Châtelet, and the Mairie of the 19th arrondissement (1876) located just outside the main gates of the Parc. [See "Appendix C" for a list of Davioud's major commissions] His work also included park elements, such as the grilles in the Parc Monceau, urinals (*vespasiennes*) throughout the city, and fountains at the place Obsérvatoire. He is credited with the designs of the guardhouse and restaurants within the Parc, as well as for the crowning glory of the Parc's island, the Tempietto, a neo-classical copy of the Temple of Sibyl in Tivoli, featured in the image from *Les Promenades*. [Fig. 24]

In the capable hands of these designers, the convergence of "Art and Industry" informed the experience and influenced a particular set of national objectives through marketing technology in the acceptable guise of the Picturesque. The Parc des Buttes Chaumont's relative size and the unique topography of its setting proved highly conducive to the ideals of the Picturesque. This will be examined through the following: the site itself with its unique history, geology and topography; the landform as reshaped by the designers; the layout of circulation routes and the views associated with these; the

[37] White, *Guide to the Architecture of Paris*, p. 85.

planting; the water features; the grotto; some of the details, particularly those in the rusticated manner; and finally, the folly. These constituted some of the highlights of the Parc's experience. Alphand's rendered plan is the best image to show the entirety of the Parc and identify significant features and elements as well as the general topography and planting. [Fig. 25]

Galignani's New Paris Guide for 1868 introduced the newly finished Parc with text that carefully highlighted the Parc's sordid history: a receptacle for night soils and their transformation into *poudrette*, the gibbets and charnal house of Montfaucon, and the slaughterhouses for horses and the associated rendering plants.[38] Few Exposition visitors, and perhaps even fewer local visitors, could have been unaware of this past. One source noted, "This delightful park was originally stone quarries, and afford a surprising instance of the skill and taste which has converted a barren wilderness into an oasis of verdure."[39] Awareness of the site's past touched the legacy of the sublime that figured in earlier treatises and attitudes surrounding the Picturesque. Visitors could express astonished delight at the transformation of this wasteland and their awareness of this past allowed their experience to carry with it a sort of delicious sense of the hideousness once so intimately bound into the site. In this respect, the Parc provided a layer of experience associated much more directly with "natural" sites redolent with associations of chaos and terror.

[38] *Galignani's ... Guide 1868*, p. 451.
[39] Ibid., p. 452.

The site geology, so critical to earlier picturesque designers seeking the "genius loci," also lent itself to the rendition of the Parc. Alphand's regional and specific local determination of the physical features and properties confirmed the theory codified in Jay Appleton's essay wherein the goal of the response to site was not only to have reflected but also "... perhaps even to have exploited, the potentialities inherent in its geological structure."[40] In fact, geology, and topography dictated Alphand's design concept, for as he noted in his treatise, the style one chose to employ -- either *le style régulier* or *le style agreste* -- must relate directly to the inherent qualities of the landform.[41] His design decisions for the Buttes Chaumont directly embraced the site's quarried landscape characteristics, leading visitors to state, "The very chaos caused by the natural and forced collapse of underground chambers allowed a violent picturesqueness [sic] to devolve."[42] [See Fig. 24]

Quarries were a desireable feature within the traditions of the Picturesque, as can be discerned in the following excerpt from Richard Payne Knight's "The Landscape, A Didactic Poem,"

> The quarry long neglected, and o'ergrown
> With thorns, that hang o'er mould'ring beds of stone,
> May oft the place of natural rocks supply,
> And frame the verdant picture to the eye;[43]

This sensibility, which may have formed some of the basis for Robinson's comments regarding vines and ivy, suggests the partial concealment and roughness requisite to Knight's ideal for the Picturesque. s The quarry, and the grottos reflect the imagery.

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[40] Appleton, "Geology of the picturesque," p. 274.
[41] Alphand, *Les Promenades*, pp. XXXVIII-XLI.
[42] White, *Guide to the Architecture of Paris*, p. 395.

For Alphand, topography lead closely to concerns about soil, which properties directly influenced the ability to shape the land and fabricate its "picturesqueness." William Robinson described Alphand's design response to the site when he wrote,

> Old quarries, enormous in size, and surrounded by acres of rubbish, once occupied this spot. It was by cutting away the ground around three sides of this, and leaving the highest and most picturesque side intact, that the present results brought about. A very extensive and imposing cliff rises to a height of over one hundred and sixty feet ... .[44]

This island, "... though rising abruptly from the water to a considerable height ...is not by far the highest point within the park, it being commanded by two hills to our left, while other smaller ones dot the ground here and there."[45] [See Figs. 1, 24, 25] Alphand reshaped the jagged quarried forms into the Parc's rolling, undulating series of highpoints and grassy slopes. These related not only to the reclamation of the quarry and its *genius loci* but also built on Picturesque imagery suggested by William Gilpin in his "Remarks on Forest Scenery (1791)," in which he wrote,

> The beauty of park scenery is undoubtedly *best* displayed on a *varied surface* - where the ground swells, and falls - where hanging lawns, screened with wood, are connected with vallies - and where one part is continually playing in contrast with another.[46]

The rendered plan [See Fig. 25] from *Les Promenades* best shows how the composition of the Parc accommodated this sweep of land form, which, based on the sequence advocated by Alphand, provided the underlying framework for the system of

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[43] Hunt, *Genius of the Place*, pp. 347-348.
[44] Robinson, *Parks and Gardens*, p. 66.
[45] *Galignani's ... Guide 1868*, p. 452.
[46] Hunt, *Genius of the Place*, p. 339.

circulation.[47] Traditionally, Picturesque experiences had been dependent on the visual "consumption" of nature obtained through the requisite role of movement and passage within the landscape. Recall, for instance, the symbiotic relationship that arose between tourism and the Picturesque evidenced in journals, diaries and sketchbooks of the period.[48] The layout of the circulation routes and the views and experiences offered at the Parc not only provided a variety of routes and circuits for visitors, it contributed to the consumption of the landscape under the auspices of mid-nineteenth-century urban *promenades*. For instance, it lead Alphand to create alternate sets of paths to reach some of the key high points. [Fig. 26] André noted that two distinct ascent routes to the westernmost highpoint offered the visitor a choice: a steep ascent on ruggedly designed stairs, or along a carefully graded path that followed the contours.[49] [Fig. 27] Robinson lamented Alphand's flowing layout of routes, stating that it was, "... quite ridiculous to see the way the walks wind about in symmetrical twirlings, and, when they have entwined themselves through every sweep of turf in the place, seem to long for more spaces to writhe about in."[50] Robinson's criticism reflected his fondness for the British interpretation of circulation systems, and, I think, his antipathy towards the French penchant for geometry. As designed, the promenades, paths and footways reflected Alphand's interpretation of the French tradition and scripted a set of experiences for the visitors.

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[47] Alphand, *Les Promenades*, p. L.
[48] See Andrews, *Search for the Picturesque*.
[49] André, *Parcs et Jardins*, p. 386.
[50] Robinson, *Parks, Promenades and Gardens*, p. 64.

The approaches and urban edges of the Parc were formed by new boulevards. Three new boulevards surrounded the Parc and tied it back into the larger fabric of the City: the avenue Simon Bolivar, the rue Vera-Cruz, and the rue de Mexico. In addition, the single crossroad through the Parc traced one of the very oldest routes on the Buttes, the rue Fessart. [See Fig. 25] A new road ran southward from the newly planted rue d'Allemagne to terminate at the new main entrance to the Parc at the Place Armand Carel, the square in front of the new Mairie of the19th arrondissement. The importance of this entrance is highlighted by its ornate gate and fence detail, its relative size, and its position, which afforded a alluring first view of the island and its Tempietto. The carefully detailed and planted boulevards framed the park and distinguished it from its context. These edges defined the "framework of an experience" and inscribed within the city a bounded condition that formed a juxtaposition that provided a "... fantasy of a complete but temporary immersion [with nature that] would restore the mental and spiritual equilibrium ruptured by the city's frenzy."[51]

This effect was accomplished by planting trees and masses of shrubs to delineate spaces and facilitate a sweeping effect that lead the eye. As Alphand wrote, "Having established the lines of vision in all the chosen directions, it is necessary to avoid planting too close to them, or creating in their vicinity, clumps of greenery that are too thick that would restrict or obstruct the perspectives."[52] The rendered plan best shows the plant masses and how they were carefully balanced to augment the landform and circuits of roads and

[51] Green, *Spectacle of Nature*, p. 68-70. Green is quoting and interpreting contemporary sentiments expressed by Théophile Thoré and Jules Simon.

footways. [See Fig. 25] Planting also highlighted key features and obscured or made more mysterious some routes, particularly those on the island. The use of plants to accomplish this leading of the eye is directly relevant to the reliance on vision for the consumption of the picturesque landscape, and

In the eighteenth-century, water features played a key role in the Picturesque ideal. Uvedale Price claimed that, "... the last finishing to places and pictures is water," with the caveat that the site be worthy of the effect.[53] The Buttes Chaumont clearly was worthy for, "One of the principal attractions of the Park is a Lake, enlivened by the presence of a number of waterfowl, and by a cascade, and adorned with a Sibyl's Temple on an island."[54] In fact, the lake and island demonstrated Alphand's debt to Thouin's treatise, in which he demonstrated a marked fondness for centrally located lakes embellished with an island surmounted by some type of folly and accessed by a bridge.[55] In the Parc, the water typically emanated from hidden sources and the edges of the lake were hard-edged and strongly defined. Perhaps the realm of the technological overrode the eighteenth-century tenets stating that the water should seem unbounded, softly edged and planted.

One water source that garnered great acclaim was the grotto cascade, which impressed visitors with its design and imagery: one author noted that "... the waterfall cascade

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[52] Alphand, *Les Promenades*, p. L. Author's translation: "Les lignes de vision ayant été etablies dans toutes les directions choisies, il faut éviter de planter trop près de ces lignes, et de créer, dans leur voisinage, des masses de verdure trop compactes, qui resserreraient ou obstrueraient les perspectives."
[53] Hunt, *Genius of the Place*, p. 352.
[54] B*radshaw's Guide*, p. 85.
[55] Thouin, *Plans raisonnés*. This vocabulary was repeated visually and in text throughout the treatise.

beautifully reproduced those of nature."[56] Grottoes in gardens date back to antiquity; their presence in gardens in eighteenth-century Britain were legion and the associations with them intended to cultivate thoughts such as those expressed about Alexander Pope's garden grotto at Twickenham, "A hid Recess, where Life's revolving Day, In sweet Delusion gently steals away."[57] Pope's grotto, like many others, was also something of a geologic marvel of collected specimens. Perhaps reflecting current interests in geologic classification and discovery, Alphand constructed a false geology of stalactites and stalagmites within the recesses of the Parc's grotto. Although the construction of these will be further described in the next chapter, it is important to note that creating fake grottoes is not a novel practice. Many Picturesque gardens contained grottoes that were not intrinsic to the site's topographic or geologic circumstance.[58] Alphand in fact drew inspiration for his grotto from the cleaved faces of the existing quarry landscape. Interestingly, William Robinson deemed grottoes inappropriate for public parks. That Alphand included them in the Buttes Chaumont reflected his sensitivity to the potential of the site and demonstrated his willingness to transform the ideal into the public realm and transcend the familiar.

Another design opportunity that challenged the expected were site details designed in a "rustic" manner such as many of the benches, handrails and stairs. This rustic tradition

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[56] André, *Parcs et Jardins*, pp. 447-448. Author's translation: "Les cataractes sont beaucoup plus répandues dans la nature."

[57] Hunt, *Genius of the Place*, p. 250. For an excellent introduction to the history of the grotto in garden design, see Naomi Miller, *Heavenly caves: reflections on the garden grotto* (New York: George Braziller, 1982). For a specific French emphasis, see William Howard Adams, "Grottos, Water and Other Garden Fantasies," *The French Garden 1500-1800* (New /York: George Braziller, 1979) pp. 21-36. See also Weibenson, *The Picturesque Garden in France*.

[58] During the construction of the Parc, the naturalist Georges Cuvier and the architect Brogniart were digging for fossils at the base of the island.

was often seen in garden furnishings, as seen in the "Dessin de siège en racine, de Darly 1754," a version of a "root seat."[59] [Fig. 28] This rustic tradition reflected the desire to make details and elements appear as if hewn from nature itself, to recall a sense of "fit" or appropriateness to meld the setting and the detail. There are many other English, French and American examples of this material interpretation, including contemporary American examples in Frederick Law Olmsted's works in New York City.[60] At the Buttes Chaumont Alphand fabricated them from concrete, not wood as Olmsted and others had done. This fabrication technique, reflecting great artistry and craftsmanship, challenged the expectation that the new elements in the Parc would look refined or industrial rather than organic.

In contrast to this design tactic, the folly atop the rugged and quarried island is a neo-classical Tempietto, a copy of the "Temple of the Sibyl." [Fig. 29] The juxtaposition of the architectural folly with its "organic" situation highlighted its presence and effectively increased its lure. Functioning like the follies in eighteenth-century Picturesque gardens, the Tempietto contributed to the image of the place and functioned to lead the eye and then the feet into the experience of the place. Like many of its predecessors, it significantly contributed to the meaning of the place. Davioud's choice of architectural style for the folly represented the Emperor's status and the nature of the urban design campaign that drew parallels with ancient Rome. As articulated on a grand urban scale,

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[59]Arnaud Goumand, *Le mobilier de jardin d'hier et d'aujourd'hui.* Exhibition Catalogue for exhibition at Château de Chaumont, Chaumont-sur-Loire, 17 July-31 October, 1988 (Paris: Éditions du Patrimoine, 1988) pp. 4, 7, 9.

[60] For additional information on Olmsted and the work he did contemporaneous with the Buttes Chaumont, see Frederick Law Olmsted, *The Papers of Frederick Law Olmsted, The. Vol. III: Creating Central Park 1857-1861*, eds. Charles Beveridge and David Schuyler (Baltimore: The Johns Hopkins Press, 1977); *Vol.*

positioning the Tempietto atop the island on a significant high point aligned it with the other monuments throughout the City occupying similar vaunted positions, and particularly with the Panthéon shown as the domed building in the distance on Deroy's engraving. [Fig. 30]

The importance of the panoramic prospect from the Tempietto tied it back to the City and ideologically, to the Exposition. Attaining the height via "an intricate rocky passage winds its way under ... leading the visitor through many mock perils, charmingly managed ... to the top," added to the visitor's immersion within nature. [61] Upon attaining the height, they realized how implicitly they were still within the confines of the city. The visitor obtained the full measure of the picturesque, their eye tracing,

> ... delightful drives and walks winding among the hills, ... with views which an artist may well paint: on one side, across to the Pantheon and the churches of the southern bank of the Seine; on the other, to where the heights of Montmartre call up a reminiscence of the Acropolis of Athens, as they stand up, crowned with picturesque groups of buildings, against the misty town and faint hills.[62]

The Parc des Buttes Chaumont was in effect a kind of compromise -- the site, located in the banlieue, was no longer beyond the city, but if one gave oneself over to the experience, it was possible to believe that the place was beyond the city. This concurred with Nicholas Green's suggestion that it "... is precisely this counterpoint between moving (physically) away from the city and yet remaining in touch with it which gives a

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VI: The Years of Olmsted, Vaux & Company, eds. David Schulyer, Jane T. Censer, et. al. (Baltimore: The Johns Hopkins Press, 1992).

[61] Charles E. Fulton, *Europe Viewed Through American Spectacles* (Philadelphia: J. B. Lippincott and Co., 1874) p. 156.

[62] Augustus J. C. Hare, *Paris* (London: George Allen, 1900) p. 247.

distinctive shape to the urban experience of nature."[63] For Alphand, the choice to interpret the Parc as Picturesque -- and thus as an exemplar of "Art" -- merged with the glory of the City and its economic and industrial prosperity. The Parc became a vehicle for celebrating the new industrial products and technological innovations by encasing them within the romantic idiom of the Picturesque.

[63] Green, *Spectacle of Nature*, p. 93.

IV. Industry:

Technology and Design Innovations at the Parc des Buttes Chaumont

In Second Empire France, industry was celebrated as evidence of French progress and economic energy. As derived from the theme of the Exposition Universelle, "Industry" reflected both the progress and work of the people and the products and innovations of an increasingly technical, mechanized economy. For Alphand, industry meant the application of science to the needs of the City. At minimum, this suggested that the creation of the parks served offered the opportunity of "... applying the conquests of science and art to the conditions and health" of the City.[1] "Industry" heightened and made possible the picturesque image and experience available to those visiting the Parc des Buttes Chaumont in two ways. First, industry was expressed through the utilization of contemporary industrial materials and innovative techniques employed to create and maintain the Parc and its picturesque illusions. On the one hand, the craftsmanship evident in significant elements of the Parc helped to situate its production within a cultural response to industrialization that stressed the manual versus the machine. On the other hand, the state-of-the-art machinery used to create the Parc coupled with new technologies and industrial products found throughout its landscape situated the Parc at the forefront of a cultural movement seeking to reconcile industrialization and progress with the experience of nature.

[1] Alphand, *Les Promenades*, p. LIX.

Second, industry and its allied technologies were showcased in the experience of the Parc. Visitors to the Parc des Buttes Chaumont in 1867 found a landscape that epitomized the French transformation of the Picturesque from a private residential style into the richly conceived public park shown in Deroy's bird's-eye view from *Les Promenades*. [See Fig. 30] Moving along the promenades and footways within the Parc, a visitor would see carefully sculpted grounds accented by beautifully planted beds and groves, punctuated with small structures and novel features. Upon attaining a panoramic highpoint, the visitor would then see beyond the borders of the Parc an industrialized landscape of factories, slaughterhouses, and train yards that stood in direct contrast to the Parc's tightly orchestrated picturesque experience. This industrialized physical context became a counterpoint to Alphand's representation of nature and heightened the visitor's understanding of the dialogue between the two realms. Both modes of showcasing contemporary industry and technology reinforced that sector of the national identity associated with the Exposition theme of "Art and Industry." Furthermore, they demonstrated the initiative of a design team who embraced nineteenth-century technical sophistication and industrial exuberance to create a Parc replete with illusions of nature requisite to Alphand's interpretation of the Picturesque.

This rendition of the Parc participated in two trends, one French, the other international. There was a long-standing French tradition of garden design where civil engineering and technical advances were embraced to create ideological renditions of "power and

dominance," such as found at Versailles.[2] Such creations carried strong political messages; so, too, does the Parc des Buttes Chaumont. For Napoléon III, embracing contemporary technology and advocating its use in his projects accomplished two things: it fed the need to industrialize France and create products and markets for these techniques and goods, and it codified an image of his reign as one where France could show the marriage of "Art and Industry" through excellence in technology and design. In this respect, the Parc engaged in the nineteenth-century discourse surrounding tensions between art and manufacture. For the British art critic John Ruskin, this tension forced a rupture between the two realms. Julie Wosk noted that critics and constituents affiliated with the *Art-Union Journal* saw the "... possibility of reconciliation. Artists, it was hoped, would help assimilate the new manufactured wares by lending them a look of taste and elegance ... [and] lend their talents to industrial design and form 'more intimate relations' with manufacturing."[3] The Exposition theme succinctly engaged this discourse with their intent to showcase the relationship between the two realms.

Alphand's engagement with this discourse was to create a work of art rendered by industry as well as craft. The technological means and materials employed to both create and sustain the Parc will be examined in five areas: the mapping and shaping of the old quarry site into a landform of highpoints surrounding the lake and island; the extensive use of concrete throughout the Parc in applications ranging from structural to decorative;

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[2] Vincent Scully, *Architecture: The Natural and the Manmade* (New York: St. Martin's Press, 1991) pp. 275-311. He forwarded this argument in his chapter, "The Shape of France, Gardens, Fortifications and Modern Urbanism."

[3] Julie Wosk, *Breaking the Frame – Technology and the Visual Arts in the Nineteenth Century* (New Brunswick: Rutgers University Press, 1992) p. 107. She referenced: "The Mutual Interests of Artists and Manufacturers," *Art-Union* 10 (March 1, 1848) pp. 69-70.

supply system and reservoirs for the water features, site drainage, and irrigation; techniques for plant installation, cultivation of plant materials in the newly constructed greenhouses, and the use of exotics and tender annuals and perennials; and finally, the means of access and circulation systems, notably macadam routes, gaslights, bridges and the Chemin de Fer de Ceinture, the circuit loop train whose route slices through the Parc. These constructions, features, materials and surfaces celebrated "Industry" through the thematic impetus of the Exposition Universelle and within the context of the era's interests and capabilities.

Throughout *Les Promenades*, Alphand celebrated design solutions arrived at by way of engineering and invention and detailed the innovations employed to install and maintain the works. He tabulated, enumerated, catalogued and recorded civic improvements and described his design process as starting with the terrain, and then adding the planting and finally laying down the circulation routes. Thus, his work at the Buttes Chaumont commenced with a critical step: a determination of the physical landform by way of careful mapping and geological studies. As he stated, studying the terrain was a very interesting and delicate operation that was fundamental to all else in the design.[4] Given this, it is no wonder that Alphand required a site survey; he needed the former quarry site to be dovetailed into the citywide survey with maps detailed enough to develop the site work and calculate cut and fill. This prodigious task of mapping the City, authorized by Haussmann, preceded a period of intense activity in cartography occurring in the latter part of the nineteenth-century. While

[4] Alphand, *Les Promenades*, p. L. Author's translation: "L'étude d'un relief est une opération très-interessante et très-délicate: car elle doit imprimer aux mouvements du sol une certaine grâce, former ou corriger la direction des vallées et des plantations et des plateaux, c'est-à-dire arrêter l'assiette du paysage. C'est l'opération fondamentale don't tout le rest dépend."

drawn contours on maps were well established in France by the early nineteenth-century, mapping the whole of Paris reflected advances in surveying that established firm principles for producing charts and maps.[5]

By mid-century most European countries had undertaken large-scale surveys, which were predominantly in the hands of centralized government agencies. In fact, France pioneered national survey mapping before 1800 with the work of Cassini de Thury (1714-84).[6] In the late eighteenth-century, Verniquet produced an important map of Paris triangulated and surveyed into quadrants based on the meridian of the Observatoire.[7] Verniquet's work

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[5] *A History of Technology ... c. 1750-1850,* pp. 438, 441. There was much debate at the time to ascertain the best method for rendering the exact disposition of three-dimensional landform, as opposed to simply producing a horizontal plan. The debates generally favored the methods adopted by Deschamps in Paris. Further, "... by 1850 the general technique of land surveying, both for geoditic and topographical purposes, was well established: into an accurate framework of triangulation the topographical detail was inserted by plane-table, detail traverse, or chain-survey methods .... . The method of topographical detail varies very much from country to country, and has been modified as new instruments have been invented and developed."

[6] *A History of Technology, The Late Nineteenth Century, c. 1850 – c. 1900,* Vol. V, eds. Charles Singer, E. J. Holmyard, A. R. Hall, Trevor Williams (London: Oxford University Press, 1958) pp. 440, 600-601, 606. "For distance measurement, traditional instruments were subject to changes responding to conditions of changing temperature or humidity. To counteract this ... in his triangulation of 1733-40, Cassini de Thury (1714-84) used both 24 ft. wooden rods, tipped with iron, and iron bars 15 ft. long ... for the measurement of baselines [which] reduced the contact error by using materials with low coefficients for expansion." De Thury published in 1783 his *Description géometrique de la France.* Subsequent works improved and refined De Thury's base, adding accuracy with new instruments and more detail as necessary.

[7] See "Plan de la Ville de Paris avec sa nouvelle enceinte, Levé Géométrique sur la Méridienne de l'Observatoire par le Citoyen Verniquet, parachevé en 1791," Centre Historiques des Archives Nationales (Paris). The Verniquet survey was earlier reproduced on the "Plan de Guillot, 1775," Centre Historiques des Archives Nationale, Paris. The 1791 map included tabulations and tables of distances. It highlighted street patterns, especially those superimposed on the old perimeter walls, major monuments and some residential data. Additionally, it provided some topographic clues; of particular note are the graphic indications of quarrying operations at the buttes of Montmartre, Chaumont, and Belleville. The cartouche in the upper right corner shows, among other things, cherubs pointing to France on a spinning world globe with charts and maps below it; cherubs unfurling a chart of geometric figures and diagrams; and directly above the title, a tempietto of ionic order atop a small rocky mount from which rays of light emanate. The map just begins to include the area of the future Parc, and clearly indicates the buttes as a quarried landform.

provided the foundation for Haussmann's realization of the new urban plans.[8] Haussmann's plans could not have been carried forward without accurate surveys; the survey maps enabled him and Alphand to envision the City as a whole, an entity to be refashioned. Haussmann thus organized a *Service du Plan de Paris* and an exacting survey was carried out under supervision of the newly appointed Chief Surveyor, Deschamps.[9] Towers were set up around town and vertical and horizontal data were derived from theodolite measurements with the data based on leveling, triangulation and trigonometric calculation. This well-known effort received attention in newspaper editorials, and provided fodder for numerous political cartoons. [Fig. 31]

These state-of-the-art technological surveys facilitated Alphand's work shaping the challenging relief of the old quarry site into the smoothly contoured Parc with its island, highpoints and lake. Alphand included in *Les Promenade de Paris* a full-size engraved plate of the Parc des Buttes Chaumont site depicting existing topographic site conditions and his proposed grading, shown on the "Plan des courbes de niveau du Parc des Buttes Chaumont." [Fig. 32] The process of mapping the existing conditions in the quarry was a technical feat; the dramatic relief would have been intensely challenging to manually survey, even with newly available tools. The "finished" grading plan, the only one present in the treatise, is itself an artifact of the technological milieu surrounding the

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[8] Bernard Rouleau, *Le Trace des Rues de Paris* (Paris: Presses du CNRS, 1988) pp. 25-26. Regarding the Verniquet plan, Rouleau stated that, "... ce plan servi de base à la plupart des plans exacts de la Révolution au Second Empire."

[9] Pinckney, *Napoleon III*, p. 47; Howard Saalman, *Haussmann: Paris Transformed* (New York: G. Braziller, 1971) pp. 15, 22. Not to be confused with M. Barillet-Deschamps, this M. Deschamps (who, despite all research to date, remains without a prenom) is referred to in both Pinckney and Saalman as "incorruptible," which for the time and circumstances was extraordinary. Charges of misuse of funds, graft and bribery grew to legendary proportions under Haussmann; records indicate that it was not always true, but the general tone was pervasive and persistent in the public records, including many political cartoons.

Parc. The importance given this plate can be discerned in the larger context of the treatise: excepting the twenty-two full color botanical plates, the Buttes Chaumont contour map is the only two-color engraving, with black lines indicating existing site contours and red lines indicating "l'état actuel," or the "as-built" conditions. Careful examination of the plan aides in understanding Alphand's engineering feat in heightening and shaping the effects of the quarried land.[10] The manipulation of the landform and the resulting landscape accomplished by the reshaping and the importing of many tons of rock and soil was a huge and expensive technical achievement.[11] The final form of the land can be seen in the images of the contour model, as well as in the rendered plan. [See Fig. 25; Fig. 33]

Alphand refers to the technical aspects required to construct the Parc in *Les Promenades*, yet it is probable that the general population was also aware of the full scope of this landscape's transformation. One visitor, James McCabe, published in 1869 his summary of the work undertaken to "... convert the foul spot into an ornament to the capital," which he acknowledged that many felt was, "... another waste of the people's money."[12] He described the process as one having been,

> ... carried forward energetically. About a thousand workers and a hundred horses were employed in the undertaking. First, the bed of

[10] Choay, "Haussmann et le Système ...," p. 94. She mentioned geology and topography, and attributes Varé's downfall at the Bois de Boulogne to his relative lack of this knowledge, and Alphand's comparable success where, "En ce sens, les Buttes-Chaumont, le plus beau jardin de Paris, n'en demeure pas moins, avant tout, un tour de force de technique."

[11] Alphand, *Les Promenades*, pp. 198-204, 232. The amount of cut/fill, soil import was prodigious, as was the cost of 2,465,769 francs cited by Alphand. See also André, *L'Art des Jardins*, pp. 406-436. He devoted a section to "Travaux d'execution. – Terassements," in which he described the earthworks process, calculations and estimating of costs and lines item expenses for earthwork. It clearly draws from Alphand.

[12] James D McCabe, *Paris by Sunlight and Gaslight; A Work Descriptive of the Mysteries and Miseries, the Virtues, the Vices, the Splendors, and the Crimes of the City of Paris* (Philadelphia: National Publishing Company, 1869) pp. 261-263.

> gypsum was laid off in accordance with the plans decided upon. The lake beds were dug, caves were cut and blasted, and the rough rocks hewn into the most picturesque shapes. [13]

The process of molding the Parc out of the quarry required the technical documentation of its existing conditions and a detailed vision for what it would become. In *Les Promenades*, Alphand addressed the stages of production and the process of shaping the Parc not only with crews of workers but also through the use of advanced "industrial" steam-powered equipment, stating:

> To give an idea of the importance of the work undertaken, it is enough to recall that the year 1864 hardly sufficed to roughly hew out the earthworks, even though the number of workers occupied with this work was considerable and in spite of using railways and steam engines. The years 1865 and 1866 were still necessary to finish the earthwork, to create the avenues, the length of which was around 5,000 meters, and to cover the immense planting areas with topsoil; a requirement because the land on which the park was being built, composed of chalk-ridden clay and rock, was inhospitable to any type of vegetation."[14]

An important design aspect was the way in which the existing cliffs and quarried areas were reconfigured to accommodate their new uses while attaining -- or maintaining -- the desired picturesque imagery. The central island highlights the combination of the in-situ geologic forms with new construction in stone and concrete. Visible lines of extraction, still evident as horizontal "bands" on the side of the island, testify to how closely the designers worked with the existing quarry conditions and indicate their desire to maintain

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[13] Ibid., p. 262.

[14] Alphand, *Les Promenades*, p. 203. Author's translation: "Pour donner une idée de l'importance des ouvrages exécutés, il suffit de rappeler que l'année 1864 suffit à peine pour dégrossir les terrassements, quioque le nombre des ouvriers occupés à cette oeuvre fût considérable et malgré l'emploi de chemins de fer et de machines à vapeur. Les années 1865 et 1866 furent encore nécessaire pour compléter les terrassements, créer les routes, dont la longeur est d'environ 5,000 mètres, et couvrir de terre végétale cette immense surface; car le terrain, sur lequel il s'agissait de faire un parc, composé de terre glaise et de marnes argileuses, était rebelle à toute espèce de végétation."

some evidence of the site's quarried past. [Fig. 34] The bottom sketch highlights the extraction lines of the cliff to the west of the suspension bridge, while the sketch plan of the island identifies the zones where the cliff was left alone (falaise naturelle) versus those areas where various concrete and cement materials have been applied.[15] [Fig. 35] Artificial cliff edges and tops were described as created in *meulière* or millstone grit. The area below the Tempietto is fabricated from *béton* and *meulière*, a combination necessary to stabilize the quarried cliffs and to support the structure. [Fig. 36 and Fig. 37]

Employed in applications ranging from structural to decorative, concrete was used throughout the Parc in three modes: as *stuc ciment* (stucco cement), as reinforced concrete, and as the impervious lining for water rills and lake bed. Concrete was not actually a new material in the history of building, however developments by the mid-nineteenth-century led to the production of a fairly consistent quality of cement and hydraulic lime concrete. These developments gave considerable impetus to the use of concrete as both a decorative and a structural material.[16] Decorative examples are found throughout the Parc, especially on the central island.

Stuc ciment was a relatively loose or wet cement mix that was artistically applied over a foundation of masonry, rock, or concrete. In Alphand's and André's treatises, *stuc ciment* is referred to in the sections detailing *rocaille grottes*, or rockwork grottos, and is also addressed in their descriptions for creating *rochers*, or ornamental rock in a mixture of limestone and clay, hand sculpted and laid or artistically molded. *Stuc ciment* in the

[15] Exhibition on the Parc des Buttes Chaumont, City of Paris: 2000. Sketch of the island plan is derived from exhibition material and field verified in the summer of 2000.

application technique seen at both the Exposition and the Parc first appeared around 1824, and its popularity expanded by 1850. Through the work of the craftsman Hilaire Muzard (1841-1893), the Parc des Buttes Chaumont acquired many beautiful works of art in the material.[17] The Parc is a veritable conservatory of these *rocaille* and *stuc ciment* techniques. *Stuc ciment* was employed in numerous instances to achieve the effects of "naturalness" or rusticity. Particular applications in the Parc included merging new "rockwork" surfacing with the existing in-situ rock, and in conjunction with cast or molded concrete, it resulted in,

> ... an imitation of nature accomplished first of all by the simulation of stone in all its different shapes and forms and according to its various uses: flagstone paving, fallen rock to form a crevice or to hold a torrent of water, an underground passage adorned with rocks, [and] rockwork on the edges of the abutments to the suspension bridge.[18]

On the central island, the "... foundations of rough stone bedding were composed of limestone found on the site, grouted with cement and occasionally water-colored with a mixture of yellow ochre, smoke black and green."[19] The effect produced imitation stonework that closely assimilated the existing rock, although Robinson implied that it was not too skillfully done when he acidly noted that, "... the chief feature of the place is

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[16] *A History of Technology ... c. 1750 – c. 1850*, p. 449.

[17] Jenn, *Le XIXe Arrondissement*, p. 68. Author's translation: "Rocaille grotte et stuc ciment ... sont l'occaision d'aborder un métier apparu vers 1824, qui s'est dévelopé à partir de 1850, et dont les ouvrages particulièrment nombreux et de qualité dans le parc des Buttes-Chaumont, celui de "stucateur ciment" pour reprendre l'expression de l'un d'entre eux, Hilaire Muzard (1841-1893)." The rivalry noted in Chapter 3 between the stuc cimenteurs at the Parc and the Exposition suggests that the work at the latter was equally noteworthy

[18] Idem. Author's translation: "... un mélange de chaux et d'argile sculpté et dessiné à la main ou moulé artisanelement. L'imitation de la nature se traduit tout d'abord par la simulation de la pierre sous ses differentes formes et selon ses usages divers: dallages, éboulis en vue du former une rocaille ou de conduire un torreat, passage souterrain garni de rochès rochers aux abords des culées du pont suspendu ...."

[19] Exhibition on the Parc des Buttes Chaumont, City of Paris: 2000. Author's translation: "Les enrochements sont constitués de roches calcaire trouvées sur place, jointoyées au ciment et parfois peintes à l'eau avec un mélange d'ocre jaune, de noir de fumée et des vert."

the great cliff, and unhappily the chief feature of the rock is plaster."[20] [Fig. 36 and Fig. 37] Although one visitor felt that the imitation rockwork "... so well [imitated] the coarse limestone and plaster gypsum which formed the soil and subsoil of the old quarries" as to seem completely natural, it is possible to determine the fake from the original rock.[21] Figure 37 shows the natural stone cliffs embellished and stabilized with the smoother surfacing in cement work and both Figures 36 and 37 show the "rugged" and seemingly aged areas of béton and meulière keyed out in the sketch plan.

Two contemporary photographs of the abutments to the suspension bridge leading to the island show not only the cement rock but also the joint where the new material met the existing limestone face of the quarry remnant. [Fig. 38 and Fig. 39] Though their form echoes those of the in-situ rocks, the texture and surface treatment identify the abutments as imitations of the calcareous rock. Their fabrication and positioning related to requirements for the bridge, and the intention to artistically "hide" the necessary structure: deadmen bolting the cables into the existing rock face. Although Alphand did not include a detail for this bridge in *Les Promenades*, he showed a comparable detail for the "Pont de L'Île de Reuilly" suspension bridge and its rock abutments located in the Bois de Vincennes. [Fig. 40] At the Buttes Chaumont, the obviously artificial abutments highlighted the engineering marvel of the suspension bridge and its point of attachment to the cliff.

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[20] Robinson, *Parks, Promenades, and Gardens*, p. 62.

[21] André, *L'Art des Jardins*, p. 447. Author's translation: "... le parc des Buttes-Chaumont, où les rochers reproduisant bien la formation du calcaire grossier et du gypse parisien qui constitué le sol et le sou-sol de ces anciennes carrières."

These details, and many others throughout the Parc, merge natural rock with man-made, artistically applied new concrete and cement mixes to achieve a picturesque effect that was intended to imitate the existing situation. *Stuc ciment* was also used to create a feature that was palpably impossible given the soil and hydrological conditions of the site: the grotto cascade. Despite its unlikely natural occurrence, the illusion of the cascade grotto fascinated visitors, who discovered "... in the valley ... a delightful grotto, the interior of which sparkles with stalactites and stalagmites."[22] [Fig. 41] This *stuc ciment* work replicates at a grand scale the stalactites and stalagmites displayed in the Aquaria of the Exposition's *Jardin Français*. [See Fig. 21] Robinson deemed them "... well formed and striking, though hardly the kind of thing to be recommended for a public garden."[23] Alphand obviously disagreed; their presence contributed to his desired transformation of picturesque garden imagery into the public realm of experience and heightened the impressions of the grotto as an element of geologic historic within the quarry site.

These examples of *stuc ciment* and its allied applications remain as permanent installations of this technique that was also showcased in the Exposition gardens and Aquaria. In addition to this kind of concrete work, of which only a fraction has been mentioned here, both locations included elements produced in reinforced concrete. In the1855 Universal Exposition, Edmond Coignet (1850-1915) won bronze medals for his newly patented material called *Béton-Pisé*, a version of a monolithic reinforced structural

[22] *Galignani's ... Guide 1868*, p. 452. See also André, *L'Art des Jardins*, pp. 486-521. André provided a "recipe" for the stuc ciment in his treatise in the section on "Travaux d'Execution - Rochers."
[23] Robinson, *Parks and Gardens*, p. 67.

concrete.[24] Subsequent work by Coignet revealed the capabilities of this entirely new system of iron reinforced concrete construction with its fullest capabilities for structural applications allied to the use of Portland cement.[25] Using iron as a structural reinforcement in masonry countered concrete's inherent tensile stresses.[26] Portland cement alleviated the intrusion of moisture and thus prevented the freeze/thaw and rusting of the iron that had previously contributed to the cracking and resultant failure of the hardened pours of concrete. Portland cement's water impervious nature and its ability to cure in a wet situation led to its acceptance and popularity for many uses in the burgeoning building campaigns of the Second Empire. The photograph of the extensive iron structure of Garnier's Opéra demonstrates how rapidly architects and designers of the Second Empire projects adopted the innovation. [Fig. 42] The use of concrete as a building material gained great favor through the interest and support of the Emperor which thus promoted its acceptance, use and ultimate popularity[27]

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[24] Peter Collins, *Concrete, the Vision of a New Architecture; a study of Auguste Perret and his precursors* (New York: Horizon Press, 1959) pp. 28-34. Collins noted that Coignet's work received the "respectful attention " of the Society of Civil Engineers, and that "... the Emperor himself had also become interested, and had personally ordered experiments to be made on the effectiveness of concrete in marine constructions." Collins described Coignet's role in the vast building schemes of the Second Empire. He cited the construction of a flat-roofed concrete pavilion ornamented with Renaissance details located near the Pont d'Iéna for the 1867 Exposition, and the "magnificent retaining wall of the Passy cemetery, which still majestically dominates the Place du Trocadéro." See also: *History of Technology ... c. 1750 – c. 1850*, p. 448. This entry affirmed Coignet, and perhaps also his father, responsible for major work on the Paris sewer system from the mid-1860s into the 1980s.

[25] Collins, *Concrete*, p.36. Collins' history of this material detailed the neck and neck developments shifting between France and Great Britain, wherein each country offering patents and counter-patents addressing various capabilities and applications. In 1824, Joseph Aspdin patented the earliest version of Portland Cement as "An improvement in the Modes of Producing an Artificial Stone," a material which he regarded primarily as a stucco material to simulate Portland Stone. J. C. Johnson manufactured the first "modern" Portland Cement in 1844. The Frenchman Coignet took out an English patent for a similar material in 1855 and continued to develop his techniques for industrial production. Vying with Coignet, Frederick Ransome opened a large factory works for his "New Patent Concrete Stone" in 1867. Joseph Tall was the first English building contractor to expand on Coignet's methods. He created standardized form-works called "Tall's Patent Shuttering," which were awarded a gold medal at the 1867 Exposition.

[26] *History of* Technology ... c. 1750 – c. 1850, p. 451-490.

[27] Collins, *Concrete*, pp. 34, 40-41. Collins noted that, "The Emperor's interest seems to have conferred a new dignity on concrete, for at the beginning of the 1870s we find a marked rise in its social status.

At the Parc des Buttes Chaumont, reinforced concrete is found in a variety of structures such as Davioud's Tempietto and the massive retaining walls lining the railroad embankment, which Coignet may have built.[28] [Figs. 43 and Fig. 44] Notably, reinforced concrete was also applied to details at the Parc, particularly for the stairs and railings created as versions of *imitatio*; these rustic details were fabricated from reinforced concrete to imitate another material, typically wood logs or tree limbs.[29] Alphand confidently rendered versions of such rustic details in reinforced concrete and cast cement, again taking an opportunity to celebrate both design and contemporary "cutting edge" technology. Examples of concrete employed in this rustic genre are found throughout the Parc des Buttes Chaumont. The most prominent details -- the handrails imitating logs and branches -- were sophisticated examples of iron reinforced, molded concrete. [Fig. 45] The railings, typically posts supporting two cross-rails running parallel to the ground, were constructed in sections and skillfully joined. In a few cases where the railings are currently in disrepair, the iron reinforcing rods are evident. The

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Whereas formerly it was regarded by noble landowners as suitable only for their animals and more humble tenants, it was now adopted by the gentry as worthy to be used in the construction of their own mansions, and was specified without more than a passing shudder by the fashionable architects of the day."

[28] Coignet worked primarily on engineering projects during the Second Empire. I suspect that Coignet may have been involved in the design and construction of the retaining walls for the railroad -- the retaining wall bears much in common with the Passy Cemetery wall on which he worked. Coignet also may have been involved in the work at the reservoir at the Parc Montsouris, which has a large concrete retaining wall constructed of reinforced concrete. With these kinds of commissions, he may also have been involved with the Belleville reservoir that fed the Buttes Chaumont's waterworks. In addition, Coignet's finances suffered greatly when the City of Paris did not pay him their debts between 1867 and 1871. I infer from this that he, and his company the *Société Centrale des Bétons Agglomérés* (founded in 1861) probably had significant contracts with the City.

[29] Olmsted incorporated similar rustic details in "The Ramble" at Central Park, although he used real wood. William Robinson mentioned rustically detailed outdoor furnishings in his book and particularly noted a cast iron seat from the1867 Exposition with rustic feet and armrests rendered as tree branches. Alphand frequently used a similar version of this rustic bench in the parks of the city, including the Buttes Chaumont. Robinson, *Parks, Promenades and Gardens*, p. 564.

architect Louis-Auguste Boileau (1812-1896) addressed the usefulness of molding methods when he wrote,

> With regard to forms and decorative appearances ... the true economy of concrete is in the manufacture of accessory decorative elements which have to be repeated a large number of times, and in which costly handcarving [sic] is replaced by factory-made molding.[30]

While it seems unlikely that these railing details were "factory" produced, a similar "repeat molding" technique was employed to fabricate many examples, perhaps in-situ. [31]. I examined and photographically documented *imitatio* railings at the Parc des Buttes Chaumont, the Parc Montsouris, the Parc Monceau and the Trocadéro on the Passy side (which was under repair in the summer of 2000). After close study, I could discern common molds, but the general impression is one of a relative lack of repetition. It is also fascinating because of the difficulty in finding the joints between the molded parts – the technical craftsmanship -- or artistry -- employed in producing these rails is of the highest caliber. These rails were also installed in the Trocadéro grounds across from the Exposition, so visitors would have been familiar with the detail which arguably constitutes an identifiable "Alphandian trademark." These rustic handrail details appear in many of the smaller squares, such as Batignolles, and in virtually all of Alphand's Parisian parks, including Boulogne and Vincennes, Monceau, Buttes Chaumont and

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[30] Collins, *Concrete*, p. 34. Quoting a letter in *Moniteur des Architectes*, December 1867, no page. Collins referred to Eugène-Emanuel Viollet-le-Duc, who favored greatly Coignet's work: "In perfecting this material, M. Coignet has not only given it the principal role in masonry but, as a result of progressive experiments, has rendered it fit to replace the materials employed in our buildings: stone, brick, iron and wood."

[31] Alphand doesn't describe the practice for making these handrails. I would like to find more information on the actual techniques for producing and installing them -- perhaps some exists within the archives. Historically, the practice may link to Joseph Monier (1823-1906) who patented tubs for orange trees made of concrete with an embedded mesh of iron rods.

Montsouris. At the latter, the railing details displayed great skill and inventiveness; one stair rail is particularly stunning for its three dimensional qualities.

Other typical *imitatio* details in Alphand's parks are stair treads, and especially stair risers, fabricated to look like logs. [Fig. 46] At the Buttes Chaumont, this style of molded edge finish was used on concrete stair risers for several of the smaller scale pedestrian footways winding through trees and shrubs up to highpoints. [See Fig. 45 and Fig. 46] The rusticity of the detail was in keeping with the "woodsy, rambling" nature of the area and trail. Another instance of fabricated of cast-in-place, reinforced concrete is an ingenious trough for water in the eastern rill alongside the stairs. The concrete forms both an imitation natural stone channel and a fabricated tree stump at the edge of the rill. [Fig. 47]

Because these rills and details held water, they had to have been constructed from a version of the newly developed Portland Cement, also called *béton*, a highly refined hydraulic lime concrete. This material was initially recognized in the mid-eighteenth century for its capacity to cure and harden in water and therefore found its earliest trial application in bridge foundations. Over the next century, the material garnered wide coverage in architectural and engineering circles, for instance an 1866 article on "Concrete for Seaworks" in *The Builder* highlighted innovative research by a French engineer, M. Poirel, on properties and capabilities for using water-cured lime cement. In Second Empire building projects, *béton* or similar versions of the material, were used for applications with high water or moisture such as the sewers and reservoirs, as well as for

bridge foundations and the quays of the Seine. Alphand's use of it at the Parc reflected his training at the Écoles des Ponts et Chaussures and an awareness of the contemporary field of knowledge regarding the material and its applications.

Alphand's studies of the inherent geology and physical capacities at the Buttes Chaumont made it clear that any water features would require extensive adaptations. A water feature, such as the lakes so popular in the Picturesque idiom, could not simply be dug and filled because of the inherent porosity of the geologic limestone substrata and the overlay of muck precluded making much but mud in many spots.[32] Alphand therefore lined the lakebed with an impervious concrete material, undoubtedly a version of the newly refined Portland cement. The "Tout Paris" series picture postcard from the turn-of-the century clearly shows the surface of the lakebed in an area partially drained to allow for some kind of work.[33] [Fig. 48] The image also shows that Alphand detailed the lake with a hard-edged finish of concrete sill, almost like a large curb and rim detail. This finish distinguished it from lakes with softened and screened edges described in Picturesque treatises, and more pointedly, it placed the fabricated condition of the Buttes Chaumont's lake directly into the viewer's experience. Thus, concrete was used extensively at the Parc des Buttes Chaumont to give shape to cliffs, ravines, and rills and it contributed instrumentally to creating the artificial lake, conduits and receptacles for the water features in the Parc.

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[32] Alphand was originally charged with "fixing" the problem of the lakes at Boulogne which had been poorly designed and engineered by the landscape gardener, Varé. At the Bois de Boulogne, the water would have simply seeped away into the water table. See Haussmann, *Mémoires*, and Alphand, *Les Promenades*.
[33] Laborers with equipment can be seen in the lower left area of the dry lakebed. This postcard image shows just how shallow the lake is – the dividing dam itself is no higher than two feet, and when the lake is full, it is at most twelve inches below the water surface.

Water was a key element in the Picturesque conception of the Parc. The lake, as well as all of the fabricated water rills and cascades within the Parc, relied heavily on technological expertise and innovations. The engineered waterworks system moved water to and from a new reservoir, piped it to the sources, from which it flowed into rills and cascades and then directly into the lake. [Fig. 49] In describing the water cascade tumbling into the grotto, recognized at the time as a technical achievement, Edouard André noted that,

> "... a stunning effect was obtained in the Parc through an artificial waterfall penetrating eighteen meters to the bottom of the grotto. The waters are pumped through a capacious artificial supply pipe laid under the boulevard Vera-Cruz and break away from the summit, flowing in streams over a course of rough stones covered with climbing vines and plants.[34]

The water effects were achieved in a series of steps beginning with the process of getting the water to the Parc and then into the features. First, water was hydraulically pumped from the Canal de L'Ourcq to a newly constructed reservoir, shown on Galignani's 1868 tour guide map located in an elevated position to the southeast of the site across the rue de Vera Cruz (now the rue Botzaris). [Fig. 50] Hydraulic technology, an innovation highlighted in the elevators at the Exposition, was used "... to bring water for the

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[34] André, *Parcs et Jardins*, pp. 447-448. Author's translation: "... un effet remarquable a été obtenu dans ce parc par la pénétration artificielle d'une cascade au fond d'une grotte de 18 mètres de hauteur. Les eaux, s'échappant du sommet par une vaste conduite forcée, amenée sous le boulevard de la Vera-Cruz, coulent d'abord en cataractes sur des assises déchirées et couvertes de plantes d'une végétation sarmenteuse ... Les cataractes sont beaucoup plus répandues dans la nature." Repairs on the grotto and pump system were completed in 1988; the feature had been inoperable and closed since WW II. The repairs cost 1.4 million and took nineteen months to complete as reported in "Travel Advisory: Grotto, Repaired, Reopens in Paris," *New York Times*, Sunday, September 11, 1988, no page number.

cascades."[35] The elaborate and expensive pump system transported the water over a long distance, bringing it to Belleville's hilltop reservoir, which was capable of containing 40,000 cubic meters of water.[36]

The reservoir supplied the flow of water to the Parc's set of water features through an internal hydraulically pumped water system. On Alphand's rendered plan, he identified water sources, with the easternmost at number 6; and the source of the cascade at number 7. [See Fig. 25] At source number 6, water emanated from a pipe laid into an imitation rock. Of this, Robinson disparagingly wrote, "... the streamlet ... instead of coming from any probable source of rock or brushwood, starts out of a plastered hole in the grass, in a way one cannot admire."[37] [Fig. 51] Today, it is slightly more screened, but still easily found. This rill joins another emerging from the adjacent hillside and together they flow into the lake. To the western side of the Parc, another source springs from a *rocher*, then flows below two paths, alongside more *rochers* and stairs, under the carriage road and into the lake, the terminus of the engineered waterworks system. [Fig. 52]

In concert with this system, Alphand engineered another hydrological system at the site: surface sheet flow and drainage for rainwater. In some instances, Alphand designed the hydrological drainage system to capture this water and co-mingle it with that in the rills. In other cases, particularly along the circulation routes, the water flow is directed into

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[35] Grumbach, "Promenades," p. 96. No doubt, the reservoir was also constructed in the new water-tight béton material; perhaps Coignet was the contractor.

[36] *Galignani's ... Guide 1868*, p. 452. The reservoir is sometimes also called the "Reservoir Menilmontant." See also: Pierre Couperie, *Paris Through the Ages*, Section XIII, no page. Couperie stated that the canal, conceived in 1802 under Napoléon I, was originally constructed "... as an aqueduct

drop inlets where it becomes part of the subterranean drainage system, as can be seen at the top of the stairs on the left-hand side in the contemporary view.[38] [See Fig. 46] While site drainage has been an attendant issue in landscape design throughout history, the unusual element in this circumstance is the connection to the new sewer system that had recently been expanded and improved by Eugene Belgrand. The drainage followed the general topographic dictates of the site, where the lowest points beyond the lake edge occurred near the main entrance off of the rue de Mexico (now the rue Manin). From here, the drop inlets carry the water directly to the new "Collector sewer of the north," shown on the plan of 1878. [Fig. 53] A typical cross-section detail showing the pitch of the road surface, the side inlets, pipes, and sewers was included in *Les Promenades*. [Fig. 54] By creating a Parc where the roads and footways remained puddle free, well-graded and passable, Alphand enhanced the visitor's experiences. The overall sophistication of the site drainage reflected his technical engineering skills and knowledge of contemporary innovations and practices, once again showcasing a marriage of "Art and Industry."

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open to navigation, [that] was to be, according to the imperial conception, a place of enjoyment, the 'Champs-Elysées east.'"

[37] Robinson, *Parks, Promenades, and Gardens*, p. 63.

[38] Département de la Seine, Direction des travaux de Paris, Service des promenades, "Plan des travaux de parc (1875); Parc des Buttes Chaumont," Perotin, #10653, Box # 153, Archives de Paris, 19th arr., bvd. Sérurier. Field observations were verified through an examination of an 1875 plan from the "Direction des Travaux de Paris" archive. This plan showed repairs and extensions to some of the subsurface drainage system, with notations about the links into the sewer system. I do not yet know where the water from the lake goes -- in other words, is it some kind of re-circulating system, or is there a point where the water leaves the lake and Parc, which may be operated either by water level of through manual valves. On a parallel note, see the discussion of the surface drainage system Alphand installed at the Bois de Boulogne in ***The Builder***, "Parisian Parks and Squares, with a view to the Improvement of our own," vol. XXVII, no. 1374, June 5, 1869, pp. 437-439.

Alphand and his design team embraced and contributed to the design of new techniques and equipment for another realm of water integral to the Parc's image and experience: irrigation for the lawns and plants and arrangements for wetting down roads to minimize dust. Indeed, the striking effects of "... the deep fresh green of the Parisian parks and gardens..." were due entirely to innovations in this area.[39] Robinson stated that, "... the French system of watering gardens ... is excellent."[40] He commented at length on the practices and equipment and provided several diagrams and images drawn from *Les Promenades*. [Fig. 55] The "hoses" were cast and molded iron pipes, perforated at intervals, jointed to flex and mounted on wheels. Couplers attached them to the piped water sources constructed throughout the parks at strategic points. Parts and pieces were produced in local factories to meet the specifications developed by the Department of Parks; Alphand discussed the system at length, referring to the innovative design and proper methods for use in his chapter on pressurized water systems for irrigation.[41] Robinson echoed Alphand's remarks on the efficiency of the system in water usage and manpower required for irrigating and watering the parks. [Fig. 56] These innovative mechanized watering programs and specialized equipment kept turf areas green and lush throughout Paris. The success of the irrigation practices on the Buttes Chaumont's steep slopes was evident: by 1869, when James McCabe's book was published, the trees were "... growing finely, [and] the shrubbery and flowers ... [were] thriving beyond all chance of failure."[42] This success of the remarkable irrigation practices and equipment

[39] *The Builder*, "Parisian Parks and Squares ...," p. 437.
[40] Robinson, *Parks, Promenades and Gardens*, pp. 37-47.
[41] Alphand, *Les Promenades*, pp. 15-26.
[42] McCabe, *Sunlight and Gaslight*, p. 262.

contributed to the present condition of the Parc, with its many mature trees, lush thickets of shrubbery and green slopes.

Contemporary, industrial technology and design innovations for soil preparation and plant propagation also facilitated Alphand's and Barillet-Deschamps' creation of a lushly planted Parc with "... flower beds, arranged in the taste peculiar to the French, and among lawns of green turf, covering what was lately an unsightly waste."[43] The designers faced the challenge of transforming an essentially empty and inhospitable site into a landscape suitable for plant survival. This was accomplished through earthwork and soil amendment. They then addressed installing the plant materials, some of which were notably large trees, using newly designed and created machinery and tools. Finally, to obtain the desired plants, including many non-native and tender species, species were cultivated in new nurseries and hothouses expressly built by Alphand and Barillet-Deschamps,

Two unique problems existed for planting: the treeless condition that lent itself to the site's name – Chaumont, which is a conflation of Mont Chauve, from the Latin "Calvus Mons" or bald mountain, and the residual tailings and offal of an active quarry and dump.[44] To rectify these conditions, during the final phases of the earthwork a "... bed of hard clay, mixed with marl and loam was ... formed over the gypsum, and upon this was thrown about 200,000 cubic metres of vegetable earth, manure, etc. brought in carts."[45] The topsoil was fine-graded and details were developed and implemented to

[43] *Bradshaw's Guide*, p. 85.
[44] Alphand, *Les Promenades*, p. 198.

accommodate special planting pockets and unique plant arrangements. On the central island, for instance, soil pockets on rugged facets near the summit were filled with soil and plants. [Fig. 57] Robinson had decried the "baldness" of the island and lamented the "lack of ivy and verdure" draping the sheer upper sides that he found so attractive elsewhere, although he acknowledged the ingenuity and attempt.[46] [Fig. 58]

The task of planting the Parc entailed not only preparing the land but also selecting and installing them. Installing large specimen trees on the steep slopes of the Buttes Chaumont required careful attention. Robinson, among others, noted a "... remarkable feature of the public gardening of Paris ... the excellent system of transplanting trees there practised [sic]."[47] Quoting at great length an article by Edouard André, Robinson described the invention by the city architects and engineers of a "... new machine which would work more easily and with less damage to the lives of the trees. ... [It was capable of moving] for example, a specimen tree, thirty years old, thirty feet in height, the trunk [with] a circumference of three feet at a height of three feet from the ground, its total weight with the earth-ball being nearly two tons."[48]

In *Les Promenades* Alphand described the state-of-the art tree planting equipment: three sizes of chariot, each capable of moving differing sizes of trees and their root balls. The

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[45] *Bradshaw's Guide*, p. 262.
[46] Robinson, *Parks and Gardens*, p. 62.
[47] Ibid., p. 161.
[48] Ibid., pp. 161-164. André's essay, which Robinson quoted (without a citation) at great length, supplements in greater detail information provided by Alphand. André explained the machinery and described the required method for digging the tree, getting it into the chariot, moving it, and then re-planting it. He also provided information for ground preparation for the new tree pit, thus hoping to insure a successful transplant. Alphand briefly discussed what he deemed the three critical criteria to facilitate a

size of the machinery was chosen based upon the unique conditions of soil, tree type, and placement. [Fig. 59 and fig. 60] All three machines are made of wood and cast iron, the smaller two operating with windlasses. The largest model, which required four men to perform the tree planting task, was operated by a system of cast iron gears and cogs to leverage lifting and transporting the tree. This technology was certainly part of the contemporary awareness; even the 1882 *Bradshaw's Guide* acknowledged the effective planting on the site owing to "... Parisians having the art of transplanting full-grown trees in the most successful manner."[49] Visitors in 1867 would have found large trees all around the Exposition grounds, along the boulevards, and in the parks.

In addition to tree moving machines, the design team introduced and used several smaller pieces of equipment that had been specifically designed to meet plant installation and maintenance needs. One example which was featured in the Exposition gardens was a cast iron "raidisseur," a tightening component attached to galvanized wires used to stabilize a newly planted tree. [Fig. 61] Other new, specialized cast and forged iron hand tools, detailed in Robinson's *Parks, Promenades and Gardens*, included a collection of variously sized sécateurs (pruners), a numérateur for tagging (naming) specimens, and a binette for loosening hard ground.[50]

In addition to creating the machinery required to install the plant materials in the City's parks and promenades, the architects and engineers also created hothouses and nurseries.

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successful planting: soil, appropriate root growth relative to the tree size, and the elimination of elements harmful to plant growth. See Alphand, *Les Promenade*, pp. 45-48; 243-246.

[49] *Bradshaw's Guide*, p. 85.

[50] Robinson, *Parks, Promenades and Gardens*, pp. 568-580.

While greenhouses as such were not new, their use to provide plants for civic embellishment was novel. The propagation structures were necessary to procure the desired quantity and quality of plants for Paris' numerous new parks and planted areas. The hothouses and nurseries provided a majority of the plants for the Buttes Chaumont as well as for the Exposition grounds and the Trocadéro. These cultivated plants contributed to meeting opening day expectations for landscaped areas that appeared verdant and thriving, if not yet with fully established plants.

Greenhouses themselves were not new; hothouses and orangeries had existed in gardens for centuries and the 1855 London Exposition introduced them into the public milieu. Barillet-Deschamps had experience with greenhouses and closely assisted Alphand in establishing them for Paris' public works projects. Demonstrating their devotion to the newest and most cutting edge technology, Alphand devoted a chapter in *Les Promenades* to the greenhouses at La Muette near the Bois de Boulogne (established in 1855). This became the chief supply nursery for the park and promenade plant materials, as well as the site for experimentation and propagation.[51] [Fig. 62] Alphand described the set of iron and glass structures equipped with an elaborate central heating system with a stove and many conduits for circulating the hot air throughout the chambers. This system maintained constant temperatures as required by the differing functions and plant. La Muette also housed a parallel system for circulating hot water through pipes to special needs areas, such as the bulb rooms and a pipe and hose system to supply irrigation water. A set of rooms fed with cool air further balanced cultivation capabilities.

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[51] Alphand, *Les Promenades*, pp. 125-148. This greenhouse also encompassed immense caves in the old quarries at Passy where in the winter rhizomes and bulbs were stored.

Alphand stated that with a staff of forty-eight, La Muette produced close to three million plants each year for the needs of the City.[52]

In large measure, the cultivated plant palette, including exotica, reflected the design predilections of Jean-Pierre Barillet-Deschamps. In addition to furnishing a great quantity of annual bedding plants, the new nurseries provided him with an array of hardy subtropical species, many of which had been recently "discovered" and brought to Europe.[53] Robinson described the typical sub-tropical introductions as,

> ... large, vigorous, and easily grown. Some of them attained a height of ten or twelve *feet (Centaurus babylonius)*; others, like pampas grass (*Gynerium argentium*), were remarkable for the 'rapid vigor and great size of their herbaceous vegetations,' or, like a type of the common tobacco (*Nicotiana macrophylla*), were 'readily raised from seeds and [grew] luxuriously in rich soil.'"[54]

Barillet-Deschamps' work was noteworthy for the use of exotic plants; he frequently planted hothouse-cultivated, tender annuals including begonia, coleus, fuschia and hibiscus. Many of these plants, such as the Begonia rincinifolia, were featured in the

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[52] Alphand, *Les Promenades*, p. 34. This vast quantity of plants was in itself a mind-boggling feat, reflective of the Prefecture of the Seine's centralized policies and practices and the entire tone of numeration and quantification exercised in Alphand's treatise. See also: Robinson, *Parks, Promenades and Gardens*, pp. 139-158. In his chapter, "The Jardin Fleuriste and other Public Nurseries of the City of Paris," Robinson described the "most instructive features" and the advantages afforded by such a system, and lamented that London so dismally lacked such efficiency and cost effective foresight.

[53] Giedion, *Space, Time and Architecture*, p. 486. Giedion mistakenly suggested that Alphand and Barillet-Deschamps (who were fully engaged in their Paris based work) were the "discoverers" of these new plants; it seems more likely that the new imports were part of the global explorations and plant discoveries occurring throughout the previous century. Additional information on these discoveries can be found in such works as Anne Leighton, *American Gardens of the Nineteenth-Century* (Amherst: University of Massachusetts Press, 1987).

[54] Robinson, *Parks, Promenades and Gardens*, pp 182-238. In these chapters, Robinson went into great detail on the materials, concepts and effects achieved in "sub-tropical planting," which he suggests originated in Paris and which means "... flower gardens embellished by plants having large and handsome leaves, noble habit or graceful outlines. It simply means the introduction of a rich and varied vegetation, chiefly distinguished by beauty of form, to the ordinarily flat and monotonous surface of the garden." See also Giedion, *Space, Time and Architecture*, pp. 486-487.

color plate section of *Les Promenades*. [Fig. 63] He planted many cultivated species in environments constructed to support particular plant groups, such as the water rills described Robinson:

> Streamlets in this park are arranged in a tasteful way, their beds being sometimes rocky; and by taking advantage of their twinings and tiny cascades, positions have been formed for a great variety of hardy plants which are grouped along the sides. Among these the free-flowering Yuccas, Y. filamentosa and Y. flaccida, occur in groups and masses, and are very effective when in bloom.[55]

The shrub and tree palette at the Parc des Buttes Chaumont directly reflected the nursery cultivation system initiated by Alphand and Barillet-Deschamps. The plant palette included many exotic and imported varieties, such as Rhododendron and Azalea species, Hardy Orange, Lebanon Cedar, Ginkgo, Tulip Tree, Monkey Puzzle Tree, and Japanese Pagoda Tree. A surprising number of these are still thriving in the Parc, for instance the lush thickets of rhododendron interspersed with native species at the base of the island. [Fig. 64] "Appendix D" provides a list of specimen trees in the Parc in 1989, with notes as to provenance. Robinson remarked on the folly of planting Cedrus deodar, trees native to the Himalayas, which he felt were doomed because of climatic and cultivation issues. Fittingly, the stately cluster still stands at the juncture of paths, an eloquently testimony to the planting conditions and care they received.[56] [Fig. 65]

As with many other aspects of the Parc, circulation routes within and surrounding the Parc relied on new industrial materials and technology to achieve the desired impression and experience. Macadam and asphalt roads and footways, bridges and overpasses,

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[55] Robinson, *Parks and Gardens*, p. 67.
[56] Robinson, *Parks, Promenades and Gardens*, p. 60.

gaslights, and new modes of transportation, including omnibuses and the loop railroad express this realm of production and experience. Contemporary guidebooks noted that, "Excellent carriage roads lead all around the Park, and the Paris Metropolitan Railway, or Chemin de Fer de Ceinture, has a station close to the lake."[57] Once they had arrived at the Parc, the visitor's movements were choreographed by the circulation routes Alphand carefully scripted over the topography. A three-tiered hierarchy of intertwining carriage routes, broad walks or promenades, and secondary walks, or footways offered choices and different opportunities to engage the Parc, as noted in Chapter 3. [See Fig. 25]

Alphand provided costs for paving work in the Parc under several headings: travaux d'empierrements (ballasting and road base, macadam roads); pavage (paving); bordures en granite (granite curbs); and dallages en bitume (asphalt block paving). The total costs totaled 490,844 francs, about fifteen per cent of the total costs for the Parc. This phase of the project depended closely on the earthwork, which underlay the smoothly graded series of carriage routes, promenades and footways that wound through the Parc and led to key features and highpoints. Alphand paid careful attention to the gradient, or steepness, of the routes; Robinson described the carriage roads as "... twenty-two feet wide, the inclines rarely reaching 6 in 100," which allowed visitors to "... drive all over the park in spite of the great difference in level existing in the various parts."[58] [Fig. 66] He described the paths as having inclinations seldom exceeding a slope of 10 per cent (10 feet vertically over a hundred feet horizontally). These hard-packed, well-graded bitumen and gravel paths afforded "... foot passengers the means of making short cuts

[57] *Bradshaw's Guide*, p. 85.
[58] Robinson, *Parks, Promenades and Gardens*, p. 66.

between the carriage drives in order to reach the heights of the park more expeditiously."[59] This attention to grading was directly related to the careful site survey and Alphand's knowledge of site conditions.

Improved cross-section design was enhanced by careful attention to road and footway surfacing that provided more stable, drier road conditions and thus smoother, faster more pleasant carriage rides and walking surfaces. While Alphand mentioned the types of materials and procedures employed in surfacing, Robinson devoted several pages to describing pavements, especially focusing on the new macadam and asphalt (or bitumen) surfaces.[60] He detailed specifications for the materials and application techniques for a variety of uses such as carriage roads versus footways. In concurrence with Alphand's expenditures, Robinson made very clear that securing a good foundation for the carriage roads was essential. The application of "... steam rollers, or 'compresseurs,' as they are called, for forming the macadamised [sic] roads of the new thoroughfares in Paris has been very successful."[61] The class of machines used to lay Alphand's paved surfaces, which were described along with the technique in *The Builder* in April of 1866, could have been either those developed by M. Lemoine, or M. Ballaison, the latter perhaps slightly preferred.[62] Thus, Alphand again employed state-of-the-art technology in both

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[59] Idem.
[60] Robinson, *Parks and Gardens*, pp. 141-148.
[61] *The Builder*, "Macadamized Roads in Paris," vol. XXIV, April 14, 1866, p. 266. This entry discussed of two particular steam roller machines, of French design, and the techniques for applying them to the task of preparing the road bed.
[62] Idem. The author wrote, "The Ballaison machine has two rollers, the engine being between them and the boiler on one of them. The motion is communicated by a gault chain. With fuel and water the weight is 13 1/4 tons; but with springs and iron framework it weighs 15 1/4 tons. The force is ten horse power, and the consumption of coal 7 to 8 kilog. Per horsepower."

materials and machinery to formulate this important contribution to the Parc's design and experience.

All circulation routes within the Parc included bridges, not surprising given Alphand's training and technical engineering interests. The majority of these were constructed of iron, or had cast iron elements; both "Le Pont de fer," or Iron Bridge, the brick arch bridge, or "Pont rustique," had cast iron fence, clearly seen in the turn-of-the-century photograph postcards. [Fig. 67] These structures highlighted some of the technical developments employed in the Parc and added to the experiences for the visitors, especially the Pont Suspendu. [See Fig. 39 and 40] As noted earlier, the attachments for the cables of the suspension bridge were hidden in some of the imitation rock. The thick, twisted, iron cable ropes were joined by cast iron pieces, with the whole bridge slung between the cables.[63] [Fig. 68 and Fig. 69] Visitors swayed as they moved over the lake far below on their way to the island and Tempietto, the bridge design integral to the sublime experience.[64]

For evening visitors, who were certainly anticipated since guards closed the Parc's gates well after dusk, gaslights along the paths and carriage routes would have made the visits even more noteworthy and pleasant. [Fig. 70] Gaslights were an innovation that impressed many contemporary visitors to both the Exposition and the Parc. A guidebook

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[63] Restoration on the Pont suspendu was completed in 2000. It still sways deliciously.

[64] White, *Architecture of Paris*, p. 395. White esteemed the design of the suspension bridge and suggested the structural innovations had some basis in the work of Isaac Brunel, a British engineer of French ancestry. With his background and in his capacity as the Director of Bridges and Roads, Alphand would have been well aware of the developments in this new structural technique. His decision to highlight it at the Parc merely furthers the arguments of this paper.

noted that, "Strangers in the city who wish to view these gas-light scenes generally engage carriages and drive slowly through the different boulevards."[65] James McCabe, an American visitor, recognized the contributions the lights made to the experience of the City when he titled his book, *Paris by Sunlight and Gaslight.* By end of the Second Empire, Alphand had under his authority the Municipal Lighting Service.[66] Areas annexed to the City in 1860 received most of the new light installations. The old City benefited from the adoption of improved reflectors and new lamp fixtures that cast a minimum shadow, as well as by the reduction of the lamp height so that more light reached the street pavement.[67]

The beautifully graded and handsomely paved new boulevards surrounding the Parc des Buttes Chaumont linked it to the larger Parisian context. In 1868, visitors to the Parc were advised that "... the best way of getting there is to take a carriage by the hour."[68] While this may have been the most leisurely way to engage the Parc, two other

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[65] Charles E. Fulton, *Europe Viewed Through American Spectacles* (Philadelphia: J. B. Lippincott and Co., 1874) p. 146.

[66] Pinckney, *Napoleon III,* p. 47, quoting Haussmann, *Mémoires, III,* pp. 137-18, 145, 152-55; *Galignani Guide for 1851*, pp. 38-39; *Moniteur*, Dec. 12, 1861, Dec. 4, 1862; *Revue Générale de l'architecture et des travaux publics* (Paris), XII (1854), pp. 257-58. In Pinckney, the description of the situation in 1850 suggested that, "By night the streets were little inviting either to carriages or to pedestrians. During six months of the year some 12,000 gas lamps and 1,600 surviving oil lanterns were lighted nightly along the streets. During the remainder of the year only a fraction of them was used and for only part of the night. The permanently fixed gas lights installed during the July Monarchy were an improvement over the oil lamps that swayed like ships' lanterns on ropes hung across the streets, but even they cast little light on the streets." Lighting was thus an inherited problem. Through most of the decade of the fifties the street lamps were a responsibility of the Prefect of Police, and his Lighting Service brightened the streets of Paris with some 3,000 new gas lamps and substituted all-night lighting the year around for the seasonal and intermittent lighting of the forties. In the autumn of 1859 the Emperor transferred this service to the Prefecture of the Seine, and in the next decade the new service added 15,000 lamps, doubling the number in use.

[67] Pinckney, *Napoléon III*, p. 72, quoting Haussmann, *Memoires*, III, pp. 156-157; *Moniteur*, July 5, 1851, Oct. 27, 1858, June 12, Dec. 12, 1861, July 18, 1862, Dec. 6, 1863; *J.O.*, Supplément, May 1869, p. 7; *The Builder*, XX (1862) p. 571.

[68] *Galignani's ... Guide 1868*, p. 452.

significant means of access also served the Parc: the new public omnibuses, and the Chemin de fer de Ceinture. Paris had been served by

> ... public buses since 1828, and in 1850 had thirty lines (with fascinating names like Gazelles, Doves, and Reunited Women) and more than 300 buses. They were equipped, moreover, with cushioned seats, and every passenger was assured of one, for once all the places were filled no more riders were taken. ... the fare remained at 30 centimes, about one-tenth of an ordinary worker's daily wage in 1850, and ... fashionable Parisians would not be seen on the public buses.[69]

Recognizing that public transport companies were not seeking concessions to service less populous areas, Haussmann gave his full support to the Metropolitan Omnibus Company that had been established in 1855 by the Perire Brothers. The omnibus company was granted in 1860 a fifty-year monopoly to establish new routes. The promise of Exposition visitors to the newly annexed nineteenth arrondissement and its elegant Parc assured routes -- and profits -- for the omnibus companies and their constituents.[70]

Finally, a celebrated presence within the Parc is the Chemin de Fer de Ceinture, or Loop Railroad, that opened on14 July 1862.[71] The train, which had only one class of carriages,

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[69] Pinckney, *Napoléon III*, p. 18; referencing *Galignani Guide for 1851*, p. 8; Alfred Martin, *Etudes Historiques et statistiques sur le moyens de transport dans Paris* (Paris, 1894) pp. 86-87.

[70] Kain, "Urban Planning and Design," p. 243, citing Haussmann, *Mémoires* (no page given): "naturally no-one sought a concession to serve the less populous areas." See also *Historical Dictionary ... 1852-1870*, pp. 473-474. The Perire brothers, financial entrepreneurs, had great stock in several railroad companies and held the Crédit Mobilier until its collapse in 1867.

[71] *Historical Dictionary ... 1852-1870*, pp. 89, 536-539. The presence of the train reflected the influence of industrialist Michel Chevalier (1806-1879), an outspoken cabinet advisor and proponent of the Exposition, as noted in chapter 2. Chevalier praised industry as the motor of human progress and advocated public works built by an alliance of private enterprise and government. He was one of the key catalysts behind the transport revolution that came to fruition in the Second Empire; in fact, "... railroads were a key economic development of the Second Empire and one of the chief shaping forces of the era." The entry on railroads explains the centralized nature of their development in France and discusses the various alliances between the government and independent investors and industrialists. Chevalier continued to press for improvements and for government encouragement, such as the guarantee of interest on railway capital. The railways system affected many sectors of French, and Parisian, life including ease of access, distribution of goods, connections to the country and ports, all of which brought economic and social changes. In addition, the economic impact required for production, installation and operation for the

with one price according to distance, was one of the ascribed routes to the Parc for contemporary tourists.[72] From the south, its route tunneled under the buttes of Belleville and emerged to slice through the eastern third of the Parc. The bird's-eye view of the Parc in *Les Promenades* emphasized this technological presence, with the track strongly dominating the left foreground of the image. [See Fig. 31] The train stopped at the Station de Belleville/Villette, which is located a short distance from the Parc at the end of the new Rue Menadier as it swings to the northwest from the intersection of the new Rue de Mexico and the Avenue Laumier.[73] [See Fig. 50] While not the most fashionable route to the Parc, the train may nonetheless have been exciting as well as quite convenient. The Exposition grounds were served by a spur of the circuit train route, and a visitor could have purchased a ticket there and ridden around the outer fortification of the City to arrive at the Station de Belleville/Villette. A short stroll would lead them to the Place Armand Carel and the main entrance of the Parc, with an impressive first view of the island and the Tempietto.

Despite its depression below the graded surfaces of the Parc, the railroad's industrial presence in the Parc is celebrated and engaged both visually and physically by visitors. The track lies directly beneath one of the three Café restaurants. From the café's, the view down-slope to the north takes the eye directly to the track and beyond to the northeast entrance. Another prime view of this track is from the northeastern highpoint or belvedere, number 5 on Alphand's rendered plan. [See Fig. 25] A sightline to the

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railroads was huge; it spurred industrial development, material invention and innovation, and large capital campaigns.

[72] *Bradshaw's Guide*, p. 85; Hare, *Paris*, p. 247.

[73] *Historical Dictionary ... 1852-1870*, p. 742.

tracks is clearly delineated on the rendered plan and despite some overgrowth of planting, is still within view today. Physically, the railroad track is the centerline of two nested loops of paths – one for carriages and pedestrians and the other solely pedestrian – that swing around the graded depression. When the Parc opened, two opportunities existed for visitors to cross directly over the railroad tracks. At the northeast corner of the Parc, the rue Crimée and the rue Manin intersect at a large overpass constructed above the tracks. This juncture is a major entrance to the Parc. Just inside the entrance, a carriage route swung off to the left on another bridge over the tracks. The second opportunity to cross the tracks was a pedestrian bridge that once attached to the railroad retaining walls. It appeared in the original plans and traces of trails and bridge foundations can still be found marking the spot it once held. [See Fig. 25 and Fig. 30] This smaller cast iron bridge no longer exists, perhaps because its crossing elevation was too low for modern trains to pass beneath, or perhaps eventually it was deemed too dangerous. One can only imagine the exhilaration (and cinders) which would have aroused a terrifying thrill and excitement for a visitor caught on the bridge while the train rushed beneath them, frighteningly noisy and earth-shaking, full evidence of the industrial promise of France.[74]

The sum of a visitor's experience in the Parc de Buttes Chaumont thus included obvious and thrilling engagements with full-scale industrial power. It also included the more subtle expression of industry offered to the observant visitor in the lay of the land, the

[74]Shelley Rice, *Parisian Views* (Cambridge, MA: The MIT Press, 1997) p. 184. Rice nicely contextualized this experience: "Archetypes of technological power, these machines [trains] nevertheless helped to create the reality of evanescence that greatly transformed the perceptions of those living in the nineteenth-century. At once we enter the culture of mediated experience; the culture of movement and change; the culture of afterimages and visions that fly by, leaving our subjectivity floating in a space that is, in truth, a nonspace.

pleasures of the rock work and rustic details, the water features, and the planting that transformed the former derelict site into a pleasure ground fit for strolling and promenading.

The landscape traversed by the trains is a landscape transformed by technology into a panorama, a passage in which life becomes art – and art itself turns into an allegory of the real."

V. Conclusion

The Parc des Buttes Chaumont was a significant new park within Napoléon III's urban redesign campaign. Moreover, it was conceived as a permanent exhibition directly linked with the 1867 Exposition Internationelle. The Parc furthered the Exposition's thematic ideas of "Art and Industry" through the means and materials employed in its production and thus participated in the economic and financial agendas of the regime. At the same time, it redefined contemporary notions of urban nature. The sure-handed rendition by Alphand and his design team was a highly successful melding of picturesque landscape aesthetics and site reclamation for urban park development. In the nineteenth-century, the Parc des Buttes Chaumont was an instance of a designed landscape used to mitigate the tensions and fears attendant with industrialization and rapid modernization. As a fabricated, technologically enhanced landscape, the Buttes Chaumont was a sophisticated rendition of a picturesque park dedicated to a visitor's experience of nature within the City.

So just what would a visitor have encountered in 1867? Tiring of the Exposition and its glut of objects and stimuli, a few foreigners sought relief in a quiet walk in the newest park in the City. After a smooth carriage ride along several of the new boulevards, they arrived at the main gates of the Parc des Buttes Chaumont just off the Place Armand Carel. Directly in front of them a craggy island loomed above the placid lake, crowned with a neo-classical replica of the Temple of Sibyll. [Fig. 71] Their promenade around the lake unveiled the island from all sides, but failed to offer a route to the top; they had

to be discovered and doing so demanded an immersion into the spaces and footways of the Parc. The only access was on foot, either by first reaching the island on boat and then making a steep ascent through passages amidst the rocks of the old quarry, or by finding the paths that took them onto the bridges. Upon attaining the Tempietto, they experienced a revelation; the city reasserted itself beyond the boundaries of their closely orchestrated experience of "nature" in the Parisian banlieue – the perimeter zone beyond the walls once the locus for such strolls and jaunts before being overtaken by the growth of the industrializing City.

From the high vantage points the panorama before them recalled the Exposition's theme: "Art and Industry," all the glory of Paris lay before them, a tribute to the Emperor and his administration. [See Fig. 30] The foreign visitors came to agree the opinion expressed by a French visitor, who felt that looking southwest from the Tempietto,

> ... the sublime balcony -- the lantern of the Buttes Chaumont, one best appreciates the intense poetry that becomes clear in the ocean that is Paris. The poetry of the splendid domes of the Panthéon, the Val-de-Grâce, the Invalides, the towers of Nôtre Dame and of so many monuments rising from that vast sea which is the mother city in the mist.[1]

They were reminded of their experience at the Panorama at the Exposition as their position on the heights in the Tempietto also offered views in the round. [Fig. 72] In the distance beyond lay Paris, with its trains, smoking factories and numerous buildings including,

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[1] Robert Hénard, *Les Jardins et Les Squares* (Paris: Librairie Renouard, 1911) pp. 181-182. Author's translation: "... de ce balcon sublime qu'est la lanterne des Buttes-Chaumont, on goûte mieux qu'ailleurs l'intense poésie qui se dégage de l'océan parisien. Poésie des dômes splendides du Panthéon, du Val-de-

> ... La Petite Villette and its Protestant Church, and La Grande Villette; the large *abbatoir* (Slaughter House) of La Villette, on a space of 67 acres; the Paris *Cattle Market*, 5/8 mile square, ... and *the Entrepôt des Blés* (Granaries). These adjoin the Canal de L'Ourcq and its basins. Further in the distance appear numerous towns, hamlets, woods, and forests, and lastly ranges of hill forming the horizon, which extend from right to left over a space of 30 miles, in five or six different departments.[2]

Looking downward below the island, their view encompassed, "Close at hand, and underneath ... the Lake ... and the whole park." Viewers beheld the richly layered landscaped park through which they had passed in their search for the Tempietto: sweeping green lawns being watered, clusters of exotic trees and shrubs, the hard edge of the lake below, people moving on the smooth promenades and rustic footways, the picturesque rochers and the rockwork anchoring the suspension bridge, a few buildings, and plumes of smoke from the Chemin de fer bringing visitors to the nearby station.

From the Tempietto at the center of the park, this set of three nested views epitomized the theme of "Art and Industry." The Parc constituted a critical element in the oeuvre of Alphand and his design team that stressed integrating new technologies and materials in the service of Napoléon III's political agenda. When examined against the Exposition's theme of "Art and Industry," the Parc des Buttes Chaumont offered a rendition of Art through its picturesque aesthetic conception, and Industry as seen in the display and use of innovative nineteenth century materials and technologies employed in its production. It offered the message that industrial products and contemporary technology could be artistic and attractive. Considered by many as Alphand's crowning achievement, the

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Grâce, des Invalides, des tours hauttaines de Notre-Dame et de tant monuments surgis de cette immensité bleue qu'est la cité-mère dans la brume."

Buttes Chaumont is the paradigm of the nineteenth-century Parisian park utilizing industrial and building technology in the service of the picturesque conception of an urban landscape park.

Questions about the Parc and the thrust of its political message remain. From the vast number of visitors tallied through ticket sales to the Exposition, how many actually visited the Parc? Alas, there is no way to verify whether or not the success of the Exposition extended to the Parc. Contemporary guidebooks certainly recommended visiting the Parc, and the joint opening ceremonies definitely linked the two projects. Yet Exposition visitors more frequently penned comments on the much closer Bois de Boulogne and Parc Monceau.[3] Two factors perhaps contributed to why the Buttes Chaumont were less well known by Exposition visitors. First, there is the relative distance separating the two sites. While access by train was possible and actually preferred later in the century, most contemporary guidebooks recommended hiring a cab or coach as the best way to get to and see the Parc.[4] Second, the very coachmen in the position to provide the most efficient and enjoyable means of access were "en grève." Nicholas Papayanis, a social historian, explained,

> The coachmen ... had struck during the expositions of 1855 and 1867 and would strike again during the expositions of 1889 and 1900. They walked

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[2] *Bradshaw's Guide*, p. 86.

[3] These two parks were in closer proximity tot he Exposition grounds, and while both evidenced aspects of the industrial and technological sophistication inherent to Alphand's work, the Buttes Chaumont is singularly spectacular for its transformation of the quarry site, the degree to which the production relied on new means of production, and the density of the experience of these conditions for the visitor.

[4] *Galignani's ... Guide 1868*, p. 452. Galignani stated "... the best way of getting there is to take a carriage by the hour." *Bradshaw's Guide,* p. 85. Bradshaw's 1882 guide stated, "Excellent carriage roads lead all round the park, and the Paris Metropolitan Railway, or Chemin de Fer de Ceinture, has a station close to the lake. This line has only one class of carriages, with one price according to distance." Hare, *Paris*, p. 247. By 1900 Hare wrote, "The Parc des Buttes Chaumont may be reached by the station of La Villette on the Chemin de Fer de Ceinture."

> out during every Paris exposition in the nineteenth-century (though they never attained their main objectives). Here were two events, one staged by the successful and confident elite of the state, attracting millions of French and international tourists to Paris, the other planned by workers to disrupt the official festivities in order to press their claims.[5]

This reflection of the energies and undercurrents in 1867 Paris offers insights into the cultural context within which Napoléon III's urban campaign was drawn. As a permanent installation associated with the Exposition Universelle, the Parc epitomized a cutting edge application of science to create the artistry of the Parc. It offered "... structured space through which the Parisian viewer could live out, however briefly, *natura naturans*," albeit an illusion of this constructed and displayed within the technological, industrializing milieu of 1867.[6] However, the political agenda and messages inherent to its conception faded against the evolving circumstances and context of the Parc. The impact of the site's history moved into memory and the impact of the new materials and technologies also faded as they became more common. Like other urban parks constructed in the nineteenth-century, the Parc des Buttes Chaumont possessed a life of its own that extended far beyond the lives of those who produced it. What remains is the physical form of the Parc, its scripted sweep of avenues and footways and the mature

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[5] Nicholas Papayanis, *The Coachmen of Nineteenth-Century Paris - Service Workers and Class Consciousness* (Baton Rouge and London: Louisiana State University Press, 1993) p. 3-4, 160; referencing Michelle Perrot, *Les Ouvriers en grève, France*, 1871 - 1890 (Paris, 1974) p. 333. Papayanis stated: "Coachmen were a central presence in Paris. They constituted a work force ranging from about five thousand in 1860 to about fifteen thousand in 1911, scattered throughout the city. Such a ubiquitous group must always attract attention, and opinions about coachmen varied from the extremes of pity, sympathy, and affection to those of fear and hostility." Concerning these strikes during international expositions, he wrote that the coachmen "... expected such strikes to succeed because during the expositions a work stoppage would severely reduce the higher revenues for the cab companies that an influx of visitors would bring. The police and other authorities also dreaded cab strikes at such times because they put a strain on the public transportation system, they caused confusion, they erupted in unpleasant incidents between strikers and strikebreakers, and they tarnished the public image of France. For the otherwise scattered coachmen, who worked for different and varied cab companies out of depots and public cab stations spread throughout Paris, the exposition strikes became a single unifying force in a very diverse profession."

[6] Green, *Spectacle of Nature*, p. 70.

trees and shrubs that offer the temporal depth of the site. The extant Parc, testimony to the dreams of those who produced it, remains to inspire contemporary visitors with their own visions.

In *The Nightwalker*, the surrealist twentieth-century writer Louis Aragon pushed his interpretation of the Buttes Chaumont to embrace its latent offer for an experience of nature. Described as a "walk," Aragon and two friends, seeking to alleviate boredom, proposed a walk through the Parc:

> Certain words carry in their train images which transcend the physical representation of an object. The Buttes-Chaumont evoked a mirage, tangible as such phenomena are, which held the three of us spellbound. The blackness evaporated beneath a hope immense for being no naïve. At long last we were going to destroy boredom; the prospect of a miraculous hunt stretched before us, a landscape of experiences which could not but hold in store a multitude of surprises and -- who knows?-- some great revelation which would alter life and destiny. This huge oasis ... this mad eyrie ... for the three walkers it was an alembic of human chemistry in which precipitates have a tongue to speak and eyes of a strange color. ... they hope to find in it neither asylum nor solitude, but, at the very least, a world of adventures here at the apex of the mystery, weeded and in its parts marshaled according to hidden affinities by their desire to penetrate the grove.[7]

These words are a testimony to the power of the site, evidence of the potential of Alphand's design to move beyond the conditions of its genesis yet retaining richness and communicative power in its form.

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[7] Louis Aragon, *Nightwalker*, trans. Frederick Brown (Englewood Cliffs: Prentice - Hall, Inc., 1926) pp. 109-110.

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APPENDIX A

List of urban landscape projects created under the Second Empire[1]

Bois:
Bois de Boulogne (846.5 ha)
Bois de Vincennes (901 ha)

Parks:
Monceau (8.5 ha)
des Buttes Chaumont (24.5 ha)
Trocadéro
Montsouris (15.5 ha)

Gardenss:
des Champs-Élysées (12 ha)
du Ranelagh (6 ha)

Squares:
de la Tour Saint-Jacques
des Arts et Métiers
des Innocents
du Temple
Montholon
Sainte-Clotilde
de la Trinité
des Batignolles
Louvois
Louis XVI
de Charonne
Laborde
de Montrouge
Monge
Vintimille
de l'Archévéché
place Sainte-Geneviève de Belleville
de la Chapelle
des Invalides

Principal places and grand planted avenues and boulevards:
place Malesherbes
place de Grenelle
place de Roi de Rome
avenue de l'Observatoire
avenue de l'Empereur (Président-Wilson)
boulevard Richard-Lenoir (established over the canal Saint-Martin)

[1] J. C. (Jean-Charles) Adolphe Alphand, *Les Promenades de Paris* (Princeton: Princeton Architectural Press, 1984) reprint of *Les Promenades de Paris* (Paris: Éditions J. Rothschild) 1867-73. A list is also found in Francoise Choay, "Haussmann et le Système des Espaces Verts Parisien," *Revue de L'Art*, no. 29 (1975) pp. 83-99.

APPENDIX B

Classification system for the 1867 Exposition Universelle[1]

The system of classification which has been adopted differs entirely from any hitherto devised, and forms a special feature of the Exhibition, the shape and arrangements of the building having been specially adapted for the display of the objects thus classified. The classification is based on the idea that these exhibitions are intended to bring into notice all the resources which industry can create for satisfying the wants of mankind, and the Exhibition is divided primarily into groups, which are intended to correspond with the great wants of the human family. The wants thus common to all people are divided into the following departments: - Food; clothing; dwellings; raw materials and their treatment; the liberal arts; and the fine arts. These divisions are considered by the French authorities to represent everything connected with the industry of a people, and they form the basis of the following groups:

1. Works of art.
2. Materials used in the liberal arts.
3. Furniture and articles necessary for dwellings.
4. Clothing and articles required for the person.
5. Products, raw and manufactured, connected with mining industry, forestry, &c.
6. Apparatus and processes used in the arts.
7. Food (fresh and preserved) in various states of preparation.
8. Live stock and specimens of agricultural buildings.
9. Growing vegetable products and specimens of horticultural apparatus.
10. Articles exhibited with the view of improving the physical and moral condition of the people.

These ten groups are again subdivided into classes, amounting in all to ninety divisions.

[1] This excerpt is directly quoted from : *The Builder - An Illustrated Magazine for the Drawing Room, the Studio, the Office, the Workshop and the Cottage* (London), "Classification of the French Exhibition," vol. XXIV, December 8, 1866, p. 907.

APPENDIX C

Davioud, Gabriel (30 October, 1823 - 6 April,1881)[1]

Major architectural works and commissions

1850-51	Théâtre d'Etampes
1854-60	Jardin d'Acclimatation on the periphery of the Bois de Boulogne
1855	Les Halles Centrales (as *sous-inspecteur* under Victor Baltard)
1855-61	Bois de Boulogne - numerous pavilions including the Pré-Catalan and Armenonville, various kiosks, chalets, and restaurants, and the guard dwellings of the gates.[2]
1857	Grandstands of the Longchamp race course[3]
1858-60	Fontaine Saint-Michel at the place Saint-Michel, between rue Danton and boulevard Saint-Michel.[4]
1859	Place Monge
1859-60	Nouvelle Panorama of the Champs Elysées
1860-62	Canal St. Martin - directed and worked on various elements and structures
1860-62	Square des Arts et Métiers - the Crimean War column and the two basins
1860-62	Parc Monceau - designed the four entrance grilles, relocated monuments
1860-62	Place du Chatelet - Davioud had major responsibility for this square.[5]

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[1] Sources: Norval White, *Guide to the Architecture of Paris* (New York: Charles Scribner's Sons, 1991) pp. 8, 56, 85, 102, 120, 139, 192, 215, 307, 342, 395, 423; *Historical Dictionary of the French Second Empire 1852-1870*, ed. William E. Echard (New York: Greenwood Press, 1985) pp. 173-174. Davioud's birth year varied between the sources; it's either 1823 or 1824.

[2] Davioud frequently collaborated with Alphand and Barillet-Deschamps, including working on the Bois de Boulogne, the Parc Monceau, the Square de Batignolles and the Parc des Buttes Chaumont.

[3] Done with Antoine Nicholas Bailly (1810-1892).

[4] Davioud moved the Fontaine du Palmier (originally the Fontaine de la Victoire) and built the sphinx pedestal. The sculptor was Françisque Duret.

[5] *Historical Dictionary ... 1852-1870*, p. 173. The entry stated that the Place du Chatelet, including the significant theater buildings, "... most impressively bears his name." White, *Architecture of Paris*, p. 56.

1860-62	Théâtre Impérial (or Cirque Impérial) now the Théâtre du Châtelet
1862	Théâtre Musical de Paris (Théâtre Lyrique) at the place du Châtelet.
1862	Squares Montholon
1862	Place Pigalle - constructed the basins
1862	Square des Batignolles - urban furnishings and the kiosks and vespasiennes
1862	Named to the Legion of Honor
1864	Created the boulevards de Grenelle and de Charonne
1865	Fountaine de la Place François I^{er} at the minor rond-point (roundabout)
1865	Square des Innocents - moved and restored Jean Goujon's fountain
1865-67	Magasins Réunis (now the Magasin Printemps) at place de la République
1866-67	Parc des Buttes Chaumont - Temple de la Sibylle, numerous assorted kiosks and restaurants, and the guardhouses at the gates.
1870-80	Cimitière Père-Laschaises - various tombs and mausolea
1872	Named Inspector General of Buildings for the City of Paris
1874	Fountain de la place André-Malraux, rue Richelieu at the avenue de l'Opéra.
1874	Fontaine de la place Félix Eboué, rue de Reuilly and avenue Daumesnil[6]
1874-78	Fontaine de l'Observatoire
1874-78	Fontaine de place du Chateau d'Eau (now Place Daumesnil)
1878	Palais du Trocadéro, for the Exposition of 1878[7]

Private commissions: Houses (hôtels) on the boulevard Sébastopol and the place St. Michel and apartments on the rue Sainte-Placid (Nos. 36 and 38).

White offered a different name for one of the theaters, calling it the "Théâtre de la Ville de Paris, previously known as the Théâtre Sarah Bernhardt."

[6] White, *Architecture of Paris*, p. 215. The fountain was originally located on place de la République, and moved here in 1883. White stated that, "Davioud's work up close is delightful, those thirst-quenching lions spouting relentlessly."

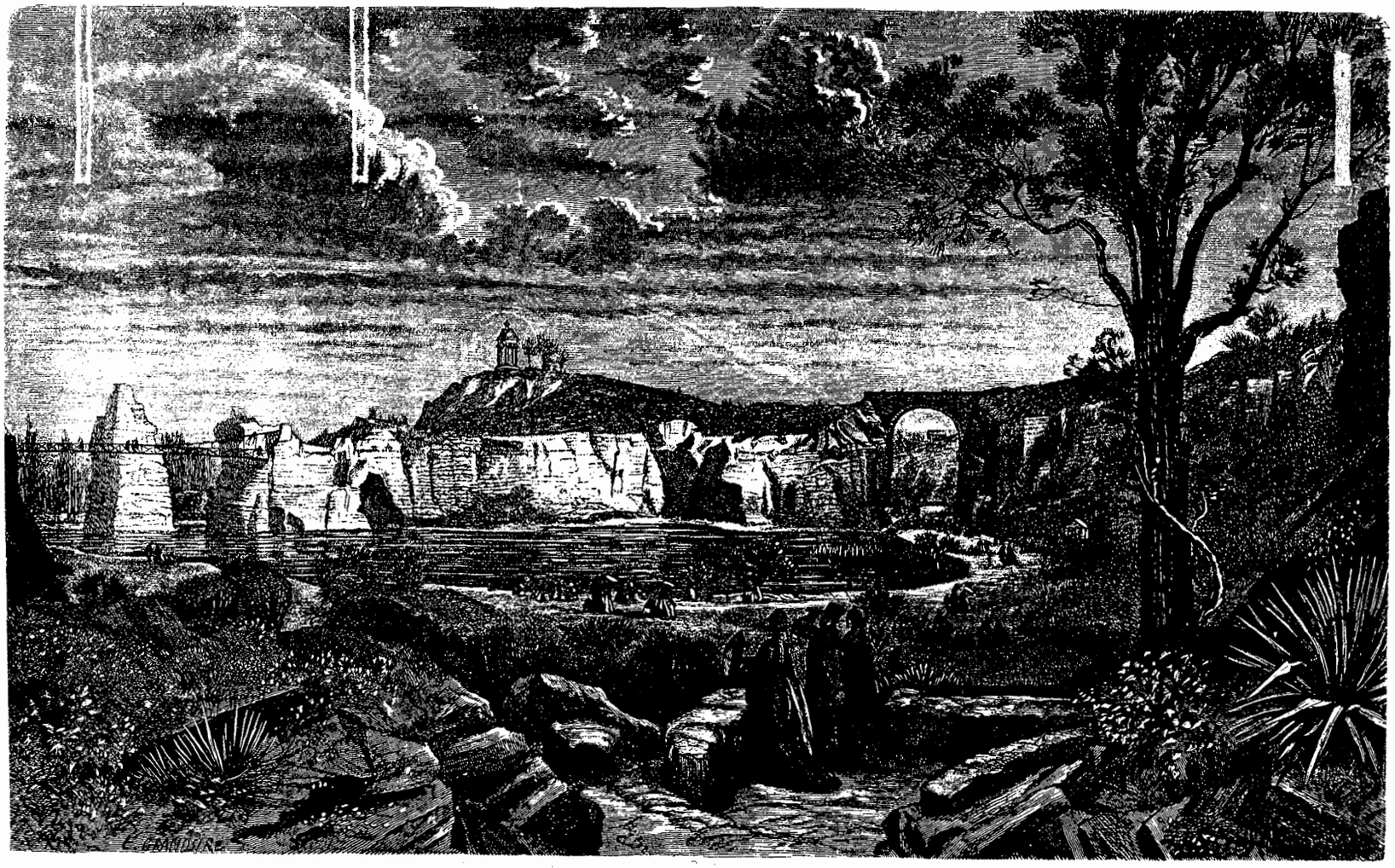
[7] Done with Jules Désiré Bourdais (b. 1835).

APPENDIX D

Partial Plant List - Trees in the Parc des Buttes Chaumont[1]

Latin (botanical) name	Common Name	Region/country of origin
Aeschylus hippocastanum	Horse Chestnut	Southern Europe
Ailanthus glandulosa	Tree of Heaven	China (probably)
Alanus glutinosa imperialis	European Alder, sp.	Not available
Aracaria auracana	Monkey Puzzle Tree	Chile
Cedrus libani	Cedar of Lebanon	Asia minor
Corylus colurna	Turkish Filbert Tree	Southeastern Europe
Ginko biloba	Ginkgo or Maidenheair	China
Gymnocladus dioicia	Kentucky Coffee Tree	Eastern United States
Koelreuteria paniculata	Golden Rain Tree	China, Korea, Japan
Liriodendron tulipifera	Tulip Tree	Eastern United States
Maclura aurantiae	Osage Orange	Not available
Magnolia grandiflora	Southern Magnolia	Southern United States
Micocoulier austral	Australis	Not available
Platanus acerifolia	London Plane Tree	Great Britian/United States
Poncirus trifoliata	Hardy Orange	China or Japan
Prunus serrulata	Oriental Cherry	Japan
Pyrus salicifolia	Willowleaf Pear	S.E. Europe/Western Asia
Sophora japonica	Japanese Pagoda Tree	Japan
Taxus baccata adpressa	English Yew	Great Britain
Ulmus campestris	English Elm	Great Britain/Western Europe
Zanthoxylum alatum planispinum	Prickly Ash	Not available.
Zelkova crenata	Elm zelkova	Japan

[1] This information is based on field work and a map hung as a visitor's guide in the Parc in 1984. The Latin name and country of origin have been derived from Donald Wyman, *Wyman's Gardening Encyclopedia, revised and expanded edition* (New York: Macmillan Publishing Co., Inc., 1977).

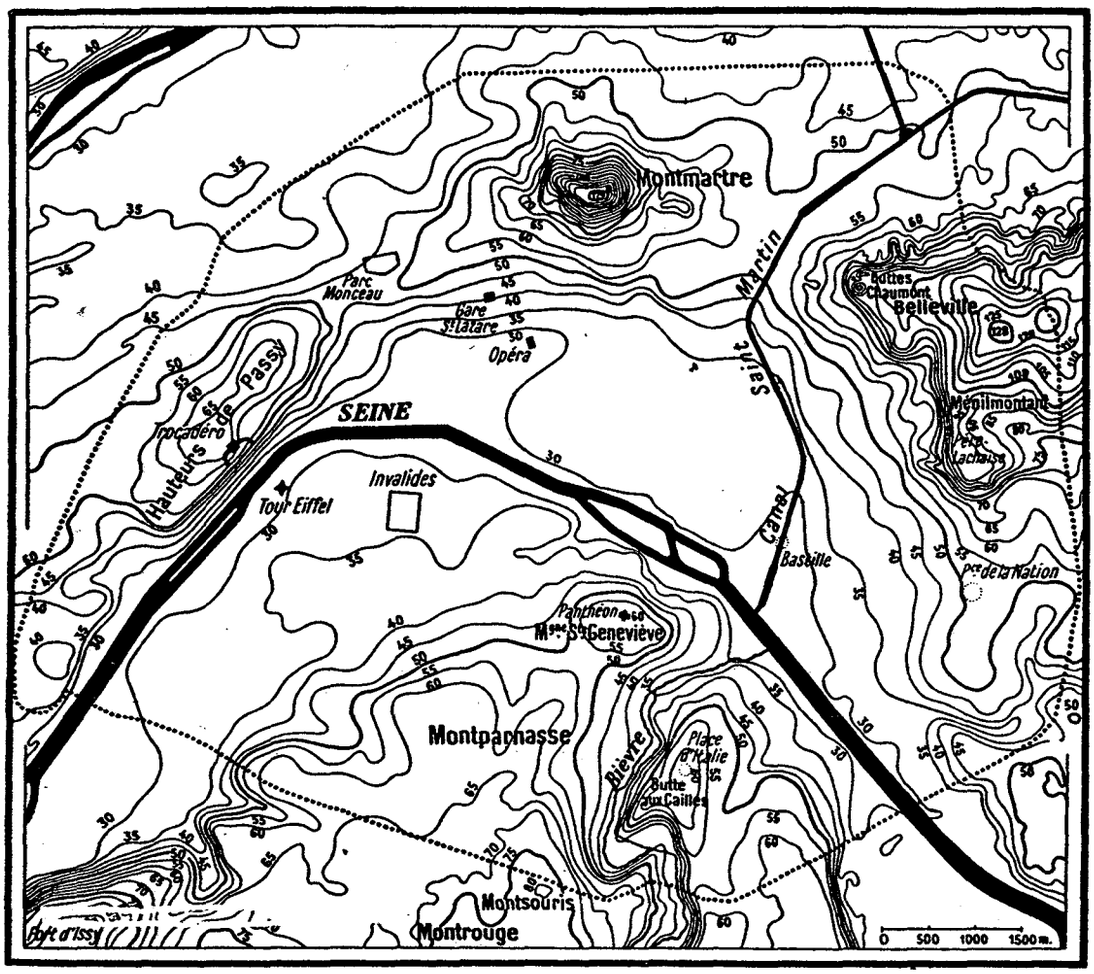


E. GRANDSIRE, DEL. J. CLAYE, TYP. J. ROTHSCHILD, ÉDIT.

PARC DES BUTTES CHAUMONT. — VUE DES FALAISES.

Figure 1

Figure 2

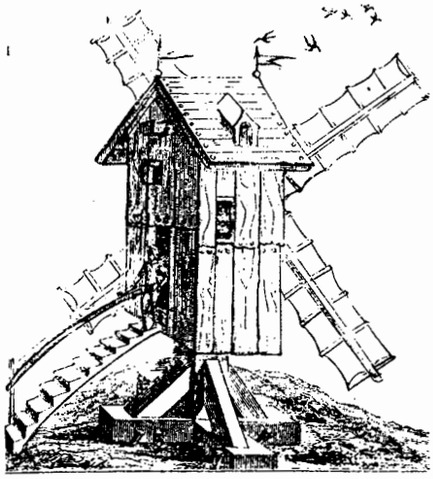


Le site de Paris. —Au centre, la vallée de la Seine, avec sa large plaine alluviale, où parfois encore les grandes crues inondent les quartiers bas. Au Sud, on voit les plateaux de rive gauche, qui portent le quartier Latin, le quartier de Montparnasse, le quartier de la place d'Italie et que traverse la Bièvre, s'avancer jusqu'aux rives de la Seine qu'ils dominent par des pentes assez raides (montagne Sainte-Geneviève). Au Nord, on voit se détacher nettement dans le relief les buttes et les collines de la rive droite (Belleville, Montmartre, Passy). Entre Montmartre et Belleville s'enfonce le col où passent le canal Saint-Martin, ainsi que les lignes de chemins de fer du Nord et de l'Est.

Figure 3


CARTE DE RÉFÉRENCE N° 2
CROQUIS OROGRAPHIQUE DE PARIS
(équidistance des courbes de mètre en mètre)
(d'après les cartes du Service de l'Inspection Générale des Carrières 1/5000)
0 500 1000 m
SEINE
BOIS
NEUILLY-SUR-SEINE
VANVES
MALAKOFF
ISSY-LES-MOULINEAUX

Figure 4



1 Moulin à vent à cage de bois, monté sur pied de bois comme on en rencontrait sur les collines bellevilloises aux XVII^e^ *et* XVIII^e^ *siècles.*

2 Manesson-Mallet a dessiné, en 1702, cette vue générale des moulins à vent de la Butte de Chaumont. On aperçoit au pied de la butte l'hôpital Saint-Louis. Sur la butte, de gauche à droite : le moulin Maquereau, le Moulin Vieux, les moulins de la Folie, de la Carosse, de la Tour de Chaumont, le Grand Moulin, et le moulin de la Chopinette.

Figure 5

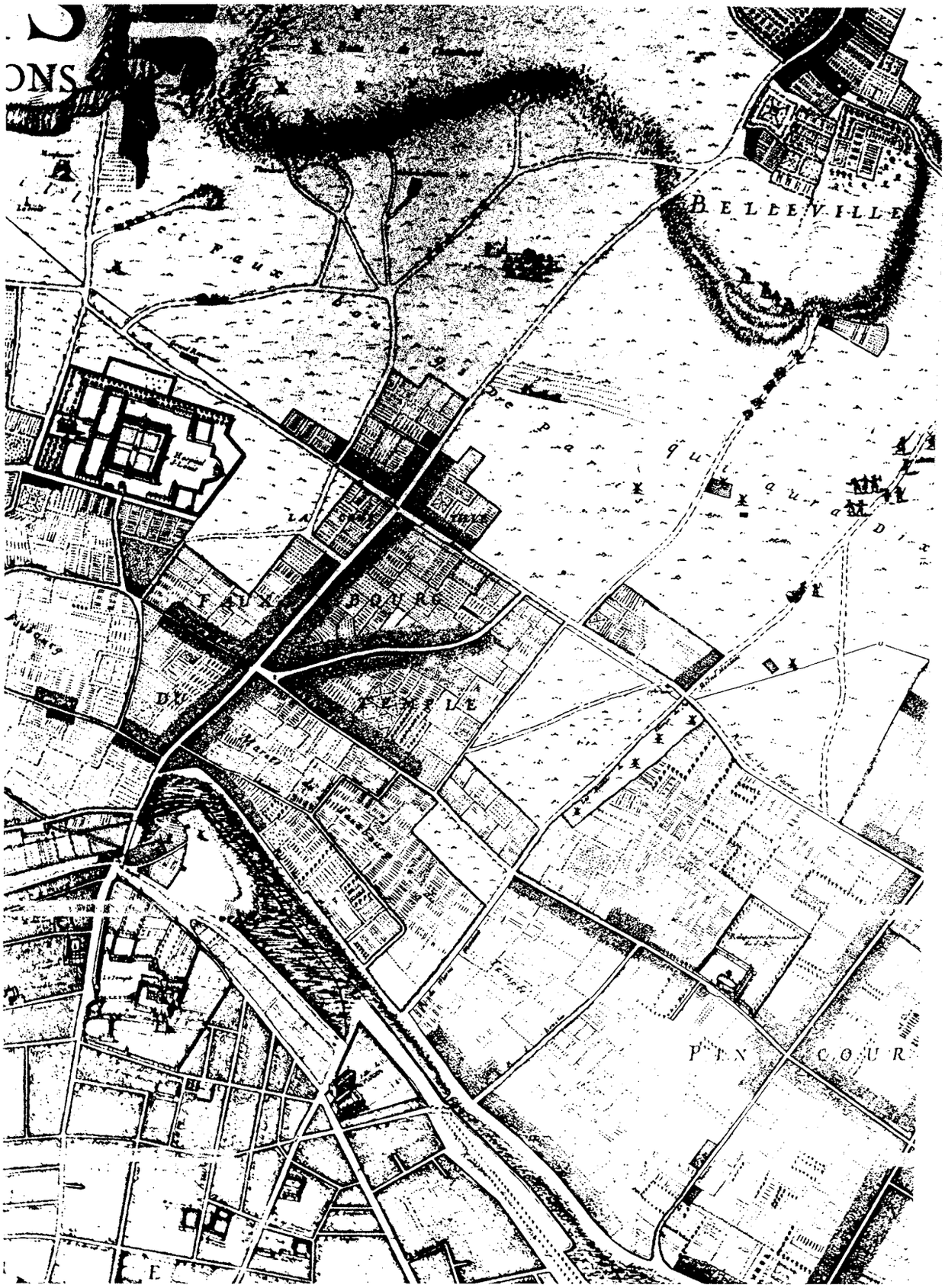


Figure 6

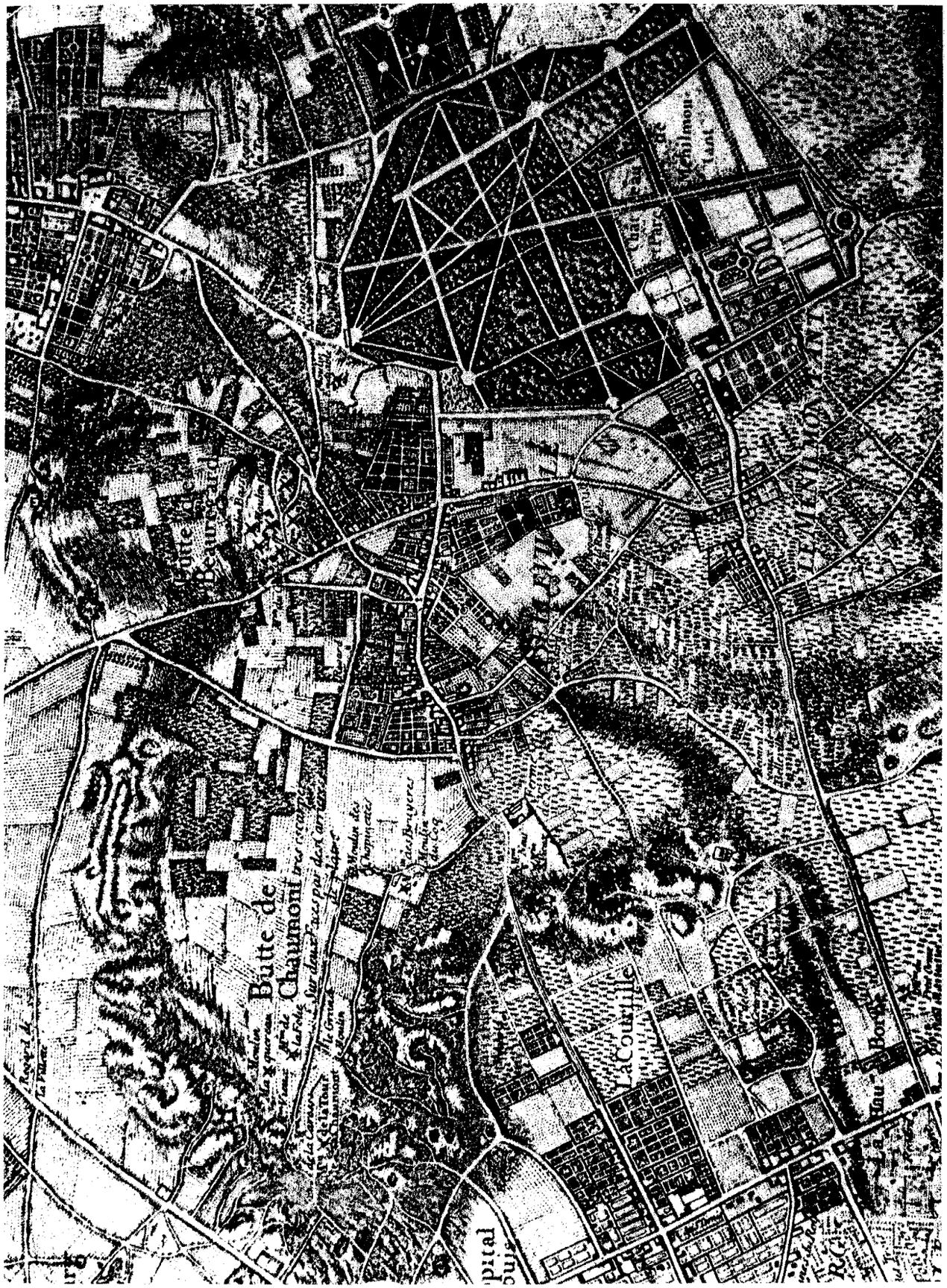


Figure 7

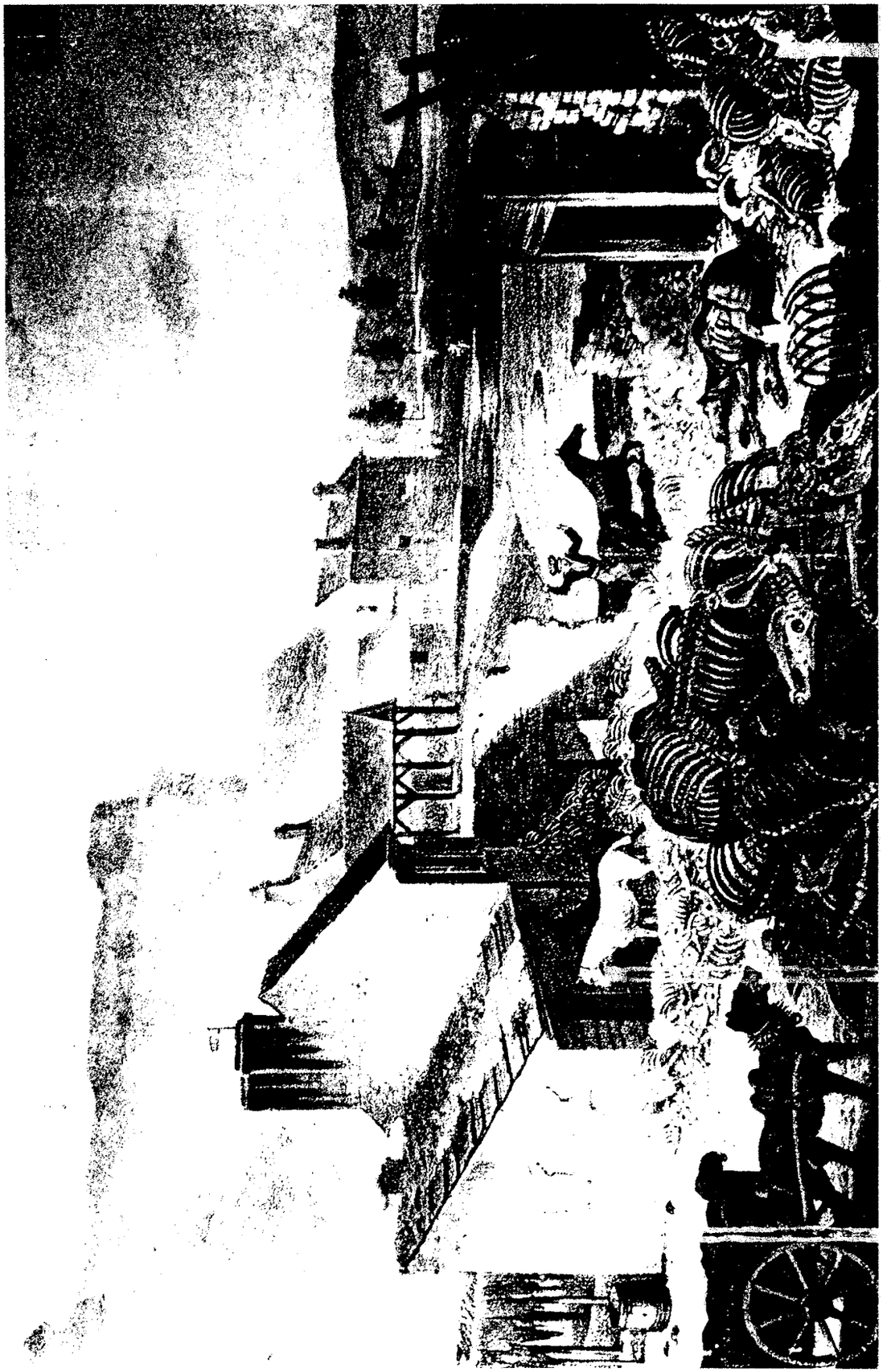


Figure 8

L'aménagement du parc des Buttes-Chaumont lors de la visite de Napoléon III à Belleville, le 28 juin 1865. Sur la butte rocheuse et déserte allait prendre place deux ans plus tard, le Belvédère.

Figure 9

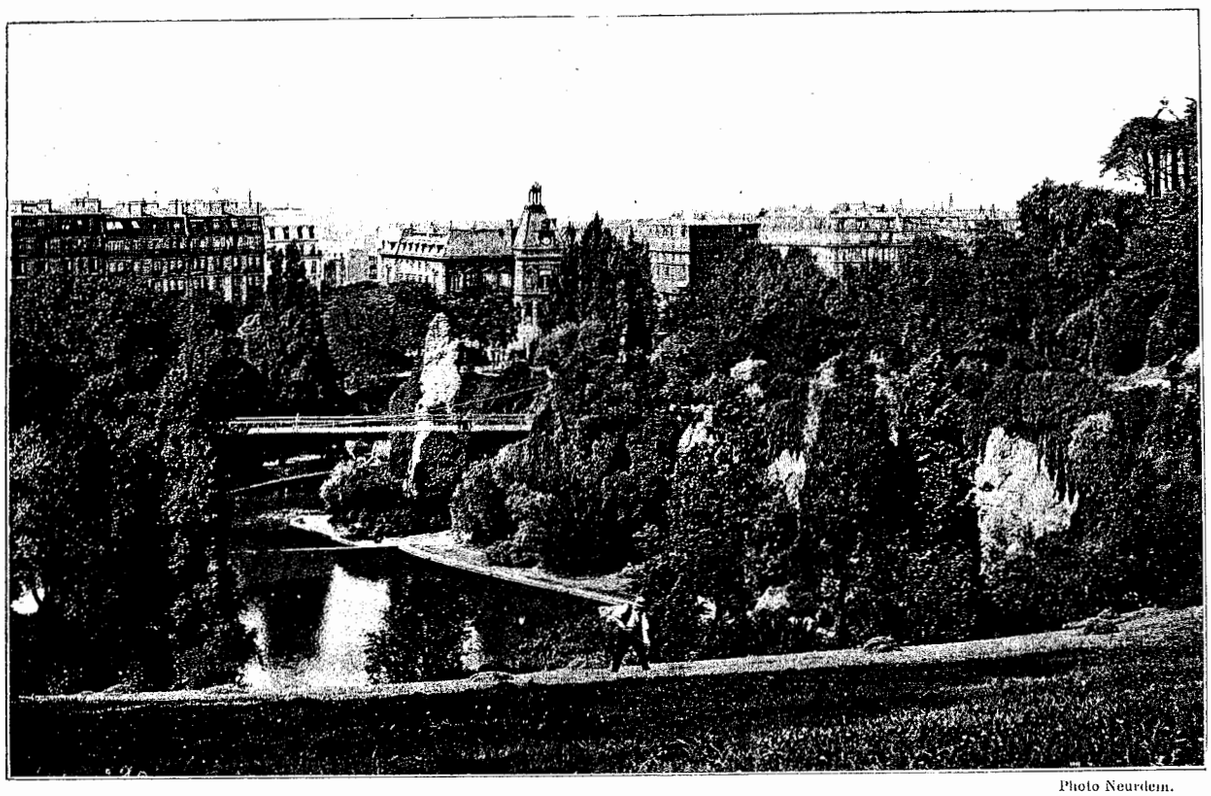


Photo Neurdein.

BUTTES-CHAUMONT. — LE PONT SUSPENDU, L'ILE ET LE BELVÉDÈRE

Figure 10

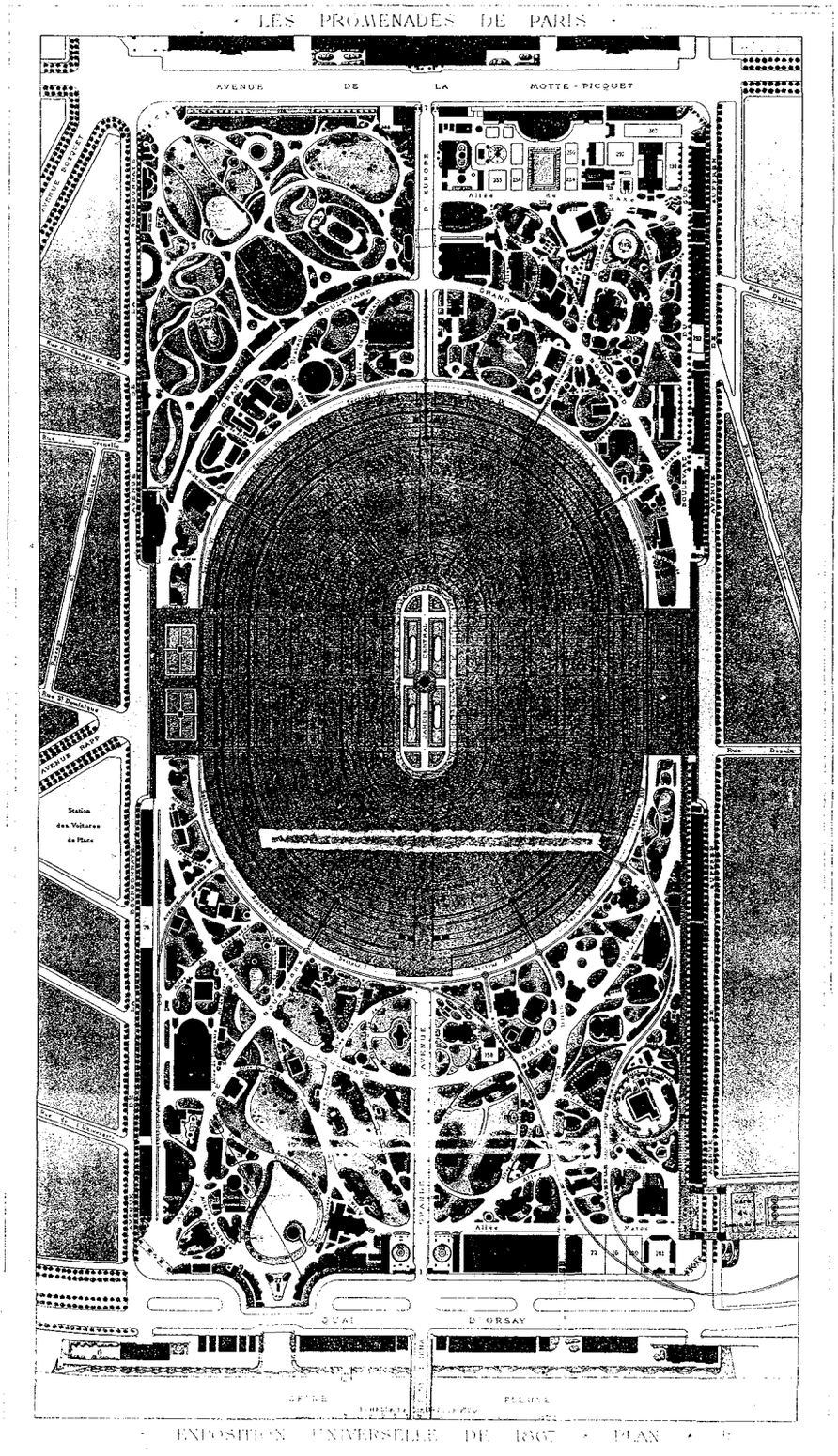

LES PROMENADES DE PARIS
AVENUE DE LA MOTTE - PICQUET
Station des Voitures de Place
QUAI D'ORSAY
EXPOSITION UNIVERSELLE DE 1867 - PLAN

Figure 11

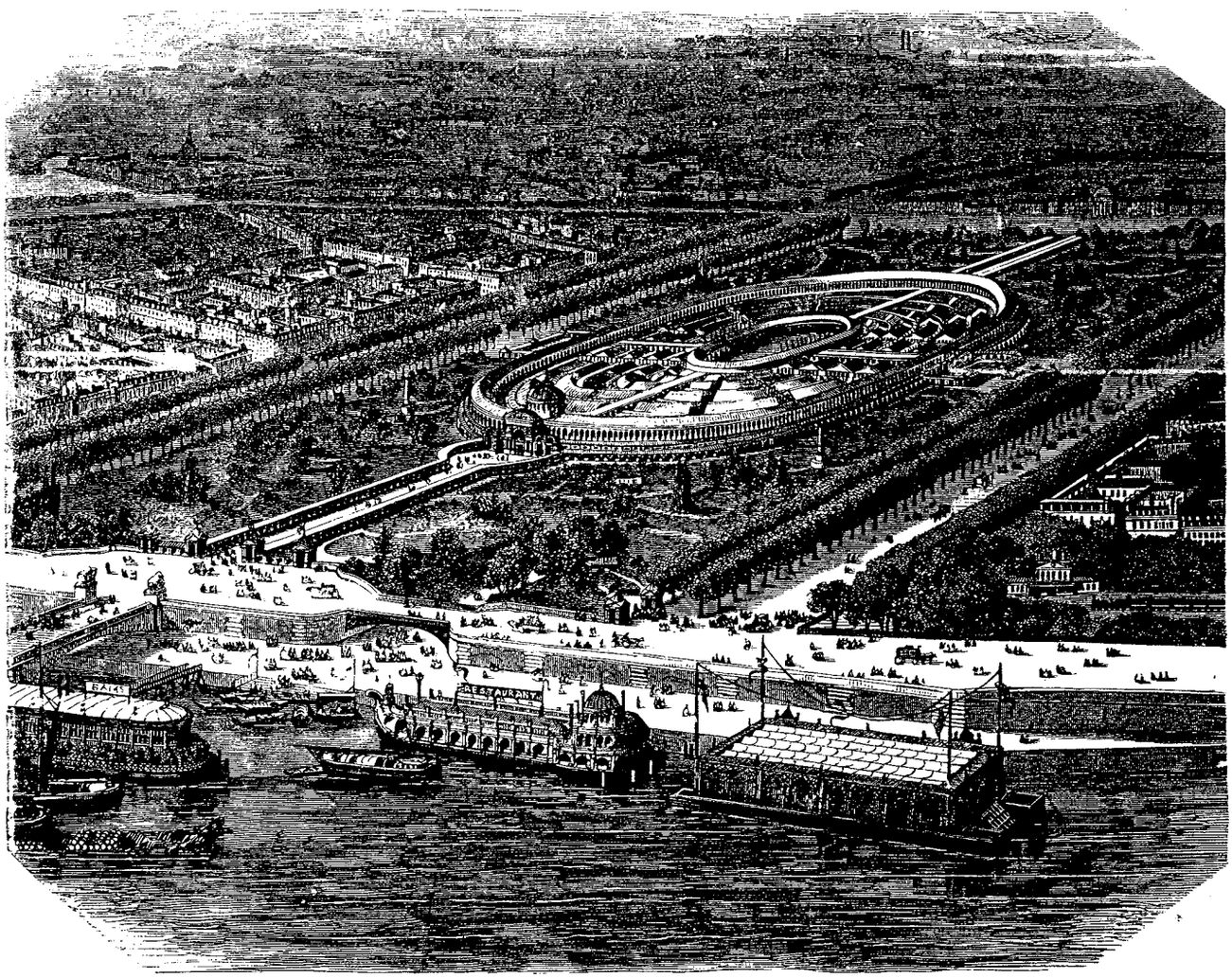


Figure 12

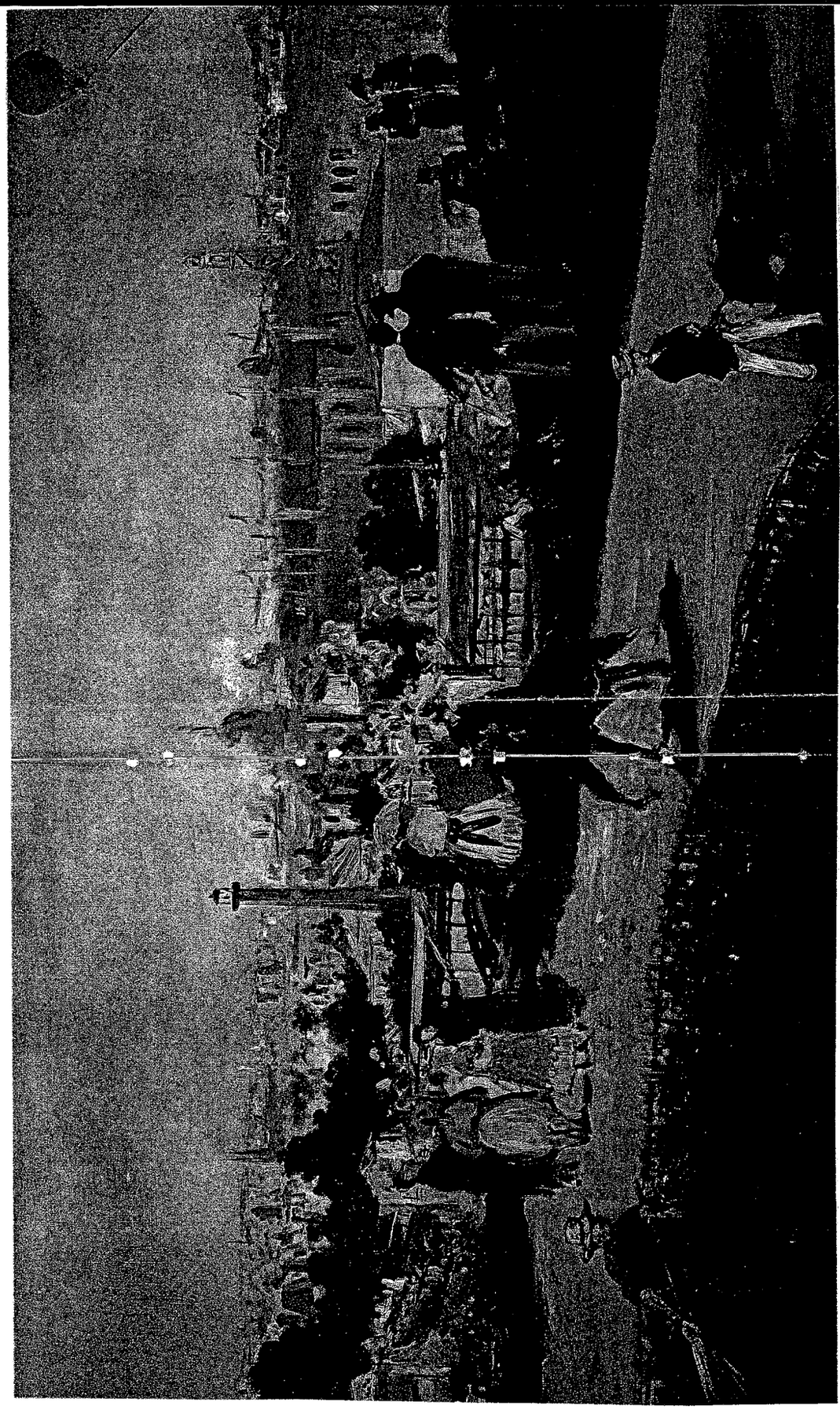


Figure 13

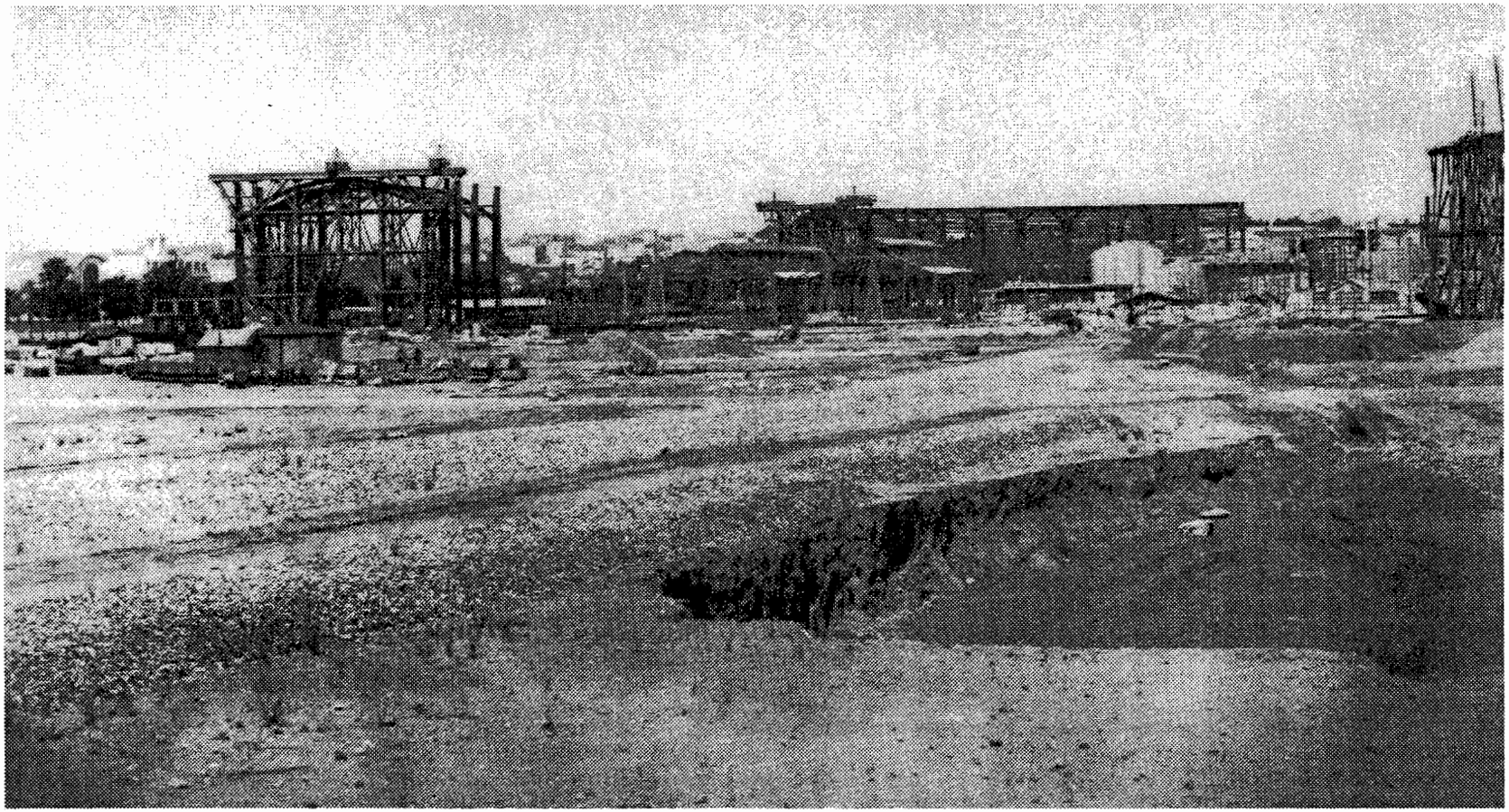


Figure 14

fig 3.[10]

P. Petit, from the *Photographic Album of the Building of the Universal Exposition of 1867*, June 27, 1866 (Bibliothèque Historique de la Ville de Paris, Paris)

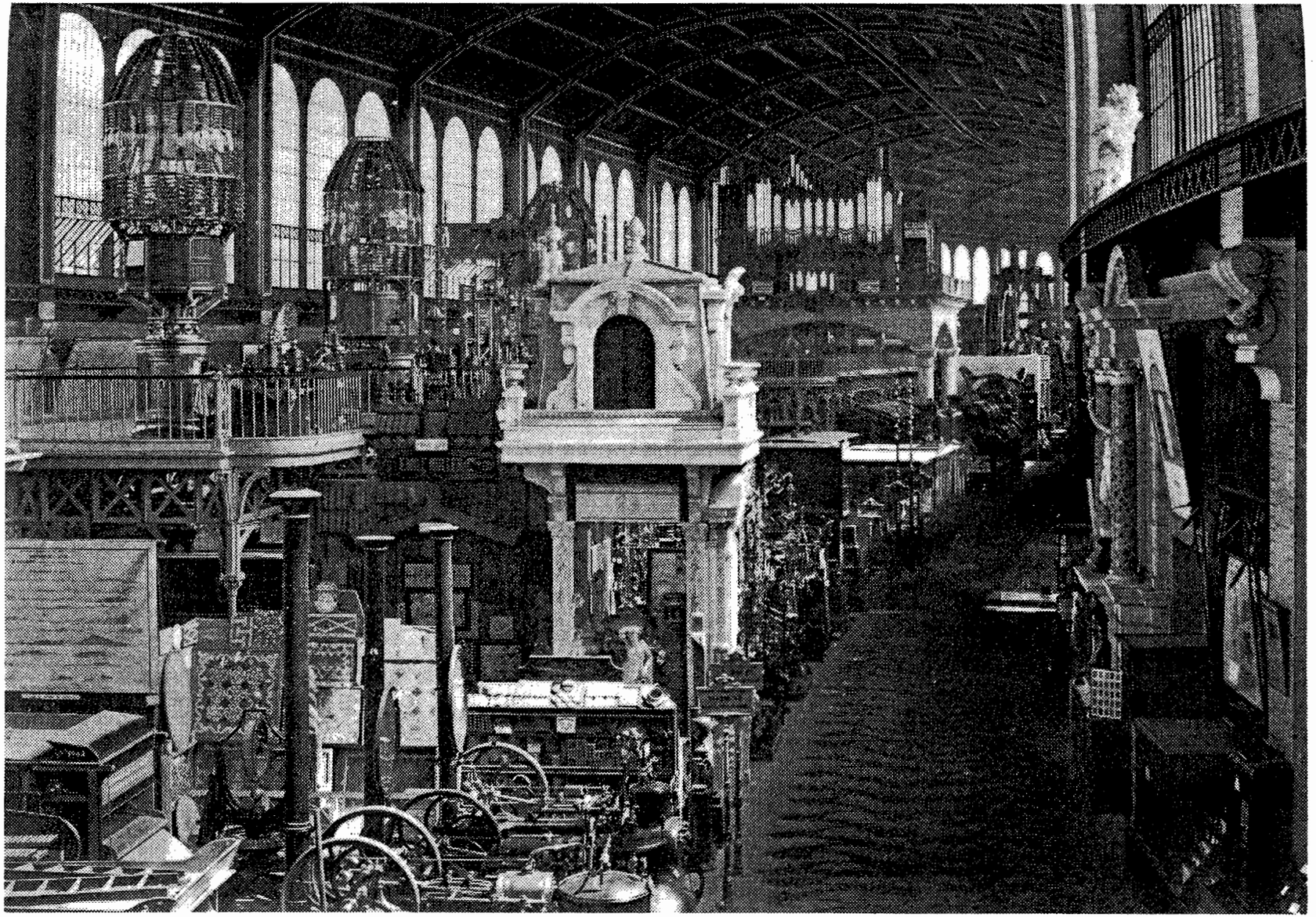
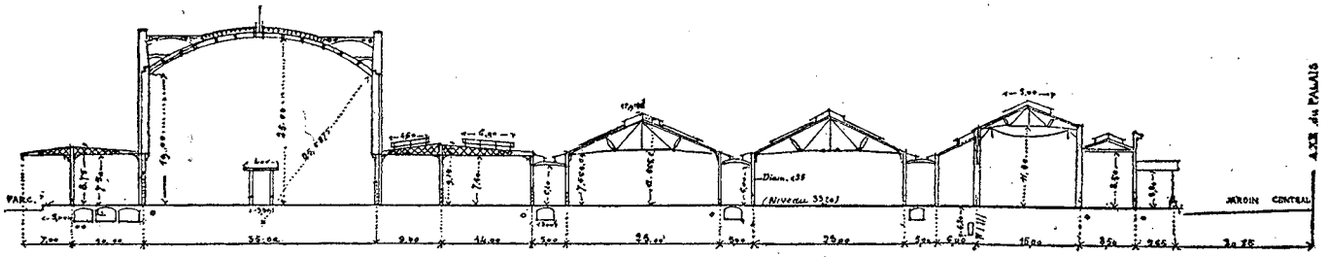


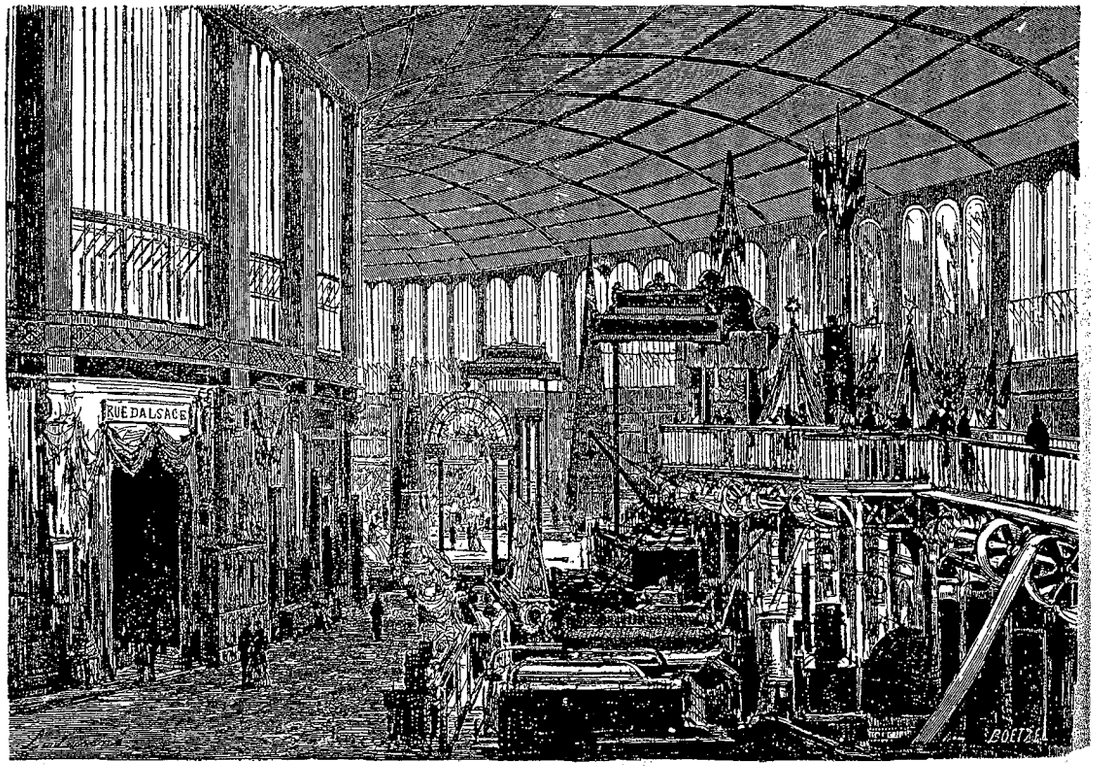
Figure 15

fig 2.[1]

Bisson Brothers, (Louis-Auguste, Auguste-Rosalie), 1867, *Universal Exposition, Hall of Exhibitions* (Bibliothèque Nationale, Paris)



115. International Exhibition, Paris, 1867. *Section of the galleries of the main building. Seven concentric galleries were placed within the elliptical main building; the Galerie des Machines was twice the height and width of the others.*



116. International Exhibition, Paris, 1867. *Galerie des Machines. The entire span of thirty-five meters was achieved without visible tie bars.*

Figure 16

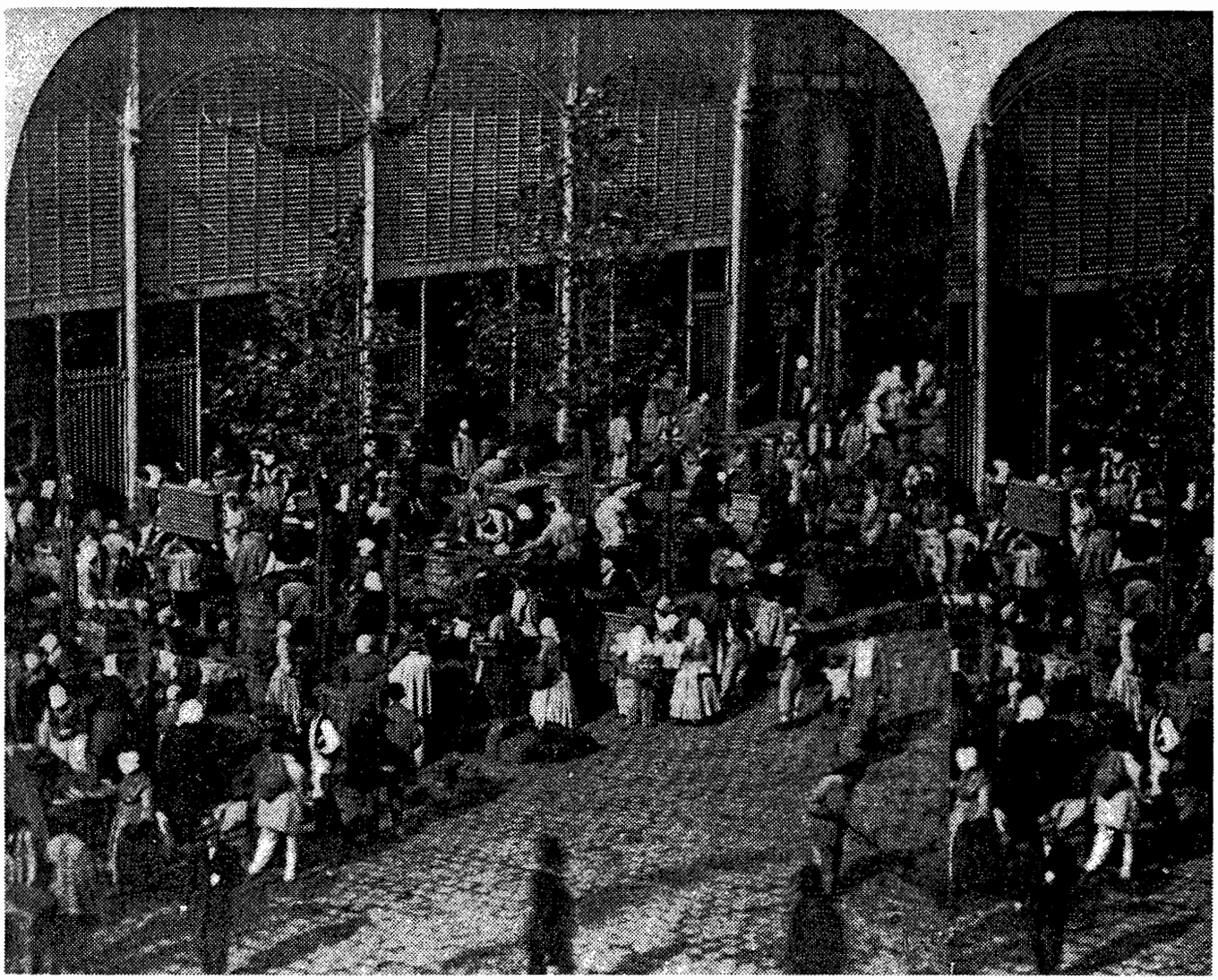


fig 6.[15]

H. Jouvin, *Group of Merchants from Les Halles,* 1860s, stereocard (Bibliothèque Nationale, Paris)

Figure 17

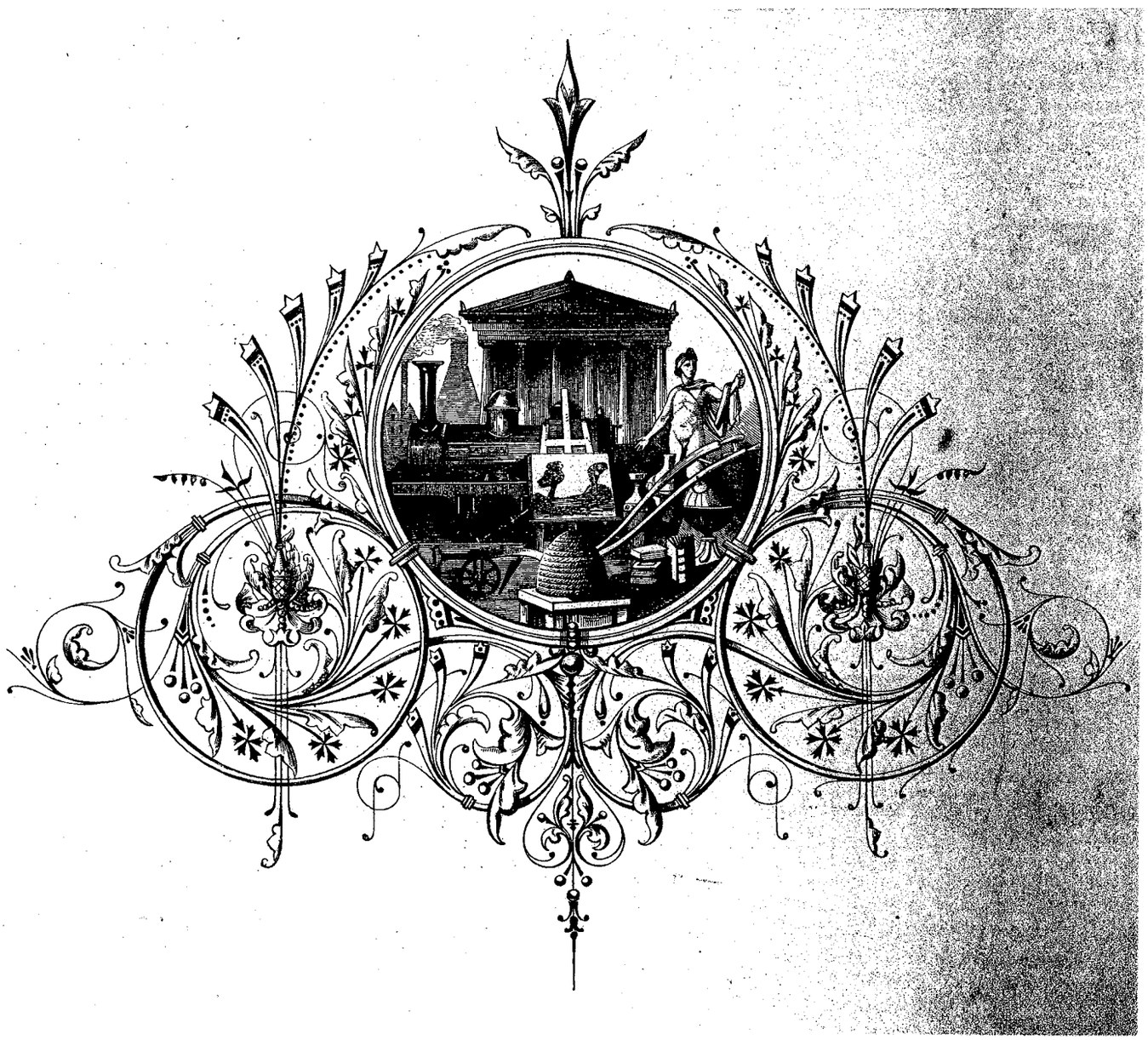


Figure 18

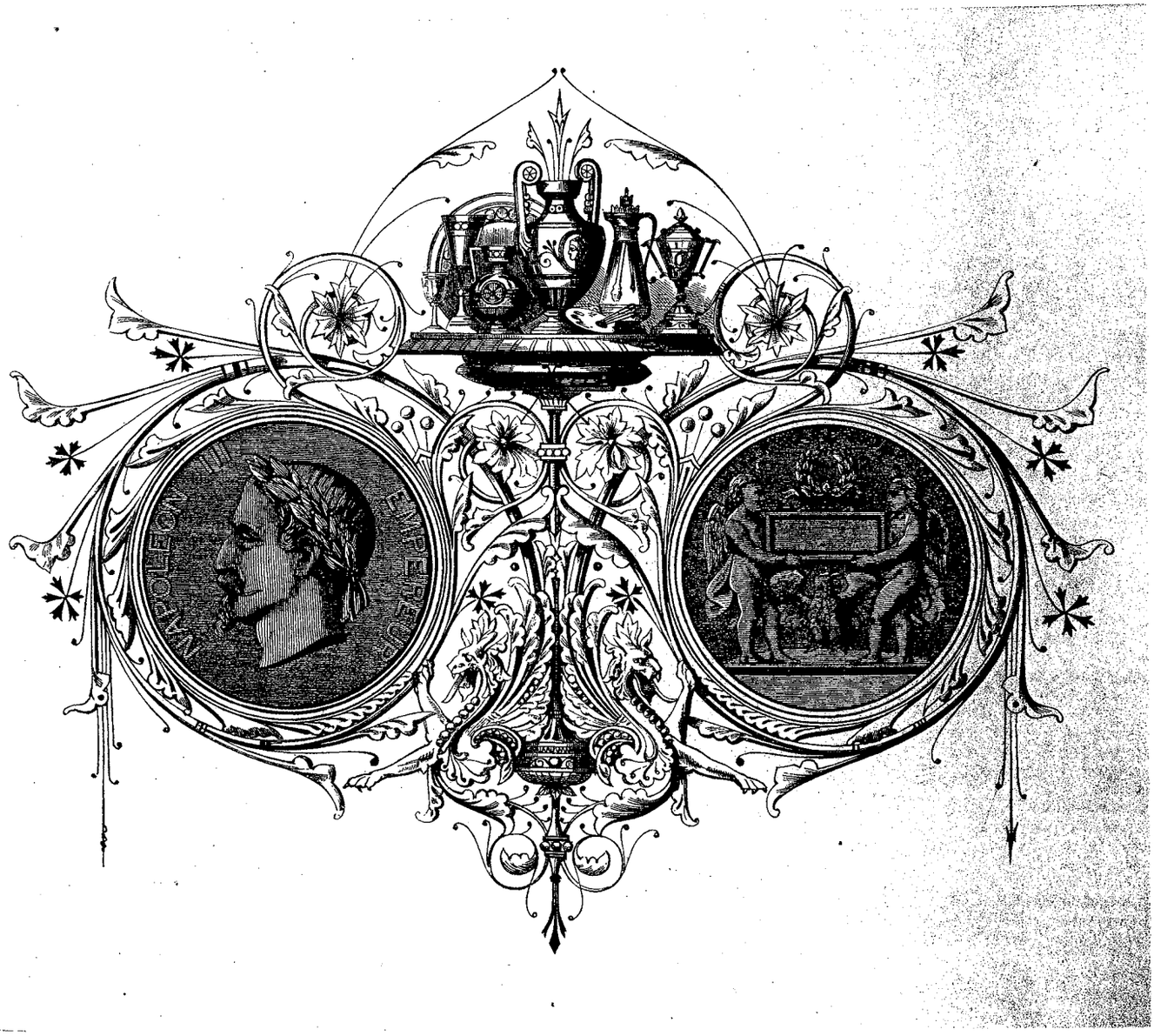
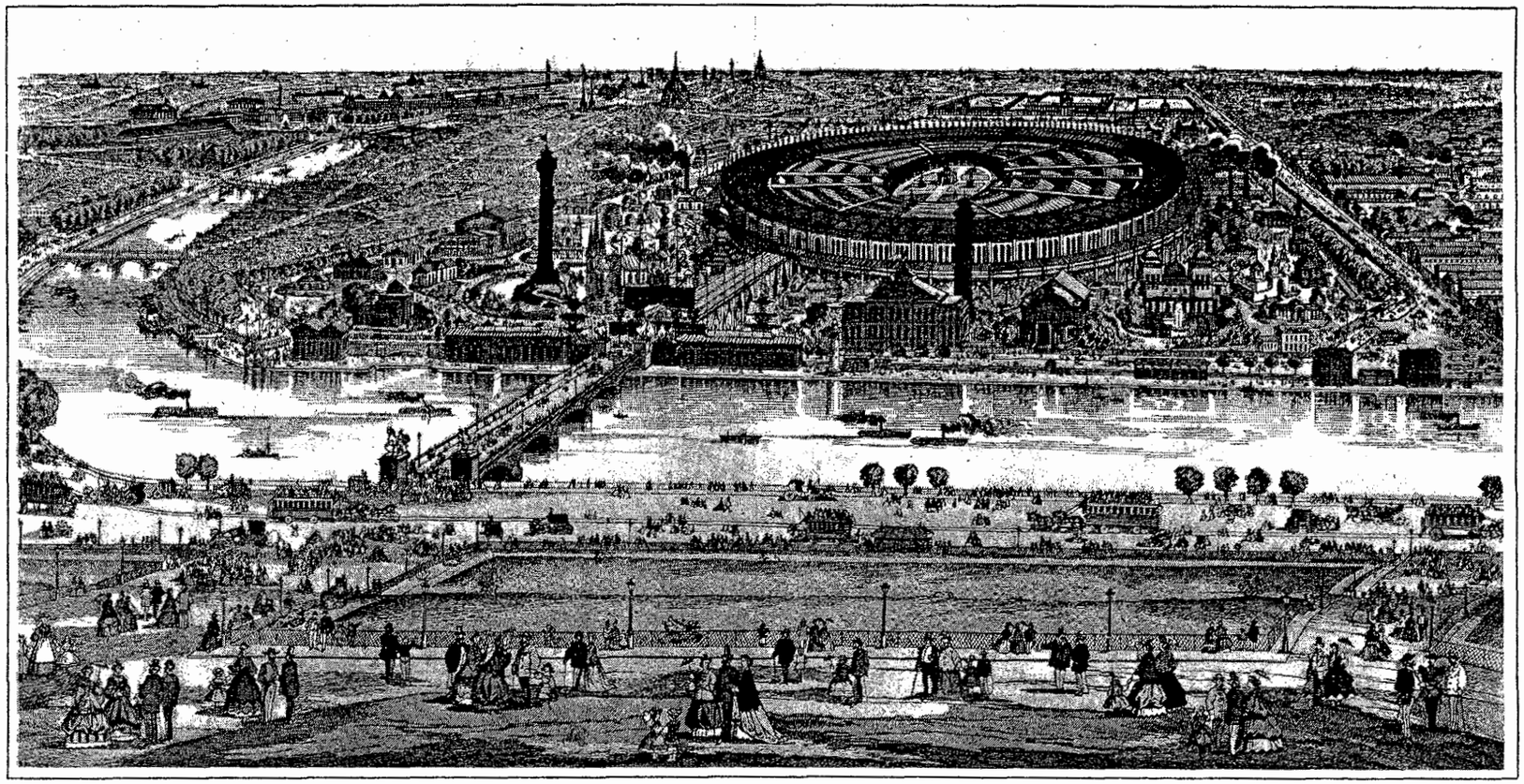


Figure 19



87. Pinot et Sagaire, *General View of Paris and of the Universal Exposition of 1867*, Epinal print. Bibliothèque Nationale, Paris.

Figure 20

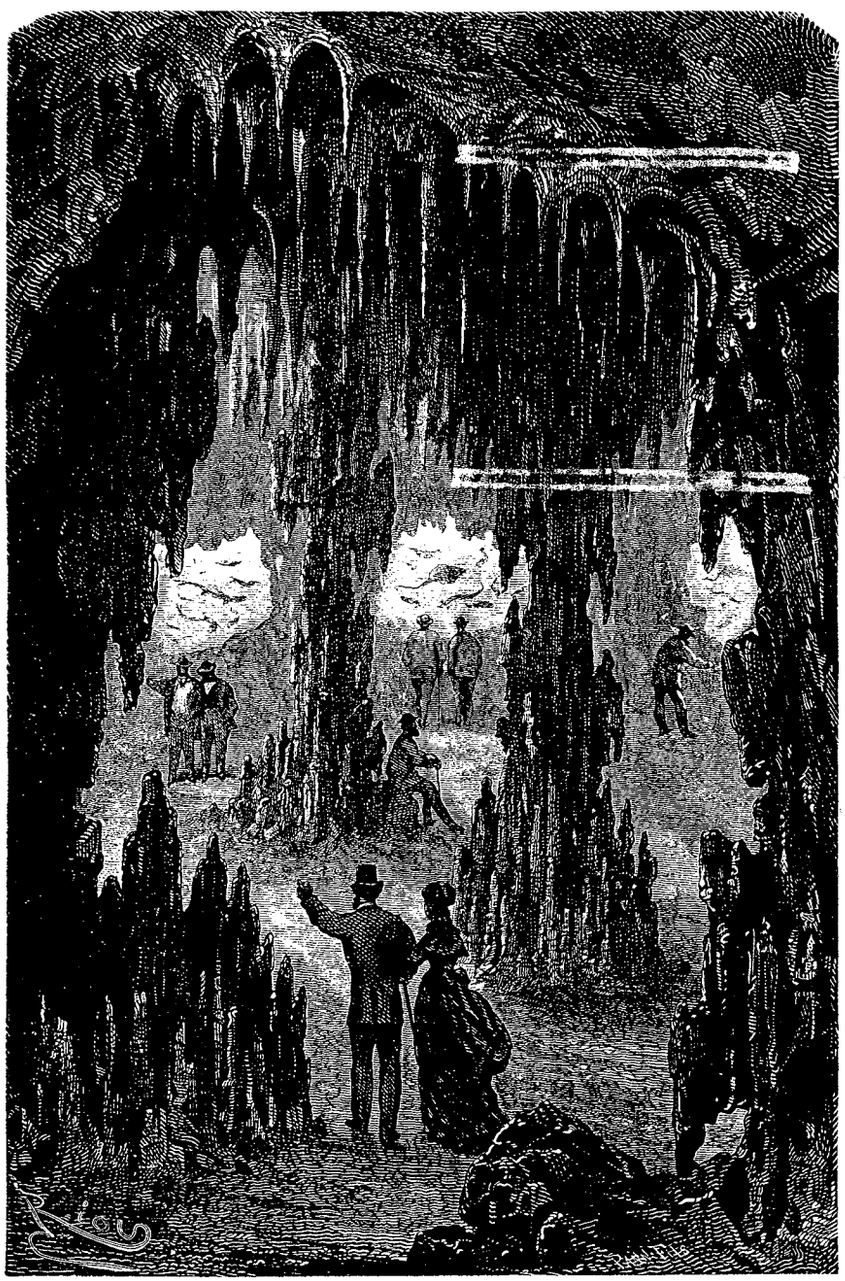
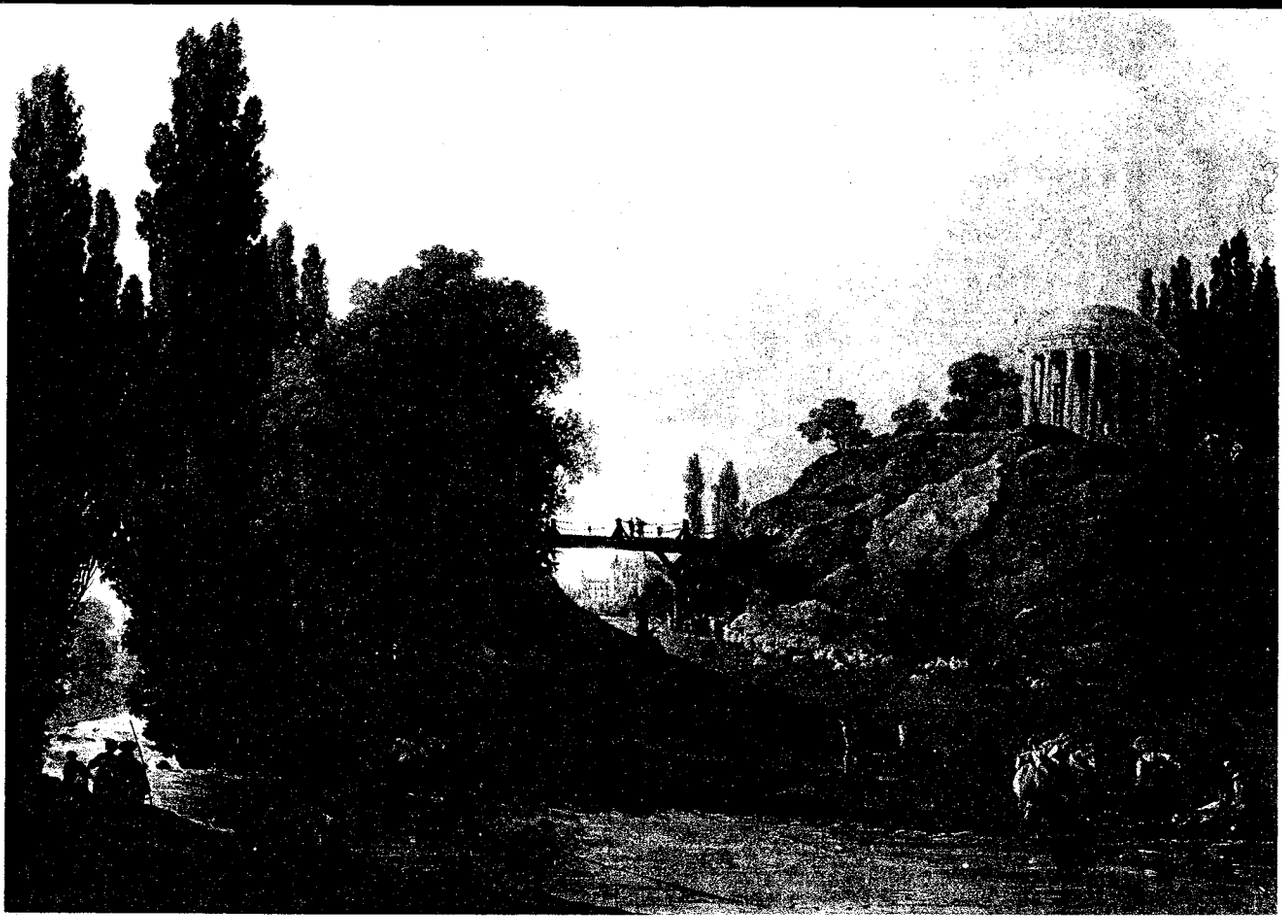
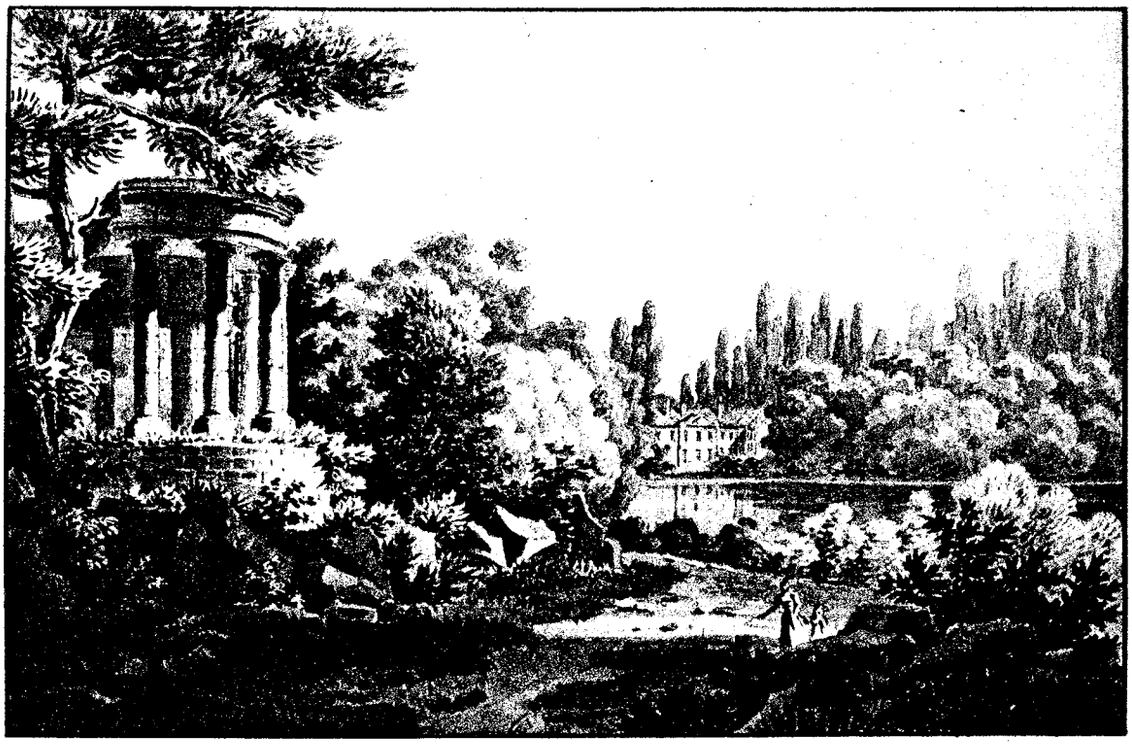


Fig. 294. — Grand aquarium de l'Exposition universelle de 1867.

Figure 21



113 Méréville, view of temple and château. Painting by Hubert Robert, after 1786. Private collection



72 Ermenonville, Temple of Modern Philosophy. Wash drawing by S. Gobelain. Bibliothèque Nationale, Paris **Figure 22**

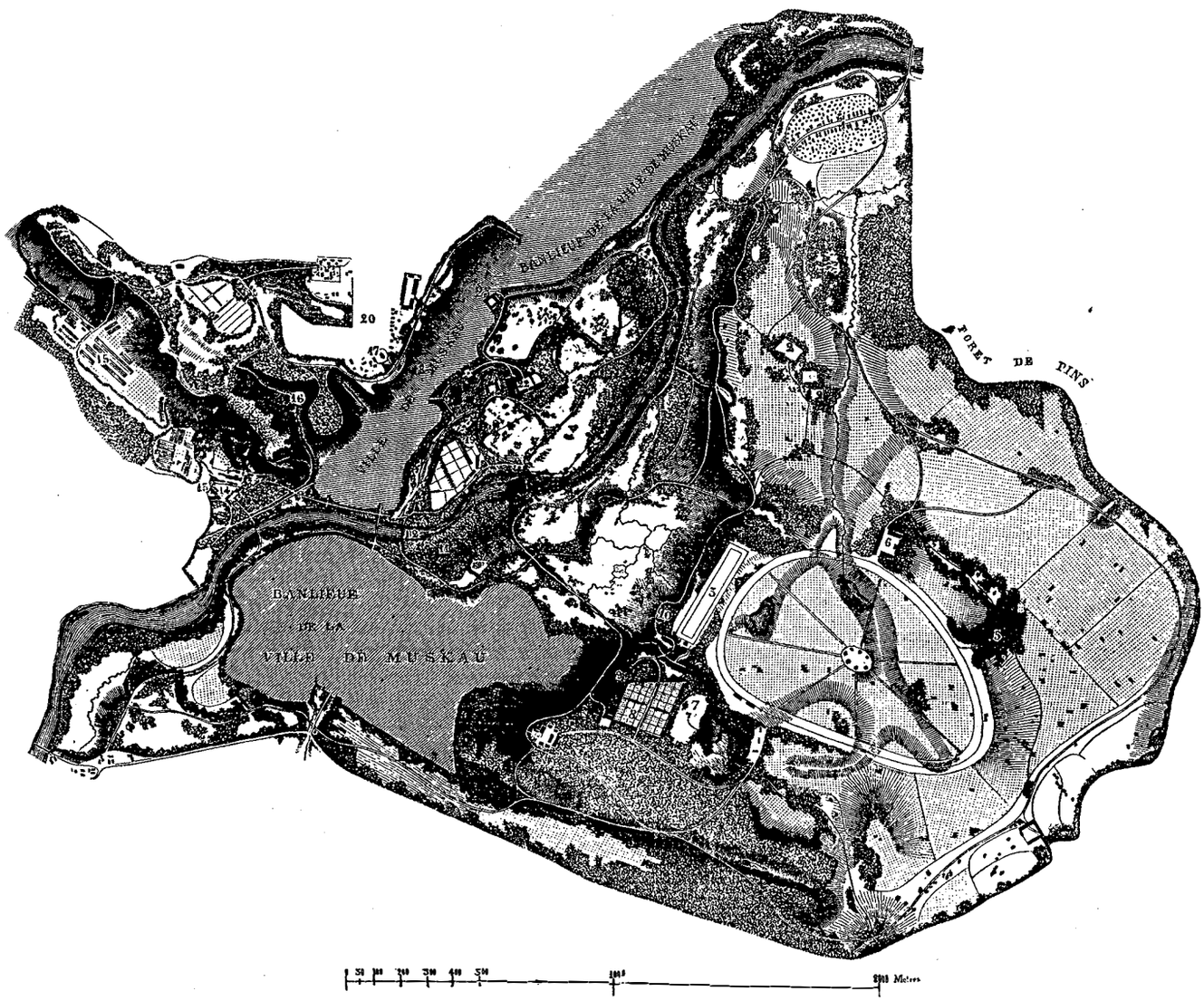
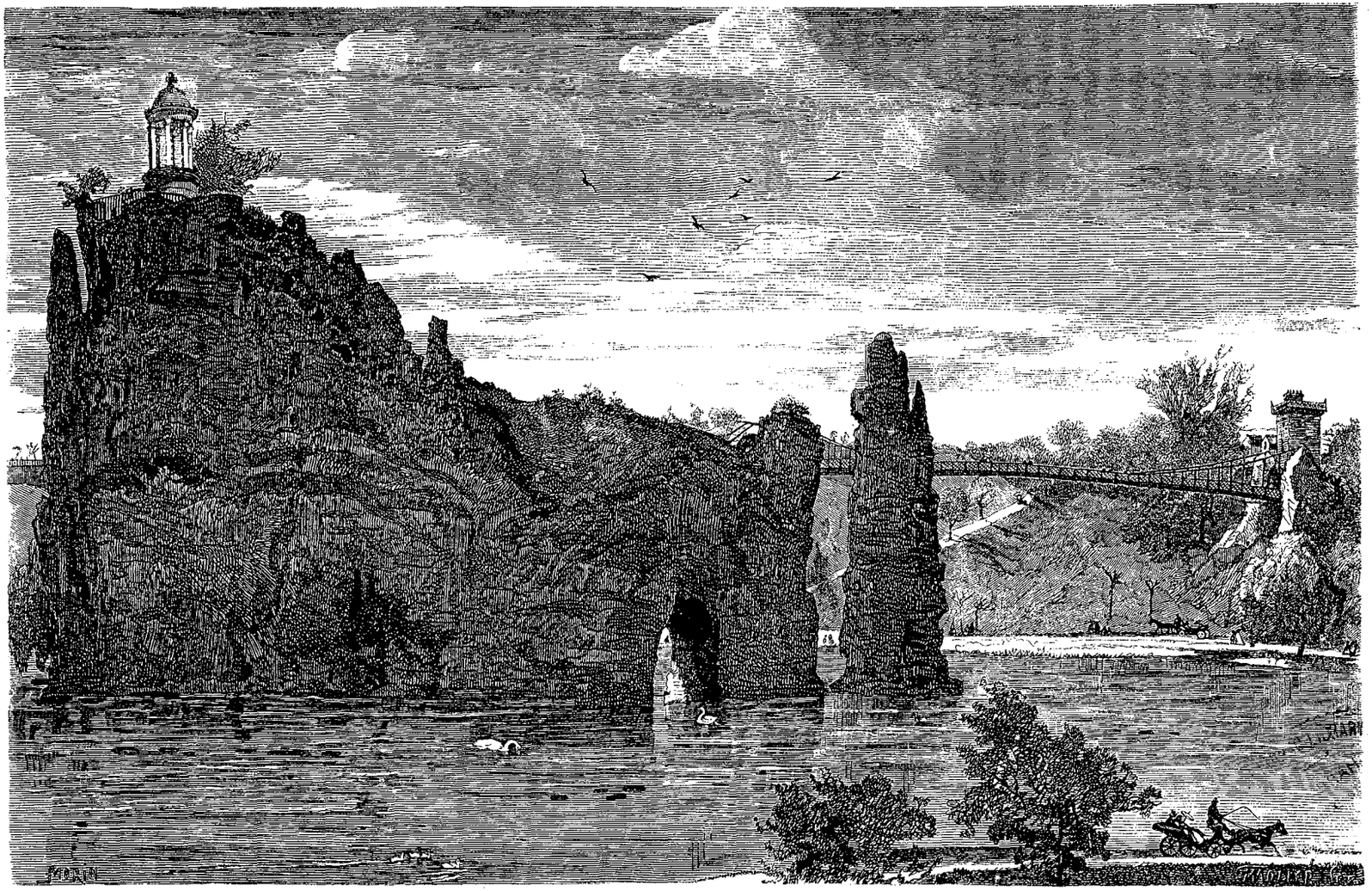


Fig. 95*. — Parc de Muskau, d'après un Plan dressé par le Prince Pückler-Muskau.

1. Village.
2. Colonie.
3. Manége.
4. Steeple-
5. Pièce d'eau.
6. Bergerie.
7. Colonie d'ouvriers.
8. Pépinière.
9. Tombeau.
10. Chapelle.
11. Faisanderie.
12. Rivière.
13. Château.
14. Bains.
15. Mines.
16. Manége.
17. Ruine.
18. Maison Vendéenne.
19. Orangerie.
20. Village Berg.
21. Château.
22. Théâtre.
23. Hôtel.
24. Huttes de pêcheurs.
25. Bains de rivière.

Figure 23



PARC DES BUTTES CHAUMONT — VUE DONNANT SUR LE LAC.

Figure 24

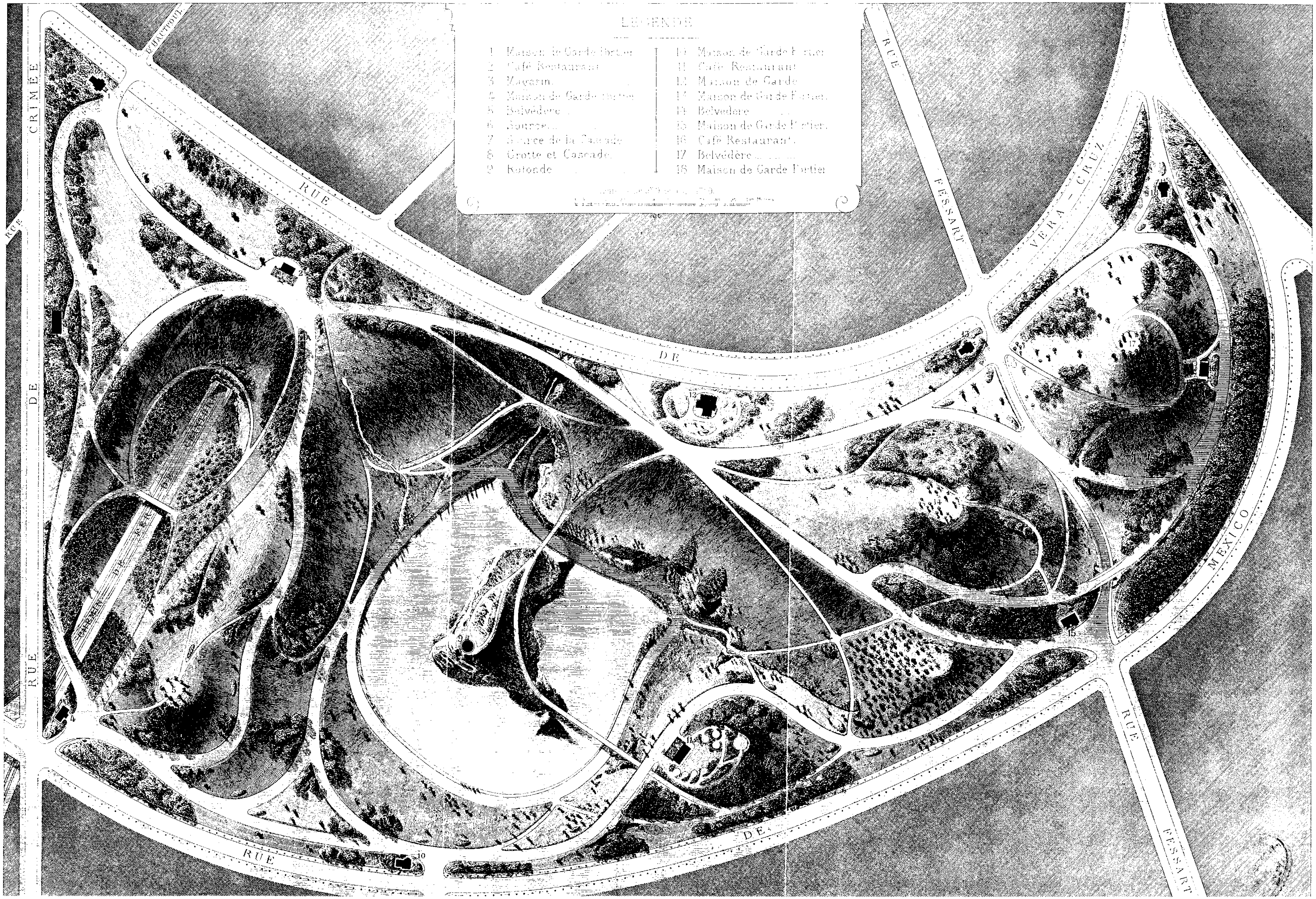

LEGENDE
2 Café Restaurant
3 Magasin
5 Belvédère
8 Grotte et Cascade
9 Rotonde
11 Café Restaurant
12 Maison de Garde
14 Belvedere
16 Café Restaurant
17 Belvédère
18 Maison de Garde Portier
RUE DE CRIMÉE
RUE D'HAUTPOUL
RUE DE MEXICO
RUE FESSART
VERA-CRUZ
RUE FESSART
RUE DE

Figure 25

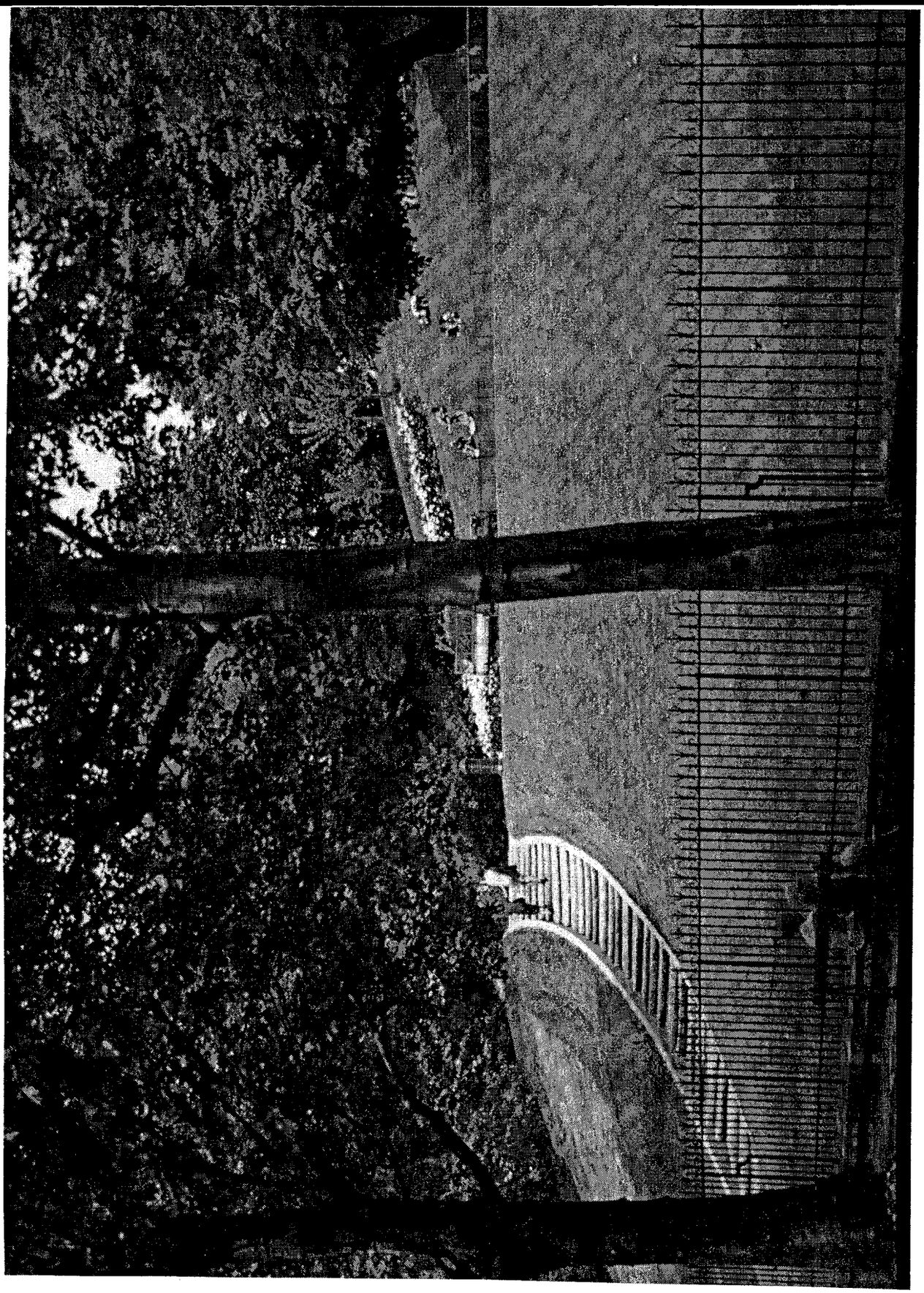


Figure 26

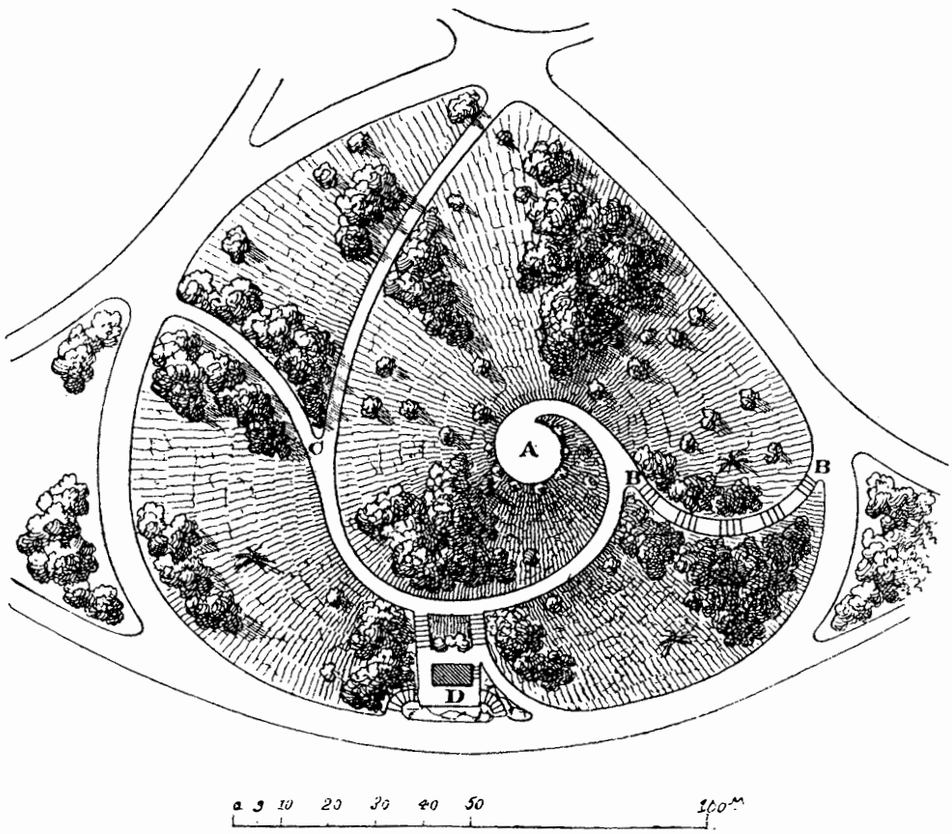


Fig. 164. — Sentiers escarpés du parc des Buttes-Chaumont. Belvédère du sud/ouest.
Footpaths steep

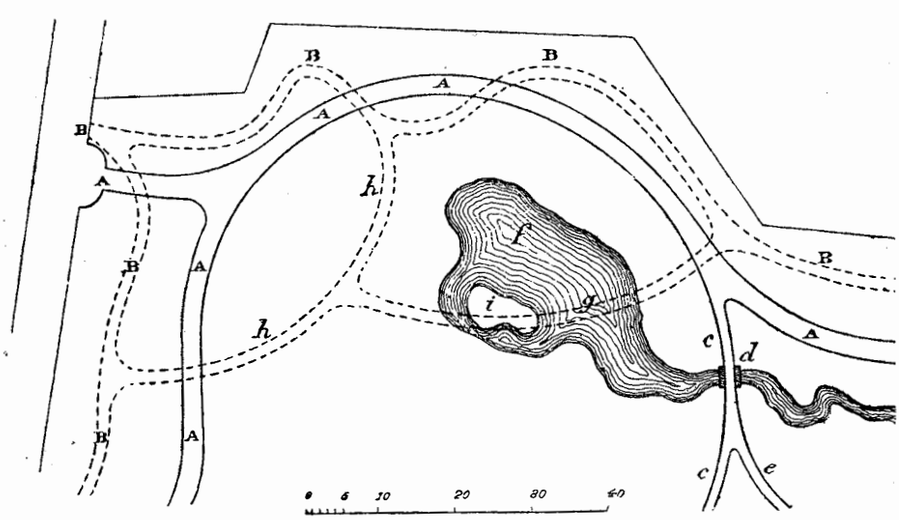


Fig. 144. — Allées de ceinture. — Bon tracé (A *ce*) et mauvais tracé (B *hg*.)

Figure 27

Dessin de siège en racine,
de Darly, 1754.
Londres, Victoria & Albert Museum.
© Bibliothèque Forney, Paris

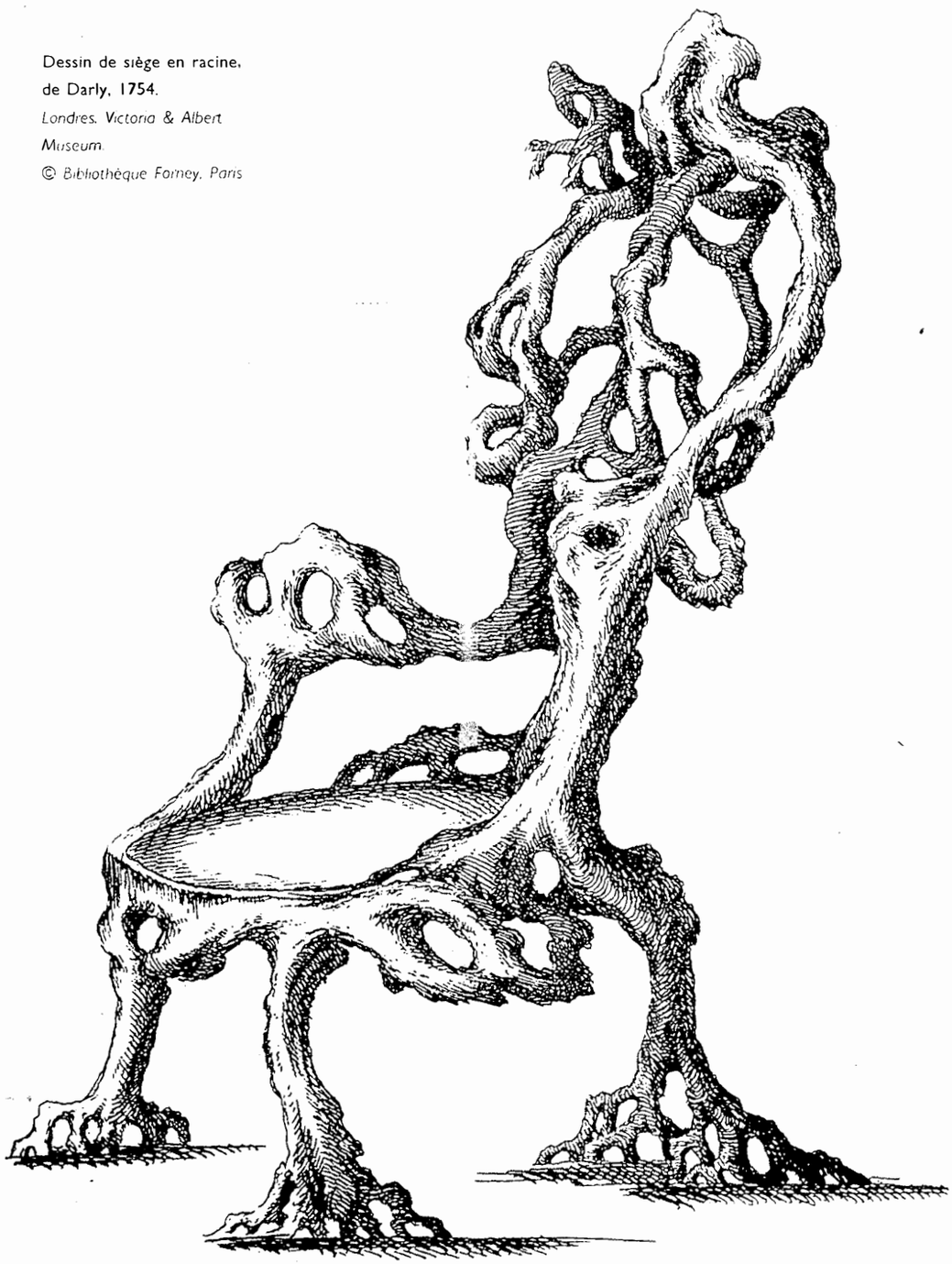
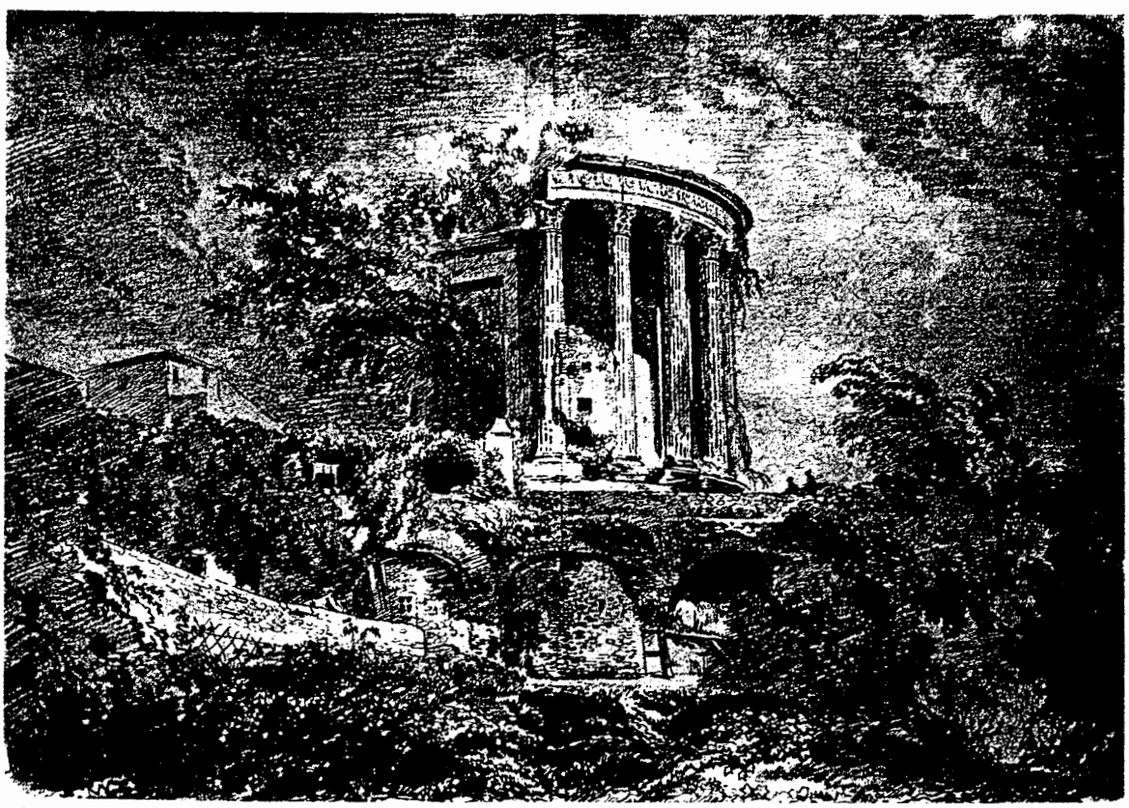
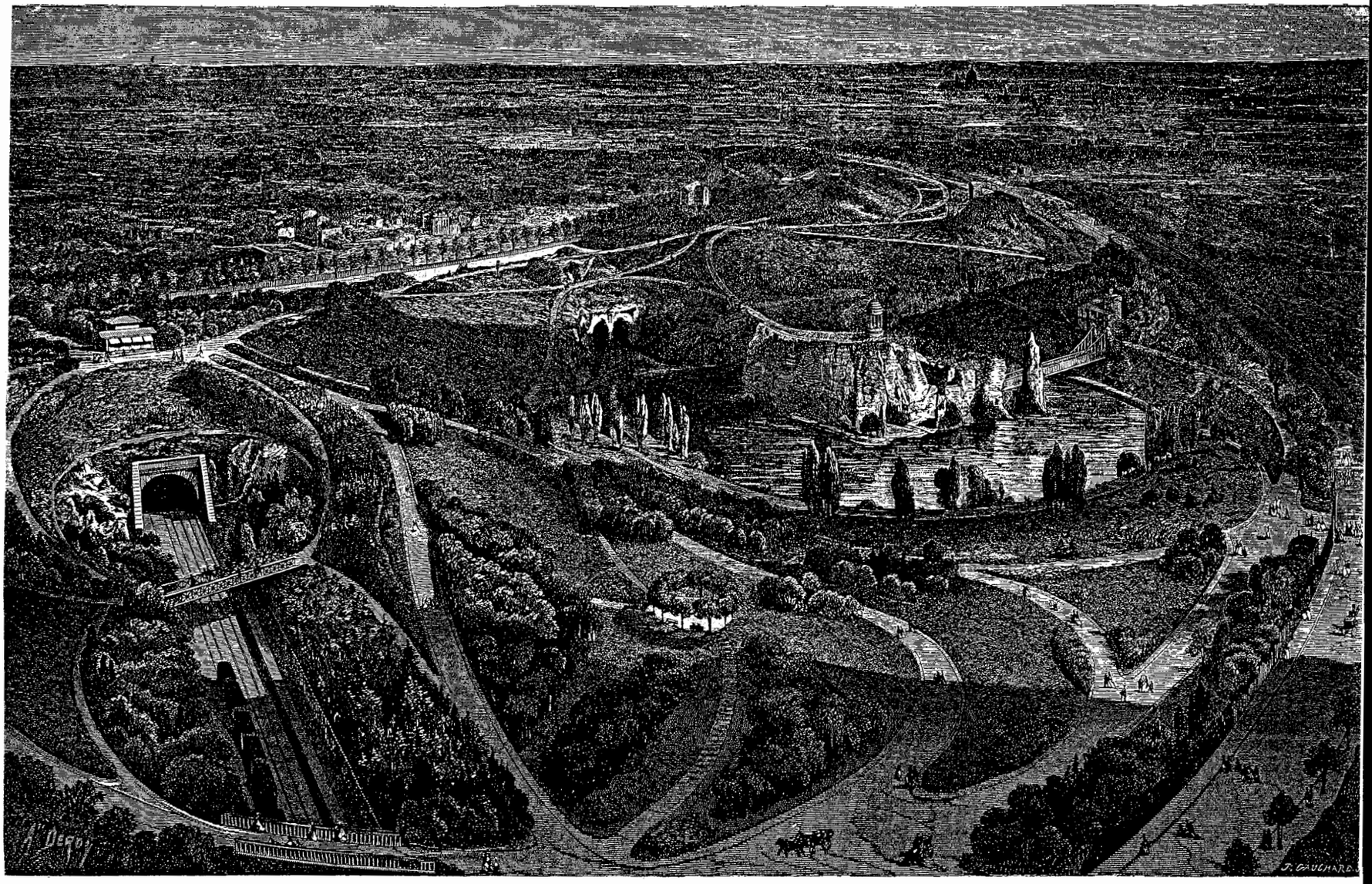


Figure 28

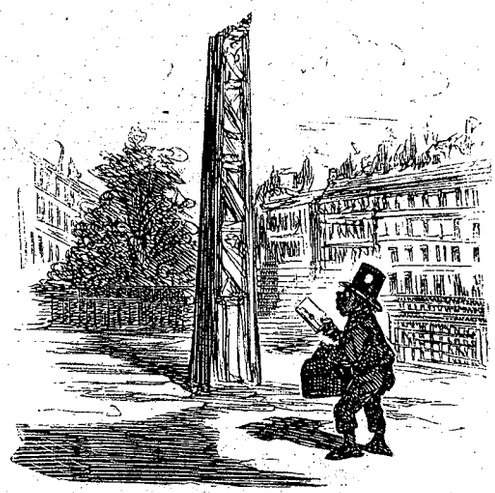


73 Temple of the Sibyl at Tivoli. Drawing by Fragonard, 1759. Musée des Beaux-Arts, Besançon

Figure 29

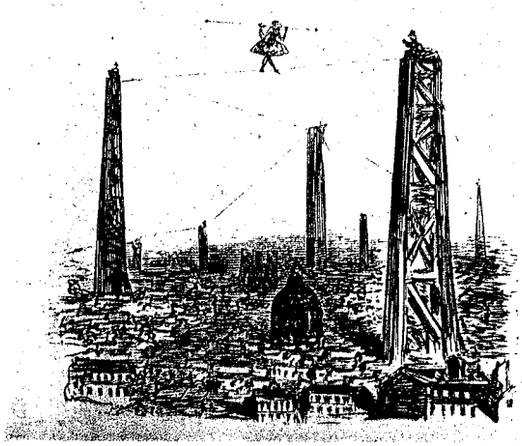


18. Bird's-eye view of the Park of the Buttes-Chaumont, built on the site of abandoned quarries in northeast Paris. (Adolphe Alphand, *Les Promenades de Paris*, Paris, 1867-73, Text, p. 199, Fig. 306.)

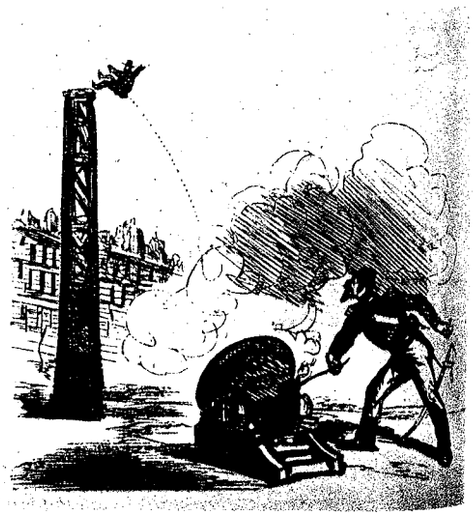


The Post Office employing chimney sweeps to deliver letters addressed to the surveyors engaged in triangulating the city.

The giraffe used in surveying the district around the zoo.



Madame Saqui, the celebrated aerialist, entrusted with maintaining communications among the surveyors during the triangulation project.



Using artillery to send the surveyors to their offices.

5. The cartoonist Cham comments on the towers erected for the triangulation of Paris. (Cham, pseudonym for Amédée de Noé, *Croquis contemporains*, Paris, [n.d.], Part 3.

Figure 31

RUE DES ALLOUETTES

RUE HASSARD DU PLATEAU

RUE DE CRIMÉE

RUE DE MEXICO

RUE DE VERA-CRUZ

RUE FESSART

Niveau de l'eau 58.75
Fond du lac 57.40

Légende

Les courbes noires indiquent l'état ancien
Les courbes rouges indiquent l'état actuel

ECHELLE DE 0M0005 POUR 1M00.

0 10 20 30 40 50 60 70 80 90 100 Mètres

* PLAN DES COURBES DE NIVEAU DU PARC DES BUTTES CHAUMONT *

TH DEL.

J. ROTHSCHILD ÉDITEUR

Figure 32

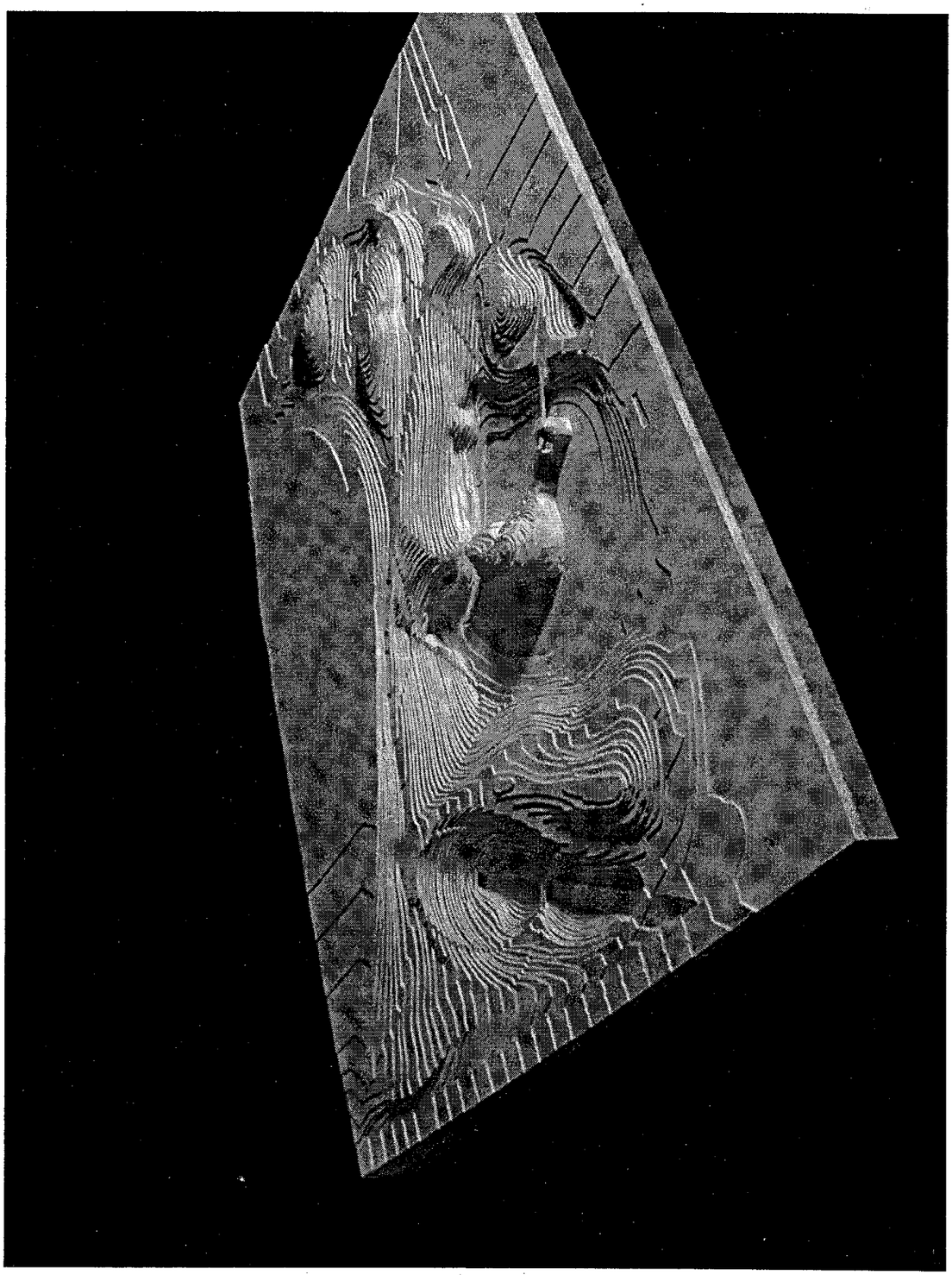


Figure 33

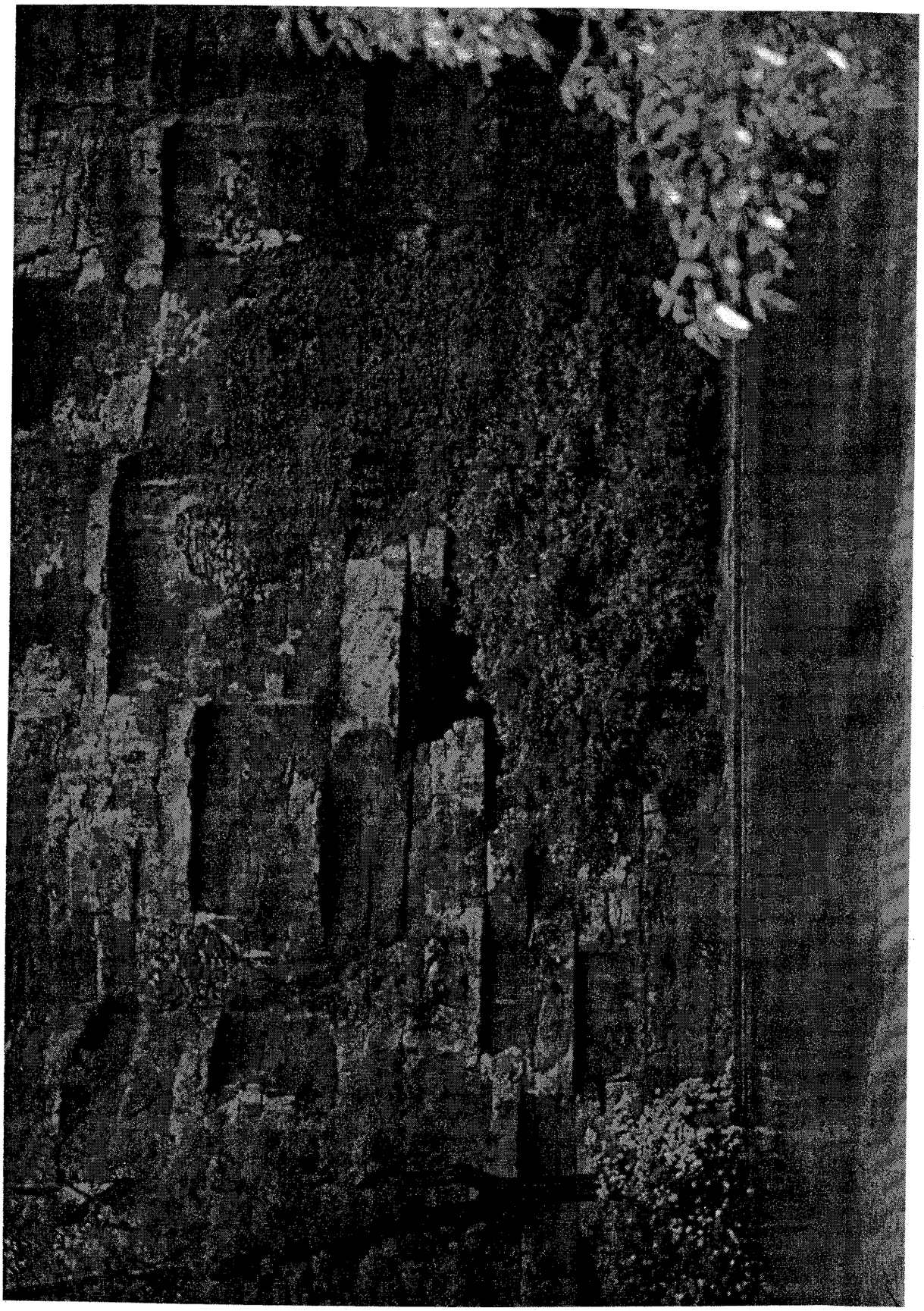


Figure 34

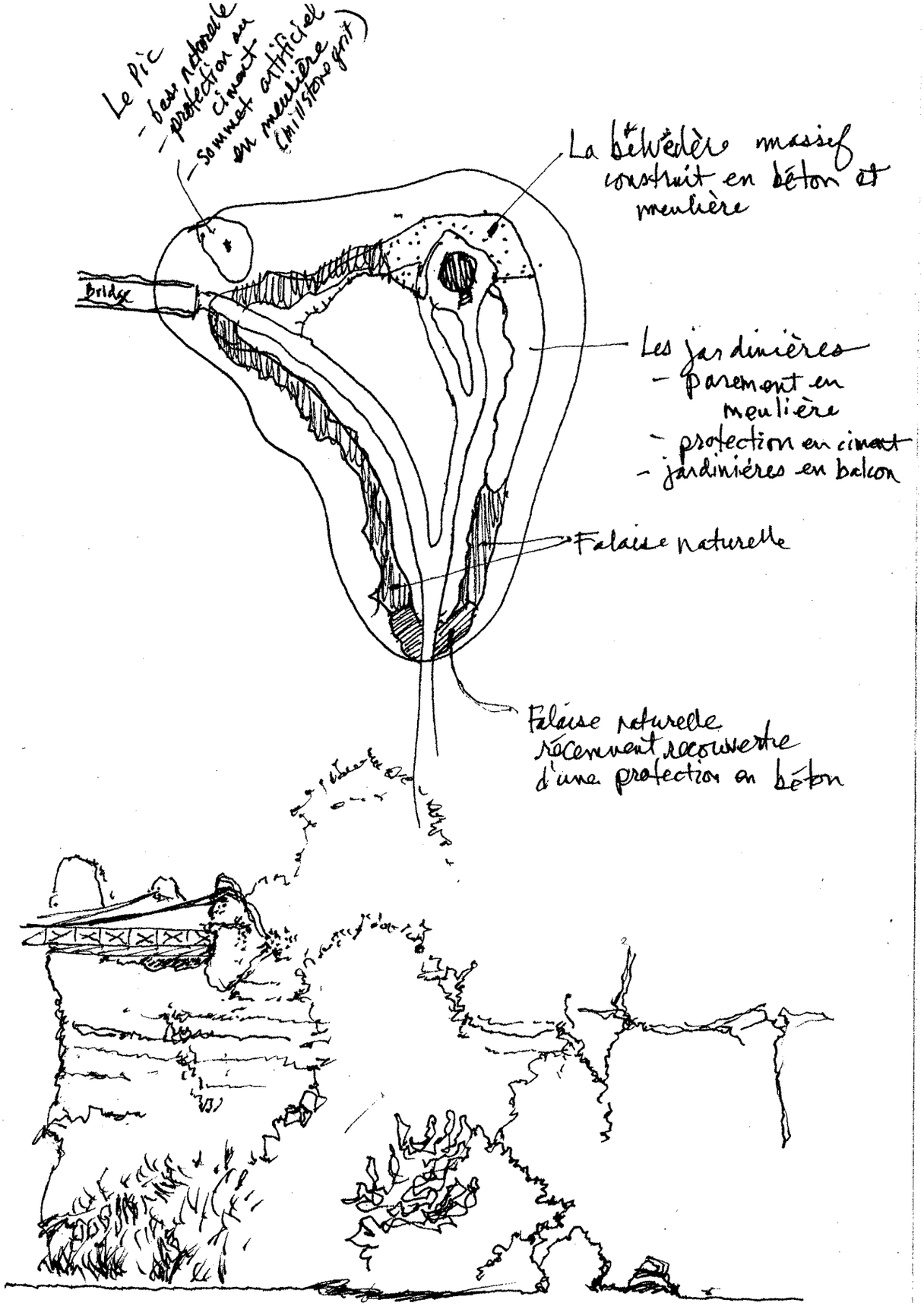

Le Pic
- base naturelle
- protection en ciment
- Sommet artificiel en meulière (Millstone grit)
La belvédère massif construit en béton et meulière
Bridge
Les jardinières
- parement en meulière
- protection en ciment
- jardinières en balcon
Falaise naturelle
Falaise naturelle récemment recouverte d'une protection en béton

Figure 35

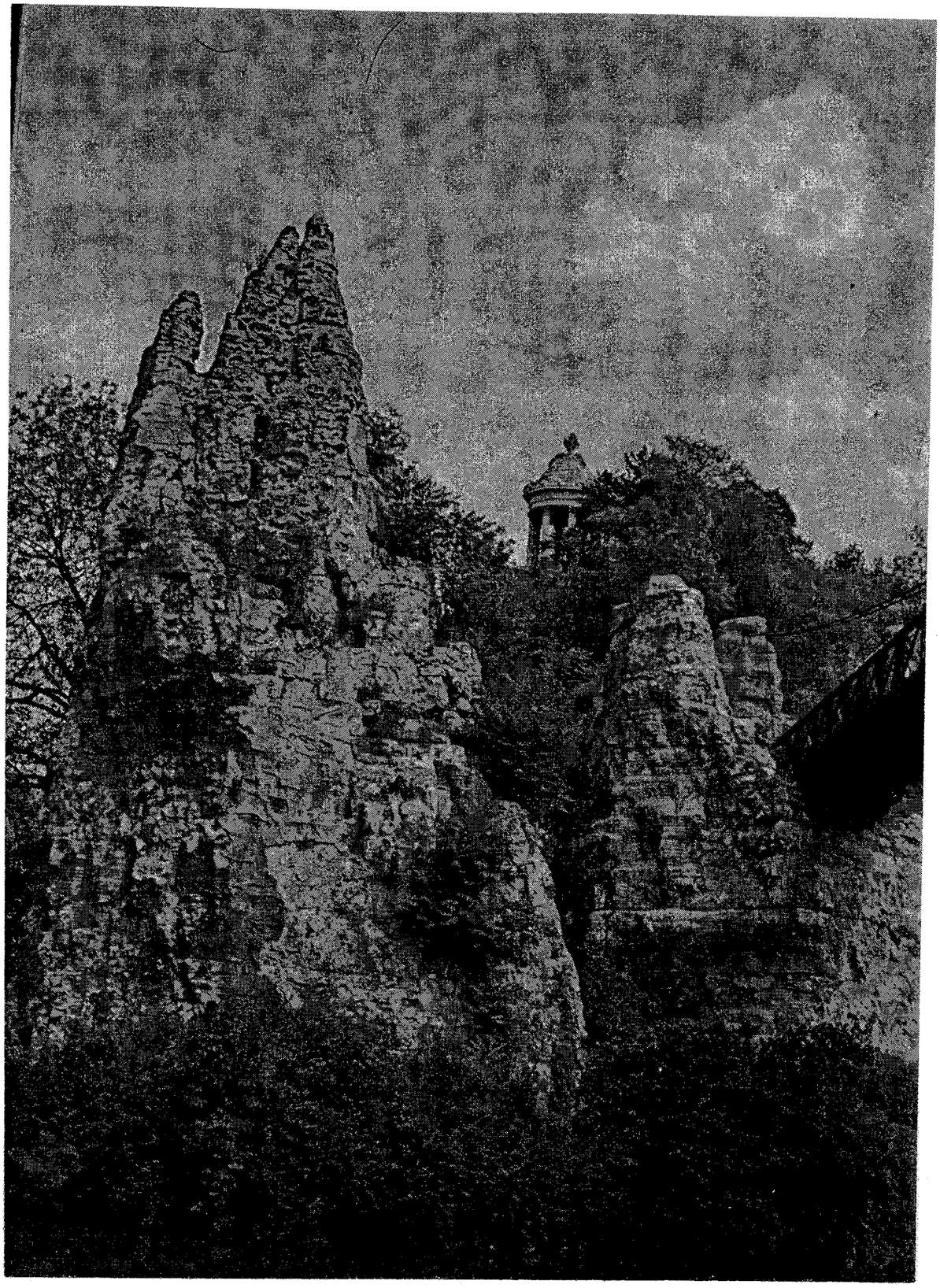
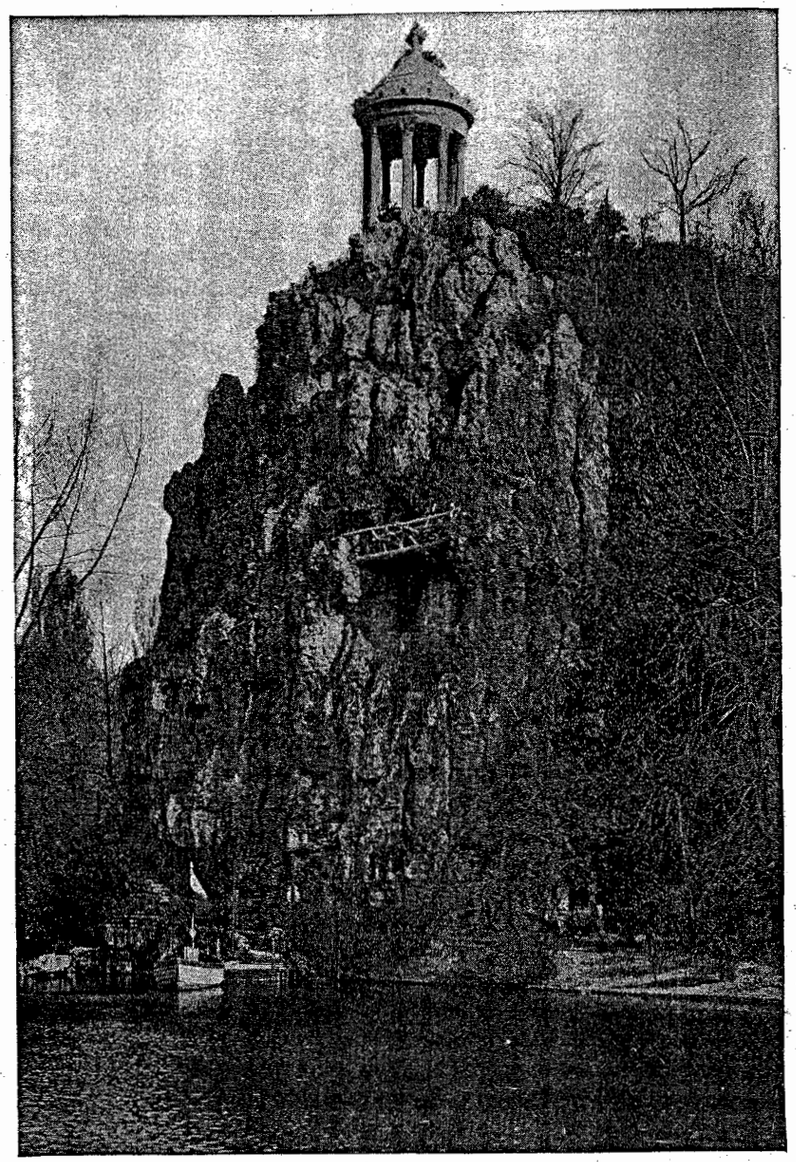


Figure 36



Collection Petit Journal. — PARIS. — Belvédère des Buttes-Chaumont.

Figure 37

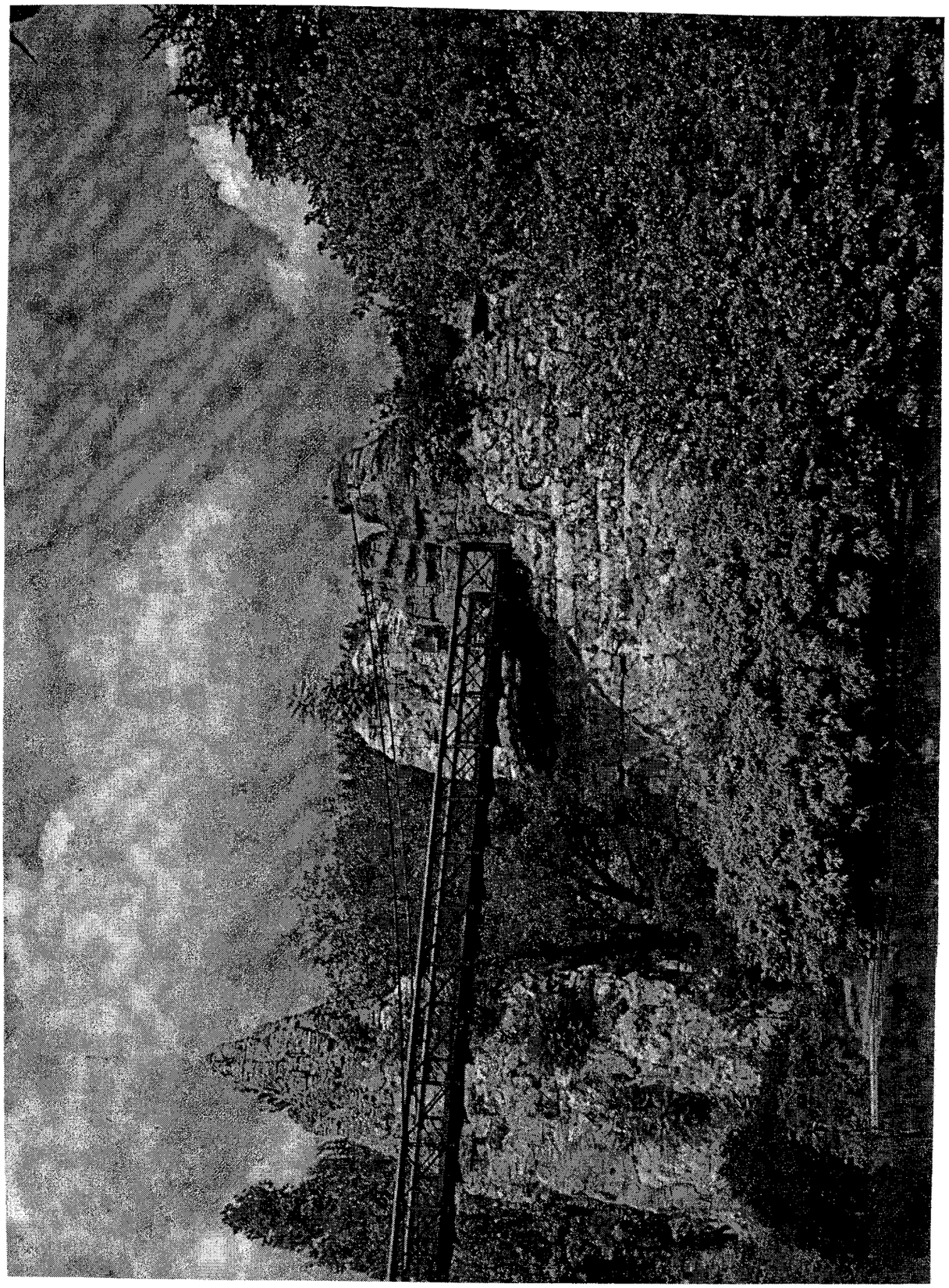


Figure 38

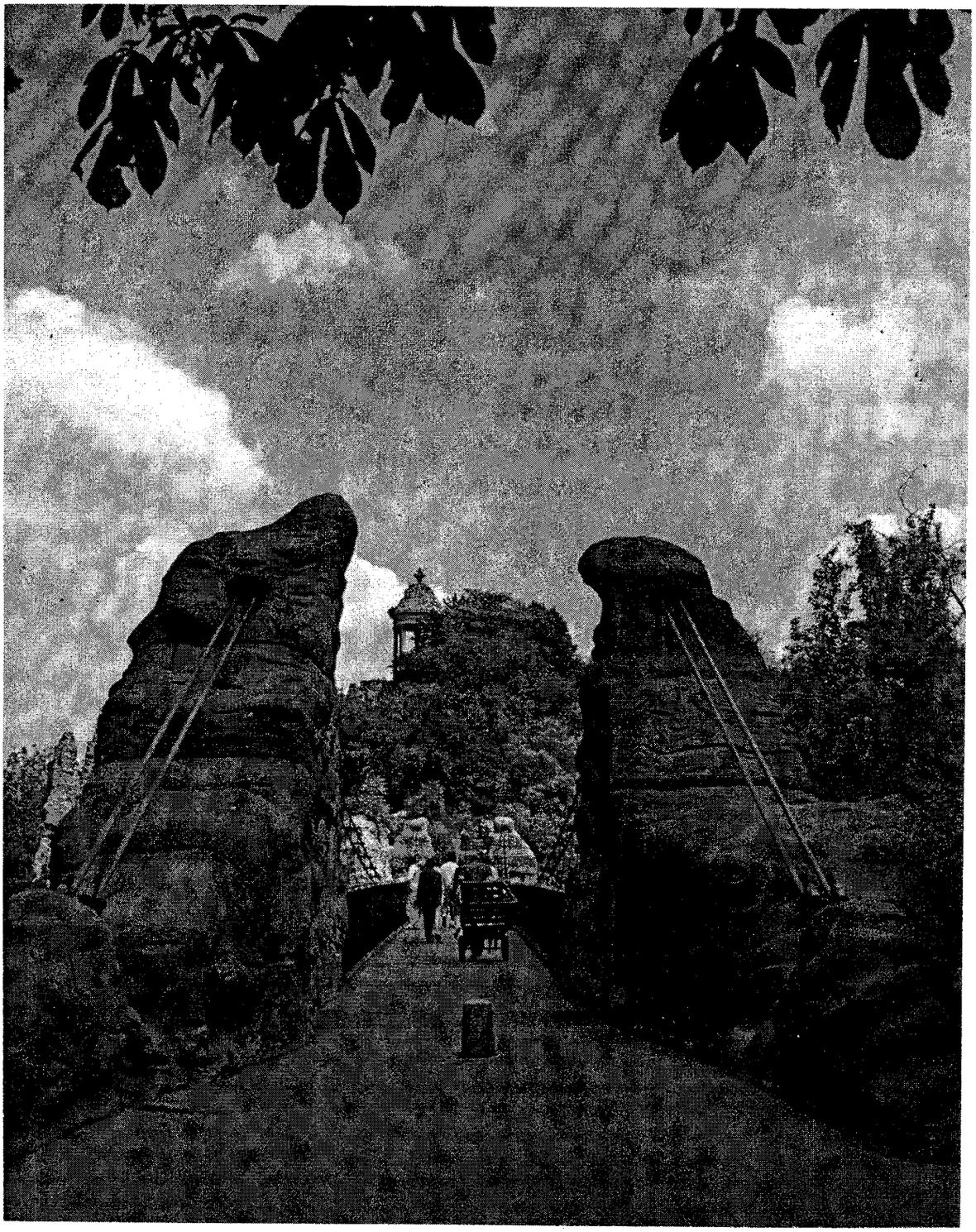


Figure 39

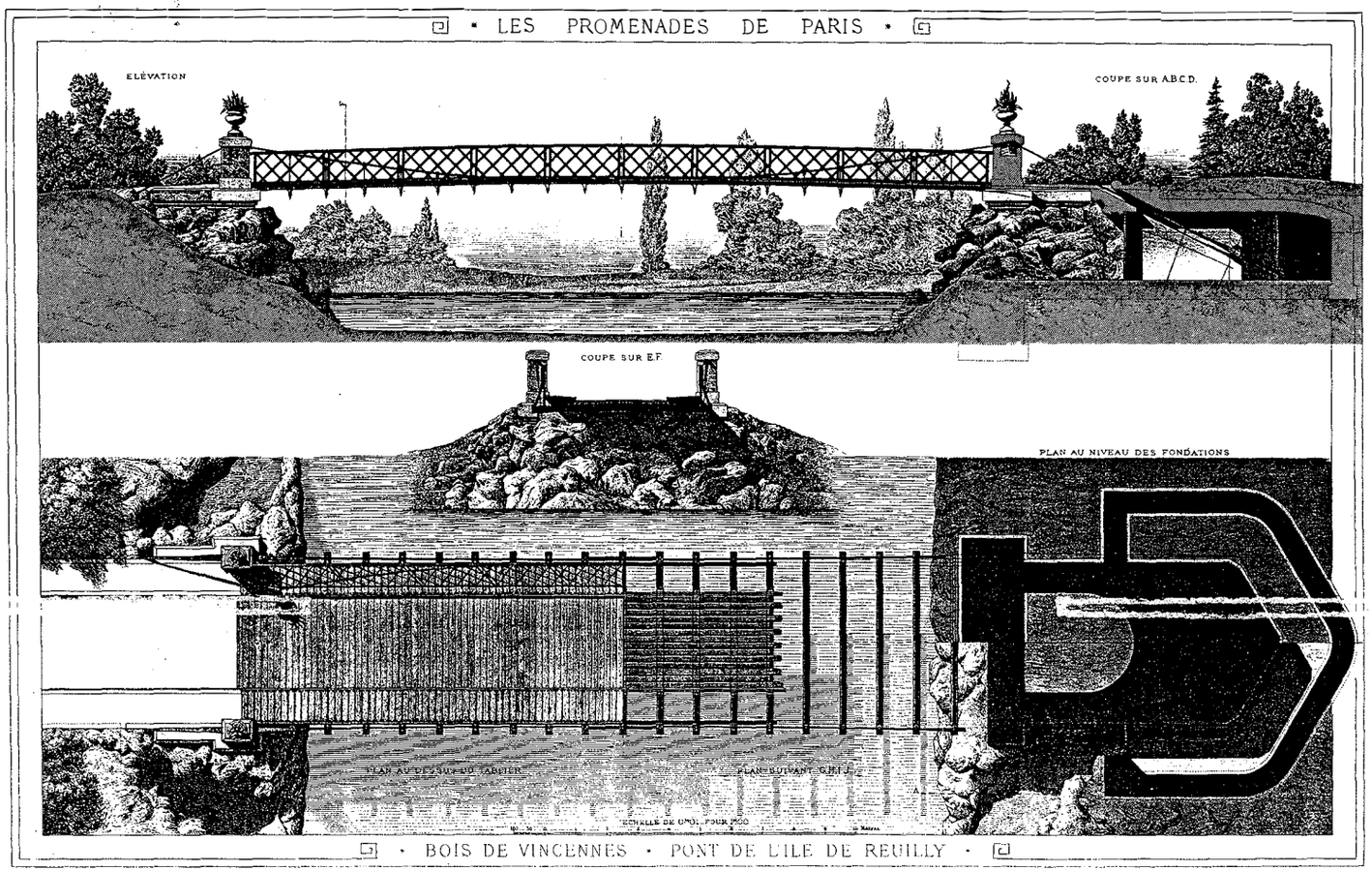

LES PROMENADES DE PARIS
ELÉVATION
COUPE SUR ABCD.
COUPE SUR EF.
PLAN AU NIVEAU DES FONDATIONS
PLAN AU DESSUS DU TABLIER
PLAN SUIVANT GHIJ
ÉCHELLE DE 0M01 POUR M00
BOIS DE VINCENNES · PONT DE L'ILE DE REUILLY

Figure 40

Figure 41

Fig. 311. Cascades, vue de l'intérieur de la Grotte.

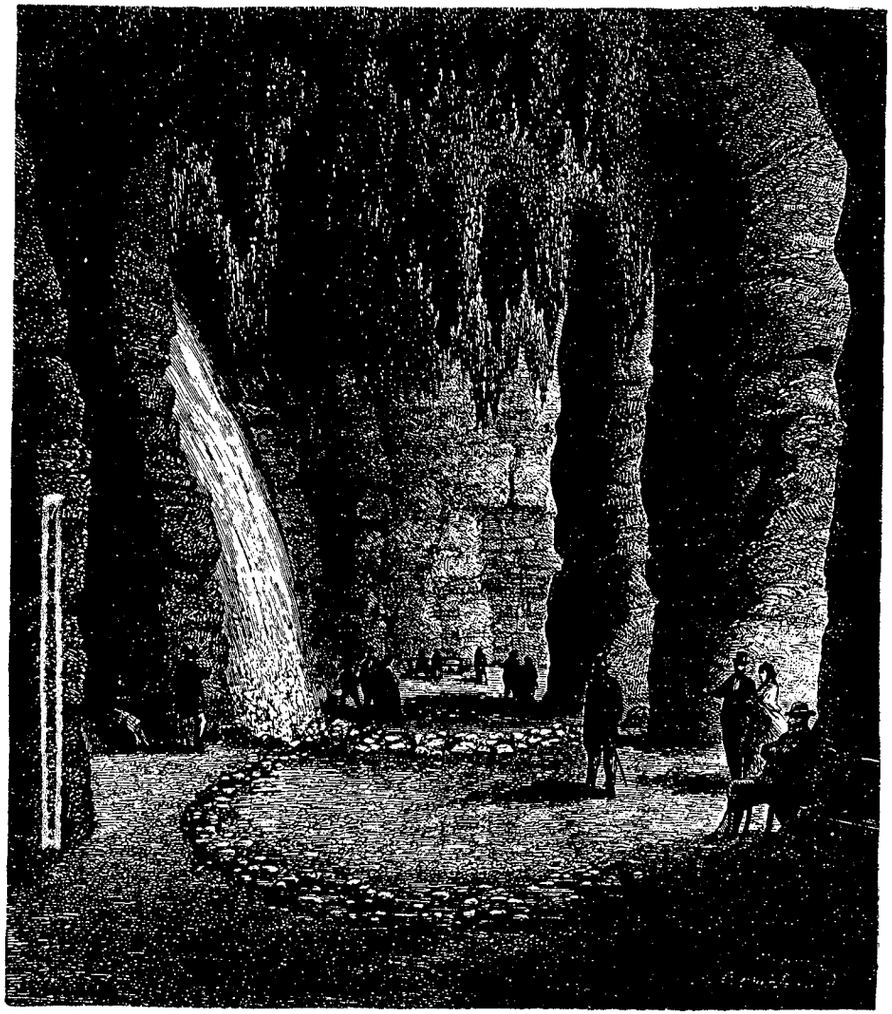


Fig. 312. Intérieur de la grotte.

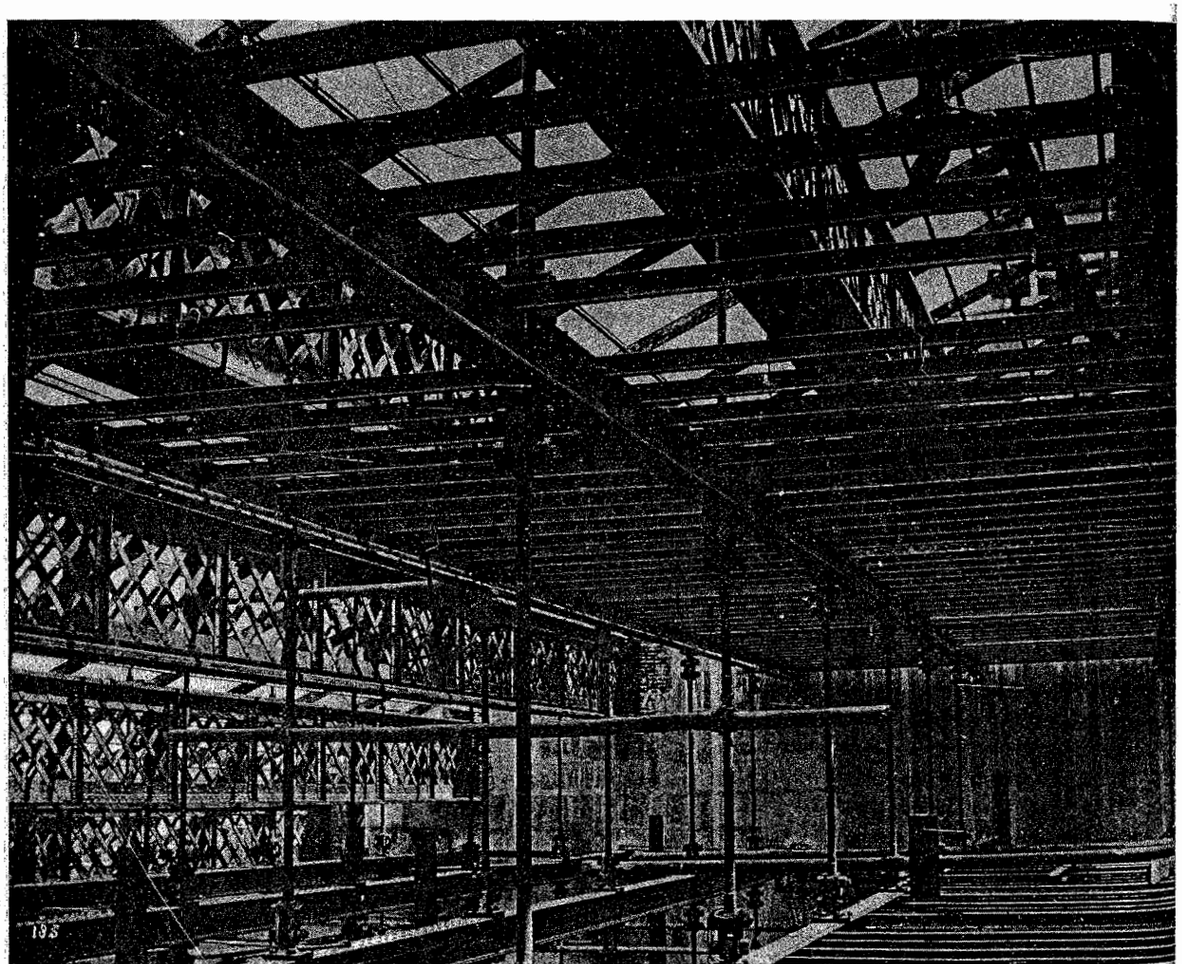


fig 2.[5]
Delmaet and Durandelle Studio, *Construction of the Opera,* 1865–1872
(Bibliothèque Nationale, Paris)

Figure 42

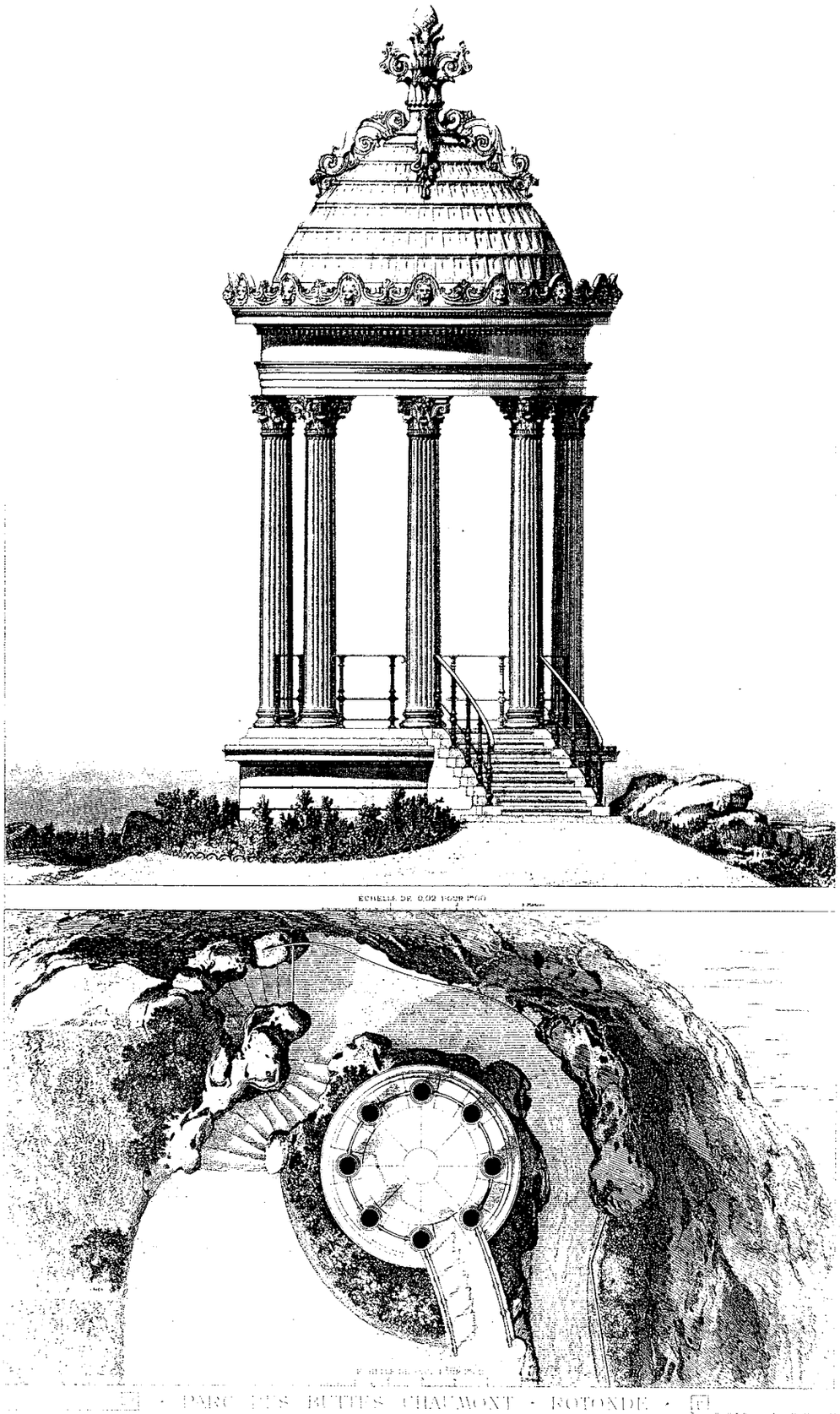


Figure 43

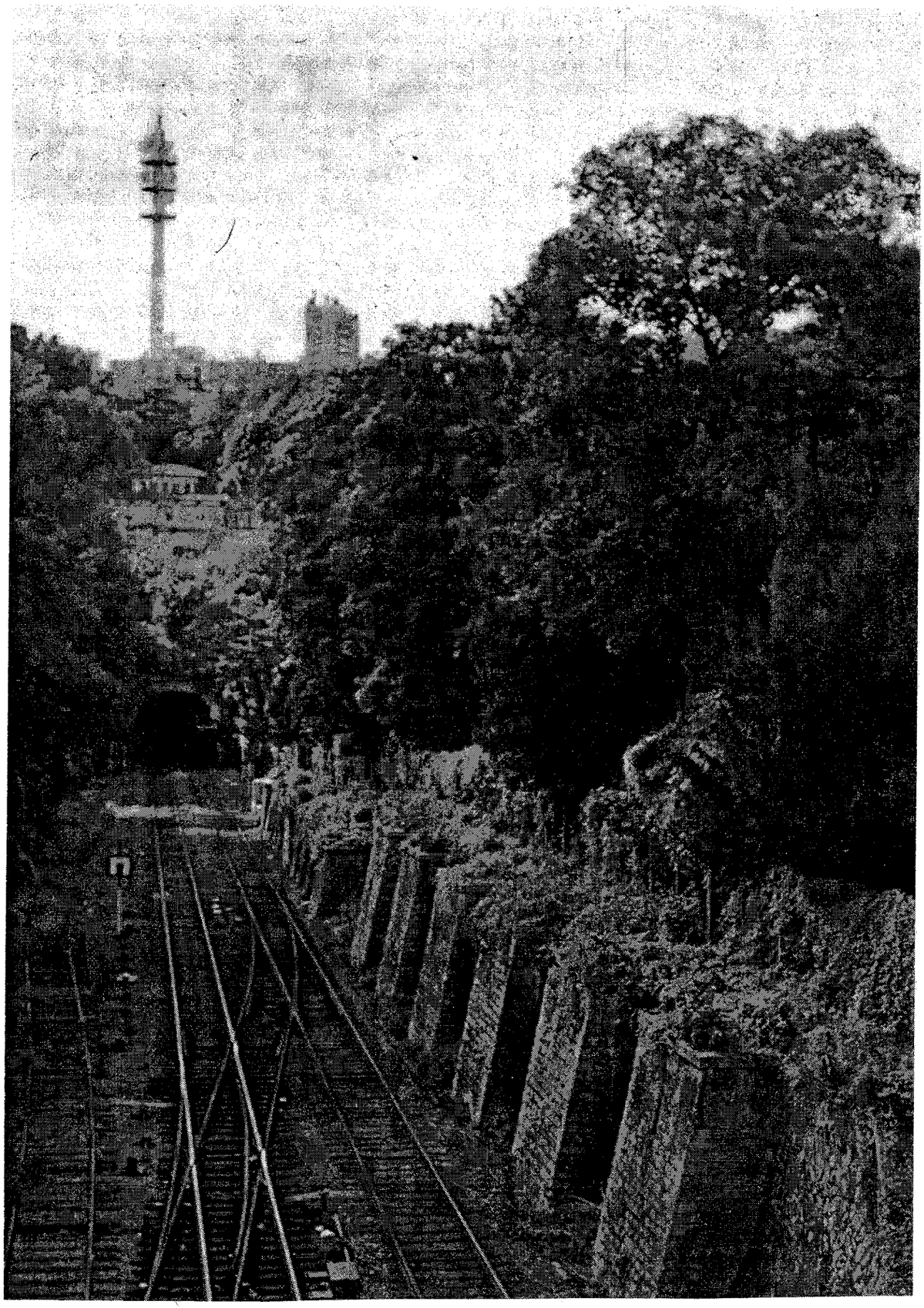


Figure 44

Photo Berthaud.

BUTTES CHAUMONT — PONT RUSTIQUE

Figure 45

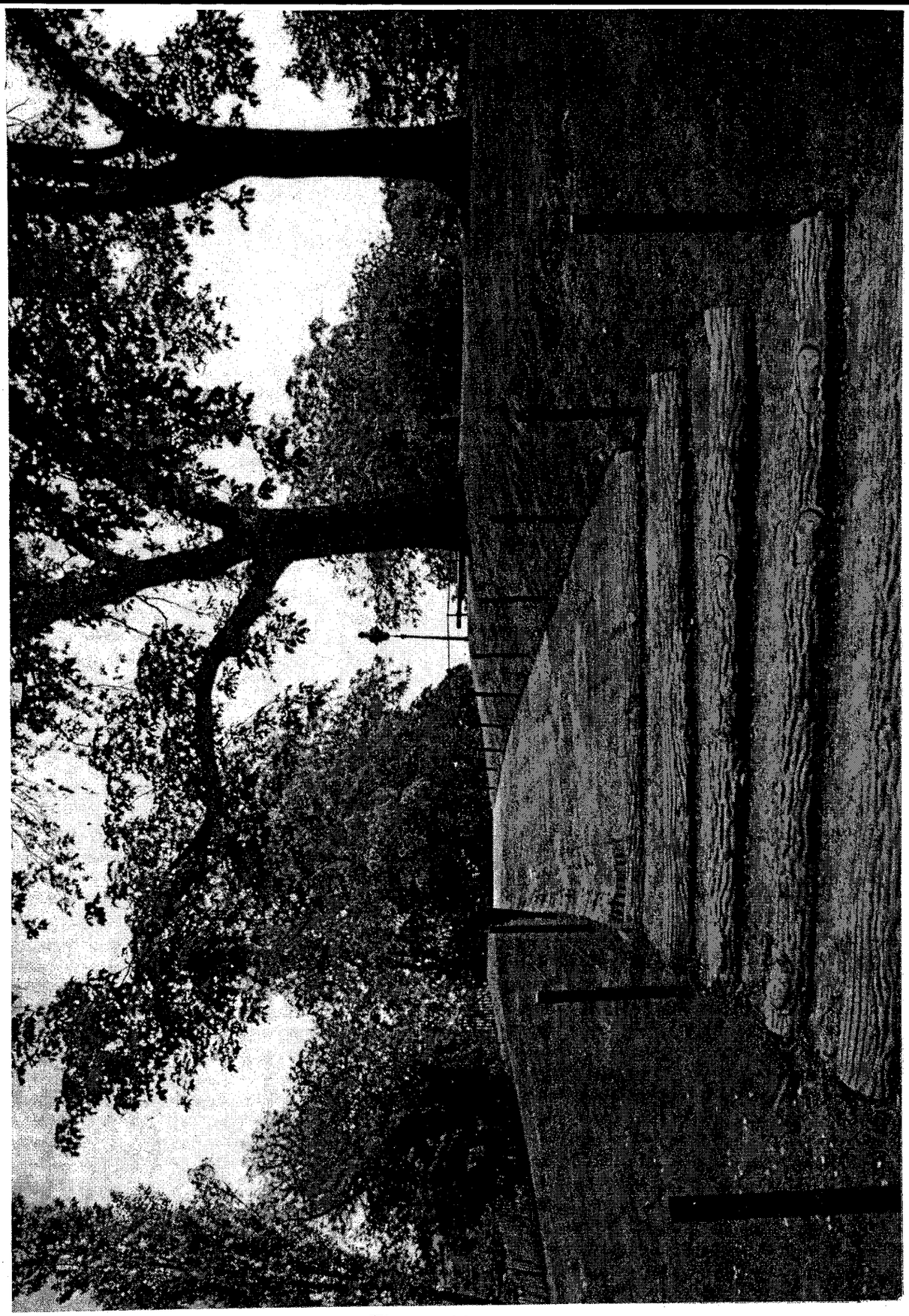


Figure 46

Figure 47

Figure 48

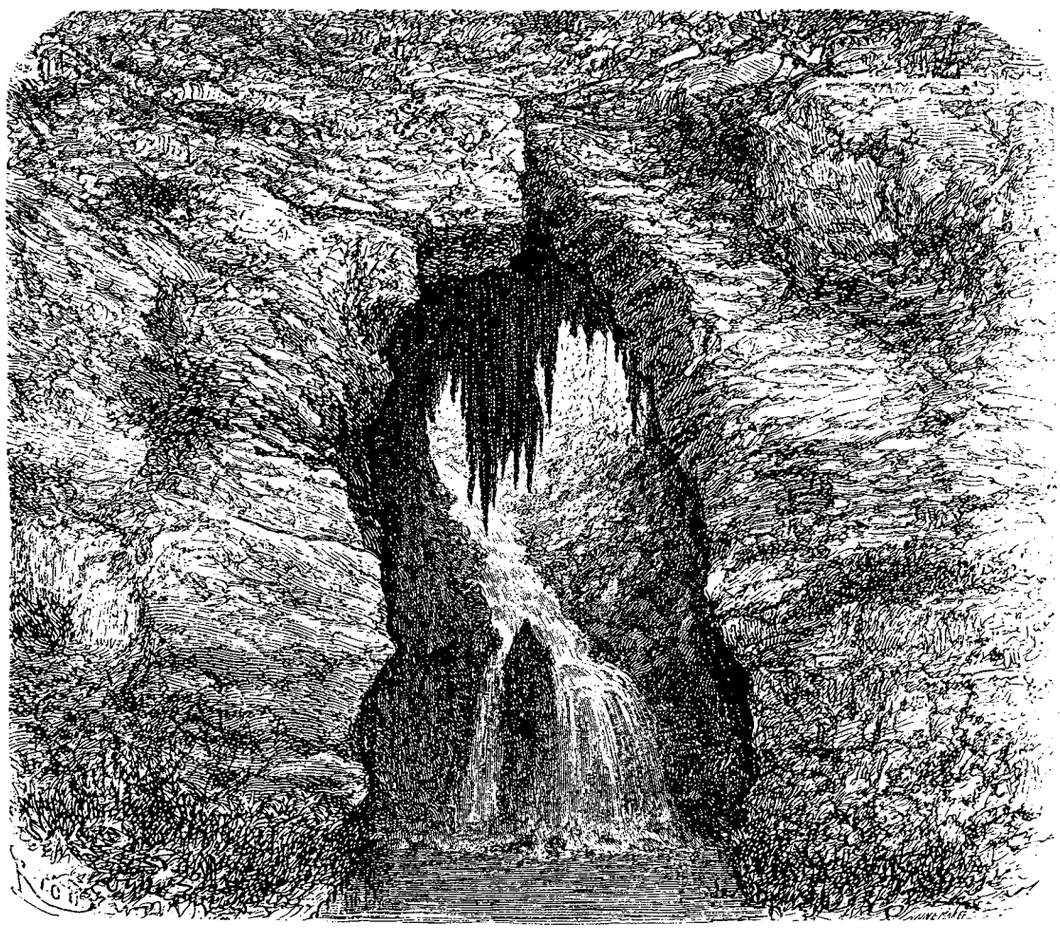
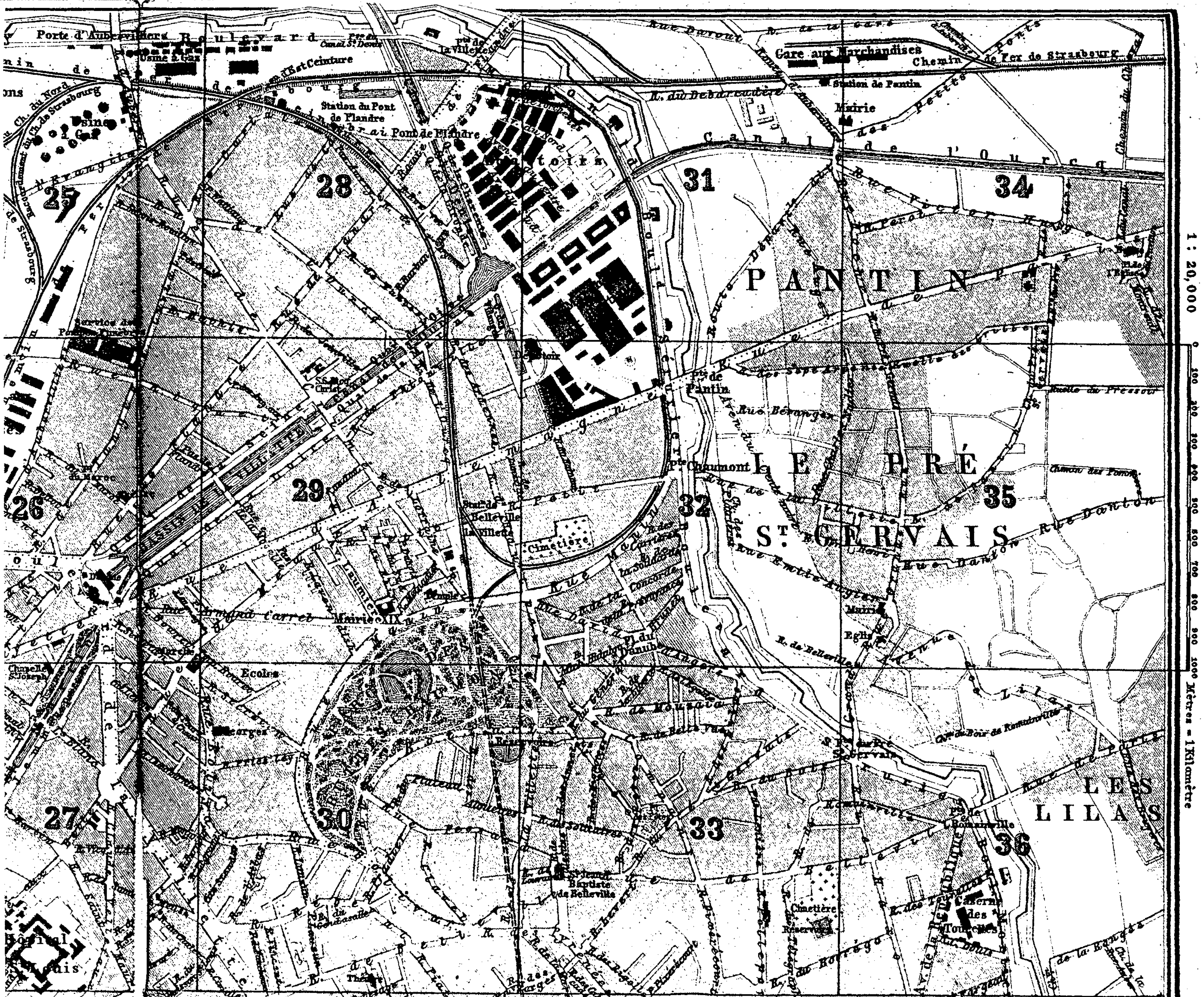


Fig. 223. — Cascade dans la grotte du parc des Buttes-Chaumont.

Figure 49



Porte d'Aubervilliers
Boulevard
Gare aux Marchandises
Chemin de Fer de Strasbourg
Station de Pantin
Mairie
Station du Pont de Flandre
Pont de Flandre
Canal de l'Ourcq
25
26
27
28
29
30
31
32
33
34
35
36
PANTIN
LE PRÉ
ST. GERVAIS
LES LILAS
Pte de Pantin
Pte Chaumont
Rue Bérenger
Rue Danton
Cimetière
Mairie XIX
Ecoles
Service des Pompes Funèbres
Rue Armand Carrel
R. de Mouzaia
R. de Belleville
Cimetière
Caserne des Tourelles
Hôpital St. Louis
1 : 20,000
Mètres = 1 Kilomètre

Figure 50

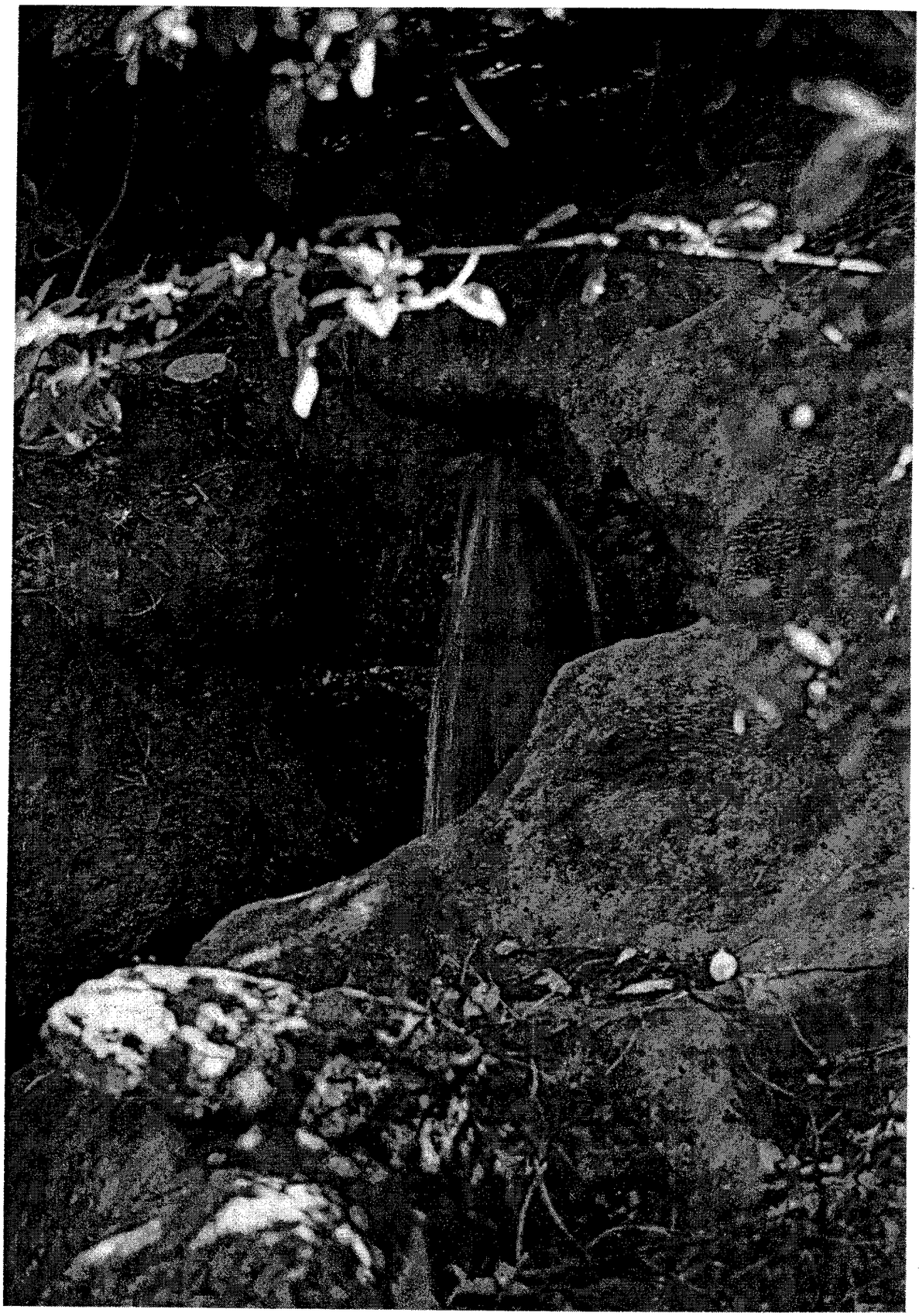


Figure 51

Figure 52

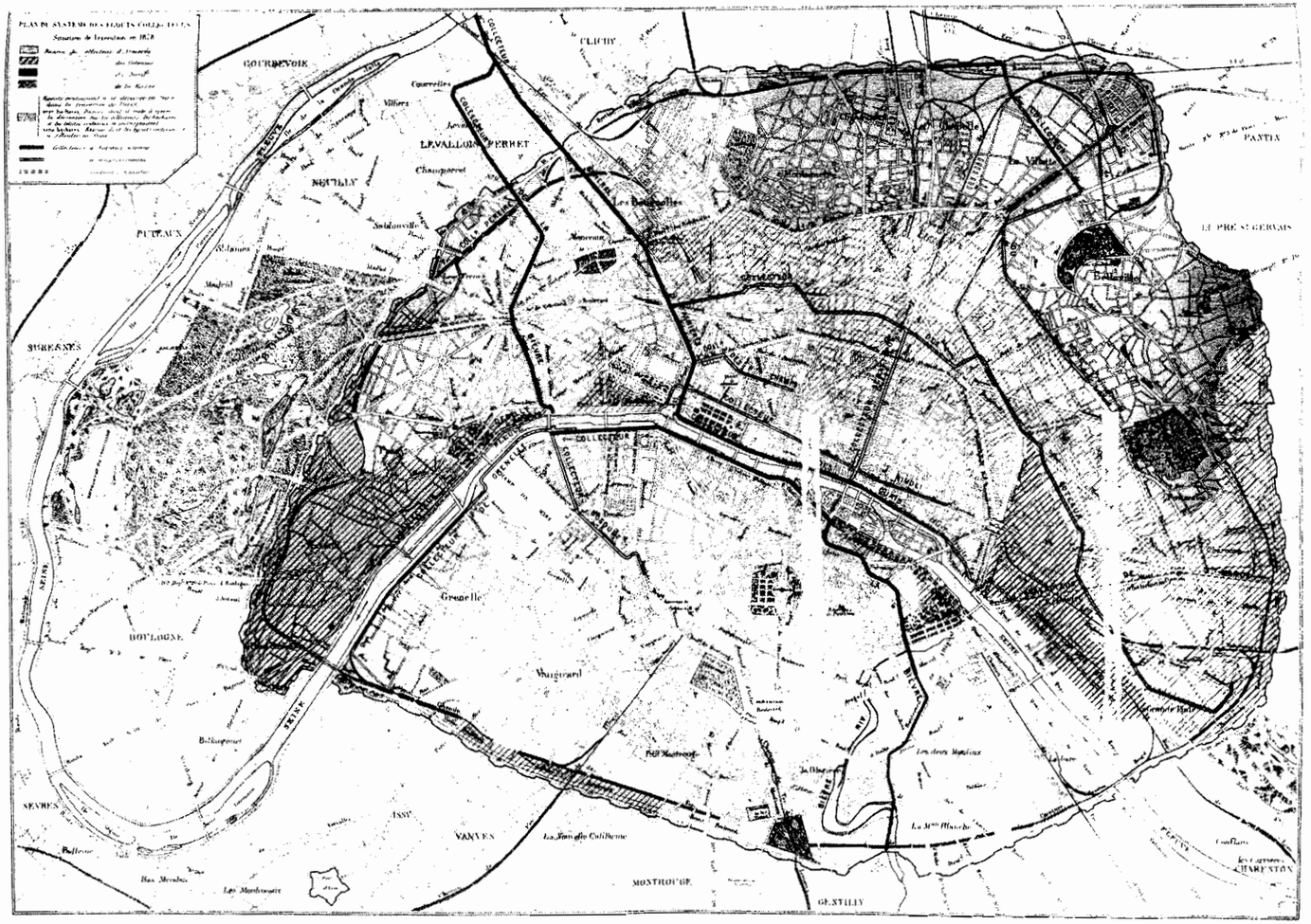


Figure 53

Collectors' sewers, plan of 1878. Note also the cemeteries: (1) Cimetière du Nord (now Cimetière Montmartre), (2) Cimetière Père-Lachaise, (3) Cimetière du Sud (now Cimetière Montparnasse). (4) Collectors' sewer at Asnières.

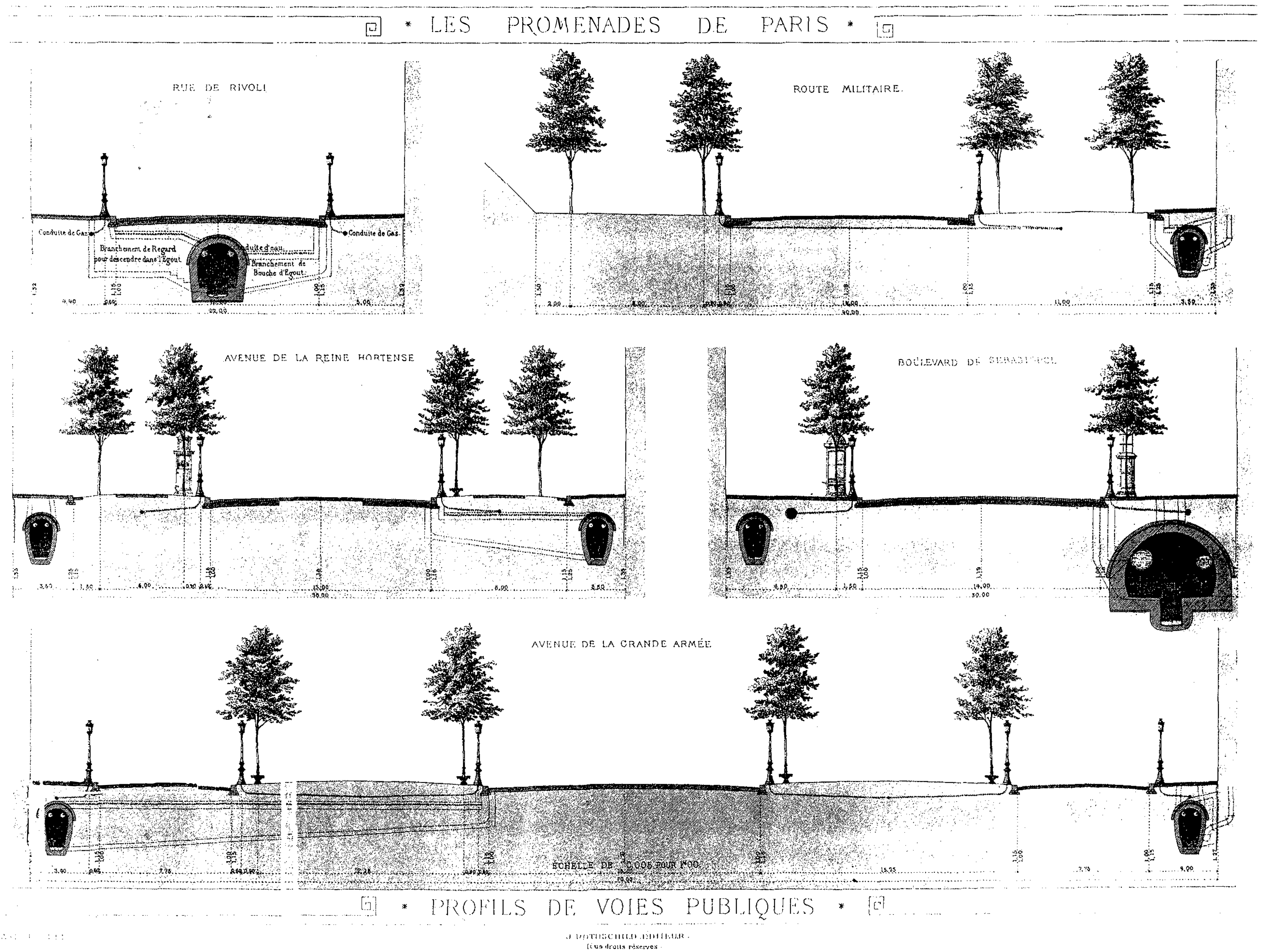
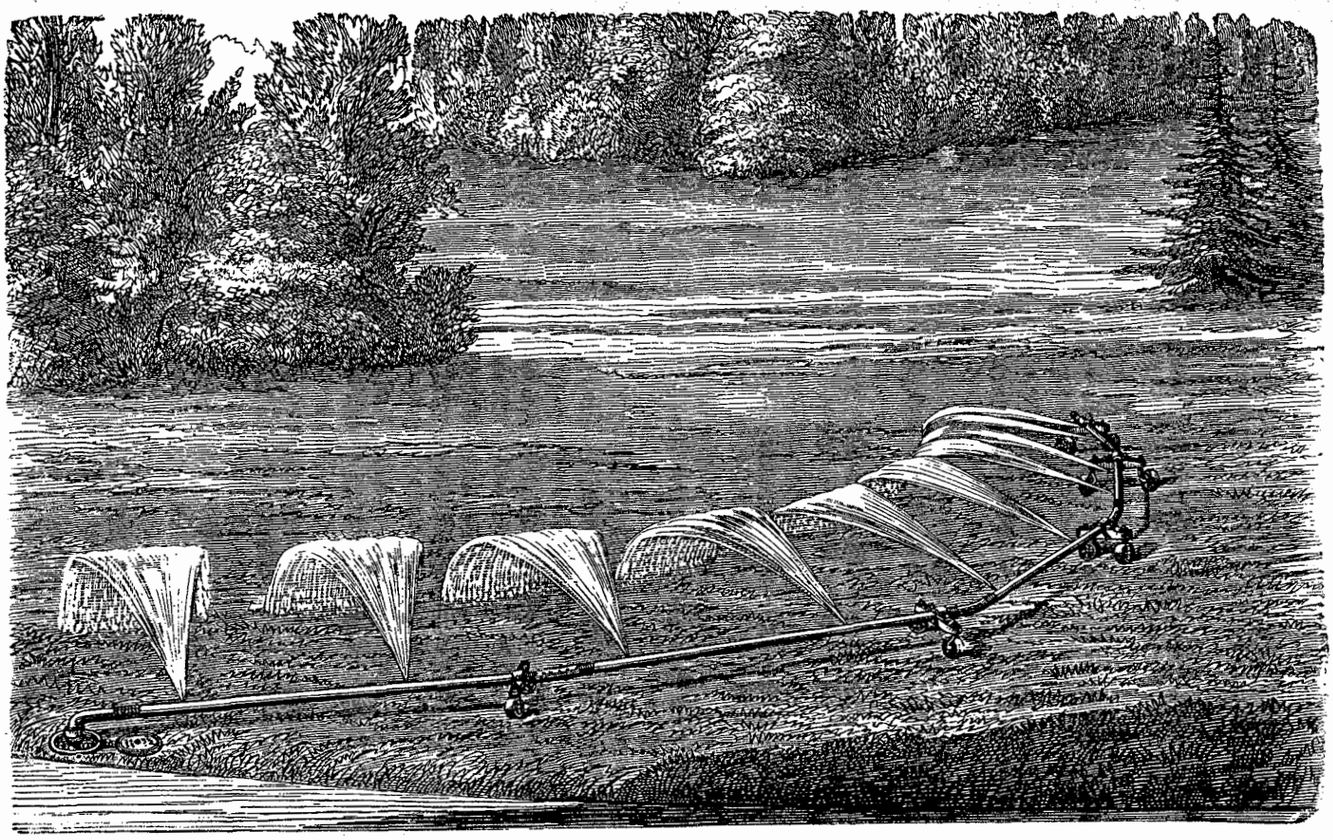
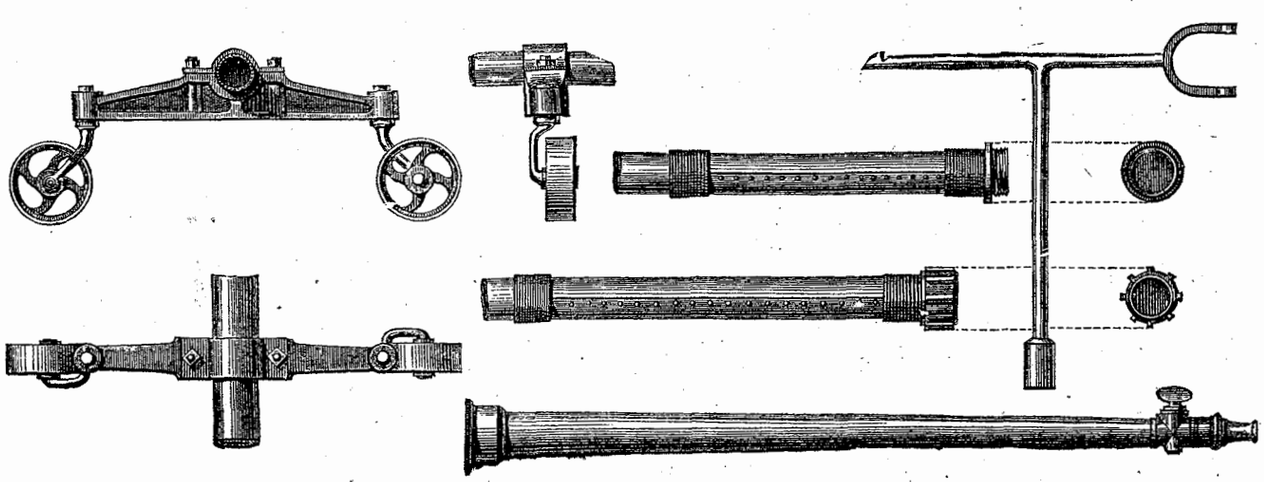

LES PROMENADES DE PARIS
RUE DE RIVOLI
Conduite de Gaz
Branchement de Regard pour descendre dans l'Egout
Conduite d'eau
Branchement de Bouche d'Egout
Conduite de Gaz
ROUTE MILITAIRE
AVENUE DE LA REINE HORTENSE
BOULEVARD DE
AVENUE DE LA GRANDE ARMÉE
ECHELLE DE 0,005 POUR 1,00
PROFILS DE VOIES PUBLIQUES
J. ROTHSCHILD ÉDITEUR
Tous droits réservés

Figure 54



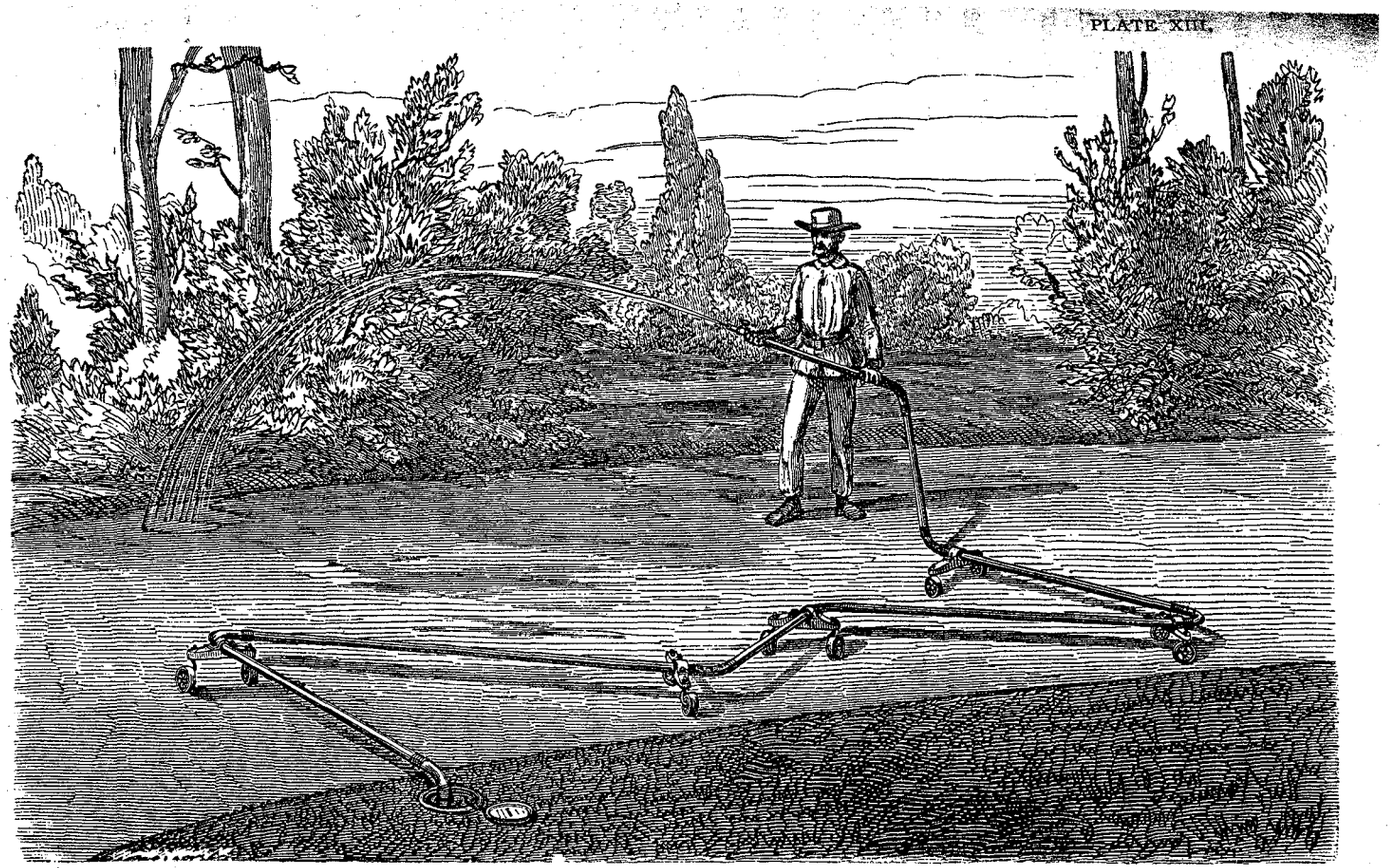
MODE OF WATERING THE GRASS IN THE PARKS, WITH PERFORATED HOSE ON WHEELS.

FIG. 20.



Details of the preceding figure.

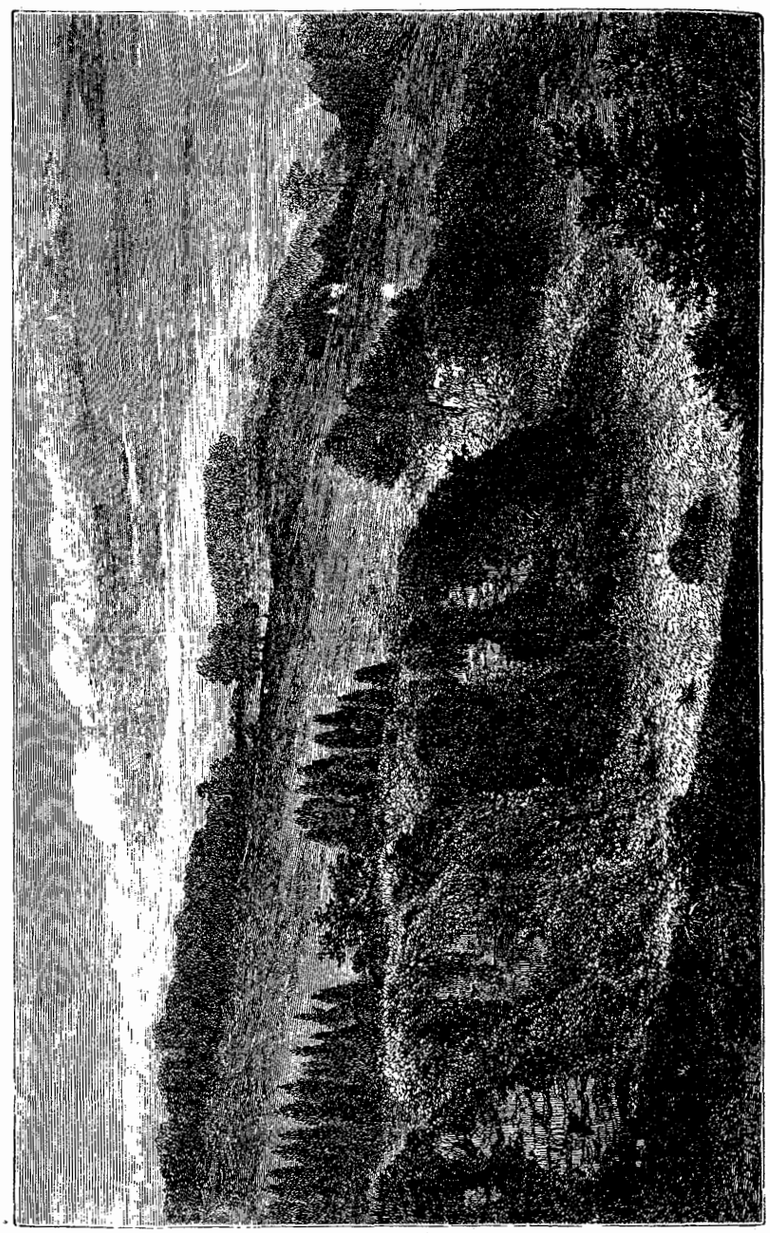
Figure 55



MODE OF WATERING ROADS, DRIVES, FOOTWAYS, AND THEIR MARGINS.

Figure 56

Figure 57



IVY-CLAD ROCKS AND HIGH LAWNS IN PARC DES BUTTES CHAUMONT.

Figure 58

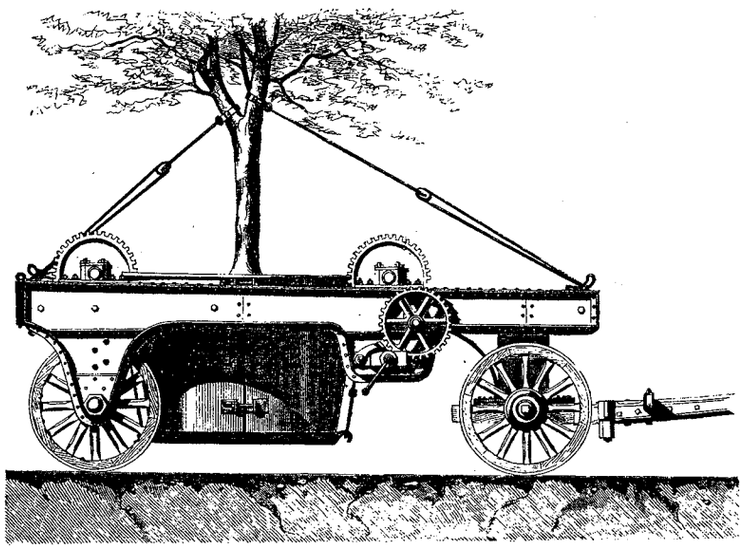


Fig. 54. Élévation latérale.

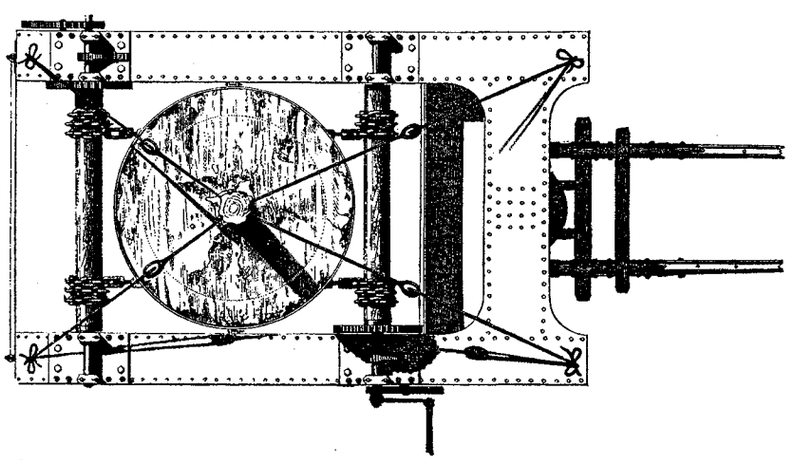


Fig. 55. Plan du chariot.

Échelle $0^m,02$ p. m.

Figure 59

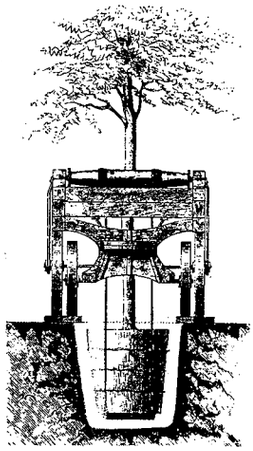


Fig. 46. Élévation de l'avant-train.

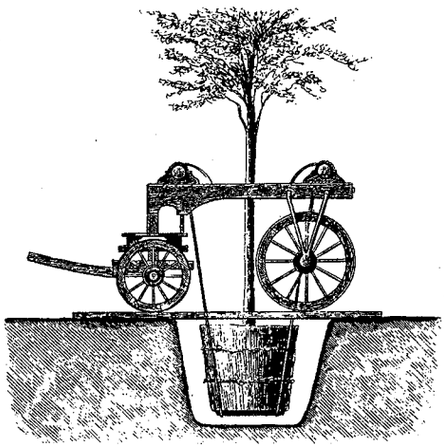


Fig. 47. Élévation latérale.

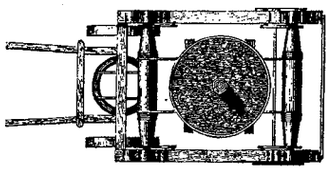


Fig. 49. Plan du chariot.
Échelle de 0,m02 p. m.

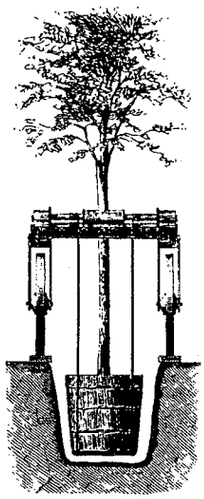


Fig. 48. Élévation de l'arrière-train.

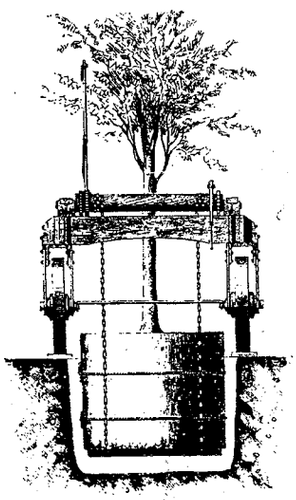


Fig. 50. Élévation de l'arrière-train.

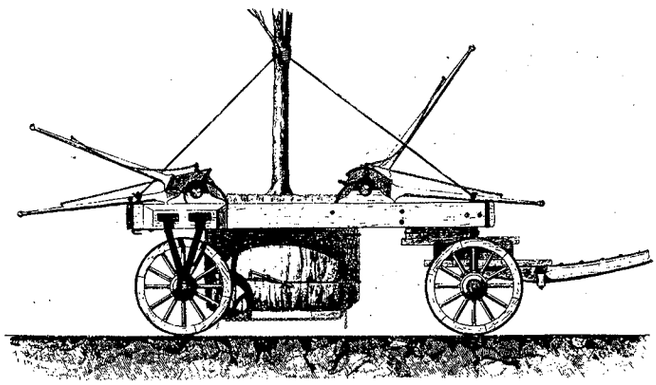


Fig. 51. Élévation latérale.

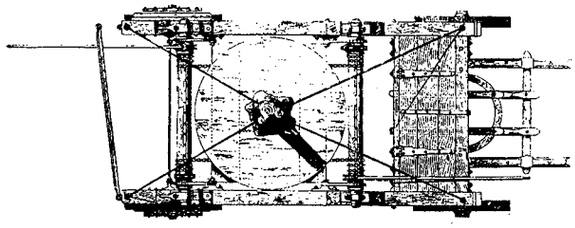


Fig. 53. Plan du chariot.
Échelle 0m,02 p. m.

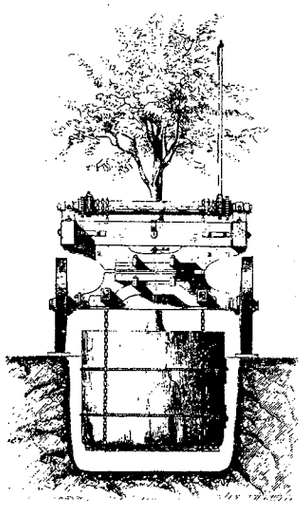
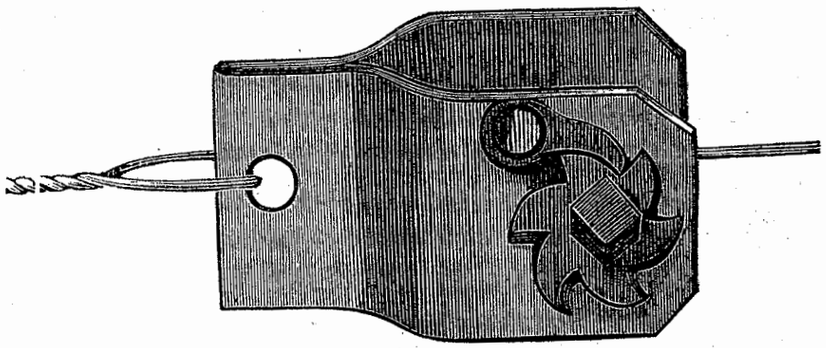


Fig. 52. Élévation de l'avant-train.

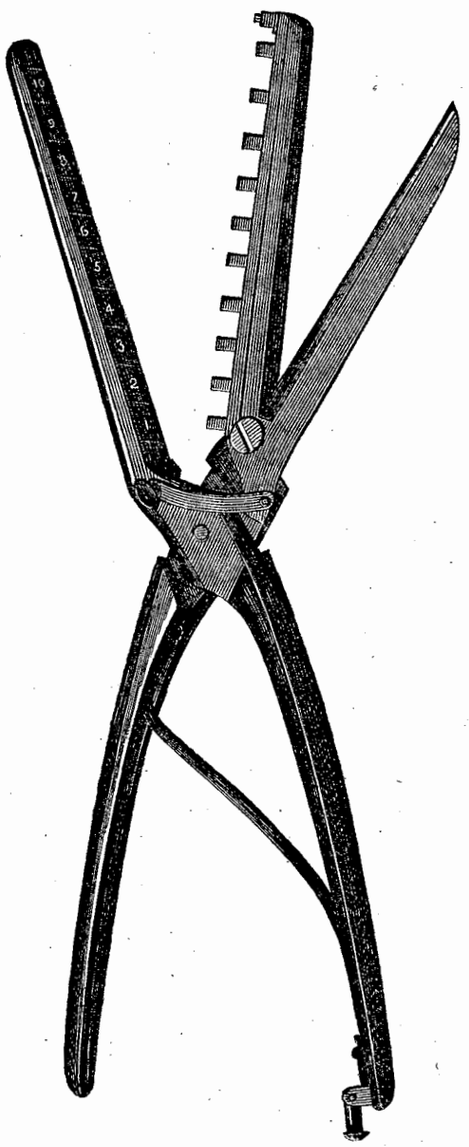
Figure 60

Fig. 333.



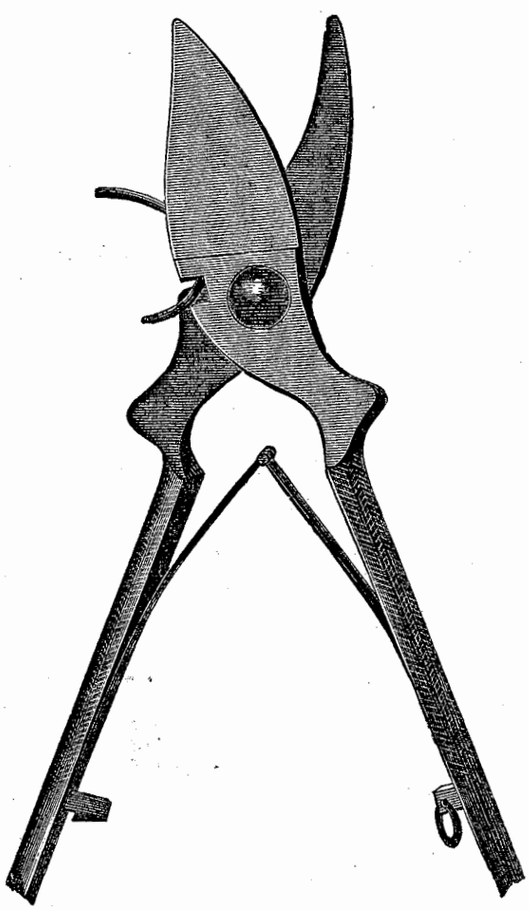
Raidisseur used in the garden of the Exhibition.

Fig. 325.



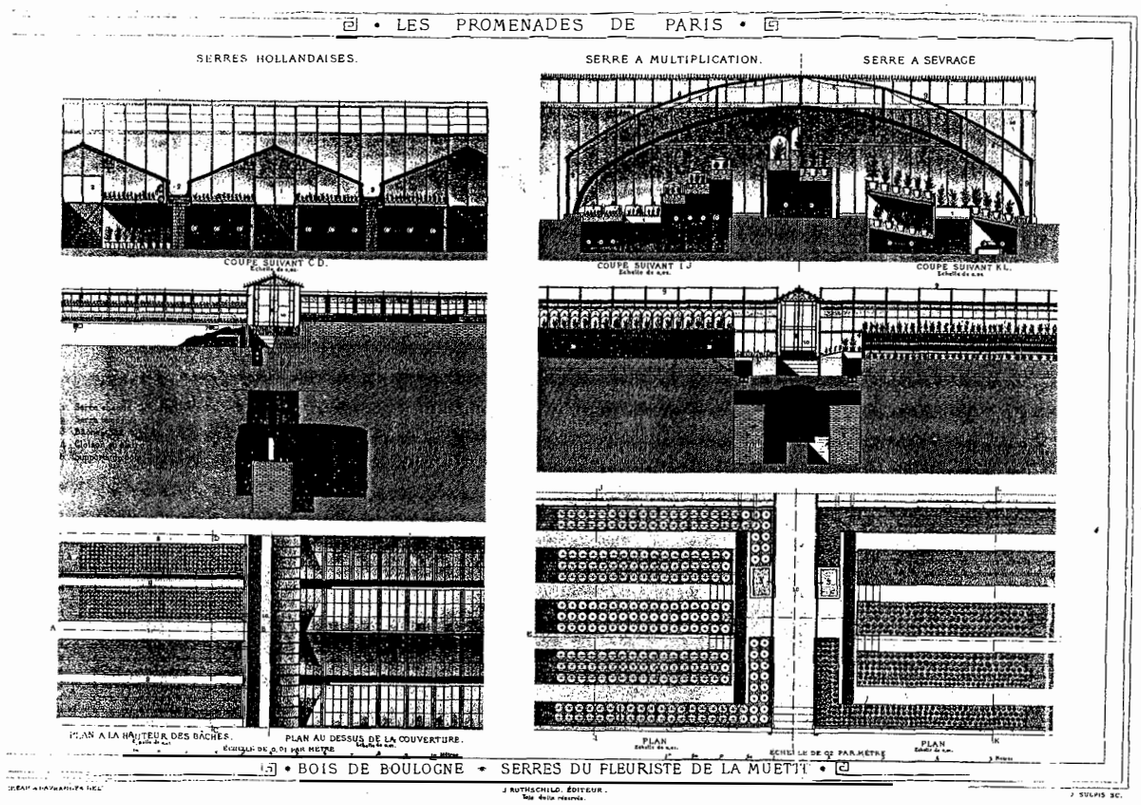
The Numéroteur.

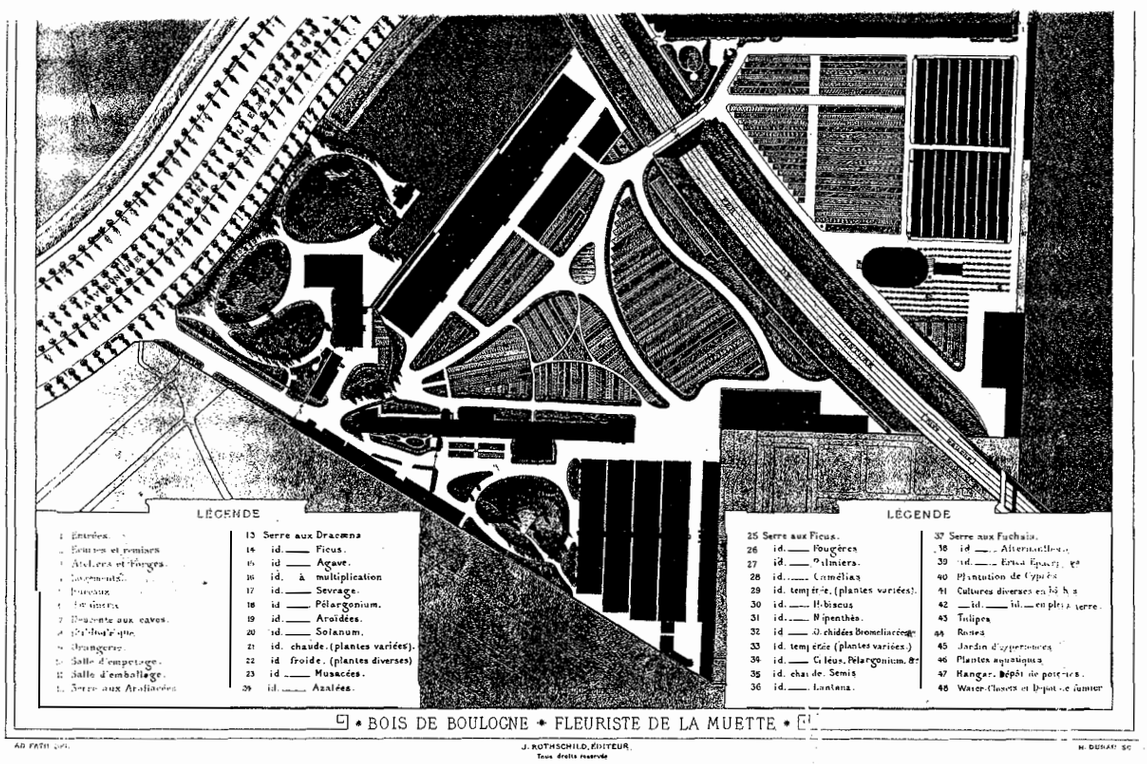
Fig. 326.



The Sécateur Vauthier.

Figure 61





floriculture (artificial flowermaker)

Figure 62

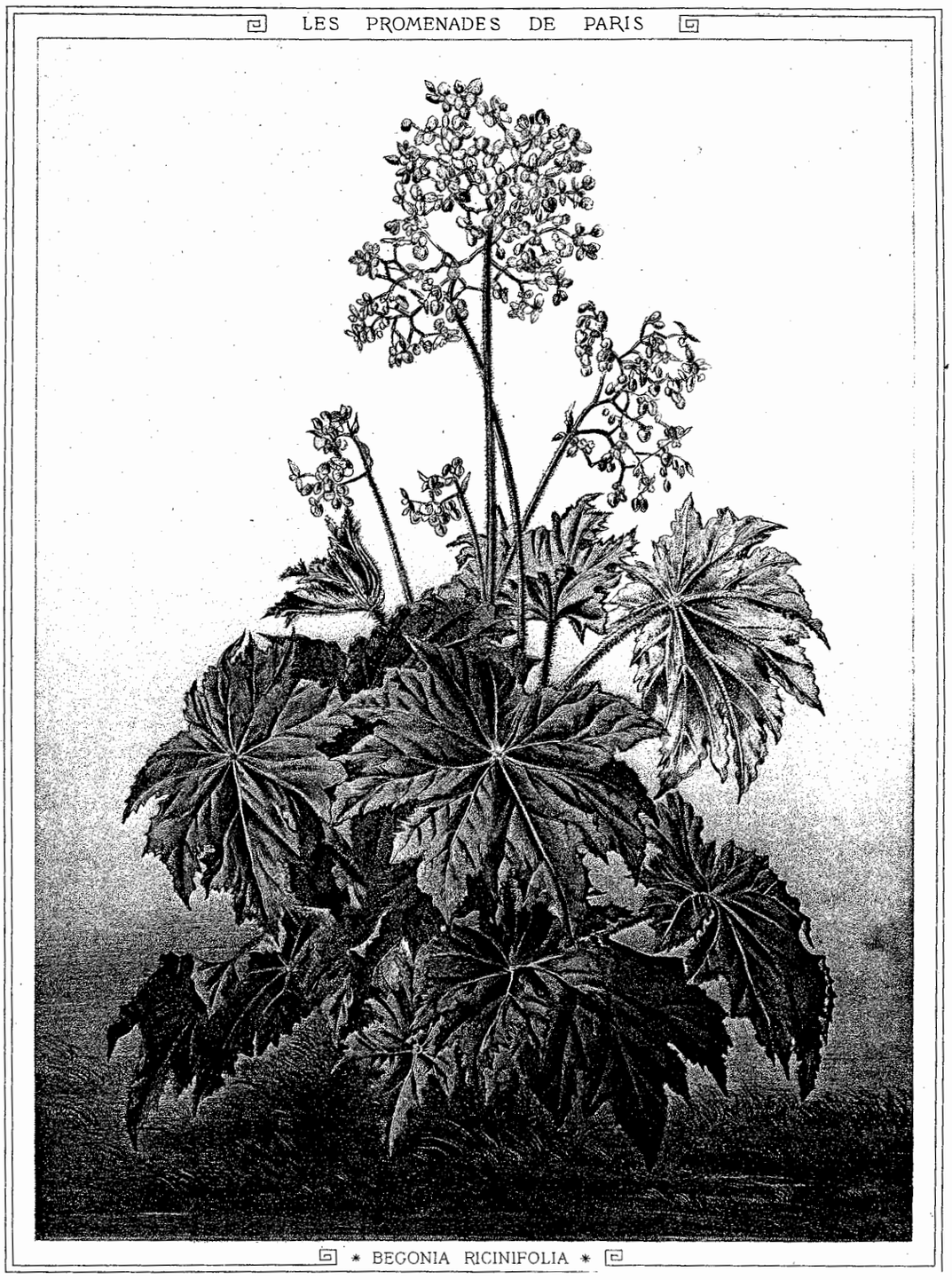


Figure 63

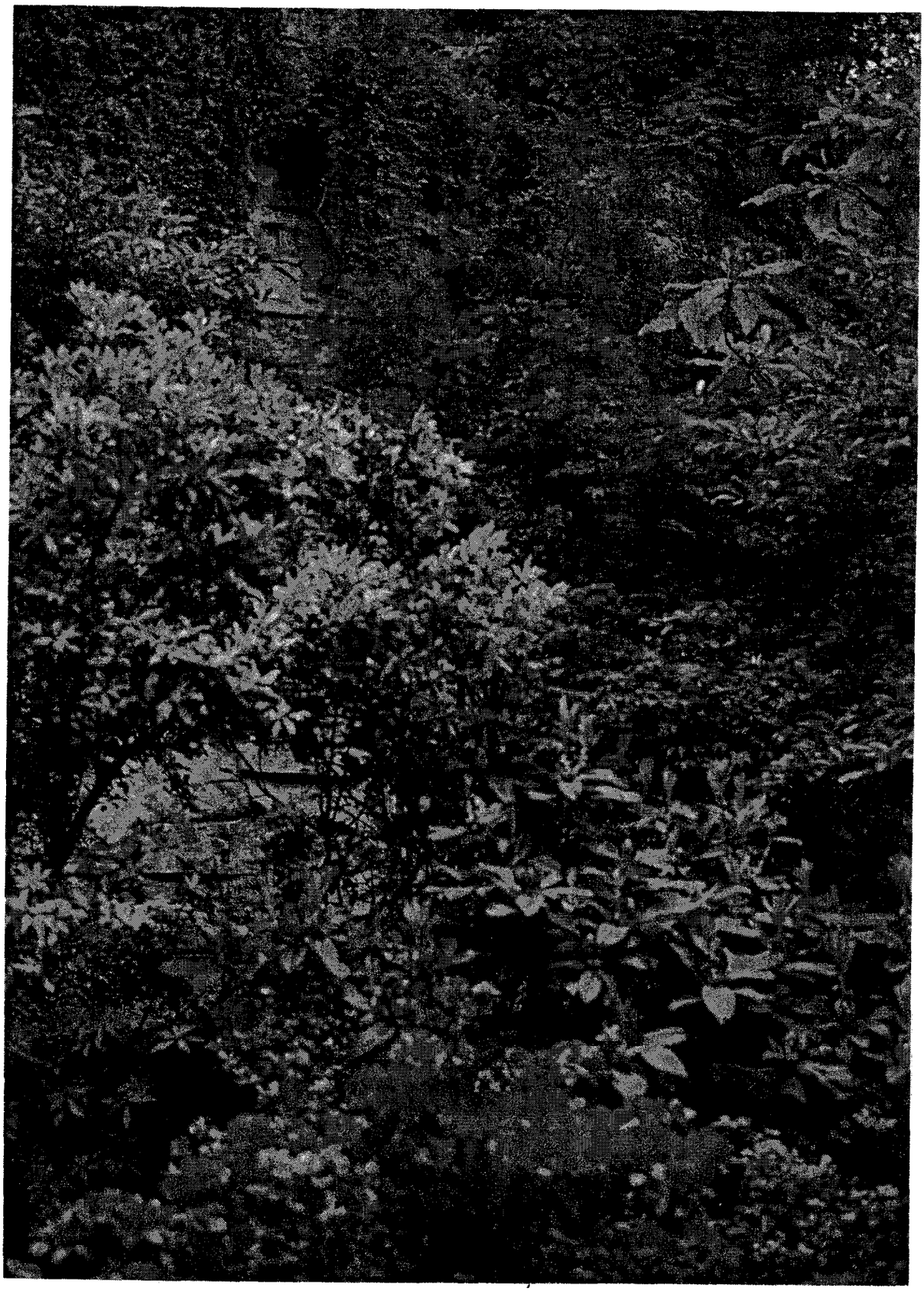


Figure 64

Figure 65

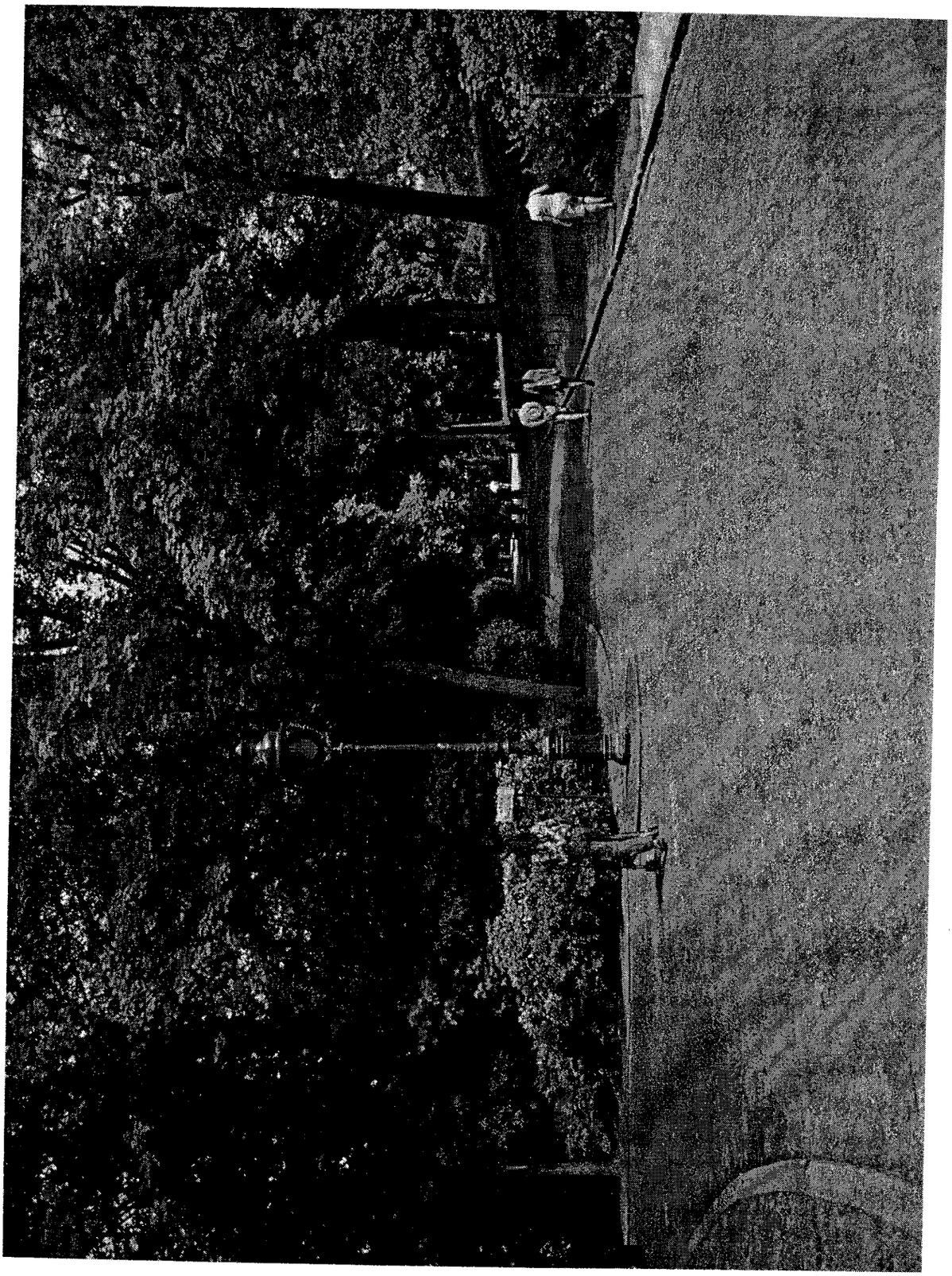
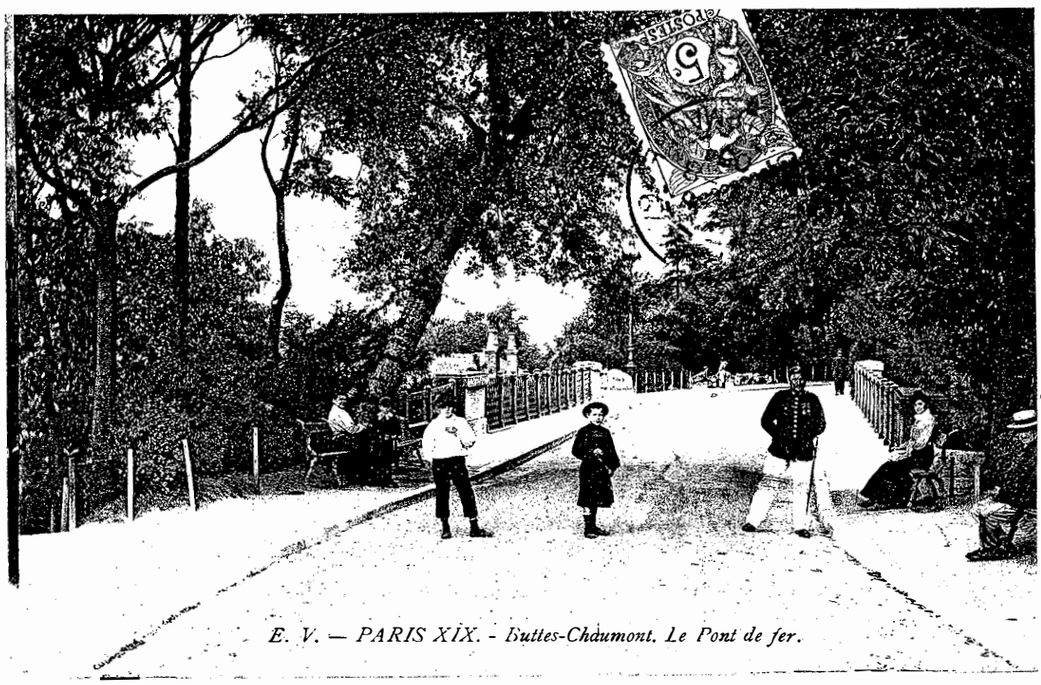


Figure 66



E. V. — PARIS XIX. - Buttes-Chaumont. Le Pont de fer.

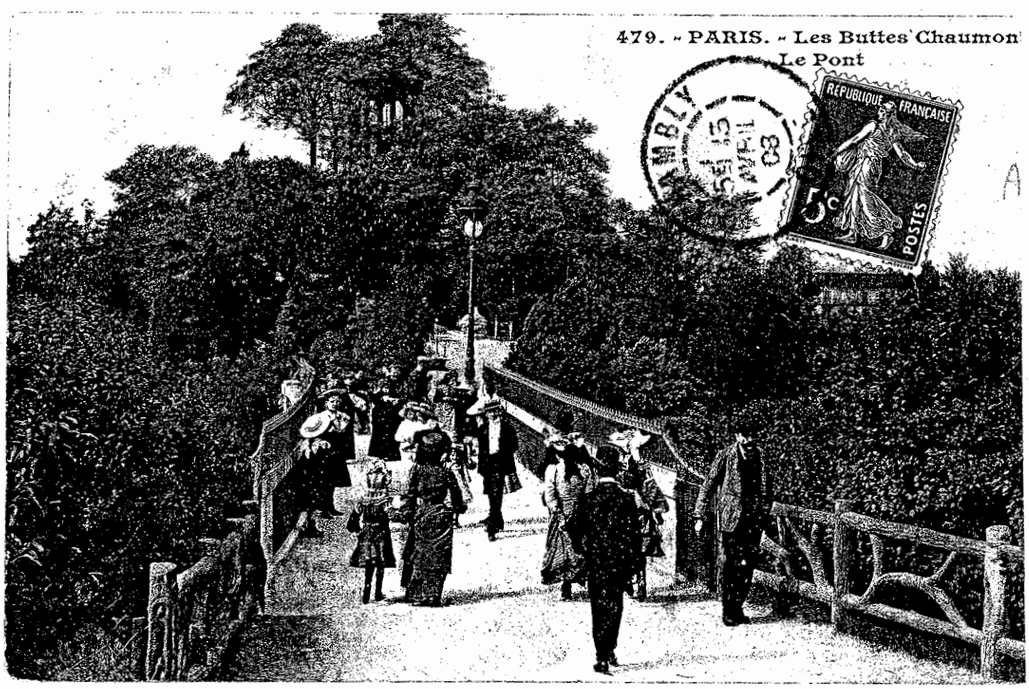


Figure 67

Figure 68

TOUT PARIS
35 — Buttes-Chaumont (XIXe arrt)
Sur le Pont suspendu

Figure 69

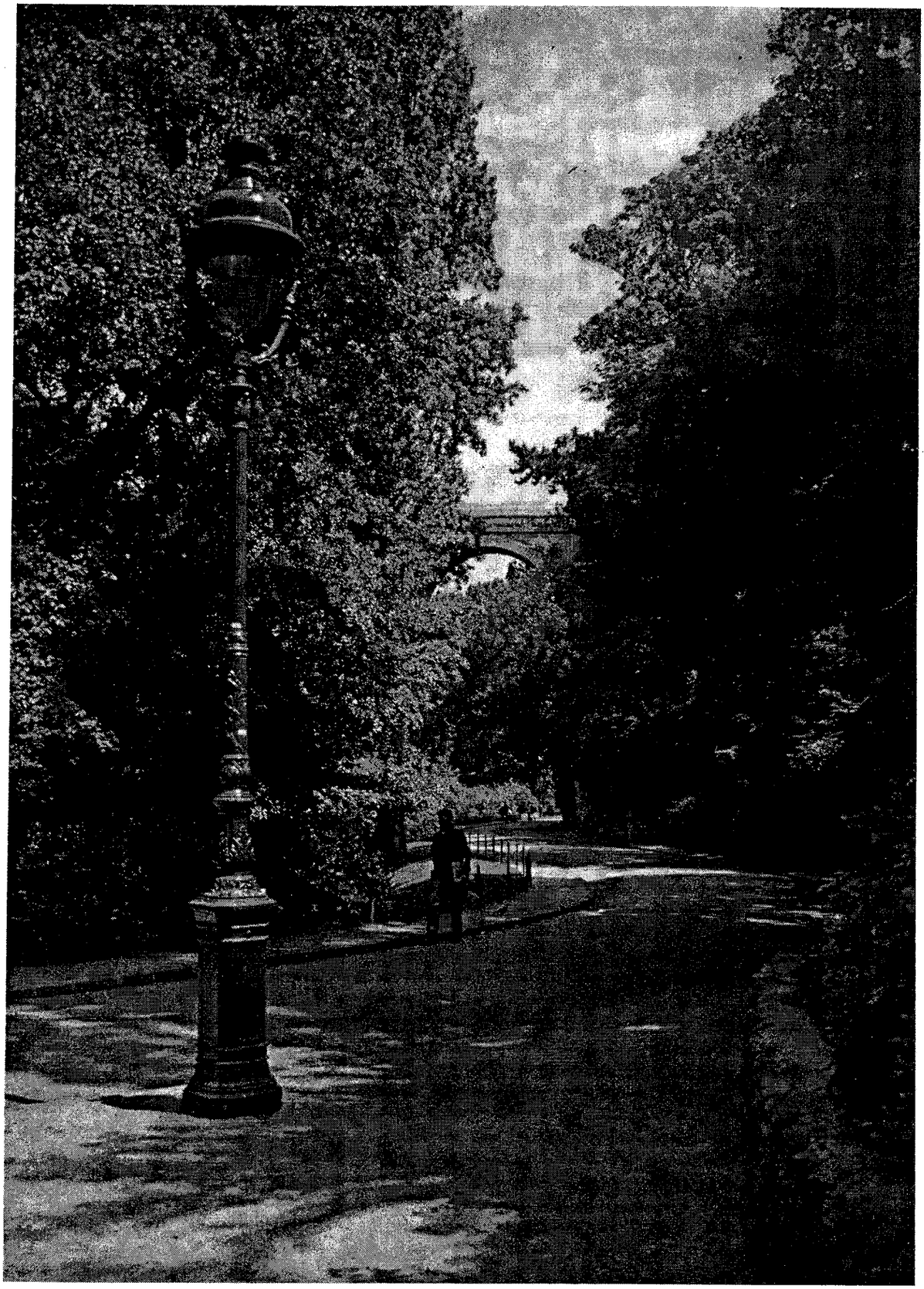


Figure 70

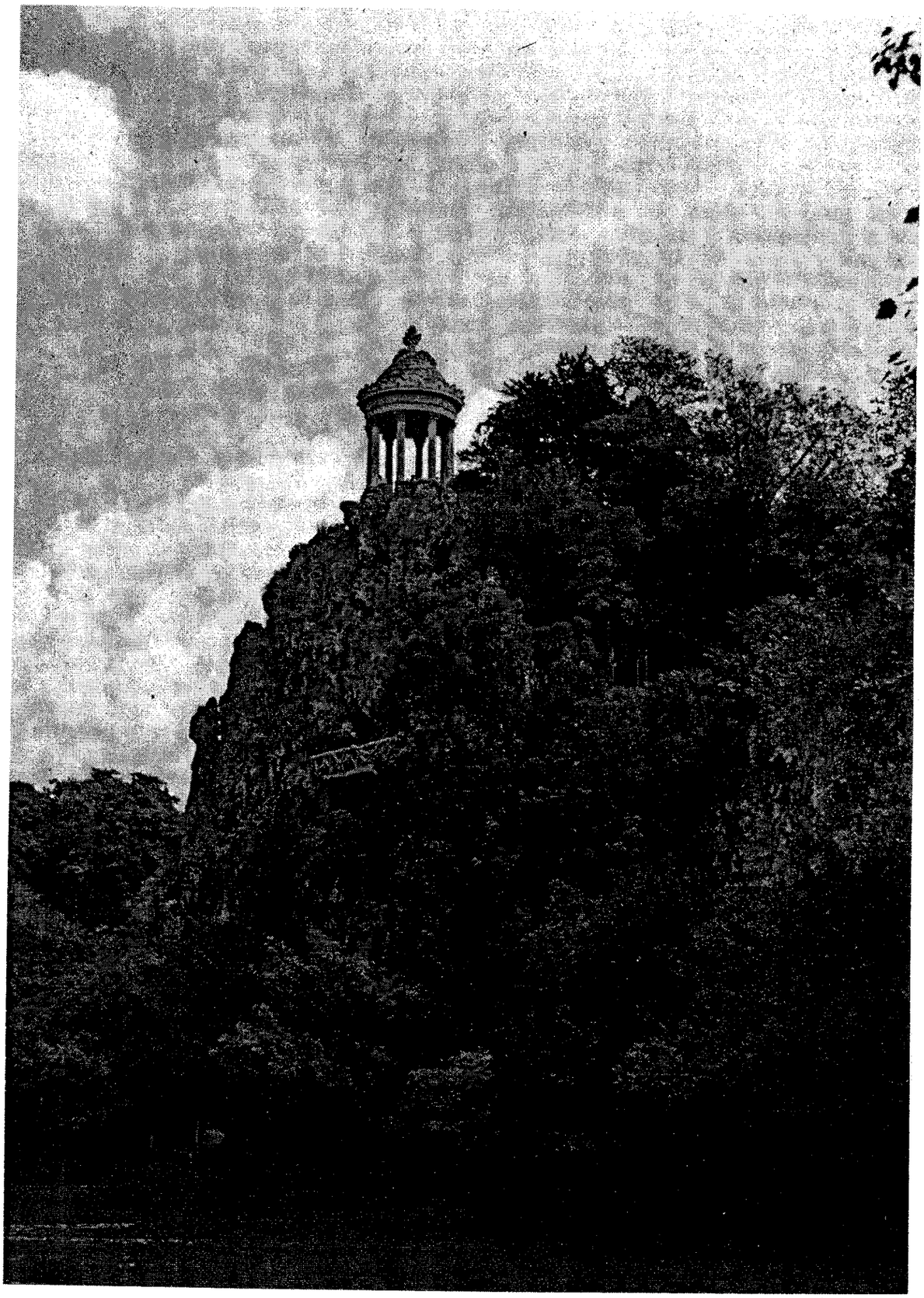


Figure 71

Figure 72