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SOCIETY OF
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HISTORIANS

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Source: *Journal of the Society of Architectural Historians*, Vol. 74, No. 1 (March 2015), pp. 13-40

Published by: [University of California Press](#) on behalf of the [Society of Architectural Historians](#)

Stable URL: <http://www.jstor.org/stable/10.1525/jsah.2015.74.1.13>

Accessed: 20/09/2015 07:21

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Le Corbusier and Postwar America: The TVA and *Béton Brut*

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As France emerged from World War II under Charles de Gaulle's leadership, Le Corbusier positioned himself to assume a key role in the nation's architectural and urban reconstruction.¹ To do so he would continue his wartime direction of ASCORAL (Assemblée de Constructeurs pour une Rénovation Architecturale) and its series of books aimed at French architectural and urban redevelopment, rehabilitate his professional career after a thwarted episode of Vichy activity through professional patronage as adviser to Eugène Claudius-Petit (1907–89), organize and preside over a governmental cultural relations mission to the United States, engage professional colleagues in Europe and the United States through such organizations as CIAM and the Atelier de Bâisseurs (ATBAT), and plunge into a range of new initiatives in France as well as in other parts of the globe.² These initiatives included plans for the reconstruction of towns at Saint-Dié in the Vosges region of eastern France, La Rochelle-Pallice, and Nemours in Algeria, as well as the design and construction of the Unité d'Habitation in Marseille (1945–52). "Since 1945," Le Corbusier later claimed, "I've led the architectural movement in France."³ The United States held a central role in his postwar activity, for in early 1946 it was to New York City and then to the Tennessee Valley (Figure 1) that Le Corbusier and Claudius-Petit traveled after Raoul Dautry, minister of reconstruction and urban planning in France, had scotched the architect's prospects for developing the valley of the Seine from Le Havre to Paris, even though other important reconstruction

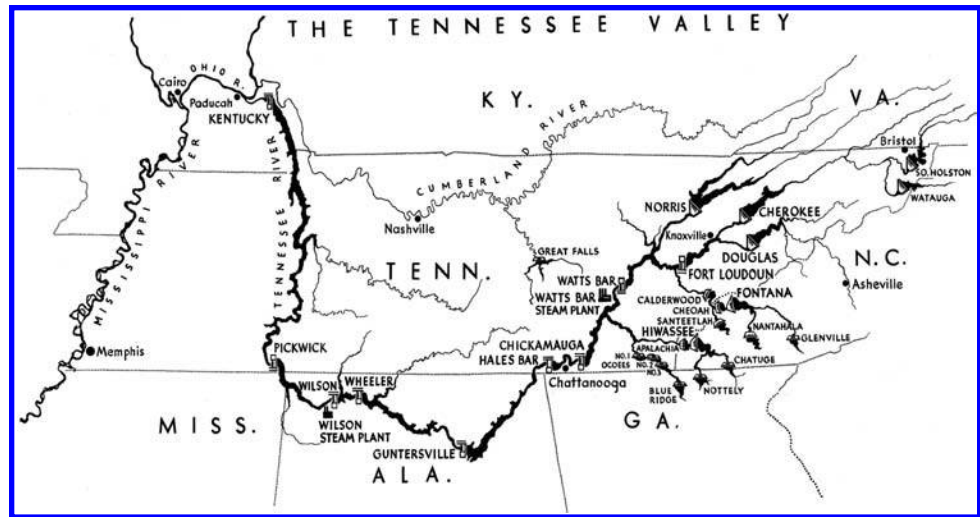
initiatives still lay before him.⁴ Such postwar projects coincided with a formal shift in Le Corbusier's work, which emphasized architectural mass over volume as well as a renewed interest in infrastructure. This shift joined with other evolving tendencies, which advanced curvilinear forms and a sensitivity to regional, vernacular, and humanistic concerns.

In this article I will address a series of multifaceted and interrelated questions centered on the postwar transatlantic reception of the Tennessee Valley Authority (TVA) and Le Corbusier's firsthand encounter with its projects. What agents helped to facilitate Le Corbusier's return to America after World War II and to rehabilitate his architectural career? Why was his trip to the Tennessee Valley so critical immediately after the war? To what extent did Le Corbusier's understanding of the TVA draw on the reconnaissance of other mission team members? How did his encounter with the TVA inform French aspirations for reconstruction? In what way did Le Corbusier's experience of the TVA and its iconic dams contribute to the broad redirection in his work, particularly in Marseille, where it would advance his professional rehabilitation after the war? How does the impact of the TVA dams on the Marseille Unité precipitate a new reading of the building and thereby expand the interpretation of Reyner Banham and others as one embedded largely in Mediterranean culture?

By Le Corbusier's own account his postwar return to the United States, deferred since his previous trip in 1935, was nothing short of heroic. Following the French Liberation he boarded the Liberty ship *Vernon S. Hood* in late December 1945 for the lengthy crossing.⁵ The architect was not alone but in the company of Claudius-Petit, a former leader in the French Resistance who was then a *député* in France's National Consultative Assembly as well as vice president of its

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Figure 1 Map, Tennessee Valley region (Historic Photographic Collection, K-2921; RG 142 Records of the Tennessee Valley Authority, National Archives at Atlanta, Morrow, Georgia).



Commission on Reconstruction and Urban Planning.⁶ Le Corbusier's plan to "carry out a small mission with Claudius" was actually an official trip sponsored by the Direction Générale des Relations Culturelles under the Ministry of Foreign Affairs.⁷ While the United States was the general destination, the Tennessee Valley remained their principal objective, a trip that would culminate a long-held ambition for both.

At the onset of World War II French urbanists focused on wartime needs and also on postwar planning. By early 1944 Claudius-Petit began to promote the bold idea that reconstruction could be responsive to modernism, even before he met Le Corbusier in October of that year.⁸ He shared Le Corbusier's modernist belief that new construction, like urbanism, should be "an expression of an era."⁹ During the course of his Resistance work in North Africa and as a *député* to the Consultative Assembly, Claudius-Petit brought together a group of architects, engineers, and technicians dedicated both to Le Corbusier's ideas and to public sector reconstruction. With the political assistance of Henri Laugier, then de Gaulle's director of cultural relations, Claudius-Petit was named adviser on urban affairs to a national educational commission on youth working with Pierre-André Emery (1903–82), André Sive (1899–1958), Michel Écochard (1905–85), and other young modernists who had gravitated to North Africa in the early 1940s. With them Claudius-Petit published a small planning book, *Problèmes d'urbanisme contemporain* (1944), which adopted both Corbusian modernism and the TVA as models for French renewal. *Problèmes* was in sync with the principles of the Athens Charter, the CIAM cause, and the tenets of ASCORAL concerned with "a practical theory of city planning."¹⁰ Claudius-Petit later recalled that the report emphasized Corbusian concerns of "prefabrication, sanitary equipment, ventilation, sunlight, sound insulation and

thermal insulation ... space, harmony, traffic separated from 'pedestrian' pathways in cities."¹¹ The report also drew on the humanist rhetoric that suffused Le Corbusier's *Quand les cathédrales étaient blanches* (1937), placing the machine in the service of humankind so that social politics could influence urban development.¹² Commingling two models, Claudius-Petit thought that no path to reconstruction was more far-sighted than that provided by Corbusian modernism, and no redevelopment model was more instructive than the TVA. In guiding France toward postwar recovery, Claudius-Petit and his colleagues had picked up on the TVA trope of "man in harmony with nature," which had also been a central theme of Le Corbusier's mandate for the CIAM 4 congress in 1933 and the Athens Charter.¹³ Moreover, *Problèmes* expressed objectives similar to those of Le Corbusier, the charter, and the TVA when it advocated maintaining the integrity of the individual and the family in the "collective life" of new development.¹⁴

Claudius-Petit looked specifically to the TVA enterprise as a model for French regional planning in which national policy might bring together a wide range of activities, programs, and amenities across a large territory, facilitate new construction, and replace slums with hygienic housing. Claudius-Petit himself considered the report as "preparation for sending to the United States an official mission responsible for identifying the best that had been built before and during the hostilities, learning about the methods, techniques employed in the fields of construction and management of large areas like the Tennessee Valley."¹⁵ Thus TVA regional planning and development were of special interest to French reconstruction because of the mandate to "re-shape France as a physical and economic unit."¹⁶ While endorsing Claudius-Petit's report, which emphasized "rethinking our cities ... to become aware of problems and opportunities of our time," Le Corbusier appreciated the

importance of the TVA as a model for the integrative development of an entire region.¹⁷ In September 1944, following the Liberation of Paris, Claudius-Petit made plans to return to France to begin a program of reconstruction. Two months later he would make proposals to Le Corbusier, offer to lobby de Gaulle on behalf of the Athens Charter mandate, and join Le Corbusier's ASCORAL group. Through his many initiatives Claudius-Petit became Le Corbusier's major supporter and played a critical role in the postwar rehabilitation of his professional career.

From January 1941 Le Corbusier attempted to engage Marshal Pétain, whose Vichy initiatives, including autocratic centralized planning, appealed to him. While at Vichy he had found the "ambiance very favorable" and told Sigfried Giedion that the work he was proposing there, most notably his plan for Algiers, would be consonant with CIAM principles.¹⁸ But by July 1942 his Algiers plan had been rejected by the Vichy government and he returned to Paris. The following March he formed ASCORAL.¹⁹ However, Le Corbusier seems not to have taken the measure of his own actions. He never apologized for his involvement with the Vichy government or even publicly acknowledged it.²⁰ This dark episode in his wartime pursuits did not sit well with European colleagues on either side of the Atlantic, even though American professional circles were largely unaware of his Vichy activity, referring to him as one of "France's non-collaborationist architects."²¹ It was up to Claudius-Petit to be Le Corbusier's postwar apologist. Years later he would write that their Liberty ship crossing forged his friendship with "this man so unrecognized ... so generally misunderstood."²²

Le Corbusier's ambitions for postwar reconstruction began to take shape in late September 1944 with redevelopment plans for the valley of the Seine in which he projected the involvement of ASCORAL and CIAM-France. He envisioned a regional plan for the 134-mile valley of the Seine from Le Havre to Paris with the intention of restoring war-damaged Rouen as a "city of art."²³ In January 1945, however, Dautry, head of the French Ministry of Reconstruction and Urban Planning, declined Le Corbusier's bid for the Seine valley and Rouen, giving him instead a less important commission for the reconstruction of the port city of La Rochelle-Pallice.²⁴ Claudius-Petit criticized Dautry's rejection of Le Corbusier's bold regional plan to restore the port (Le Havre), the city of Rouen, and the Seine valley with industrial plants, and even Paris and its suburbs. Combining architecture, urbanism, and land development, the prospective enterprise was inspired by Tennessee Valley Authority planning.²⁵ In reaction to Claudius-Petit's support for Le Corbusier's plan, Dautry countered, "Le Havre to Le Corbusier? It is not possible!" and, instead, offered that project to Auguste Perret.²⁶ Nonetheless, the following November, in deference to Claudius-Petit, Dautry would give

Le Corbusier the commission for a "Unité de grandeur conforme," later known as the Unité d'Habitation in Marseille.²⁷

With an end to World War II in sight, the French leadership was keenly aware that the country's diminished home front stood in sharp contrast to the vitality of American developments. The war had virtually halted new construction in France. French building methods were still largely artisan based, especially for housing.²⁸ Industrialization would be a critical factor in reconstruction. In an effort to learn from developments overseas, the French government organized a number of task forces to inspect and report on American technology, management, and productivity, with the aim of upgrading France's own infrastructure and methods of production.²⁹

In his capacity as adviser to Claudius-Petit and at his request, Le Corbusier responded in January 1945 to a call from the French Ministry of Foreign Affairs by organizing a group of architects and engineers to investigate building and construction in the United States. The participants in this "productivity mission" hoped that their initiatives would prepare the groundwork for a "fruitful era of economic and intellectual relations in the field of building [architecture and planning] between France and the United States."³⁰ At the same time, Le Corbusier turned his attention to other projects, including La Rochelle-Pallice, Nemours, and his assignment as reconstruction adviser to the town of Saint-Dié. Claudius-Petit and Le Corbusier now focused on the upcoming mission to the United States. By August 1945, a team of five designers had signed on to a tour projected to last between three and six months.³¹ All were partisans of modernism and especially of Le Corbusier's work and ideas. Three had been drawn from Claudius-Petit's North African group: Pierre-André Emery, a Swiss architect who had worked in Le Corbusier's atelier from 1924 to 1926 and had now become his trusted friend; André Sive, a Hungarian-born friend of Le Corbusier who had been a founding member of CIAM and had also worked on prefabrication with Jean Prouvé; and Michel Écochard, an experienced architect and planner who had previously done restoration work and urban planning in Lebanon and Syria.³² The others were Gérard Hanning (1919–80), a British-born architect who had worked in Le Corbusier's atelier throughout the war and assisted him in developing his Modulor, and Vladimir Bodiansky (1894–1966), a Ukrainian-born civil and aeronautical engineer who had worked in the automobile and aviation industries and was a specialist in building prefabrication.³³

The French Mission Arrives in New York

Four members of the French mission—Sive, Écochard, Hanning, and Bodiansky—reached New York City on 14 September 1945. Emery would arrive in mid-November but not reach the working party until their reunion in Los

Figure 2 Le Corbusier and Eugène Claudius-Petit, construction site, Unité d'Habitation, Marseille (Fondation Le Corbusier, Paris, FLC L1.16.2; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



Angeles on 5 December. Contrary to the original plan, Le Corbusier and Claudius-Petit would not land in New York until early January 1946 (Figure 2), the master plan for Saint-Dié having delayed Le Corbusier's departure, and they would never join their colleagues' transcontinental tour. In New York Bodiansky took the lead in organizing the Le Corbusier–founded Atelier de Bâisseurs, conceived as a building cooperative composed of engineers, architects, technicians, and administrators. Many of its members, including José Luis Sert, Stamo Papadaki, Ernst Weissmann, Pierre Chareau, and Sigfried Giedion, were then in the United States. Bodiansky's research on American buildings and construction would later inform the ATBAT team charged with constructing Le Corbusier's postwar buildings.

In the spring of 1945, Le Corbusier conceived of the mission as a study tour examining four aspects of American productivity: (1) city planning departments, (2) construction methods, (3) prefabrication, and (4) industrial architecture.³⁴ More specifically, it would focus on heavy industry, especially the New Deal program of industrial and planning redevelopment, most notably at the TVA.³⁵ He charged the team with visiting American infrastructure, including highways and bridges, the Port of New York, airports, and both rail and subway systems, in addition to housing, schools, hospitals, and offices, among other sites.³⁶ He instructed team members to collect documentation for use in future publications.³⁷ From his characteristically chauvinistic perspective, Le Corbusier even mandated a preconceived "attitude" for the mission: "confidence in France, where [there] are ideas. The U.S.A. absorbs many French ideas."³⁸ Thus, although the mission was to learn from the United States, its members were coached to endorse French hegemony by finding evidence of American progress that derived from French thought. The architect envisioned an ambitious outcome of four books, one on

each of the "four functions" of the CIAM Athens Charter: to live (*habiter*), to work (*travailler*), to grow in body and mind (*cultiver*), and to circulate (*circuler*).³⁹ During the fall of 1945 Bodiansky submitted bimonthly reports of the group's activities to Le Corbusier while Écochard kept his own *carnet de route* (travel notebook) with explanatory sketches.⁴⁰

The mission's members envisioned an ambitious coast-to-coast itinerary that would take them from New York to Los Angeles and San Francisco by way of the Tennessee Valley and Boulder (later Hoover) Dam, returning from Seattle to New York via Chicago with dozens of stops between. They received assistance from members of New York CIAM, including Sert, Papadaki, Chareau, Oscar Nitzschke, Giedion, and American architects Paul Nelson and Wallace Harrison, as they did from Joseph Hudnut, Walter Gropius, and Marcel Breuer in Boston.⁴¹ In New York they went to an exhibition of Le Corbusier's work at Rockefeller Center.⁴² While preparing for the upcoming tour, they learned about prefabrication methods and automation during visits to Sert and Paul Wiener's office and to the General Panel Corporation and Dodge Corporation. They also visited the New York City Housing Authority, the New York City Planning Commission, and the Regional Planning Association.⁴³ To allow for the fullest experience of America's parkways and such regional sites as the TVA, the group chose to travel by car, and Sive negotiated the purchase of a secondhand Packard for the transcontinental tour.⁴⁴ The mission's investigation of the TVA served as a scouting expedition for Le Corbusier and Claudius-Petit, who would follow later.

The Mission Reaches the Tennessee Valley

After a delay, the mission team left New York on 8 November and reached the Tennessee Valley the following week.



Figure 3 Roland Wank, principal architect, and staff, Norris Dam, TVA, 1933–36 (Library of Congress, Prints & Photographs Division, Farm Security Administration Collection, LC-USW33-015628-ZC).

The team focused not only on the TVA's technical advances but also on its social, political, and economic dimensions as a sustainable system of regional development. At the TVA electrical power was a tool of public policy; TVA dams would make the Tennessee River more navigable as well as promote flood control, reforestation, agriculture, and industry.⁴⁵ Moreover, generating electricity over the seven-state watershed of the river basin covering 40,000 square miles fostered economic and social progress. During their two weeks in Knoxville, where the administrative center of the TVA was located, they met with John Ferris, director of the authority's commerce department. He introduced them to TVA propaganda advancing the idea that public policy resulted from cooperation among the states rather than from coercion by the federal government.⁴⁶ They learned that TVA planning was dedicated to the regeneration of soil degraded by erosion and the production of electricity through the building of dams. Most impressive was the town of Norris, a model community built for workers.⁴⁷ There Tracy Augur, a former member of Clarence Stein and Lewis Mumford's Regional Planning Association and the planner of Norris Village (1933–35), had followed garden city ideals. The mission team also took great interest in the pioneering methods of industrialized housing introduced by Carroll Towne, the village's chief engineer and a specialist in prefabrication.⁴⁸

Of all the TVA highlights, the most compelling were the dams. The mission visited eight: Norris, Cherokee, Fontana, Fort Loudoun, Watts Bar, Wheeler, Wilson, and Pickwick. Some, like Norris and Fontana, were storage dams and not

only adapted to the topography of their respective sites but also integrated into a comprehensive program including tourism. Écochard was impressed with Norris Dam (1934–36; Figure 3) and especially the “very beautiful” façade of its powerhouse, which consisted of distinctively articulated bare concrete. He called this rough exposed concrete “*béton brut de décoffrage*” (literally, raw or untreated concrete at its stripping or as it emerged from its formwork) because the imprint of its formwork or shuttering was disposed in alternating horizontal and vertical bands (Figure 4).⁴⁹ Norris launched the first powerhouse of the first TVA dam, designed by Roland Wank, who served as chief architect. Trained in Hungary and Czechoslovakia, Wank practiced in Vienna before immigrating to the United States in 1924.⁵⁰ Wank's “Viennese checkerboard” treatment of concrete was both a functional and an aesthetic response. Intentionally rough, the marks of its formwork served to conceal color variations and other imperfections in the concrete and also to break down the scale.⁵¹ Écochard's concept of *béton brut de décoffrage*, which he represented in a sketch of the concrete checkerboard pattern at the Norris powerhouse (Figure 5), would resonate in the French architectural press. It would appear in Le Corbusier's later work and in that of other architects from the 1950s as evidence of an emerging “brutalism,” a concept promoted by Banham and discussed below.

The mission team also went on excursions to other dams, including the newest, Fontana (1941–44), which turned out to be the summit of their TVA experience, its power plant a “revelation.” Having spent more than two months abroad,

Figure 4 Roland Wank, principal architect, and staff, Norris Dam, TVA, powerhouse and visitors' reception room, 1933–36 (Library of Congress, Prints & Photographs Division, Farm Security Administration Collection, LC-USW33-015707-C).



Écochard could declare Fontana “the most beautiful building that we saw until now in the U.S.A.” owing to “its simplicity, the perfection of details, the elegance of proportions, the beauty of the rhythm of the bays and their lines” (Figure 6).⁵² Moreover, he observed that Fontana was also finished with *béton brut de décoffrage* in the same checkerboard pattern, the Norris powerhouse serving as a template for other dams.⁵³ In front of that “great work,” Écochard revealed, they had found a “perfect harmony between the architects and engineers.”⁵⁴ As Écochard later expressed, “The beauty of the dams and their infrastructure ... satisfied me both aesthetically and practically.”⁵⁵

The French mission considered the TVA a successful demonstration of social enterprise. There President Roosevelt and his agents had put forth a “well-posed technical problem with a ‘philosophy’ ” implemented by effective legislation.⁵⁶ According to Emery, Roosevelt’s vision served as an object lesson that a “deprived” region could regenerate

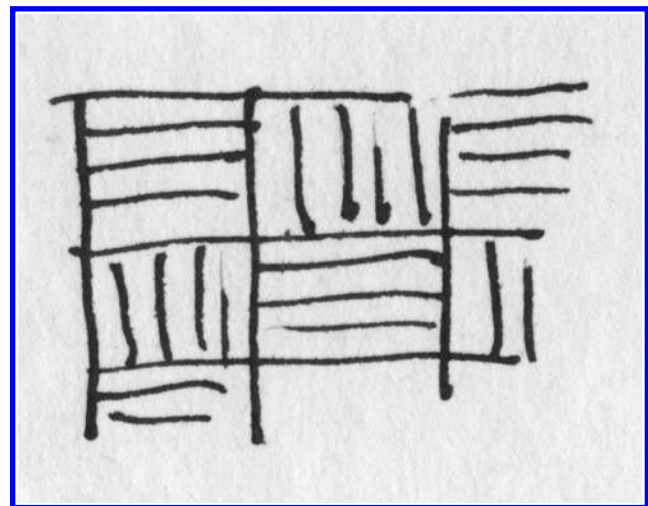


Figure 5 Michel Écochard, sketch of *béton brut décoffrage*, Norris Dam powerhouse, 1945 (Michel Écochard, “Carnet de route,” Fondation Le Corbusier, Paris, FLC D1-13, 232; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



Figure 6 Fontana Dam, powerhouse interior, 1942–44 (Historic Photographic Collection, K-3076, Tennessee Valley Authority; courtesy of the Tennessee Valley Authority).

and create “wealth, even if the entire nation is on the brink of bankruptcy.”⁵⁷ Écochard thought this New Deal public works program showed the strength of American analysis, especially in technical details and in its mode of employing the same materials as Europeans, only “pushed farther” through “more efficient” methods. It was not that the Americans knew more about urban theory, he believed, but that they could analyze specific problems posed by different population groups under different conditions of place and habitat, rather than resort to generalizations. Such technical and legislative accomplishments with respect to well-executed regional planning, flood control, rural electrification, river flow, hygiene, agriculture, and soil regeneration revealed, Écochard concluded, that even though Americans in general might be more skilled at analysis, their work at the TVA was nonetheless the product of rigorous synthesis.⁵⁸

From the Tennessee Valley the group fanned out across the United States, driving on sweeping concrete highways they had not experienced in Europe. They traveled to Texas and New Mexico, the Grand Canyon, and Boulder (Hoover) Dam before arriving in Los Angeles in early December to join Emery, who arrived there by train.⁵⁹ With CIAM member Richard Neutra they visited his Channel Heights housing project (1942) and also saw the Kaiser Steel plant at Fontana near Los Angeles.⁶⁰ On their return from the West Coast the mission team would break up, with Hanning leaving from Seattle, Écochard from Chicago, and Bodiansky

from Detroit.⁶¹ Sive and Emery were left to drive the Packard back to New York. Le Corbusier and Claudius-Petit finally arrived in New York on 9 January, but a Western Electric strike prevented the two groups from communicating while on tour.⁶²

Claudius-Petit and Le Corbusier: Preparations and Expectations

On the eve of their arrival in the United States, what prepared Claudius-Petit and Le Corbusier for their trip and what were their expectations? Claudius-Petit had no first-hand knowledge of the New World. His most significant experience with American technological prowess had come during his wartime years in North Africa, where he encountered the Caterpillar tractors with which Allied forces had constructed new airports.⁶³ He saw his role on the journey as twofold: to support Le Corbusier’s efforts to secure commissions and to garner American assistance for postwar reconstruction in France.⁶⁴ Le Corbusier had set his sights on a triumphant return to the United States since his first visit in 1935. Having weathered his earlier disappointment of returning home to France with no commissions, for which he blamed “timid” Americans, his expectations for this trip were still palpable.⁶⁵

Le Corbusier’s intense interest in the TVA as both a regional plan and a societal synthesis flowed from the

Figure 7 Lincoln Express [elevated] Highway, Newark, New Jersey, 1934 (Le Corbusier, *La Ville Radieuse* [Paris: Éditions de l'Architecture d'Aujourd'hui, 1935], 34; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



Figure 8 Le Corbusier, Plan Obus A, Algiers, photomontage, 1931–32 (Le Corbusier, *La Ville Radieuse* [Paris: Éditions de l'Architecture d'Aujourd'hui, 1935], 236, Fondation Le Corbusier, Paris, FLC L1-1, 63; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



conceptual framework that shaped his work and ideas during the early 1930s, at a time when he produced many rhetorical writings but few buildings. That engagement intersected with vernacular and environmental, humanistic, and societal concerns, which he addressed in his project for a Radiant City (1935) and in his books *La Ville Radieuse* (1935) and *Quand les cathédrales étaient blanches*.⁶⁶ This prewar agenda led him to embrace the CIAM 4 concept of a “second era of the machine age” as an “era of harmony.”⁶⁷ Moreover, in his work of the 1930s he had already begun to focus on the

union of architecture and infrastructure, drawn in part from his admiration for the American elevated highway (Figure 7), as evident, for example, in the large-scale concrete structure of his Plan Obus A in Algiers (1931–32; Figure 8).⁶⁸

As Le Corbusier would discover in the Tennessee Valley, many of the themes that had shaped his ideas about a second machine age were also embodied in the TVA: an affective relationship between modern building techniques and society, notions of collective identity in public works and social planning, monumental plastic expression of concrete, the

adjustment of infrastructure to topography, land-use policies, and regional planning based on symbiotic relationships. Moreover, the TVA provided a paradigm for large-scale regeneration. The abuse and neglect of natural resources as well as the severe flooding and erosion that had ravaged the Tennessee Valley region before New Deal intervention, Le Corbusier and Claudius-Petit presumed, might be compared to devastation caused by war. They recognized that Roosevelt's TVA program had successfully integrated technical achievement and collaborative working methods. The new commitment to building as a "social" act, in the sense that architects would plan "for the well-being of a broad social group," had become a widely held concept by the end of the war.⁶⁹ Technical, artistic, and social collaboration was also a tenet of ATBAT, which Le Corbusier (like Bodiansky) conceived as a "cooperative" workshop, albeit under his direction.⁷⁰ But there was a caveat attached to Le Corbusier's rhetoric about the TVA. Concurrent with the most expansive phase of the TVA effort during the early 1940s, including the building of such dams as Fontana and the increased production of electrical power, the United States had been engaged in World War II, which generated industrial production and profits. Le Corbusier criticized the resulting abundance as double-edged, since America's capitalist economy also produced consumer waste. Still, he would cleave to inflated expectations for commissions and collaborations emerging from this trip because he believed the United States was the "home of mass-production."⁷¹

Le Corbusier and Claudius-Petit Arrive in the United States

During his first week in New York City Le Corbusier reunited with many of his CIAM colleagues, including Papadaki, Sert, and Serge Chermayeff. He also saw his American friends Harrison, Hudnut, and James Johnson Sweeney and met with Konrad Wachsmann, his former atelier apprentice, who, with Walter Gropius, had recently founded the General Panel Corporation. Le Corbusier claimed he had "arrived too late to take part in the work of these friends" but admired Wachsmann's "excellent combined panels," which he hoped could be deployed in the first iteration of the Marseille Unité project as well as in La Rochelle-Pallice and Saint-Dié.⁷² Given the postwar shortage of steel in France, the two visitors were particularly interested in Wachsmann and Gropius's Packaged House, which relied on a system of load-bearing panels. Later Claudius-Petit recalled that he and Le Corbusier "discovered the means that the Americans have put in place in order to construct without steel or with an economy of steel ... or to economize no matter what material, because they worked extraordinarily in this domain."⁷³

In addition to giving two radio broadcasts intended for Francophone audiences, Le Corbusier met in New York with Henry Kaiser, builder of the Liberty ships as well as the Hoover and Grand Coulee Dams; Kaiser had planned to retool plants to build mass-produced houses in the postwar period but he changed his mind, producing instead what would become Kaiser and Frazer cars.⁷⁴ Like Écochard, Le Corbusier must have been impressed not only with Kaiser's organizational acumen and productivity but also with his introduction of a social welfare system (Fontana steel mill hospital and Kaiser Permanente health care) into industry. However, Le Corbusier rejected Kaiser's plan to build cars, and he was equally dismissive of the industrialist's earlier intention to build millions of single-family houses because they would have encouraged suburban sprawl. In his view, the Kaiser house, well equipped with the latest appliances, paralleled the inefficient American car, whose design responded to the consumer demand for fashionable streamlining and power rather than an emphasis on small scale and economy of use.⁷⁵ Moreover, Le Corbusier feared that suburban housing *à l'américaine* would cross the Atlantic, and Claudius-Petit shared this concern.⁷⁶ In 1946 the architect advised Europeans to let the Liberty ships bring over "frigidaires and adorable kitchenettes," along with prefabricated components for Europe's "impeccable dwelling units furnished with all their extensions and common services designed to liberate our wives from domestic slavery," but not single-family prefabricated houses, which would only encourage the expansion of suburbs.⁷⁷ Grafting Kaiser know-how to Old World wisdom and city-building traditions, however, could eliminate suburban commuting and thereby balance work and leisure, a lesson with relevance for Le Corbusier's Marseille Unité.

After just a week in New York Le Corbusier and Claudius-Petit boarded a night train bound for the Tennessee Valley (see Figure 2). In Knoxville on 15 January they met with David Lilienthal (Figure 9), chairman of the TVA and author of *TVA: Democracy on the March* (1944), which Hanning had read and perhaps also Claudius-Petit, thanks to an edition in French.⁷⁸ Le Corbusier and his colleague had already received the benefit of fresh firsthand reports from the mission team and previous accounts about the TVA, particularly from Jane West, an American architect who had worked in Le Corbusier's atelier in 1932 and was subsequently based in Knoxville.⁷⁹ Sert and other CIAM colleagues publicly endorsed the TVA's large-scale planning, in which "entire regions can be revalorized, their economy and physical aspect transformed by the machines that man has at his disposal at this moment."⁸⁰ By 1945 Marcel Lods of French CIAM, among numerous European observers, had also visited the TVA to report on it.⁸¹ Published accounts, together with material the mission acquired,

would enable Le Corbusier to amass a large collection of TVA documents.⁸²

Le Corbusier's visit to Knoxville confirmed that his second-machine-age rhetoric about harmony between man and nature in *La Ville Radieuse* was sympathetic to Lilienthal's. The TVA chairman asserted that the dams allowed men "to work in harmony with the forces of nature," drawing on the potential of the "machine and technology and science," ideas found in his writings on the TVA.⁸³ During their meeting Le Corbusier brought up Lilienthal's theme. The architect later recounted that the chairman's "face lit up at the delightful thought of establishing a reign of harmony ... by undertaking the most gigantic works and co-ordinating the most immense projects: water, motive power, fertilizers, agriculture, transport, industry." Le Corbusier observed that harmony had already been achieved in the Tennessee Valley when territory was "snatched from the grip of erosion" and transformed into "arable land."⁸⁴ To demonstrate the point, he sketched a mound of earth, terraced and contour plowed to prevent soil erosion (Figure 10).⁸⁵ Le Corbusier concluded that "man and nature, laws of nature and calculations which also express the laws of the world, human imagination in search of harmony" could achieve "basic pleasures there."⁸⁶

But Le Corbusier's appreciation of the TVA extended beyond the rhetoric of harmony. He compared the geography of scale between the Tennessee and Seine valleys. Extending 650 miles along the Tennessee River, the TVA system was comparable in size to the whole of France and more extensive than the 134-mile valley of the Seine stretching from Le Havre to Paris, which was a focus of French reconstruction.⁸⁷ If a vast territory like the Tennessee Valley could be successfully renewed, so could the valley of the Seine.

Le Corbusier's trip to Knoxville had a second objective: opportunities for collaboration. He looked to Lilienthal as a power broker, much as he had earlier looked to Adolf Berle, Nelson Rockefeller, and other Americans with whom he had hoped to collaborate in 1935.⁸⁸ To Lilienthal Le Corbusier pitched his Modulor for use in prefabricated housing, such as that he presumably saw the following day during a visit to Fontana Dam.⁸⁹ In 1942 Abraham Geller, under the supervision of Roland Wank, constructed trailer houses known as "prefabricated houses" in the North Carolina hills near Fontana Dam. These portable manufactured houses embodied modernist design principles with projecting flat roofs, stressed-skin plywood walls, and horizontal bands of windows.⁹⁰ But the TVA chairman, who was accustomed to receiving eminent foreign visitors, was not impressed by Le Corbusier's proposition—presumably tendered in halting English.⁹¹ The results of American achievement were already self-evident at Norris, Fontana, and elsewhere in the valley.



Figure 9 David Lilienthal, 1938 (Library of Congress, Prints & Photographs Division, photograph by Harris & Ewing, LC-H22-D-3367).

Aside from meeting with Lilienthal, the purpose of Le Corbusier and Claudius-Petit's three-day trip to Knoxville was to experience both Norris Dam (see Figure 4), about which Écochard and Sert had previously reported, and Fontana Dam. They visited Fontana in the company of Harry Tour, TVA architectural engineer, supervising architect at Norris Dam, and the first mayor of Norris, Tennessee.⁹² These dams made a great impression on the two visitors by virtue of their exposed concrete infrastructures as well as their role within the entire TVA system. Le Corbusier did not record his reactions to the dams individually. However, he recognized that the TVA was "one of the greatest syntheses of modern organization."⁹³ He was also deeply moved as much by the TVA as a sustainable system as by his firsthand experience of it:

Masterly symphonic urbanism. Negligence and greed had impoverished the land, deforested mountains, floods, erosion, desert increasing each year, misery spreading everywhere. *Coup de barre* [a change of course]: symphonic idea. One makes twenty or thirty gigantic dams, one regulates water madness. With these dams there is electricity in abundance, this power produces electrolysis, chemicals, fertilizers With these fertilizers, one regenerates the land, sowing grass that makes

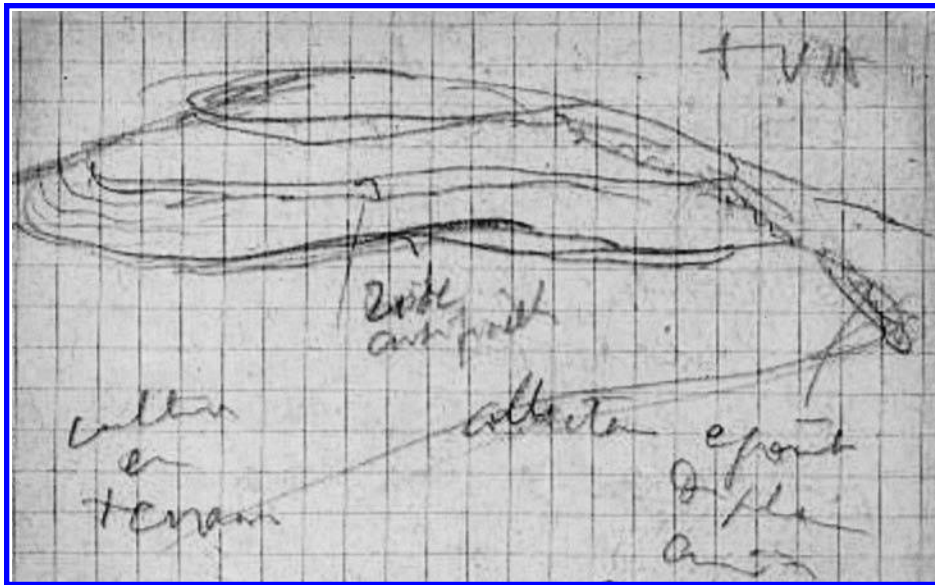


Figure 10 Le Corbusier, sketch of terraced mound of earth, TVA, 1946 (Fondation Le Corbusier, Paris, FLC F3-17, 10-010; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

deep roots, fixes the land, removes erosion, and allows cows to graze in open fields in winter, enriches farmers who have mechanical equipment and electricity. The industry extends into the valley, the boats go back to New Orleans to the depths of the earth through gigantic locks. One of these dams is a marvel of complete agreement and harmony between man and nature. The proportion is almost automatic. It is an edifying spectacle.⁹⁴

Although Le Corbusier visited only Norris and Fontana, he had received the reports of Écochard and Bodiensky on other TVA dams. Drawing on Bruno Taut's idea of collective identity invested in skyscrapers, Le Corbusier conceived of the dam as a collective force equivalent to that of an urban skyscraper.⁹⁵ As he explained in his wartime book *Sur les 4 routes*, a dam is "an essentially modern concept of power." It could produce a somatic response. Describing an earlier visit to a dam undergoing construction before being "covered under torrents of water," he experienced a "feeling of exhilaration" as he observed the "spirals of turbines" fixed to the back, where "there is nothing more lovely, vaster, nearer to those great laws of nature."⁹⁶ Here the union of technical prowess, regional interests, humanistic concerns, and poetic expression gave further evidence of a second machine age. Having now experienced TVA power, Le Corbusier could affirm firsthand that its dams were "bearers of physical and spiritual splendor."⁹⁷ They held multiple meanings. They were both generators of electrical power and monumental plastic expressions of power. In this sense, the "symbolic objectivity" of the dams was embodied in their identity as both facts and symbols of modern life.⁹⁸

The harmony he found at the TVA was, however, an exception to the culture he encountered elsewhere in the United States, largely in New York City. Since his first visit

a decade before, he had not changed his harsh opinion of America. Now he continued to judge it a "morally troubled and insecure nation" whose people possessed "no understanding of why they are living or of the long-range purpose of their civilization" by virtue of their capitalist ambitions, which fueled a consumer culture and a dysfunctional society.⁹⁹ On his first trip he had found signs of redemption in the nation's technology, white popular culture, and African American popular and folk culture, as well as high culture associated with France. In 1946 he looked principally to the TVA: that "masterfully composed spectacle" of organization resulting in a "magnificent symphonic enterprise" that was "worthy of modern times."¹⁰⁰ For Le Corbusier, the TVA had become the touchstone for the validation of contemporary American culture and society. The Tennessee Valley's cycle of degeneration and renewal, recalling the ideas of Friedrich Nietzsche that had shaped his thinking, could now guide war-ravaged France toward reconstruction and with it the restoration of Le Corbusier's career through Claudius-Petit's support.¹⁰¹

The two French visitors spent only three days in the Tennessee Valley before they returned to New York via Washington to meet with the French ambassador, Henri Bonnet.¹⁰² In the national capital they visited the Pentagon (1941–43), headquarters for the War Department (Figure 11). Designed by George Edwin Bergstrom and David J. Witmer, this hermetic and fully air-conditioned office building was the largest in the world, comprising 500,000 square feet and achieving the scale of infrastructure.¹⁰³ It contained a full complement of services. Here was an entire city of up to 40,000 workers contained in sets of reinforced concrete bar buildings joined together in concentric pentagonal formation. Like the TVA dams, the Pentagon revealed the marks of its formwork.¹⁰⁴

Le Corbusier held that it embodied “all that I could design in my projects so implacably rejected until now: silence, efficiency, brilliantly lit interior streets, enlivened with shops expanding into restaurants, cafés; sparkling clean; ramps, hallways, etc.”¹⁰⁵ His experience of the Pentagon as a mega-structure would nourish his postwar aspirations.

Le Corbusier and Claudius-Petit Appeal on Behalf of the Saint-Dié Plan

Le Corbusier and Claudius-Petit returned to New York for the purpose of enlisting American support for their postwar initiatives. Lessons drawn from the TVA empowered them to think French reconstruction could achieve the CIAM ideal of a societal synthesis of individual liberty and collective action within an apparatus of centralized control.¹⁰⁶ Although Le Corbusier no longer gave thought to his plan to redevelop the valley of the Seine, he still held expectations for Saint-Dié and La Rochelle-Pallice. On 20 January both visitors addressed (in French) a joint meeting of New York CIAM and the American Society of Planners and Architects (ASPA) at the New School for Social Research.¹⁰⁷ Claudius-Petit spoke about his government’s reconstruction program, but the spotlight was on Le Corbusier. Casting himself as the leader of the modern movement, he presented the work of ASCORAL and discussed his plans for French reconstruction, most notably the Saint-Dié project, which faced opposition back home.¹⁰⁸ The presence of the French mission signified a desire, Le Corbusier emphasized, “to see and to learn at this very moment from a country like America [and a region like the Tennessee Valley], where abundance reigns and which is possessed of extraordinary facilities.”¹⁰⁹ He made an appeal for American support for his projects, not the least of which was for the United Nations Headquarters, then in the throes of site selection.

In return, Le Corbusier received the support of CIAM and ASPA as well as that of the professional press, most immediately for the Saint-Dié plan.¹¹⁰ *Architectural Record* pointed out the plan’s significance to the United States because it posed “an entirely new conception of urban design.”¹¹¹ In effect, Le Corbusier’s project for a walking city with a new civic center marked the emergence of the urban core in the modern city, an idea derived in part from Camillo Sitte. Le Corbusier intended Saint-Dié to be a demonstration of ATBAT planning not merely as a spatial construction but one also in tune with the diverse functions of society, which the TVA embodied so effectively.¹¹² Mindful of the uncertain fate of the plan, Claudius-Petit hurried back to France in late January 1946 and Le Corbusier returned by plane on 3 February. In small measure their bid for American support for Saint-Dié anticipated the Marshall Plan (1948–51),



Figure 11 George Edwin Bergstrom and David J. Witmer, War Department, Pentagon, Arlington, Virginia, 1941–43 (Library of Congress, Prints & Photographs Division, Theodor Horydczak Collection, LC-H814-T01-W02-005-8).

giving France substantial American economic and technical assistance. In spite of their efforts, however, city officials took advantage of their absence abroad to reject the plan.¹¹³

Unité d’Habitation, Marseille

To understand more precisely both Le Corbusier’s intentions in visiting the Tennessee Valley Authority and the impact of that visit on his work, I now turn to the Unité d’Habitation in Marseille (1945–52; Figures 12, 13). The immediate prospect of Dautry’s Marseille commission helps to explain why, in late 1945, the architect left his work in France and why Claudius-Petit abandoned an active professional schedule to make a transatlantic trip to New York and Knoxville. At Marseille, during the immediate postwar years, Le Corbusier applied lessons from the TVA, including the union of architecture and infrastructure, an aesthetic treatment for bare concrete, dedication to teamwork, and communitarian ideals.

In February 1946 Le Corbusier recalled Bodiansky from his mission assignment in New York to engage his technical assistance for the Unité as part of Dautry’s program to provide *immeuble sans affectation individuelle* (ISAI), or worker housing, in Marseille.¹¹⁴ To fulfill this mandate and realize his vision for social dwelling and shared services, Le Corbusier adapted a unit of *à redents* housing (slab block), which had been featured in his Radiant City.

The conceptual ambitions of the Unité look back to the Monastery at Ema near Florence, a precedent for collective housing, and his Bastion Kellermann project (1934–35), which called for structural frames of both steel and



Figure 12 Le Corbusier, Unité d'Habitation, Marseille, aerial view, 1945–53 (Fondation Le Corbusier, Paris, FLC L.1.13.5; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



Figure 13 Le Corbusier, Unité d'Habitation, Marseille, rendering of first plan, Madrague district, autumn 1945 (Fondation Le Corbusier, Paris, FLC 26662; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

reinforced concrete.¹¹⁵ The Unité also drew upon postwar CIAM principles. As a unit of “collective” living, it reflected an investment in habitat that would shape the 1947 CIAM 6 congress at Bridgwater, England, which focused on notions of the “Common Man.”¹¹⁶ Indeed, CIAM supporters professed

the belief that “a more balanced life can be produced for the individual and for the community.”¹¹⁷ The Unité signaled Le Corbusier’s aspiration for his prototype to provide a solution to the postwar housing shortage and to the pervasive dilemma of *savoir habiter*, or “knowing how to inhabit.”¹¹⁸

With the Marseille Unité Le Corbusier would realize for the first time a “vertical garden city” (*cité-jardin verticale*) on a new scale. It contained an unprecedented number of “collective” services, including ventilation, running hot water, and both garbage and bottle disposal, with their requisite piping. To tackle the complexity of the program, structure, and construction techniques he envisioned, as well as to respond effectively to the postwar housing deficit, he turned to precedents in industrial building and public works, to the use of concrete (both prefabricated and poured in place), and to ATBAT, the consortium he had formed to take on work at this new scale and level of complexity. During much of 1946 and 1947 Le Corbusier was in the United States preoccupied with the site selection and design of the United Nations Headquarters project. Thus his more global postwar practice, coupled with the departure of Pierre Jeanneret from his practice, obliged him to rely on ATBAT, headed by Bodiatsky. In effect, this building cooperative promised a new level of research and construction management: “The consulting architects and technicians of ATBAT study, carry out and direct all architectural work and planning according to the most modern techniques: housing, factories, laboratories, agricultural facilities, prefabrication, equipment, and interior facilities, etc.”¹¹⁹ The ATBAT design group was located at 35 Rue de Sèvres, its unit working alongside the architects in Le Corbusier’s atelier under the direction of André Wogensky.¹²⁰ Four divisions within ATBAT collaborated on the Unité. Bodiatsky directed technical research (structure and prefabrication), Wogensky was responsible for architectural design, Jacques-Louis Lefebvre took charge of administration, and Marcel Py of work management. The ATBAT group produced the Unité’s construction

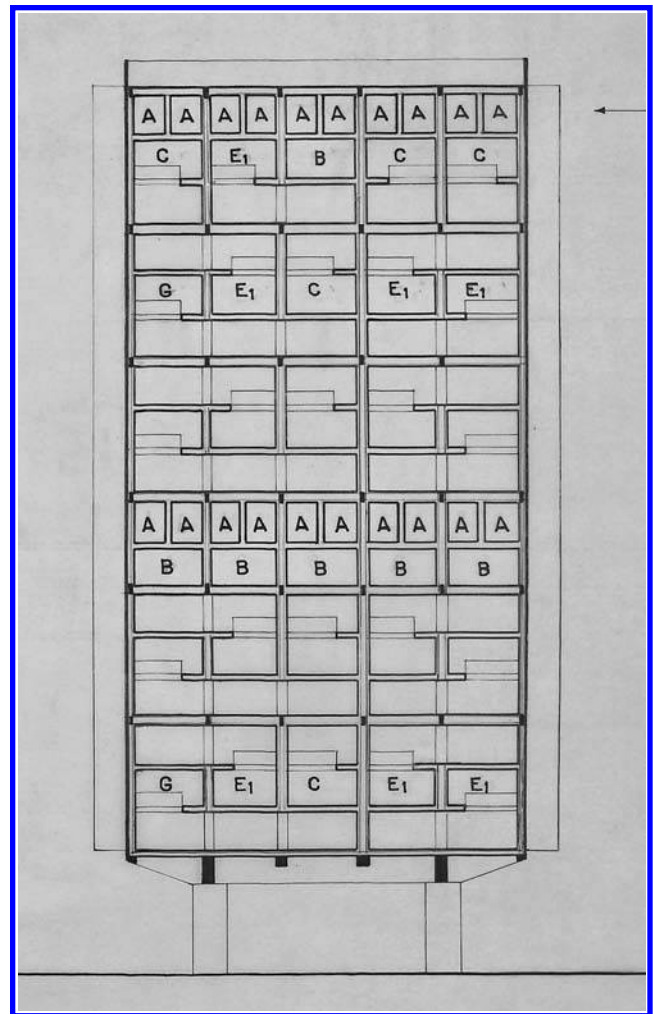


Figure 14 Le Corbusier, Unité d’Habitation, transverse section, second site, 10 May 1946 (Fondation Le Corbusier, Paris, Plan FLC 26317; © FL.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

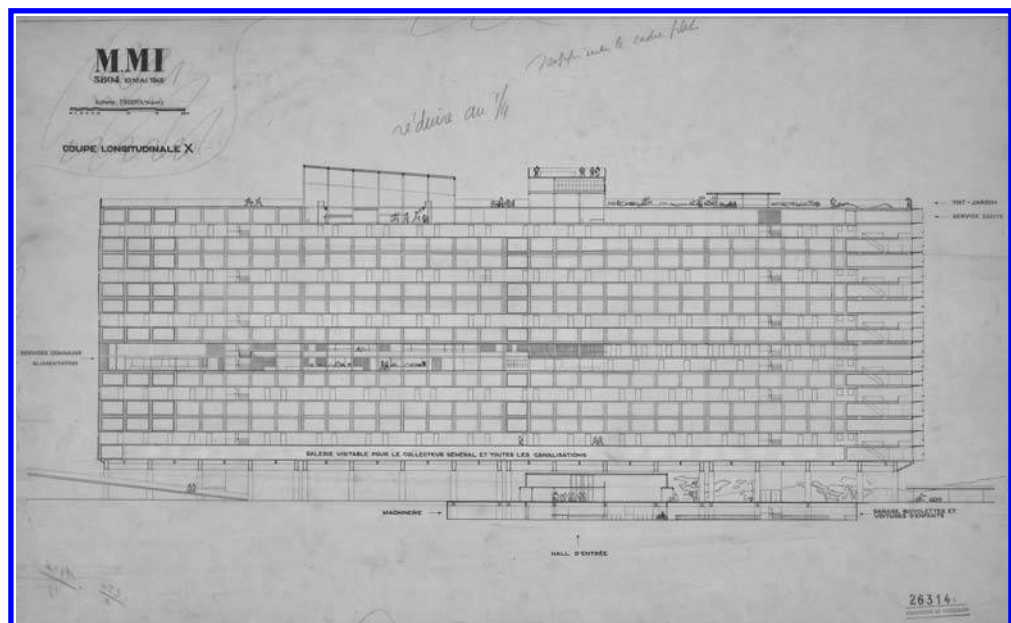


Figure 15 Le Corbusier, Unité d’Habitation, longitudinal section, second site, 10 May 1946 (Fondation Le Corbusier, Paris, Plan FLC 26314; © FL.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

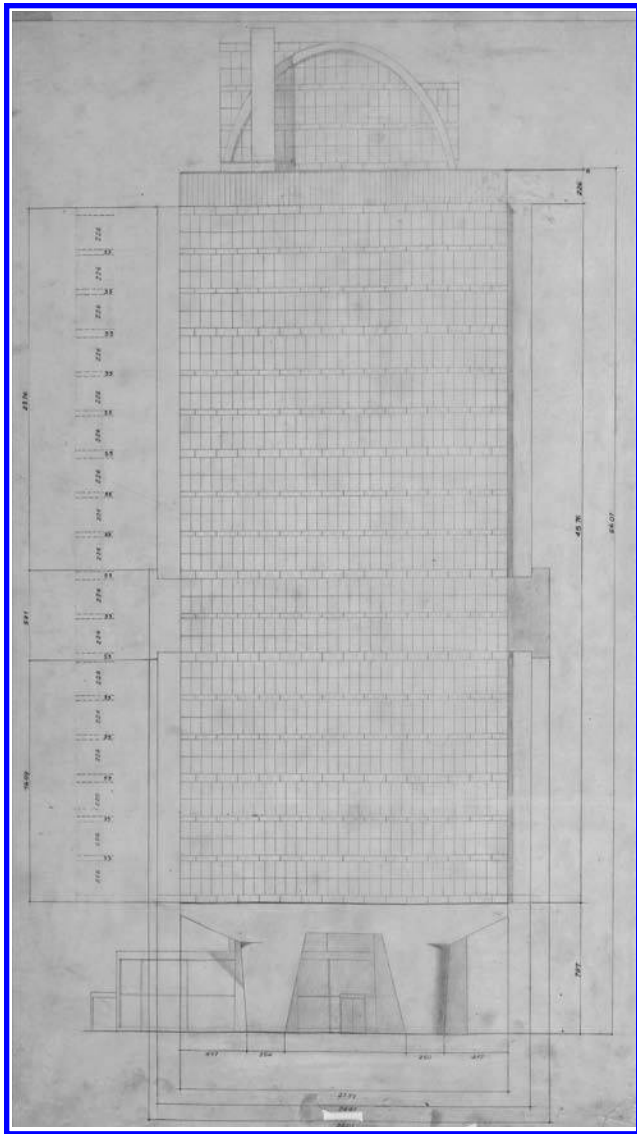


Figure 16 Le Corbusier, Unité d'Habitation, north façade, final site, 15 December 1946 (Fondation Le Corbusier, Paris, Plan FLC 25340; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

documents and supervised the work site. The team would shuttle between Paris and Marseille and, in the case of Bodiansky, between New York, Paris, and Marseille.

Unité d'Habitation: Pilotis and *Béton Brut*

Given the Marseille Unité's long design development phase, from 1945 to 1947, which involved four different sites, a brief chronology is called for here. Following the designation of a first site in the Madrague district in August 1945, according to Jacques Sbriglio, Wogensky produced a rendering that showed not only three buildings but also the key components of Le Corbusier's architectural language, including pilotis, *brises-soleil*, a midlevel shopping gallery, and traces of rooftop

structures (see Figure 13).¹²¹ The presence of reinforced concrete pilotis throughout the design development indicated their structural significance. In the spring of 1946, following his return from the United States, Le Corbusier worked on a preliminary plan for a single Unité on a second site located on the Boulevard Michelet (opposite what would be the final site). A drawing of 8 March 1946 illustrated a slab block seventeen stories high with six interior streets.¹²² That drawing, together with a transverse section (Figure 14) and a longitudinal section (Figure 15), both of 10 May 1946, indicates that the essential features of the design were now fixed.¹²³ Le Corbusier conceived the supporting framework as a "bottle rack," initially favoring steel construction resting on reinforced concrete pilotis. When structural steel was not obtainable in the immediate postwar period, however, he abandoned that idea in favor of a reinforced concrete frame and infill system.¹²⁴ In the 10 May drawings for the second site the pilotis serve a dual role as both structure and encasement for service ducts. The plan allowed for a number of communal facilities and services.¹²⁵ When the proposed land for the second site was reassigned to another purpose, Le Corbusier turned to an alternate plot in the Saint Barnabe district (third site, from July). In October 1946 he was given a fourth site, one that offered apartment units views of the hills of Marseille on one side and the Mediterranean on the other, with the north side protected from the mistral winds, resulting in a final scheme by March 1947.¹²⁶ The final design for the Unité called for a concrete supporting framework, fabricated in situ, into which independently constructed apartment units were inserted.¹²⁷ The units themselves were not fully prefabricated but employed prefabricated components. Moreover, in the spirit of Kaiser's "adorable kitchenettes" designed by Charlotte Perriand and Le Corbusier, each kitchen was appointed with a built-in electric stove, aluminum double sink, garbage disposal, and ice chest, with a continuous work surface of aluminum sheets secured by rivets, a method used in aircraft and shipbuilding fabrication.¹²⁸ From the initial Madrague scheme going forward, the pilotis served a tectonic role in the design and gave prominence to the use of poured-in-place reinforced concrete.

The housing block draws on elements of the design, construction, and exposed concrete of TVA infrastructure, specifically the Norris and Fontana Dams. Here I will focus on two formal elements in the Unité design: the pilotis and the use of *béton brut* (bare concrete without rendering). The pilotis in the longitudinal section of 10 May (second site) are comparatively slender and provide orthogonal support for their entablature. In this iteration of the design the reinforced concrete frame seems poised above the pilotis, as if floating.¹²⁹ As the design developed, as shown in a drawing of the north façade of December 1946 (final site; Figure 16), the pilotis are robust and splayed, not only to support the

Figure 17 Le Corbusier, Unité d'Habitation, drawing of a stone Modulor installed under the pilotis, 1947 (Le Corbusier, *Oeuvre complète 1946–1952*, ed. W. Boesiger [Zurich: Editions Girsberger, 1953], 183; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

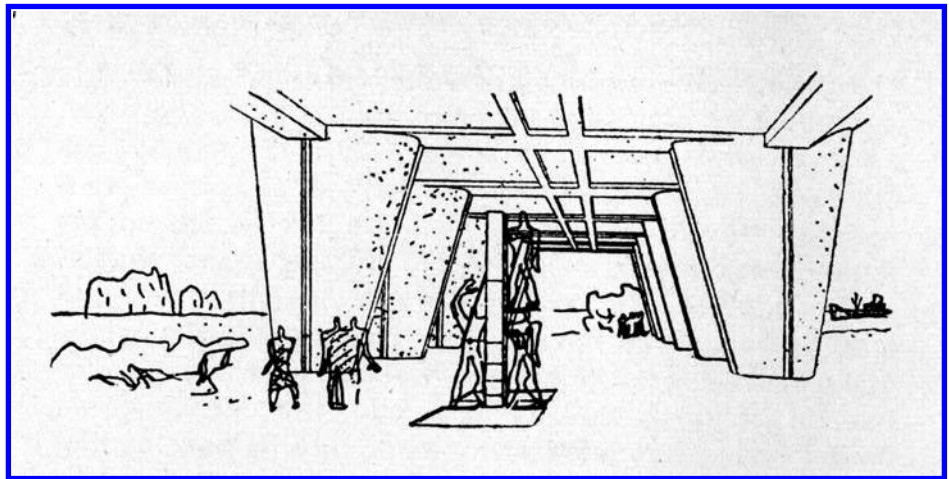
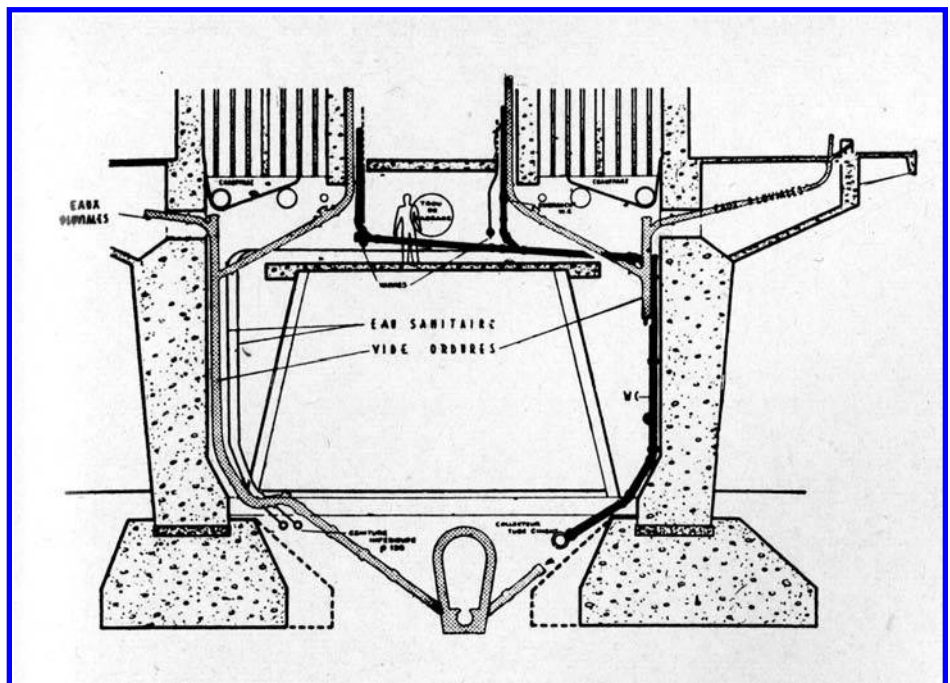


Figure 18 Le Corbusier, Unité d'Habitation, section, pilotis showing *canalisation* (piping) (Le Corbusier, *Oeuvre complète 1946–1952*, ed. W. Boesiger [Zurich: Editions Girsberger, 1953], 199; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



entire weight of the building and give visual expression to it but also to enclose its *canalisation*, or piping.¹³⁰ A parallel transformation occurred during the design development of the Swiss Pavilion at the Cité Universitaire in Paris (1930–31), where the pilotis shifted from steel columns to more plastic reinforced concrete supports, including a type known in the atelier as “dog-bone.”¹³¹ The Unité’s splayed pilotis are similarly heavyset but more tectonically expressive. The housing block now conveys a representation of its weight and gravity. The pilotis may even evoke the brawny legs and proportional system of the Modulor man, incised on the Unité walls and visualized in a preliminary drawing as a “stele” representing the building’s proportional system (Figure 17).¹³² Moreover, the pilotis’ visual weight connects with the landscape.

On one hand, the splayed pilotis, as they evolved in the summer and fall of 1946, assumed the sturdy character of infrastructural stanchions, like those of a reinforced concrete bridge, viaduct, or powerhouse, or a steel gantry, which Le Corbusier had seen at the TVA.¹³³ On the other hand, the pilotis had evolved from his earlier use of Everite concrete pilotis at the Villa Savoye in Poissy (1928–31) and also the “dog-bone” pilotis of the Swiss Pavilion, which contained drainpipes. In the Unité pilotis, however, the piping systems for the “collective” services were far more extensive than in prewar buildings, approximating those of concrete industrial buildings and public works. Developed into a dual structural and functional component, each Unité piloti was now laced with a network of piping for ventilation (*air pulsé*), gray water,

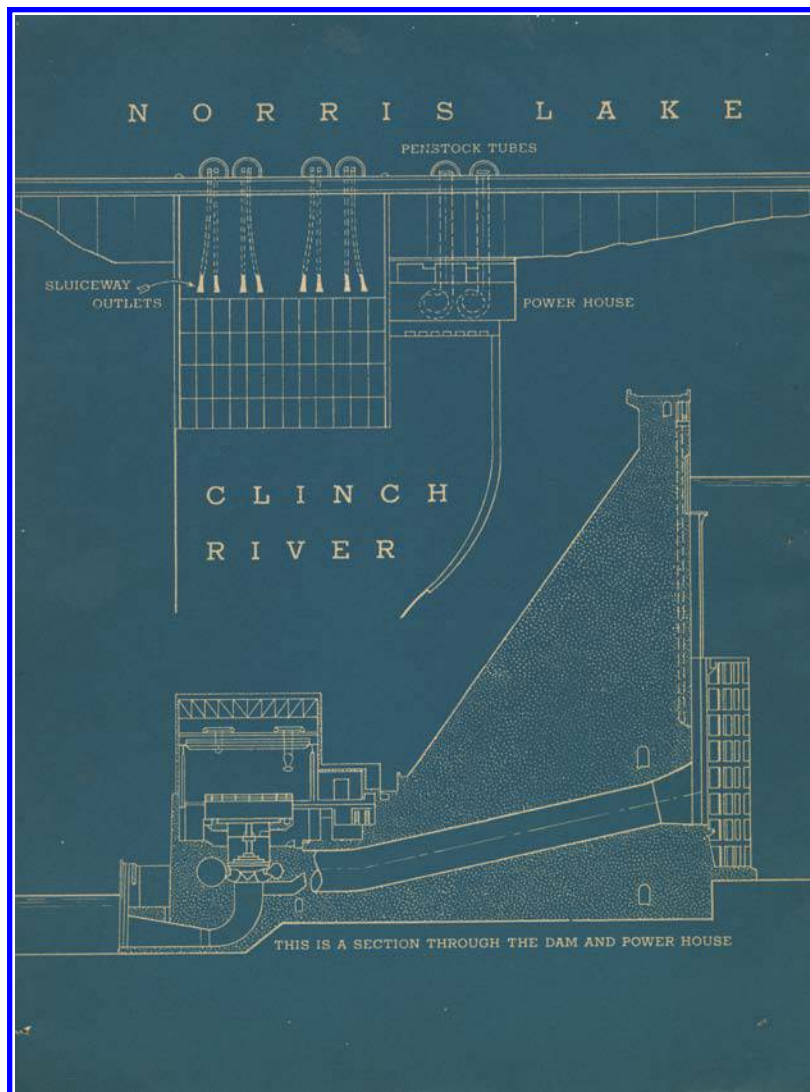


Figure 19 Norris Dam, section (*Norris Dam*, Washington, D.C.: U.S. Government Printing Office, 1936, back cover; private collection).

and garbage disposal (Figure 18). Le Corbusier himself described the Unité's intricate assemblage: "It's like a Chinese puzzle to provide housing with heat and sound insulation, water, gas, electricity, the elimination of waste and cooking odors, heating and cooling ... [for] a community of one thousand six hundred inhabitants, all entering through the same door."¹³⁴ A striking analogy may now be drawn between the section of a Unité piloti and one of the Norris Dam, which reveals its own complex system of piping (Figure 19).¹³⁵ Le Corbusier, Bodiensky, and Écochard understood the principles of hydroelectric power generation and how such gravity dams as Norris would have been represented in section with a penstock or enclosed pipe to deliver water to a hydroturbine.¹³⁶ In this way Le Corbusier looked to the formal expedience and functional efficiency of the dam as an infrastructural model.

To understand the significance of the Unité, with its pilotis and analogy to infrastructure, I look to Le Corbusier's

famous chapter *Nos moyens*—literally "Our means"—in his 1925 book *Urbanisme*.¹³⁷ There the architect introduces the Swiss gravity dam Barrage de Barberine (1923–25; Figure 20). The dam signifies collaboration between technicians and "something ... individual" as well as a conjunction of "technical equipment" and "art."¹³⁸ "Our means" is a parable about the respective roles of the technicians on one hand and the architect and planner on the other. Le Corbusier observes that the dam is constructed using teamwork, its equipment and parts conform to standards made available by global suppliers, its technicians make use of time-honored computation, and its builders employ orthodox methods. Like a monumental dam, Le Corbusier suggests, such "great works" as the Place Vendôme or the majestic nineteenth-century boulevards of Paris result from the ideas of their respective planners or designers.¹³⁹ Such celebrated examples of infrastructure as the Pont du Gard in Nîmes and Gustave Eiffel's Pont de Garabit are equally products of the "collective will"

(of an epoch) joined with “individual sensibility.”¹⁴⁰ Dams might be public works built by collaborative means, but their art could be realized only by their respective designers.¹⁴¹ In this sense Le Corbusier returns to the theme of the respective roles of the engineer and the architect in *Vers une architecture*: the engineer may achieve harmony through mathematical calculation, but the architect transcends it to create beauty.¹⁴² Thus the Unité would acquire meaning as social housing by virtue of the ATBAT team’s technical expertise, but its artistic and poetic expression would reside in the vision of Le Corbusier and the collaboration of artisans and sculptors.

The second formal element in the Unité design that draws on TVA infrastructure is the use of *béton brut*. Its role is significant in a building that embodies the postwar debate on the use of exposed reinforced concrete, as Réjean Legault points out.¹⁴³ It marks Le Corbusier’s first use of bare concrete for an entire building. Although the Unité employed several systems of concrete construction, including prefabricated *béton vibré* (vibrated concrete), which Bodiansky knew well from his work with Eugène Mopin and others at the Cité de la Muette in Drancy (1931–34), it was the poured-in-place concrete that helped to forge a new direction in Le Corbusier’s work.¹⁴⁴ When Le Corbusier published the Unité in the *Oeuvre complète 1946–1952*, he described the execution of *béton brut de décoffrage* to produce a checkerboard pattern of alternating horizontal and vertical bands of board-formed concrete for the elevator tower, shown in drawings of its four elevations (Figure 21).¹⁴⁵ As noted earlier, the term *béton brut de décoffrage* literally means bare or exposed concrete as it emerges from the wooden formwork or shuttering. Thus Le Corbusier’s early use of the term with specific reference to the checkerboard pattern embedded in the Unité’s elevator tower walls, as well as in the ceiling and canopy above the Unité pilotis (Figure 22), made an overt reference to the TVA dams, which the mission team would have recognized.

The terms *coffrage* and *décoffrage* had long appeared in technical books on concrete, including Emil Mörsch’s *Le béton armé* (1909), a book Le Corbusier knew through a translation by Max Dubois.¹⁴⁶ In their book *Après le cubisme* (1918) Le Corbusier and Amédée Ozenfant employed the terms *éléments bruts* (raw elements) and *sensations brutes* (raw sensations), denoting the tools that artists would use in returning to pure form and color.¹⁴⁷ Moreover, in essays for *L’Esprit nouveau* they used the term *matériaux bruts* (raw or exposed elements) to define a primitive or budding state of artistic creation.¹⁴⁸ In *Vers une architecture* Le Corbusier again drew on the notion of *matériaux bruts* as agents for achieving “emotional relationships” in architecture, as Reyner Banham pointed out in his famous essay “The New Brutalism” (1955).¹⁴⁹ When Auguste Perret employed exposed concrete



Figure 20 Barrage de Barberine, Switzerland, 1923–25 (Le Corbusier, *Urbanisme* [Paris: G. Crès, 1925], 139; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

construction for the Church of Notre Dame du Raincy, Le Raincy (1922–23), he eliminated a finishing veneer, thus celebrating what Paul Jamot called its *état brut* (bare or exposed state), as Peter Collins has underscored in his article “The New Brutalism of the 1920s.”¹⁵⁰ Following Perret, Le Corbusier also experimented with bare concrete for the pilotis of the Swiss Pavilion, where the imprint of crude formwork was clearly evident.¹⁵¹ Exposed concrete was also employed for military bunkers during World War II.¹⁵² Thus by 1946 Le Corbusier already knew the unrefined property of bare concrete. However, he had yet to plumb its aesthetic potential.

What appears new to the postwar years is the union of *béton* with *brut* and then their conjunction with *décoffrage*. This most likely developed from attempts to formulate structural nomenclature rather than to suggest aesthetic or poetic associations. The technical literature includes reference to an affiliation between *béton de terre* (literally “earth concrete,” or rammed earth) and *brut* where a wall of *béton de terre* could be described in an *état brut de décoffrage*.¹⁵³ Rather than to technical sources, it seems most probable that Le Corbusier

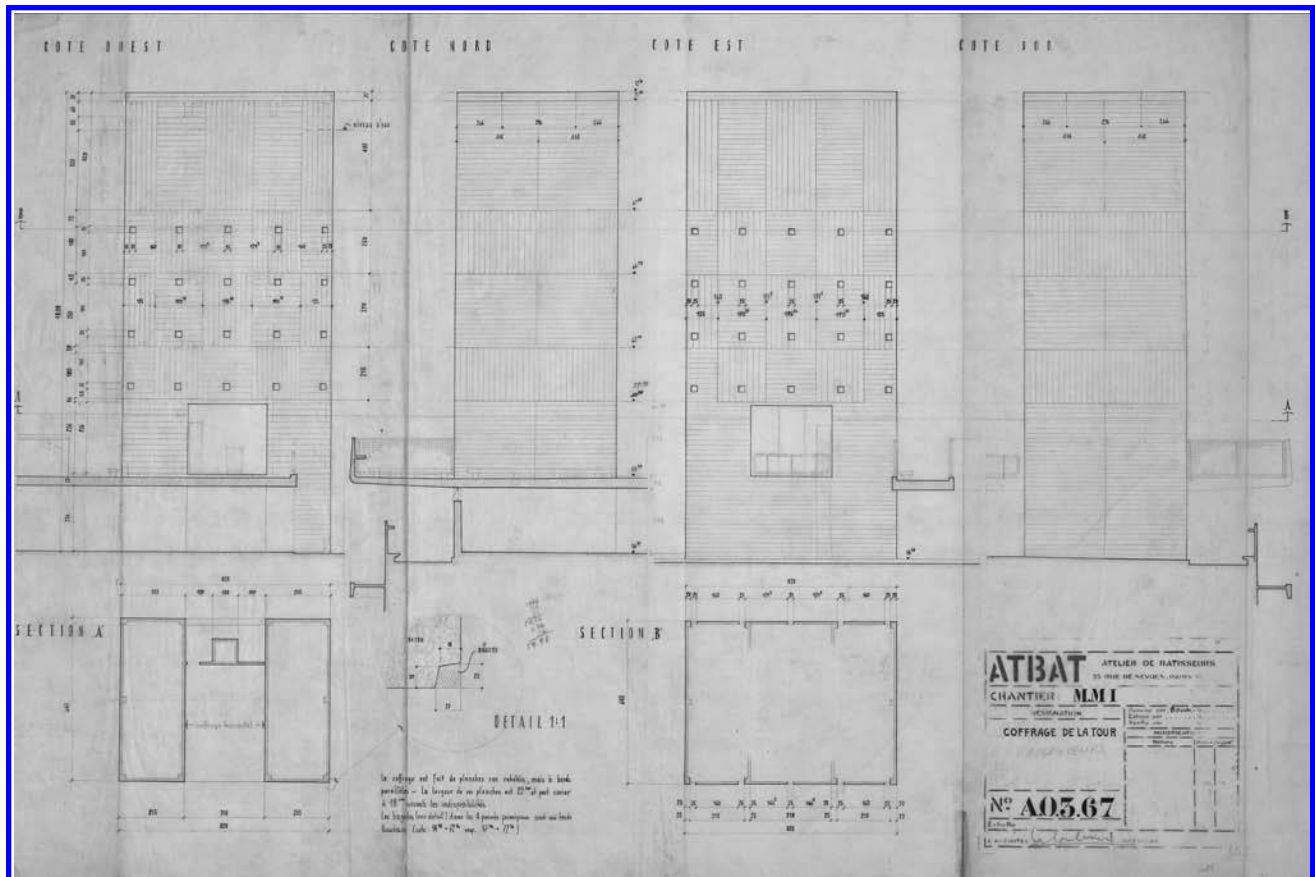


Figure 21 Le Corbusier, Unité d'Habitation, drawings of shuttering on the elevator tower walls (Fondation Le Corbusier, Paris, FLC 25237; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).

looked directly to Écochard's description of *béton brut de décoffrage* for the Norris and Fontana powerhouses as well as to Écochard's sketch of Norris concrete in his *cahier de route* (see Figure 5). Le Corbusier also owned TVA publications illustrating the Norris powerhouse.¹⁵⁴ In the spring of 1946 *L'Architecture d'Aujourd'hui* promoted both the TVA formwork technique and the new term when it published a photograph of a checkerboard wall, captioned it "*Béton brut de coffrage*," and identified it as a work of American origin. Its resemblance to the checkerboard walls of the Norris and Fontana Dams is unmistakable (Figure 23).¹⁵⁵ Le Corbusier had seen these surfaces for himself. That experience, coupled with Écochard's account, led to the revelation that he too could adopt Wank's inventive formwork technique to transform a rough and banal building material into something intentionally beautiful. Thus, when Le Corbusier later reproduced a detail of the checkerboard wall of the Unité's elevator tower in *Modulor 2* (1955), he instructed his readers to witness the use of *béton brut*, which represented "the consecration of reinforced concrete as a noble material."¹⁵⁶

A Unité drawing of 27 March 1947 shows the checkerboard shuttering pattern, known as *mosaïque*, for the ceiling above the pilotis.¹⁵⁷ A year later the formwork for the pilotis

and canopy of the building's northern section was in place. By November 1948 the removal of the shuttering from the canopy revealed the aesthetic possibilities of the grid pattern (see Figure 22). The walls of the elevator tower and other locations were also treated in *mosaïque*, as noted earlier.¹⁵⁸ Like Wank at the TVA, Le Corbusier deployed the checkerboard pattern on flat surfaces to conceal color inconsistencies and other flaws in the concrete. Its use at the Unité was also a deliberate attempt to confer aesthetic distinction on a project that approached the scale and character of infrastructure.

Given the complexity of the design and the technical limitations of postwar construction, it is not surprising that widespread imperfections (*malfaçons*) emerged in the fabrication of the reinforced concrete, in spite of Le Corbusier's efforts to avoid them. Rather than call for workers to render the concrete or resort to other methods to conceal or correct those imperfections, except in the most egregious of executions, he reconciled himself to them through a recalibration of his artistic intentions.¹⁵⁹ At the Unité's opening ceremony in 1952 Le Corbusier gave voice to the new aesthetic. In his address to Claudius-Petit, who was now serving as minister of reconstruction and town planning (1948–53), succeeding

Figure 22 Le Corbusier, Unité d'Habitation, construction view of the pilotis, shuttering, and checkerboard canopy on the south side, ca. 15 November 1948 (Fondation Le Corbusier, Paris, FLC L1.13.81; © F.L.C./ADAGP, Paris/Artists Rights Society [ARS], New York 2014).



Dautry, he affirmed the importance of *béton brut* enriched by the traces of its fabrication: “Exposed concrete shows the least incidents of the shuttering, the joints of the planks, the fibres and knots of the wood, etc. But these are magnificent to look at, they are interesting to observe, to those who have a little imagination they add a certain richness.”¹⁶⁰ In the *Oeuvre complète* he confirmed the sculptural and aesthetic character of *béton brut*. In reference to impressions or “ghosts” of the Modulor inscribed in the entrance wall, Le Corbusier held that “at stripping (*décoffrage*) the smallest details of the mold, the very fiber of the wood, the least accidents of the saw appear. Concrete, most accurate of materials, perhaps more faithful than bronze, may take [its] place in architectural art and express the intentions of the sculptor.”¹⁶¹ These textural enrichments accompany the checkerboard pattern of *béton brut* in this and subsequent projects, including the Unité d’Habitation at Rezé-lès-Nantes (1948–55) and the foundation of the Church of Saint-Pierre, Firminy-Vert (1961–70; 2003–7 José Oubrière).¹⁶² At the Church of Saint-Pierre the checkerboard pattern also held a symbolic association. Credit for the

commission was given to Claudius-Petit, who became mayor of Firminy in 1953.¹⁶³

In addition to the TVA’s role in the development of *béton brut* there were several other contributions, as Caroline Maniaque Benton, Roberto Gargiani, Anna Rosellini, and others have shown. Among them was Jean Dubuffet’s *art brut* painting, with its expressive power and impasto technique.¹⁶⁴ There was also Le Corbusier’s collaboration with the Breton cabinetmaker and sculptor Joseph Savina from 1944.¹⁶⁵ Moreover, Le Corbusier had learned the art of sand casting from the Sardinian artist Costantino Nivola, whom he had visited on subsequent trips to New York and to Nivola’s Long Island house from 1946.¹⁶⁶ In Marseille this led to his associations with Nivola’s cousin Salvatore Bertocchi, a Sardinian sculptor, as well as other artists and craftsmen (especially those of Mediterranean origin), who brought to the project a new expression of artisanal materials and methods.¹⁶⁷

Although Alison and Peter Smithson appear to have first used the term “New Brutalism” in 1953 to describe their unbuilt “House in Soho, London,” it was Banham’s later essay “The New Brutalism” and his subsequent book by the

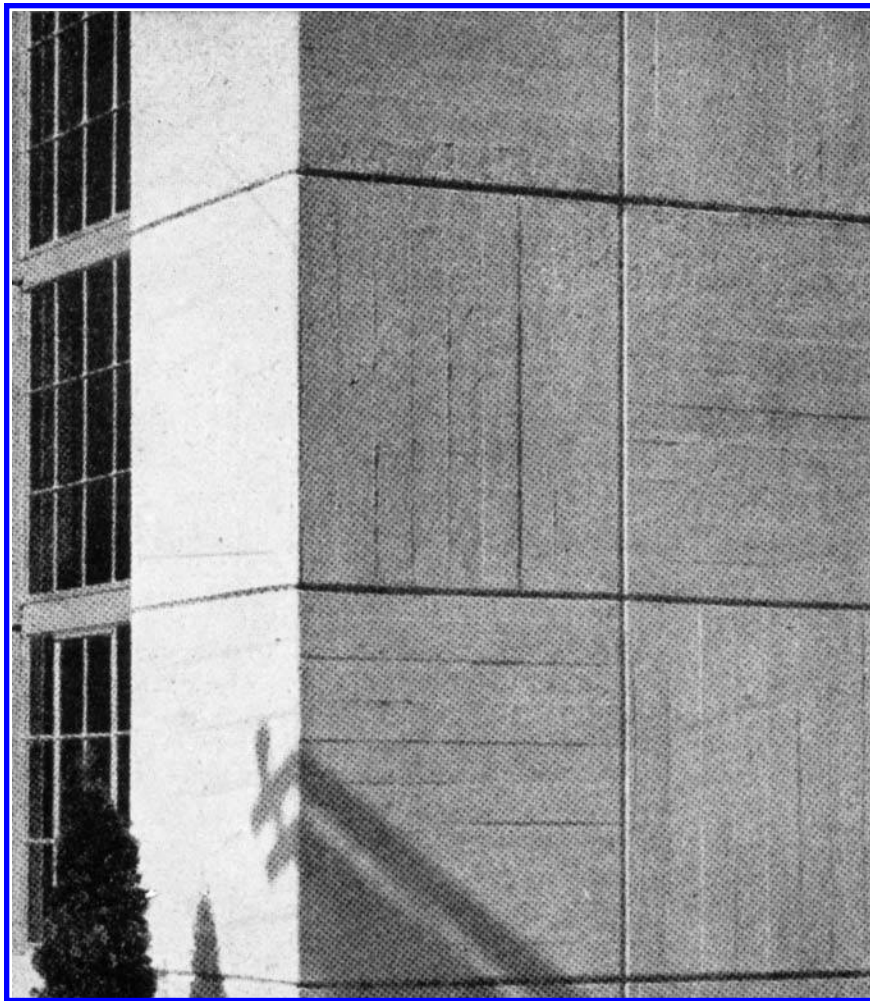


Figure 23 "Béton brut de coffrage," surface of unidentified TVA dam (*L'Architecture d'Aujourd'hui* 16, no. 5, Mar.–Apr. 1946, 41; www.larchitectureaujourd'hui.fr).

same name that identified archaic aspects of building, represented in the grid pattern of planking on the concrete at Marseille, which he called the "modern equivalent for rustication."¹⁶⁸ This joined with the sense that the Unité belonged to a regional typology of ancient buildings with monumental classical porticos whose weathered columns Danielle Janin compared to Le Corbusier's pilotis.¹⁶⁹ According to Banham, such ties to the local culture allowed proponents of Brutalism to view the Unité as part of a grand and timeless "Mediterranean architectural tradition."¹⁷⁰ Further, Banham searched for an alternative theory by exploring the concept of an *autre* (other architecture). Banham sought to account for the unfinished character of postwar concrete construction through analogies with contemporaneous artistic developments, including *art brut* painting.¹⁷¹

Knowing that Roland Wank invented the checkerboard pattern, and that Le Corbusier most likely borrowed the term *béton brut de décoffrage* from Écochard's description of the TVA dams, obliges us to assess the Unité more inclusively within a transatlantic as well as a Mediterranean culture of building and also to recognize that vital components

of its formal and artistic expression are closely associated with public works. Through the monumentality of its form, the integration of piping, the expression of its structure, and the use of *béton brut* celebrating a fusion of industrial process and artisanal craft, the Unité, like the TVA dam, assumed the character of a collective monument now raised to the level of art and poetry. Just as Le Corbusier had conferred on the TVA enterprise the generative power of a new society, so he hoped that the Unité would be "a perfect receptacle for a family" to learn how to inhabit and thereby, in the aggregate, allow this "house of men ... [to] claim back harmony" on a new scale.¹⁷²

Outcome

What began as a postwar mission on productivity, with seven protagonists crossing the Atlantic to learn from the North American example, ended with their return to Europe in early 1946 without a synthetic account of the enterprise, most especially of the TVA. Le Corbusier anticipated that his team would draft reports based on their firsthand

experiences and the documents they had collected, if not the four ASCORAL books he had originally envisioned.¹⁷³ Écochard and Emery resumed their prewar work in the former French colonies and gave conference papers on their experiences in the United States.¹⁷⁴ Sive focused on rebuilding German cities in the Saar and wrote an article on American city planning for *L'Architecture d'Aujourd'hui*.¹⁷⁵ Bodiansky was appointed to the United Nations Board of Design as a special consultant working alongside Le Corbusier.¹⁷⁶ However, Écochard's *carnet de route* and Bodiansky's reports together furnished a detailed assessment of the TVA and postwar America that Le Corbusier could not otherwise have obtained, given his brief visit. The mission's indispensable reconnaissance not only definitively shaped Le Corbusier's experience but also provided evidence that his design ideas after the war were formed not in isolation but within a culture of collaboration.

In assessing the significance of Le Corbusier's first postwar trip to the United States and the impact of the TVA on his work, we can see the legacy of themes that defined his work from the 1930s within their postwar context. On the sociopolitical front, Le Corbusier's transatlantic experience left him with the view that World War II had sharpened the divide between Europe and North America. While he and his fellow Europeans had lived in a state of wartime deprivation, the United States had reaped profits from the war, which led to overabundance and waste. The nation's capitalist system continued to cause economic disparities. Moreover, the American practice of decentralization disrupted the solar cycle—too many hours were devoted to suburban commuting. Such practices had already threatened to take hold in Europe. Le Corbusier concluded that modern societies on both sides of the Atlantic needed to face the challenge of “knowing how to live in a place,” an object lesson learned in the Tennessee Valley.¹⁷⁷

The TVA was the great exception to the American example because it offered a working model for a second-machine-age civilization in which societal synthesis and collective identity had been achieved. Regenerating a region, it balanced individual needs with communitarian life.¹⁷⁸ But Le Corbusier failed to understand the essence of TVA planning. He viewed it through the prism of the Radiant City, where “the plan is the dictator.”¹⁷⁹ The TVA, however, had no master plan. Lilienthal maintained that while the TVA was a planning agency, there was no document that could be called a “TVA Plan.”¹⁸⁰ Le Corbusier looked to Lilienthal as a self-governing authority, a distorted view of his power. The TVA was a federal agency operating as an autonomous centralized entity with decision-making authority over a region.¹⁸¹ Both Lilienthal and TVA public policy, however, were guided by democratic, not authoritarian, processes. If this was not clear to Le Corbusier, it certainly was to

Écochard and the mission team. Such misapprehensions notwithstanding, Le Corbusier admired the TVA dams as collective monuments emblematic of their society, and this admiration inspired a similar ambition for the Unité.

Le Corbusier continued to forge affective relationships between buildings and their respective sites, an extension of the vernacular. He appreciated the judicious expansion of industry into the Tennessee Valley. Seeking the same rapport between buildings and landscape, man and nature, Le Corbusier sensitively positioned the Marseille Unité on its site to allow apartment units to face the hills on one side and the sea on the other. At Saint-Dié he projected a slab block against the mountains. Moreover, he looked to vernacular concerns when he adapted the TVA's technique of handcrafted formwork to celebrate the artisanal character of the Unité's *béton brut*.

The Unité's alliance of architecture and infrastructure to achieve monumental architectural expression drew on the TVA dams. Muscular pilotis elevated the apartment block from the ground, which allowed Le Corbusier to envision a continuous landscape underneath. Although he had explored the integration of large-scale buildings and site conditions in his South American and Algiers projects of the 1930s, he now looked to new and unprecedented engagements of buildings in the landscape drawn from public works, such as those in the Tennessee Valley.

In a formal sense the plastic, expressive, and aesthetic treatment of reinforced concrete that distinguished TVA dams helped to inspire Le Corbusier's synthesis of the arts: architecture, painting, and sculpture. His ever-increasing preference for mass over volume, kindled by the dams, inspired the design of Unité pilotis and elevator walls. The shift to greater plasticity, often at the scale of infrastructure, that characterized Le Corbusier's postwar architecture beginning with the Marseille Unité would also shape subsequent Unités, the Capitol complex at Chandigarh, Punjab, India (1951–57), the Convent La Tourette, Evieux, France (1953–59), and the Carpenter Center for the Visual Arts at Harvard University (1959–63), among others. Le Corbusier would even design a monumental gravity dam in Bhakra, India (1957–58), the spillway crest of which was originally planned with a cantilevered “public platform” and “spectators' balcony” like those of the TVA dams.¹⁸²

Inspired by the collective identity that he and the members of the productivity mission found in the Tennessee Valley, Le Corbusier shifted his production toward teamwork as his architecture assumed a global dimension and a more fragmented aesthetic. In 1946 he envisioned a consortium of CIAM-France, ASCORAL, and the Union des Artistes Modernes undertaking what he called a “cyclic program” of reconstruction involving civil engineering projects, bridges, and roads as well as buildings, presumably along the

lines of the TVA enterprise he had recently witnessed.¹⁸³ This would eventually lead to Le Corbusier's formal presentation of a "Synthesis of the Major Arts" at the CIAM 7 congress at Bergamo, Italy, in 1949, where he and other members of ASCORAL focused on both planning and aesthetics.¹⁸⁴

The TVA helped to shape Le Corbusier's ideas about postwar urbanism and regional planning, increasingly conceived within a matrix of spatial as well as social, technical, and artistic dimensions. This redefined the urbanist or planner as a sociologist, technician, and humanist.¹⁸⁵ From the mission team's reports and his firsthand experience, Le Corbusier grasped the TVA's bold integration of architecture and engineering, infrastructure and landscape, technology and aesthetics, the individual and the collective. Moreover, the marriage of industrial modernity and handcraft production helped to define the formal and aesthetic character of Le Corbusier's late work.¹⁸⁶ The appropriation of TVA infrastructural elements and *béton brut* for the Unité and subsequent postwar buildings both challenges and enriches the received interpretation of Banham and others, which associated *béton brut* with a Mediterranean culture, and reframes the buildings within a typology of public works, the ideals of TVA societal synthesis, and transatlantic culture.

Notes

1. I wish to extend my deep thanks to Francesco Passanti, whose knowledge of Le Corbusier's work and ideas and whose insightful criticism strengthened this essay in innumerable ways. To Nancy Stieber I owe a debt of gratitude for her close reading of the manuscript with suggestions that helped to shape the final draft. An anonymous reviewer provided astute comments for which I am most grateful. I offer warm thanks to Vladimir and Nathalie Bodiensky for generously sharing recollections of their father and grandfather, respectively. Michel Richard and Arnaud Dercelles of the Fondation Le Corbusier deserve my warmest appreciation. I thank Inés Zalduendo, archivist at the Frances Loeb Library, Harvard Graduate School of Design; Maureen Hill, Tennessee Valley Authority archivist; and Patricia Ezzell, tribal liaison and corporate historian, TVA; as well as Ramla Benaissa, Sarena Ehrlich, Laurent Stalder, and Ian Sue Wing.

Although much has been written about the role of *béton brut* in the development of Le Corbusier's architecture—most recently Roberto Gargiani and Anna Rosellini's *Le Corbusier: Béton Brut and Ineffable Space, 1940–1965*, trans. Stephen Piccolo (Oxford: Routledge, 2011); and Jacques Sbrigliio, ed., *LC au 71: Le Corbusier et la question de brutalisme* (Marseille: Parenthèses, 2013)—scholars have neglected to consider the impact of his postwar visit to the TVA in the context of the French cultural relations mission (see note 2). (Here, as Le Corbusier does in his writings, I sometimes refer to the United States as America.)

2. See Le Corbusier, *Les trois établissements humains* (Paris: Denoël, [1945]), the seventh in the ASCORAL collection, in which many sections are signed "L.C." See P.N. [Patrice Noviant], "ASCORAL," in *Le Corbusier, une encyclopédie*, ed. Jacques Lucan (Paris: Centre Georges Pompidou, 1987), 50–51. On the formation of the French mission and its charge, see "Mission d'architectes et d'urbanistes Français aux Etats-Unis organisée par la Direction Générale des Relations Culturelles au service du Ministère des Affaires Etrangères," Paris, 31 Aug. 1945, Fondation Le Corbusier, Paris [hereafter FLC], D1-13, 1.

3. Quoted in Geoffrey T. Hellman, "Profiles: From Within to Without—II," *New Yorker*, 3 May 1947, 46.
4. Eugène Claudius-Petit, "Choses vécues," in *Paris 1937–Paris 1957: Arts plastiques, littérature, théâtre, cinéma, vie quotidienne et environnement, archives sonores et visuelles, photographie* (Paris: Centre Georges Pompidou/Gallimard, 1992), 630; Rémi Baudouï, *Raoul Dautry, 1880–1951: Le technocrate de la République* (Paris: Balland, 1992), 305–6.
5. Le Corbusier claimed that the crossing took nineteen days. Le Corbusier, *When the Cathedrals Were White: A Journey to the Country of Timid People*, trans. Francis E. Hyslop Jr. (New York: Reynal & Hitchcock, 1947), xix. He left Le Havre on 23 December and arrived in New York on 8 January, a crossing of seventeen days. Le Corbusier, *Agenda*, 1945, FLC, F3-7, and *Agenda*, 1946, FLC, F3-8.
6. Benoît Pouvreau, *Un politique en architecture: Eugène Claudius-Petit (1907–1989)* (Paris: Moniteur, 2004), 97; Rémi Baudouï, "The Quest for American Productivity," in *Catching Up with America*, ed. Dominique Barjot (Paris: Presses de l'Université de Paris-Sorbonne, 2001), 350.
7. Le Corbusier, *When the Cathedrals Were White*, xix.
8. See Benoît Pouvreau, "Eugène Claudius-Petit (1907–1989), militant de la modernité," in *1907–1989: Hommage à Eugène Claudius-Petit, fondateur du corps des architectes-conseils de l'état* (Paris: Thotm, 2007), 17–19.
9. Eugène Claudius-Petit, "Aperçus sur les problèmes de l'urbanisme," 3 Sept. 1944, FLC, D3-8, 366.
10. Pierre Claudius [wartime clandestine name for Eugène Claudius-Petit], *Problèmes d'urbanisme contemporain* (Algiers: Centre National de la Recherche Scientifique, 1944). See French Press and Information Service bulletin *Free France* 8, no. 7 (1 Oct. 1945), 194.
11. Claudius-Petit, "Choses vécues," 629. Translation by the author. See Claudius, *Problèmes d'urbanisme contemporain*, 4, 8.
12. Le Corbusier, *Quand les cathédrales étaient blanches: Voyage au pays des timides* (Paris: Librairie Plon, 1937).
13. Le Corbusier called for "harmony" in his lecture on 3 August 1933 at the CIAM 4 congress. Le Corbusier, "Air-Son-Lumière," in "Le IV Congrès international d'architecture moderne, La Ville Fonctionnelle," 15–23, CIAM Collection Folder B003, Courtesy of the Frances Loeb Library, Harvard Graduate School of Design, Cambridge, Mass. See also *Technika chronika* 44–46 (15 Oct.–15 Nov. 1933); this issue is devoted to the proceedings of CIAM 4.
14. Claudius, *Problèmes d'urbanisme contemporain*, 3, 6.
15. Claudius-Petit, "Choses vécues," 629. See also Pouvreau, *Un politique en architecture*, 71.
16. Philip Kelly, "Report from Europe," *Architectural Forum* 84, no. 3 (Mar. 1946), 105.
17. Claudius, *Problèmes d'urbanisme contemporain*, 6. Translation by the author.
18. Le Corbusier to [Sigfried] Giedion, 21 Feb. 1941, CIAM Archive, Institut für Geschichte und Theorie der Architektur, ETH Zürich, 43-K-1941-2-21-1/3, as quoted in Eric Mumford, *The CIAM Discourse on Urbanism, 1928–1960* (Cambridge, Mass.: MIT Press, 2000), 153, 308n88.
19. On Le Corbusier's efforts to garner Vichy support for his plans, see Mary Caroline McLeod, "Urbanism and Utopia: Le Corbusier from Regional Syndicalism to Vichy" (PhD diss., Princeton University, 1985), 383–403. See also R.B. [Rémi Baudouï], "Vichy: L'attitude de Le Corbusier pendant la guerre," in Lucan, *Le Corbusier, une encyclopédie*, 458–59; Anatole Kopp, Frédérique Boucher, and Danièle Pauly, *L'architecture de la reconstruction en France, 1945–1953* (Paris: Moniteur, 1982), 71–75.
20. McLeod, "Urbanism and Utopia," 403.
21. "Overseas," *Architectural Forum* 83, no. 2 (Aug. 1945), 10.
22. Claudius-Petit, "Choses vécues," 629. Translation by the author.
23. P.N. [Patrice Noviant], "Les trois établissements humains," in Lucan, *Le Corbusier, une encyclopédie*, 415–16. See also Le Corbusier, *L'urbanisme des*

- trois établissements humains (1945, as *Les trois établissements humains*; repr., Paris: Édition de Minuit, 1959); Pouvreau, *Un politique en architecture*, 86.
24. Le Corbusier to [José Luis] Sert, [Sigfried] Giedion, and Fernand Léger, 2 Apr. 1945, in *Le Corbusier, José Luis Sert: Correspondance, 1928–1965*, ed. Mathilde Tieleman (Paris: Éditions du Linteau, 2009), 91–93; Baudouï, “The Quest for American Productivity,” 350. See also Pouvreau, *Un politique en architecture*, 68–71.
25. “AN 538 AP, Idée pour une action MLN,” 12 Feb. 1945, as quoted in Pouvreau, *Un politique en architecture*, 88.
26. Baudouï, *Raoul Dautry*, 305–6.
27. Raoul Dautry to Le Corbusier, 30 Nov. 1945, FLC, as quoted in Jacques Sbrigliio, *Le Corbusier: L'Unité d'Habitation de Marseille* (Basel and Paris: Birkhäuser and Fondation Le Corbusier, 2004), 233n15; Claudius-Petit, “Choses vécues,” 630.
28. Claudius-Petit, “Choses vécues,” 627–28.
29. Terushi Hara, “Productivity Missions to the United States: The Case of Post-war France,” in Barjot, *Catching Up with America*, 171–82.
30. Le Corbusier, “Urbanisme des CIAM ASCORAL, Programme d'Enquête en U.S.A. relative au domaine bâti (Architecture et Urbanisme),” 7 Jan. 1945, FLC, D1-13, 202–4. Translation by the author. See also Baudouï, “The Quest for American Productivity,” 350–51.
31. “Mission d'architectes et d'urbanistes Français aux Etats-Unis,” 31 Aug. 1945, FLC, D1-13, 1; “Enquête en U.S.A. 1945—Sur le domaine bâti,” 11 Aug. 1945, FLC, D1-13, 6. Originally the plan called for Jean Prouvé to accompany Le Corbusier and Claudius-Petit. “Urbanisme des CIAM ASCORAL,” 204.
32. Pierre-André Emery, who received his diploma from the École des Beaux-Arts in Geneva, worked in Le Corbusier's atelier until 1926, when he left France for Algeria. André Sive was born Andras Szivessy in Hungary and graduated from the Academy of Fine Arts in Vienna. He worked under Auguste Perret in Paris in the early 1920s, in the office of Ernő Goldfinger in London from 1925 to 1929, and later for Jean Prouvé; he left France for Algeria in 1943. During the early 1930s Michel Écochard had carried out restoration work and urban planning in Syria and Lebanon, drawing up plans for Damascus (1936) and Beirut (1943–44). See Pouvreau, *Un politique en architecture*, 69nn30–31, 92n49. See also Baudouï, “The Quest for American Productivity,” 349. On Sive, see “M. André Sive,” *The Times*, 25 Sept. 1958, 15; and André Sive, “Mesures immédiates, le provisoire et le permanent,” *L'Architecture d'aujourd'hui* 16, no. 2 (July/Aug. 1945), 70–71.
33. On Emery, Hanning, and Bodiansky's respective tenures in Le Corbusier's atelier, see “Répertoire des collaborateurs de Le Corbusier ayant travaillé à l'atelier 25 rue de Sèvres ainsi qu'aux travaux exécutés à l'étranger,” FLC. Hanning, who had been a member of the French ASCORAL group from 1943, contributed to the ASCORAL/Le Corbusier publication *Les trois établissements humains* (1945). Born in the Ukraine, Bodiansky fled the Russian Revolution in 1917 to join the French Foreign Legion. After his war service he received a diploma in aviation and served as a railway engineer in the Belgian Congo before returning to France, where he designed railway engines and then airplanes and hydroplanes. Later he worked with Eugène Beaudoin and Marcel Lods on a system of prefabricated assembly, largely of reinforced concrete, for the housing at Cité de la Muette at Drancy. See P.S. [Pierre Saddy], “Bodiansky (Vladimir),” in Lucan, *Le Corbusier, une encyclopédie*, 76–77; Marion Tournon-Branly, “The Work of Vladimir Bodiansky,” *Architectural Design* 35, no. 1 (Jan. 1965), 25–28; “Curriculum vitae de M. Vladimir Bodiansky,” FLC, D1-13, 11.
34. Le Corbusier to Sert, Giedion, and Léger, 2 Apr. 1945, in Tieleman, *Le Corbusier, José Luis Sert*, 91–93; José Luis Sert to Le Corbusier, 12 Apr. 1945, and S. [Sigfried] Giedion, S. [Stamo] Papadaki, and J. L. [José Luis] Sert to Le Corbusier, 1 May 1945, in Tieleman, *Le Corbusier, José Luis Sert*, 94–97.
35. Baudouï, “The Quest for American Productivity,” 351.
36. “Mission d'architectes-urbanistes Français aux Etats-Unis,” 30 Aug. 1945, FLC, D1-13, 4. Among the mission's objectives was a case study of America's “four routes” (highways, railroads, waterways, and air), a theme from Le Corbusier, *Sur les 4 routes* (Paris: Gallimard, 1941).
37. “Mission d'architectes et d'urbanistes Français aux Etats-Unis,” 31 Aug. 1945, FLC, D1-13, 1; “Enquête en U.S.A. 1945,” 6.
38. “Mission d'architectes-urbanistes Français aux Etats-Unis,” 30 Aug. 1945, FLC, D1-13, 4. Translation by the author.
39. Emery would write on planning, Hanning on architecture, Écochard on working conditions, Sive on prefabrication, and Bodiansky on construction methods. See “Enquête en U.S.A. 1945,” 7. These themes informed the Grille (Grid), which Le Corbusier put forward at CIAM 6 in 1947. See Mumford, *The CIAM Discourse on Urbanism*, 180–82.
40. “Mission d'architectes et d'urbanistes Français aux Etats-Unis,” 31 Aug. 1945, FLC, D1-13, 1.
41. Vladimir Bodiansky, “Mission d'architecture d'urbanisme 2me mois,” FLC, D1-13, 27.
42. “Le Corbusier Show,” *Architectural Forum* 83, no. 4 (Oct. 1945), 11.
43. Vladimir Bodiansky, “Mission d'architectes-urbanistes, Sept–Oct 1945,” Oct. 1945, FLC, D1-13, 18, 19.
44. Michel Écochard, “L'urbanisme aux Etats-Unis,” conférence de M. Écochard du 7 Mars 1946, FLC, D1-13, 284.
45. On the TVA concept of electrical power as public policy, see Mario Einaudi, *The Roosevelt Revolution* (New York: Harcourt, Brace, 1959), 158, 162–64.
46. Michel Écochard, “Carnet de route,” FLC, D1-13, 232.
47. *Ibid.*, 19 and 20 Nov. 1945, 234.
48. Christine Macy, “The Architect's Office of the Tennessee Valley Authority,” in *The Tennessee Valley Authority: Design and Persuasion*, ed. Tim Culvahouse (New York: Princeton Architectural Press, 2007), 33–37.
49. Écochard, “Carnet de route,” 232–36.
50. Marian Moffett, “Looking to the Future: The Architecture of Roland Wank,” *Arris* 1 (1989), 5.
51. Walter L. Creese, *TVA Public Planning* (Knoxville: University of Tennessee Press, 1990), 175; Roland A. Wank, “The Architecture of Inland Waterways,” in *New Architecture and City Planning*, ed. Paul Zucker (New York: Philosophical Library, 1944), 441.
52. Écochard, “Carnet de route,” FLC, D1-13, 234. Translation by the author.
53. *Ibid.* Wank also used the checkerboard pattern of board-formed concrete at Guntersville in Alabama, Chickamauga in Tennessee, and Hiwassee in North Carolina. See F. A. Gutheim, “Tennessee Valley Authority: A New Phase in Architecture,” *Magazine of Art* 33, no. 9 (Sept. 1940), 520, 521, reprinted in *TVA Architecture: As Shown at the Museum of Modern Art* (Knoxville and New York: Tennessee Valley Authority and Museum of Modern Art, 1941), 10, 11, 22–25. Fontana's reinforced concrete powerhouse and visitors' building were faced with limestone. “TVA Dam, Fontana, Tennessee,” *Progressive Architecture* 28 (Dec. 1947), 46, 48.
54. Écochard, “Carnet de route,” FLC, D1-13, 234; Écochard, “L'urbanisme aux Etats-Unis,” 288.
55. Écochard, “La planification, condition de l'urbanisme,” lecture given at American University, Beirut, 9 May 1946, 5, as quoted in Jean-Louis Cohen, *Scenes of the World to Come* (Montreal: Canadian Centre for Architecture and Flammarion, 1995), 172n510. Translation by the author.
56. G. [Gérard] Hanning to Le Corbusier, 27 Nov. 1945, FLC, D1-13, 62. Translation by the author.
57. Pierre-André Emery, “Compte rendu de mission technique aux Etats-Unis,” *Travaux nord-africains*, 25 July 1946, 2. Translation by the author.
58. Écochard, “L'urbanisme aux Etats-Unis,” 302–7.
59. Vladimir Bodiansky, “3me rapport du 15.11.45 au 15.12.45,” FLC; postcard (mailed from Cheyenne, Wyoming, en route to Los Angeles), Emery to Le Corbusier, 1 Dec. 1945, FLC, D1-13, 69.

60. Écochard, "Carnet de route," FLC, D1-13, 238–39, 246, 247.
61. Museum of Modern Art curator Elizabeth Mock wrote to Ludwig Mies van der Rohe on behalf of the mission team, but there is no evidence that any members met with him in Chicago. See Cohen, *Scenes of the World to Come*, 214n508.
62. "650 Return to Work," *New York Times*, 29 Jan. 1946, 14; Pouvreau, *Un politique en architecture*, 99.
63. Baudouï, "The Quest for American Productivity," 348–49.
64. Summary of the address of M. Claudius-Petit, deputy at the "Assemblée [sic] Nationale Constituante," vice president of the Reconstruction and Urbanism Commission, and member of the "Conseil National de la Résistance," English text of speech delivered before a joint meeting of the American Society of Planners and Architects and the International Congresses for Modern Architecture in New York City, 20 Jan. 1946, FLC, D1-13, 215–19.
65. Mardges Bacon, *Le Corbusier in America: Travels in the Land of the Timid* (Cambridge, Mass.: MIT Press, 2001), 230–32.
66. Le Corbusier, *La Ville Radiuse* (Paris: Éditions de l'Architecture d'Aujourd'hui, 1935); Le Corbusier, *Quand les cathédrales étaient blanches*, 252–61.
67. On Le Corbusier's tropes of "harmony," see Le Corbusier-Saugnier, *Vers une architecture* (Paris: G. Crès, [1923]); on the "second era of the machine age" as an "era of harmony," see Le Corbusier, *The Radiant City*, trans. Pamela Knight, Eleanor Levieux, and Derek Coltman (New York: Orion Press, 1967), 340.
68. Le Corbusier illustrated a photograph of the Lincoln Express Highway in Newark, New Jersey, in Le Corbusier, *La Ville Radiuse*, 34. On the Algiers plan, see Mary McLeod, "Le Corbusier and Algiers," *Oppositions* 19/20 (Winter/Spring 1980), 54–85.
69. Paul Goodman, review of *New Architecture and City Planning*, edited by Paul Zucker, *New York Times*, 14 Jan. 1945, BR6.
70. Le Corbusier, "Working in Urbanism and Architecture: A Note to *Architectural Record* by Le Corbusier," *Architectural Record* 100, no. 4 (Oct. 1946), 82–83; Le Corbusier, "Note for 'Architectural Record,'" 7 Feb. 1946, FLC, D1-13, 90.
71. Le Corbusier, *When the Cathedrals Were White*, xvi, xx; Le Corbusier, *The Modulor*, trans. Peter de Francia and Anna Bostock (Cambridge, Mass.: MIT Press, 1968), 113–15.
72. Le Corbusier, *Carnet de notes*, FLC, F3-7-10. Wachsmann worked in the Le Corbusier atelier in 1924 and 1925. "Répertoire des collaborateurs de Le Corbusier," FLC.
73. "Intervention au colloque," *La France en voie de modernisation*, Fondation nationale des sciences politiques, Paris, 4 and 5 Dec. 1981, as quoted in Pouvreau, *Un politique en architecture*, 99. Translation by the author.
74. Le Corbusier to Joseph Hudnut ("Dear Dean Hudnut Robinson"), 20 Feb. 1946, FLC, D1-13, 135; Le Corbusier, *Carnet de notes*; Le Corbusier, "Visions et projets," *Pages françaises* 11 (Mar. 1946), 121; Mark S. Foster, *Henry J. Kaiser: Builder in the Modern American West* (Austin: University of Texas Press, 1989), 144–50; Mike Davis, *City of Quartz* (New York: Verso, 1990), 384–95. On Kaiser's plan to build "prefabricated" houses, see "Kaiser to Build Homes at Low Cost," *New York Times*, 10 May 1945, 33; on the Kaiser car, see "Big Auto Offering to Be Made Today," *New York Times*, 27 Sept. 1945, 31.
75. Le Corbusier, *The Modulor*, 53.
76. Interview with Eugène Claudius-Petit, 16 Oct. 1978, in Kopp et al., *L'architecture de la reconstruction en France*, 105; Eugène Petit (Pierre Claudius), "Vers la cité de notre temps," *Volontés*, 21 Mar. 1945, FLC, XI-14, 55.
77. Le Corbusier, *Propos d'urbanisme* (Paris: Bourrellet, 1946), 130, 132; Le Corbusier, *Concerning Town Planning*, trans. Clive Entwistle (New Haven, Conn.: Yale University Press, 1948), 116, 118. Le Corbusier elucidates his argument in "What Is America's Problem?," *American Architect* 148, no. 2643 (Mar. 1936), 16–22, reprinted in Le Corbusier, *Quand les cathédrales étaient blanches*, 273–91; Le Corbusier, *When the Cathedrals Were White*, 186–201.
78. David E. Lilienthal, *TVA: Democracy on the March* (1944; repr., New York: Harper & Row, 1953); David E. Lilienthal, *Construit pour le peuple: TVA—une expérience de la démocratie américaine* (New York: Les Éditions Transatlantiques, 1945). [Gérard] Hanning to Le Corbusier [from El Paso, Texas], 27 Nov. 1945, FLC, D1-13, 62–64. On Lilienthal's leadership, see Edwin C. Hargrove, *Prisoners of Myth: The Leadership of the Tennessee Valley Authority, 1933–1990* (Princeton, N.J.: Princeton University Press, 1994), 42–64.
79. Jane West to Le Corbusier, 22 Oct. 1935, FLC, D1-15, 9. Among the TVA pamphlets Le Corbusier received from West, whose husband, Alfred Clauss, worked for the TVA, see *The Development of the Tennessee Valley* (Tennessee Valley Authority; Government Printing Office, [1935]), FLC, D1-13, 332.
80. José Luis Sert, *Can Our Cities Survive?* (Cambridge, Mass.: Harvard University Press, 1942), 217, 238n12. In the spring of 1945 Sert sent Le Corbusier a copy of his book, which reported on the CIAM 4 meeting, elucidating the "four functions" of urbanism: dwelling, recreation, work, and transportation. Le Corbusier to José Luis Sert, 3 June 1945, in Tieleman, *Le Corbusier; José Luis Sert*, 97.
81. Marcel Lods, "Retour d'Amérique," *L'Architecture française* 7, no. 54 (Jan. 1946), 23–28; Marcel Lods, "Industrialisation et préfabrication, expériences américaines," *Techniques et Architecture* 16, nos. 5–6 (Nov. 1945), 129. Le Corbusier collaborated with Lods on a project for the urbanization of Saint-Gaudens-Vallée des Pyrénées (1945–46). Le Corbusier, *Oeuvre complète 1938–1946*, ed. Willy Boesiger (Zurich: Editions d'Architecture, 1946), 162. See also Julian Huxley, *La vallée du miracle: "TVA," une aventure dans le domaine de l'économie planifiée* (New York: Éditions Transatlantique, 1944).
82. Le Corbusier's collection contains pamphlets, reports (including congressional reports), typescripts, published articles, agricultural reports, and postcards, as well as bibliographies. See FLC, S2-9.
83. Lilienthal, *TVA*, xii.
84. Le Corbusier, *The Modulor*, 54.
85. On soil erosion and regeneration, see Julian Huxley, "TVA: An Achievement of Democratic Planning," *Architectural Review* 93, no. 558 (June 1943), 142–45.
86. Le Corbusier, *When the Cathedrals Were White*, xix.
87. Le Corbusier, *The Modulor* (Boulogne: Éditions de l'Architecture d'Aujourd'hui, 1950), 53–54.
88. On Le Corbusier's search for a power broker as an "authority," see Bacon, *Le Corbusier in America*, 31, 159–80, 183–202.
89. Le Corbusier, "Visions et projets," 121.
90. Marian Moffett, "Manufactured Housing: The TVA Experience," *Arris* 5 (1994), 34–35; Carroll A. Towne, "Portable Housing: TVA Experience Leads to Trailer Houses," *Pencil Points* 23, no. 7 (July 1942), 49–56.
91. See "Foreign Visitors," undated press release, and "Foreign Visitors to Tennessee Valley Authority January–June 1944." Lilienthal left no record of his meeting with Le Corbusier in either his appointment book or his journal. See Appointment Book, 1946, Series 5 Appointment Books, Box 156, 1945–1948, and Series 15, Box 196, Manuscript Journal, 1944–46, David E. Lilienthal Papers, Seeley G. Mudd Manuscript Library, Princeton University.
92. Le Corbusier visited Fontana Dam on 16 January. Le Corbusier, *Carnet de notes*, 16 Jan. 1946; "TVA Dam, Fontana, Tennessee," *Progressive Architecture* 28, no. 12 (Dec. 1947), 43–50. On Tour, see John N. Baker and Marvin R. Patterson, "Harry B. Tour of TVA," *The Archi* 24, no. 1 (Apr. 1945), 1–2.
93. Le Corbusier, *The Modulor*, 54.

94. Le Corbusier, "Visions et projets," 121. Translation by the author.
95. Bruno Taut, *Die Stadtkrone* (Jena, Germany: E. Diederichs, 1919). See Francesco Passanti, "The Aesthetic Dimension in Le Corbusier's Urban Planning," in *Josep Lluís Sert: The Architect of Urban Design, 1953–1969*, ed. Eric Mumford and Hashim Sarkis (New Haven, Conn.: Yale University Press, 2008), 28n7, 31–33.
96. Le Corbusier, *Sur les 4 routes*, 158; Le Corbusier, *The Four Routes*, trans. Dorothy Todd (London: Dennis Dobson, 1947), 141. Le Corbusier published an aerial view of a reinforced concrete dam showing its rear buttresses in *Almanach d'architecture moderne* (Paris: G. Crès, 1925).
97. Le Corbusier, *When the Cathedrals Were White*, xix.
98. On the concept of "symbolic objectivity" embedded in modernism, see William H. Jordy, "The Symbolic Essence of Modern European Architecture of the Twenties and Its Continuing Influence," *JSAH* 22, no. 3 (Oct. 1963), 177–87, reprinted in *Symbolic Essence and Other Writings on Modern Architecture and American Culture by William H. Jordy*, ed. Mardges Bacon in association with the Temple Hoyne Buell Center for the Study of American Architecture, Columbia University (New Haven, Conn.: Yale University Press, 2005), 135–50.
99. "Le Corbusier in U.S.," *Architectural Forum* 84, no. 2 (Feb. 1946), 23.
100. Le Corbusier, "Esthétique ou confort, problème de l'urbanisme aux Etats-Unis," *Courrier Diplomatique* 2 (Mar. 1946), 27. Translation by the author.
101. On the influence of Nietzsche in Le Corbusier's thought and writings, see Charles Jencks, *Le Corbusier and the Tragic View of Architecture* (Cambridge, Mass.: Harvard University Press, 1973), 25, 35, 64, 178–81.
102. Le Corbusier, *Agenda*, 1946, 18 Jan. 1946; Le Corbusier, "Visions et projets," 121–22.
103. Jean-Louis Cohen, *Architecture in Uniform* (New Haven, Conn.: Yale University Press, 2011), 284; "Pentagon Building, War Department, Arlington, VA," *Architectural Forum* 78, no. 1 (Jan. 1943), 40.
104. Cohen, *Architecture in Uniform*, 286.
105. Le Corbusier, "Visions et projets," 121. Translation by the author.
106. On the CIAM synthesis between "individual rights" and "collective action," see Le Corbusier, *The Athens Charter* (1943; repr., New York: Grossman, 1973), 95, 96; see also 26, 44, 104–5.
107. Serge Chermayeff prepared English summaries of both presentations for distribution.
108. [Serge Chermayeff] to Vi [Joseph Hudnut], 13 Jan. 1946, Box 26:13, Douglas Haskell Papers, Avery Architectural and Fine Arts Library, Columbia University, New York.
109. "Address by M. Le Corbusier, President of the French Mission for Urbanism, Architecture and Cultural Relations, Ministry of Foreign Affairs, delivered before a joint meeting of the American Society of Planners and Architects and the International Congress of Modern Architects in New York City on January 20, 1946," FLC, D1-13, 220–21; "Réunion d'Architectes 20 Janvier NY," lecture notes, FLC, D1-13, 222.
110. ASPA president Joseph Hudnut sent a letter to the mayor of Saint-Dié endorsing Le Corbusier's project. Joseph Hudnut to Maire de Saint-Dié, 28 Jan. 1946, Box 26:13, Douglas Haskell Papers, Avery Architectural and Fine Arts Library, Columbia University, New York.
111. "Le Corbusier, Plans for the Reconstruction of France," *Architectural Record* 99, no. 3 (Mar. 1946), 93.
112. Le Corbusier, "Working in Urbanism and Architecture," 82. See also Le Corbusier, "A Plan for St. Dié," *Architectural Record* 100, no. 4 (Oct. 1946), 78–80; [Eugène] Claudius-Petit, "Crossing the Threshold," *Architectural Record* 100, no. 4 (Oct. 1946), 81–83; Mardges Bacon, "Josep Lluís Sert's Evolving Concept of the Urban Core: Between Corbusian Form and Mumfordian Social Practice," in Mumford and Sarkis, *Josep Lluís Sert*, 94–98. Eric Mumford reproduces a model of the Saint-Dié civic center in *Defining Urban Design: CIAM Architects and the Formation of a Discipline, 1937–69* (New Haven, Conn.: Yale University Press, 2009), 59, fig. 23.
113. Le Corbusier, *Oeuvre complète 1946–1952*, ed. Willy Boesiger (Zurich: Editions Girsberger, 1953), 191; E.M. and N.R. [Edouard Mure and Nathalie Régnier], "Saint-Dié: Chronique d'un échec," in Lucan, *Le Corbusier, une encyclopédie*, 363–64.
114. Telegram, Le Corbusier to [Vladimir] Bodiansky, 7 Feb. 1946, FLC, D1-13, 42. The previous December Le Corbusier informed Bodiansky that contracts had been executed by the Ministry of Reconstruction. Le Corbusier to [Vladimir] Bodiansky, 3 Dec. 1945, FLC, D1-13, 31.
115. Le Corbusier, *Précisions sur un état présent de l'architecture et de l'urbanisme* (Paris: G. Crès, 1930), 91. On the Bastion Kellermann project, see Le Corbusier and [Pierre] Jeanneret, *Oeuvre complète 1934–1938*, ed. Max Bill (1939; repr., Zurich: Editions Girsberger, 1964), 148. Jacques Sbrigliio notes other sources in *Le Corbusier*, 122–31, as do Gargiani and Rosellini in *Le Corbusier*, 5.
116. British editor J. M. Richards and the British MARS (Modern Architectural Research) Group promoted the concept of the "Common Man." See "Reaffirmation of the Aims of CIAM," in *A Decade of New Architecture*, ed. S. [Sigfried] Giedion (Zurich: Editions Girsberger, 1951), 16–17. See also Mumford, *The CIAM Discourse on Urbanism*, 168–79.
117. A more literal translation of the French text *tendre à l'épanouissement de l'individu harmonieusement intégré dans la vie collective*, "to push toward the development of the individual, harmoniously integrated into community life," engages TVA rhetoric. See "Reaffirmation of the Aims of CIAM" and "Réaffirmation des buts des CIAM," in Giedion, *A Decade of New Architecture*, 17, 19.
118. *L'Homme et l'Architecture*, nos. 11–14 (1947), 5; Le Corbusier, *Le Modulor*, 125. Translation by the author.
119. See Atelier de Bâisseurs advertisement in *L'Homme et l'Architecture*, nos. 11–14 (1947), viii. Translation by the author.
120. Although the Atelier de Bâisseurs design group was based at the Le Corbusier atelier, the ATBAT headquarters was located at 10 Rue Saint Augustin, Paris.
121. Sbrigliio, *Le Corbusier*, 139–41. See Wogensky rendering FLC 26662 in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 2, XVII, in *The Le Corbusier Archive*, ed. H. Allen Brooks (New York and Paris: Garland and Fondation Le Corbusier, 1984), 165. See also Le Corbusier, *Oeuvre complète 1938–1946*, 172–73.
122. See drawing FLC 26295, dated 8 Mar. 1946, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, in Brooks, *The Le Corbusier Archive*, 473.
123. See drawing FLC 26314, 10 May 1946, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, 486; and drawings FLC 26315–FLC 26323, 10 May 1946, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 2, XVII, 5–10. Models and plans appear in "Marseille: Projet pour un immeuble d'état," *Techniques et Architecture* 6, nos. 7–8 (1946), 346–48. Drawings of transverse sections and a longitudinal section are illustrated in Le Corbusier, "Un immeuble d'habitation collectif type I.S.A.I. à Marseille," *L'Architecture d'Aujourd'hui* 17, no. 9 (Dec. 1946), 4–6.
124. Sbrigliio, *Le Corbusier*, 152–53. Le Corbusier alludes to the steel shortage in his caption to a photograph of the Unité's reinforced concrete frame: "the skeleton of reinforced concrete (imposed by the circumstances in 1946: no steel sections)." Le Corbusier, "L'Unité d'Habitation de Marseille," *Le Point*, 7, no. 38 (Nov. 1950), 27. Translation by the author.
125. Sbrigliio, *Le Corbusier*, 143–44.
126. For more extensive chronologies of the third and fourth sites, see Sbrigliio, *Le Corbusier*, 145–46.
127. André Wogensky, "Description of the Marseilles Block," in Le Corbusier, *The Marseilles Block*, trans. Geoffrey Sainsbury (London: Harvill Press, 1953), 54. See also Gérard Monnier, *Le Corbusier: Les Unités d'Habitation en France* (Paris: Belin-Herscher, 2002), 84.

128. Wogenscky, "Description of the Marseilles Block," 52; Sbriglio, *Le Corbusier*, 80–81. See also Mary McLeod, "New Designs for Living: Domestic Equipment of Charlotte Perriand, Le Corbusier, and Pierre Jeanneret, 1928–29," in *Charlotte Perriand: An Art of Living*, ed. Mary McLeod (New York: H. N. Abrams, 2003), 66–67, 221.
129. See longitudinal section, FLC 26314, 10 May 1946, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, 486.
130. See section of north façade, FLC 25340, of 15 Dec. 1946, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, 123.
131. William J. R. Curtis, "Ideas of Structure and the Structure of Ideas: Le Corbusier's Pavillon Suisse, 1930–1931," *JSAH* 40, no. 4 (Dec. 1981), 306–7, figs. 11, 12. See also Ivan Zaknic, *Le Corbusier Pavillon Suisse: The Biography of a Building* (Basel: Birkhäuser, 2004), 146.
132. Le Corbusier, *Oeuvre complète 1946–1952*, 179.
133. A TVA gantry crane is illustrated in "Tennessee Valley Authority," *Architectural Forum* 71, no. 2 (Aug. 1939), 90. Le Corbusier owned a copy of this article; FLC, S2-9, 283.
134. *L'Homme et l'Architecture*, nos. 11–14 (1947), 6. Translation by the author.
135. Le Corbusier, *Oeuvre complète 1946–1952*, 199.
136. In his travel notebook Écochard drew a section of the Norris powerhouse with a penstock and turbine. Écochard, "Carnet de route," 233.
137. Le Corbusier, *Urbanisme* (Paris: G. Crès, 1925), 137–52.
138. Le Corbusier, *The City of Tomorrow and Its Planning*, trans. Frederick Etchells (New York: Payson & Clarke, 1929), 150.
139. *Ibid.*, 150, 152–56.
140. *Ibid.*, 51, 52.
141. *Ibid.*, 150.
142. Le Corbusier, *Toward an Architecture*, trans. John Goodman (Los Angeles: Getty Research Institute, 2007), 92.
143. Réjean Legault, "The Semantics of Exposed Concrete," in *Liquid Stone: New Architecture in Concrete*, ed. Jean-Louis Cohen and G. Martin Moeller Jr. (Basel: Birkhäuser, 2006), 47.
144. From 1933 to 1936 Bodiansky worked as an engineer for Mopin & Cie in Paris. From 1936 to 1938 he was administrative director at Mopin and Co. in Leeds, England, where he collaborated on the Quarry Hill housing project. Both the La Muette and Quarry Hill housing projects were entirely constructed of prefabricated elements. On the use of *béton vibré* at Drancy, see Robert Weddle, "Housing and Technological Reform in Interwar France: The Case of the Cité de la Muette," *Journal of Architectural Education* 54, no. 1 (Feb. 2001), 167–75. See also Vladimir Bodiansky, "Curriculum Vitae," FLC, E-8, 69–72.
145. Le Corbusier, *Oeuvre complète 1946–1952*, 184. The first edition of Le Corbusier's *Oeuvre complète 1938–1946* makes no mention of *béton brut* in its presentation of the Unité d'Habitation. See "Coffrage de la tour d'ascenseurs" (shuttering of the elevator tower), FLC 25237, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, xxx, 74. See also Gargiani and Rosellini, *Le Corbusier*, 21, fig. 52.
146. E. [Emil] Mörsch, *Le béton armé*, trans. (from German) Max Dubois (Paris: Béranger, 1909), 335. See also H. Allen Brooks, *Le Corbusier's Formative Years* (Chicago: Chicago University Press, 1997), 191, 386–87; Augustin Mesnager, *Cours de béton armé* (Paris: Dunod, 1921), 446.
147. Ch. E. Jeanneret Gris and A. Ozenfant, *Après le cubisme* (1918; repr., Turin, Italy: Bottega D'Erasmus, 1975), 18.
148. See, for example, Amédée Ozenfant and Charles Edouard Jeanneret-Gris's essay "L'angle droit," in *L'Esprit nouveau* 18 (Nov. 1923). See also Gargiani and Rosellini, *Le Corbusier*, 57.
149. Le Corbusier-Saugnier, *Vers une architecture*, ix, 121, 123, 189; Reyner Banham, "The New Brutalism," *Architectural Review* 118, no. 708 (Dec. 1955), 355–61.
150. Paul Jamot, *A. G. Perret et l'architecture du béton armé* (Paris: G. Vanoest, 1927), 48; Peter Collins, "The New Brutalism of the 1920s," in *Concrete: The Vision of a New Architecture*, 2nd ed. (Montreal: McGill-Queen's University Press, 2004), 325.
151. Le Corbusier and [Pierre] Jeanneret, *Oeuvre complète de 1929–1934*, ed. Willy Boesiger (1935; repr., Zurich: Editions Girsberger, 1964), 82, 89.
152. On parallels between the Unité and World War II bunkers, see John Farmer, "Battered Bunkers," *Architectural Review* 181, no. 1079 (Jan. 1987), 60–65.
153. H. [Henri] Gutton, "Procédés de construction," *Techniques et Architecture* 4, nos. 11–12 (July 1945), 199, 201.
154. "Tennessee Valley Authority," *Architectural Forum* 71, no. 2 (Aug. 1939), 93, 94, FLC, S2-9, VI, 283; Gutheim, "Tennessee Valley Authority," 2–5, FLC, S2-9, VI, 265; Souvenir of Norris Dam and Tennessee Valley (color postcard series), FLC, S2-9, V, 263.
155. A. [Albert] Caquot, "Le béton armé," *L'Architecture d'Aujourd'hui* 16, no. 5 (Mar.–Apr. 1946), 41.
156. Le Corbusier, *Modulor 2, 1955: (La parole est aux usagers) suite de "Le Modulor 1948"* (Boulogne: Éditions de l'Architecture d'Aujourd'hui, 1955), 318, fig. 181; Le Corbusier, *Modulor 2*, trans. Peter de Francia and Anna Bostock (Cambridge, Mass.: MIT Press, 1968), 306, fig. 181.
157. See drawing FLC 25173, of 27 Mar. 1947, in Le Corbusier, *Unité d'Habitation, Marseille-Michelet*, vol. 1, XVI, 44. See also Gargiani and Rosellini, *Le Corbusier*, 21, fig. 51.
158. Gargiani and Rosellini give a detailed account of the formwork in *Le Corbusier*, 19–33.
159. Caroline Maniaque Benton, "Back to Basics: Maisons Jaoul and the Art of the *Mal Foutu*," *Journal of Architectural Education* 63, no. 1 (Oct. 2009), 31–40; Gargiani and Rosellini, *Le Corbusier*, 24–26, 29.
160. Le Corbusier, *Oeuvre complète 1946–1952*, 191.
161. *Ibid.*, 184. Translation by the author.
162. On the Unité d'Habitation at Nantes, see Le Corbusier's sketches for formwork pattern of 27 July 1952 (FLC 2031 and FLC 2019), 29 July 1952 (FLC 2020), and 29 Apr. 1954 (FLC 2340). The checkerboard also appears on the elevator tower wall of the Unité d'Habitation in Berlin (1955–58). See drawing of 25 Oct. 1956 (FLC 23813). These drawings are reproduced in Gargiani and Rosellini, *Le Corbusier*, 158, 165, 171, 189, figs. 360, 381, 403, 437.
163. J.L. [Judi Loach], "Church of Saint-Pierre, Firminy-Vert," and Judi Loach, "Le Corbusier at Firminy-Vert," in *Le Corbusier, Architect of the Century* (London: Hayward Gallery, 1987), 252–54, 338–43. The church's original checkerboard pattern is obscured by the wash that covers the walls, as carried out in the final design by project architect José Oubrière. Michael Webb, "Miraculous Rebirth: Church and Art Museum, Firminy, France," *Architecture Review* 221, no. 1321 (Mar. 2007), 62–67; Gilles Ragot, *Le Corbusier à Firminy-Vert* (Paris: Patrimoine, 2011).
164. Benton, "Back to Basics," 32.
165. Gargiani and Rosellini, *Le Corbusier*, 69–89.
166. Richard Ingersoll, *Le Corbusier: A Marriage of Contours* (New York: Princeton Architectural Press, 1990); Gargiani and Rosellini, *Le Corbusier*, 89–93; Maddalena Mameli, *Le Corbusier e Costantino Nivola* (Milan: Angeli, 2012). See also Niklas Maak, *Le Corbusier: The Architect on the Beach* (Munich: Hirmer, 2011).
167. Caroline Maniaque, *Le Corbusier et les maisons Jaoul: Projets et fabrique* (Paris: Picard, 2005), 72–75; Gargiani and Rosellini, *Le Corbusier*, 31–45. See also Roberto Gargiani and Anna Rosellini, "La découverte du béton brut avec malfaçons: Chronique du chantier de l'unité d'habitation à Marseille," in Sbriglio, *LC au 71*, 152–79.
168. P. D. S. [Peter Denham Smithson but written by Alison Smithson], "House in Soho, London," *Architectural Design*, Dec. 1953, 342; Reyner Banham, *The New Brutalism: Ethic or Aesthetic?* (London: Architectural Press, 1966), 16; see also Banham, "The New Brutalism."

169. Danielle Janin, "La maison radiieuse," *L'Homme et l'Architecture*, nos. 11–14 (1947), 68–73.
170. Banham, *The New Brutalism*, 16.
171. On Banham's understanding of *art brut*, see Nigel Whiteley, "Banham and 'Otherness': Reyner Banham (1922–1988) and His Quest for an *Architecture Autre*," *Architectural History* 33 (1990), 188–221.
172. *L'Homme et l'Architecture*, nos. 11–14 (1947), 6–7. Translation by the author.
173. Le Corbusier to Henri Laugier, 8 Feb. 1946, FLC, D1-13, 132. Le Corbusier to [Pierre] Emery, 16 July 1946; Le Corbusier to [Gérard] Hanning, 16 July 1946; Le Corbusier to [André] Sive, 16 July 1945, FLC, E2-21, 79–81. Le Corbusier did publish a brief account of his postwar trip, which served as a report to the French Ministry of Foreign Affairs, then headed by Georges Bidault; see Le Corbusier, "Visions et projets," 120–24.
174. [Pierre] Emery to Le Corbusier, 21 July 1946, FLC, E2-21, 87–89. Emery reports on the UNITEC (Union des Ingenieurs et Techniciens Combatants) conference, 21 June 1946, Algiers, in "Compte rendu de mission technique aux Etats-Unis," *Travaux nord-africains*, 18 July 1946, 1–2, and 25 July 1946, 1–2. See "Conférence de Michel Écochard (Mission Française d'architecture aux Etats-Unis)," *L'Architecture d'Aujourd'hui* 16, no. 5 (Mar.–Apr. 1946), 117. See also Michel Écochard, "L'urbanisme aux États-Unis," 7 Mar. 1946, FLC, D1-13, 271–327; and Michel Écochard, draft of "Introduction au rapport de la mission d'urbanisme et d'architecture aux Etats-Unis, Septembre 1945–Février 1946," Mar. 1946. I wish to thank Vladimir Bodiansky for providing me with a copy of this draft.
175. André Schimmerling, "Urbanisme en Sarre," *L'Architecture d'Aujourd'hui* 18, no. 12 (July 1947); André Sive, "Etats-Unis," *L'Architecture d'Aujourd'hui* 17, no. 8 (Sept.–Oct. 1946), 106–9.
176. George A. Dudley, *A Workshop for Peace: Designing the United Nations Headquarters* (New York and Cambridge, Mass.: Architectural History Foundation and MIT Press, 1994), 241.
177. Le Corbusier, *When the Cathedrals Were White*, xviii.
178. Le Corbusier, "The Future of the Architecture Profession," *Plan: SA Quarterly* 2 (1947), 131.
179. *Ibid.*, 134. See also Le Corbusier, *La Ville Radiieuse*, 8–9; Le Corbusier, *The Radiant City*, 8–9; Le Corbusier, *Quand les cathédrales étaient blanches*, 306; Le Corbusier, *When the Cathedrals Were White*, 211.
180. Lilienthal, *TVA*, 186. On TVA planning, see Einaudi, *The Roosevelt Revolution*, 170.
181. Lilienthal, *TVA*, 151; Einaudi, *The Roosevelt Revolution*, 175.
182. Document, 13 Jan. 1959, FLC, P3-2, 313. See also Debora Antonini, "Bhakra Dam, un haut lieu en Inde," in *Le symbolique, le sacré, la spiritualité dans l'oeuvre de Le Corbusier* (Paris: Fondation Le Corbusier and Éditions de la Villette, 2004), 85–95; Le Corbusier, *Le Corbusier: Last Works*, ed. Willy Boesiger (New York: Praeger, 1970), 158–60.
183. See Le Corbusier, "Synthèse des arts majeurs: Architecture, peinture, sculpture," in *Oeuvre complète 1938–1946*, 155.
184. CIAM addressed the theme of a synthesis of the arts with Le Corbusier presenting a program at CIAM 7. CIAM, *Programme du 7ème congrès CIAM: Mise en application de la charte d'Athènes* (Boulogne: Architecture d'Aujourd'hui, 1948), 2–5; Christopher Pearson, "Le Corbusier's 'Synthesis of the Major Arts' in the Context of the French Reconstruction," in *The Built Surface*, vol. 2, *Architecture and the Pictorial Arts from Romanticism to the Twenty-First Century*, ed. Karen Koehler (Aldershot, England: Ashgate, 2002), 209–14. See also Mumford, *The CIAM Discourse on Urbanism*, 179–80; Gargiani and Rosellini, *Le Corbusier*, 121–26.
185. Le Corbusier, "Working in Urbanism and Architecture," 82.
186. For discussion of his expression of art, poetry, and emotion in architecture, see Le Corbusier's responses to "Our Attitude towards Problems of Aesthetics," part of a questionnaire presented at the CIAM 6 congress, Bridgwater (1947), in Giedion, *A Decade of New Architecture*, 36–37.