Designing within and for War Zones
Jean-Louis Cohen

Direct investigations of the interrelation between architecture and war are a relatively recent type of collective endeavor, as the most significant historical interpretations focus essentially on the theme of reconstruction. [1] The project I have developed on the Second World War under the title *Architecture in Uniform* began with the frustration I felt when attending the conference *Tra guerra e pace: società, cultura e architettura nel secondo dopoguerra* (Between war and peace: Society, culture, and architecture after the Second World War) held in Turin almost exactly twenty years ago. [2] Nearly all the contributions dealt with the minute aspects of *pace*, and almost nothing was said about *guerra* per se, as if the two realms were completely separated by a tight yet invisible membrane and the more precise relationship of architecture with the conflict remained taboo.

Yet, this relationship is far from being a feature of modern times. Architecture has been involved in warfare since its origins as an intellectual and material practice in Antiquity. To take only the most obvious example, Vitruvius devoted an entire chapter of his *De architectura* to the design of military machines, which were exquisitely drawn in Claude Perrault's seventeenth-century edition. fig.1 Renaissance architects such as Michelangelo and Antonio and Giuliano da Sangallo—and even artists—drew fortification plans. The differentiation between civilian and military engineers was accomplished only in the late eighteenth century, when the École des Ponts & Chaussées was created in Paris.

In Search of Zones

I would like to focus first on this publication's ingenious title, "War Zones," and on the eponymous symposium "Wars and Architecture: Forms of Construction and Destruction in War Zones" that Samia Henni convened at the Institute for the History and Theory of Architecture, ETH Zurich, on June 2–3, 2017. The notion of a "zone" is common in the semantic field of armed conflict. A *war zone* can be defined as a precise subdivision within a theater of war; it is the area in which active combat takes place, along with any peripheral support territories. In warfare, specialized zones are devoted to specific operations, many of which were defined by the American armed forces during the Korean and Vietnam wars: for instance, "landing zones" or "dropping zones"—not to mention the "forbidden zones" that tend to proliferate in the contemporary world. Zones have also become long-lasting legacies of previous wars, guaranteeing the status quo for decades, as in the case of the Demilitarized Zone created on the Korean Peninsula after the

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1 See for example Werner Durth and Niels Gutschow, *Träume in Trümmern: Planungen zum Wiederaufbau zerstörter Städte im Westen Deutschlands, 1940–1950* (Braunschweig: Fried, Vieweg & Sohn, 1988); Jeffry M. Diefendorf, *In the Wake of War: The Reconstruction of German Cities after World War II* (New York: Oxford University Press, 1993); Carola Hein, Jeffry M. Diefendorf, and Ishida Yorifusa, eds., *Rebuilding Urban Japan after 1945* (New York: Palgrave Macmillan, 2003); Nicholas Bullock, *Building the Post-war World: Modern Architecture and Reconstruction in Britain* (London: Routledge, 2002).

2 Patrizia Bonifazio, Sergio Pace Michela Rosso, and Paolo Scrivano, eds., *Tra guerra e pace: società, cultura e architettura nel secondo dopoguerra* (Milan: Franco Angeli, 1998).

Planche LXV. Fig.I.

Fig.II.

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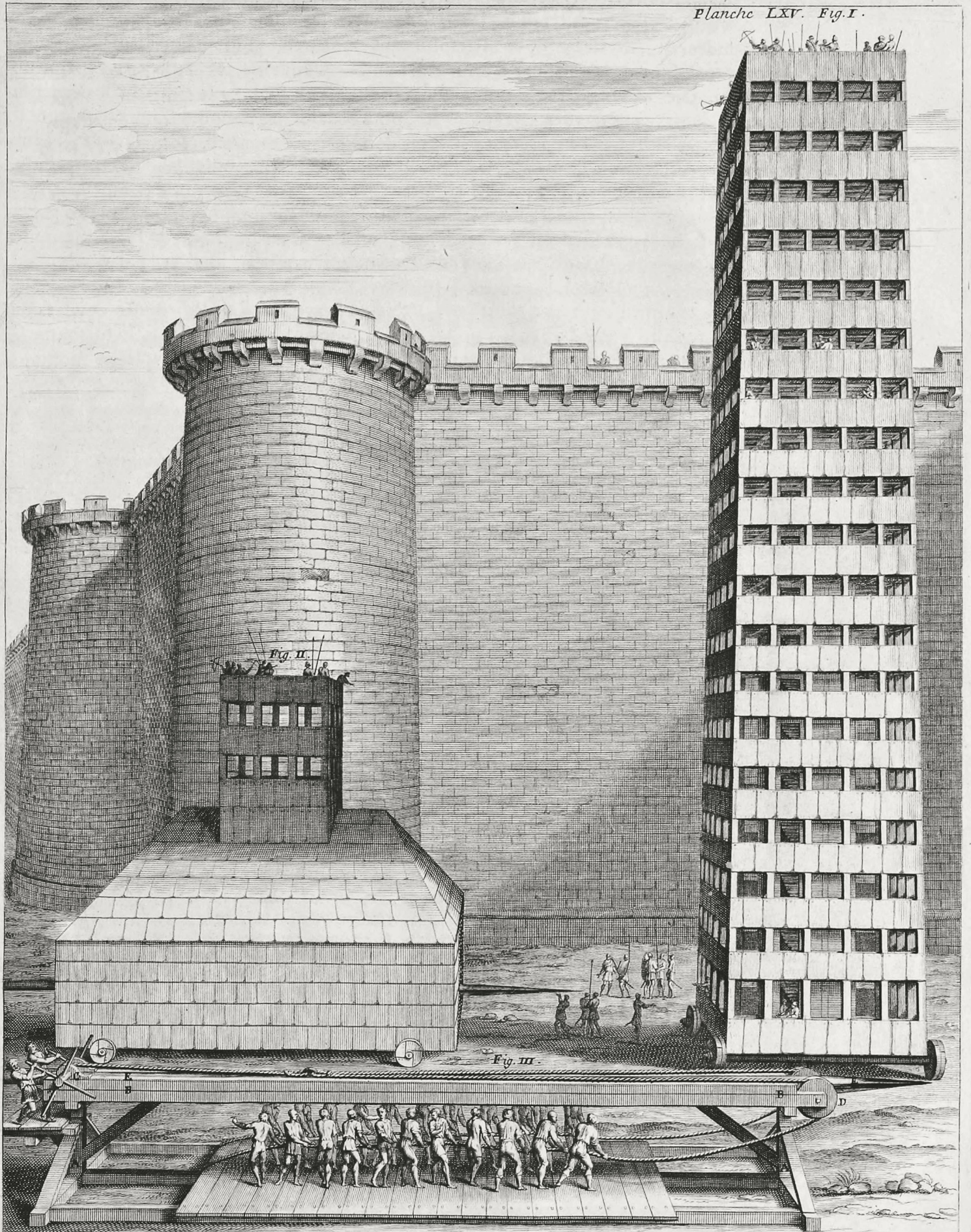
1953 Panmunjom armistice, which is still in effect today. In post-Nazi Germany the Allies carved out occupation zones that divided the east and west of the country for several years, before giving way to two competing states in 1949. In Austria, the transition from occupation zones to full restoration of the unified state lasted six more years.

Born in the realm of war, zones have not been confined to the geography of armed confrontation. Since the advent of artillery, specific zones have been defined in the territories surrounding fortresses and urban fortifications, prescribing differentiated rules for the height and the building techniques of permanent constructions or allowing only temporary structures, which were faster to dismantle in the case of a looming siege. When the first law on the expansion of cities was written in 1875, in the context of the unification of the German Empire, zones took on new meaning. Urban plans divided cities into areas where precise uses and morphologies were meant to be preserved or implemented, with varying degrees of sophistication. This innovative practice was first theorized by the civil engineer Reinhard Baumeister in his handbook *Stadterweiterungen in technischer, baupolizeilicher und wirtschaftlicher Beziehung* (Urban expansion in terms of technology, building regulations, and economics), published in 1876. [3] The practice became standard in the expansion of European cities, allowing for the control of uses and densities, and found a more elaborate formulation in the plans conceived for North American cities at the turn of the twentieth century. [4]

In this respect, the contribution of what we continue by a regrettable intellectual inertia to call the "modern movement" has not been the invention of functional zoning, which had already a long history, but the reduction to simplistic slogans of a complex urban management tool, which had been continually refined by Baumeister's colleagues and followers in charge of city planning and management. The codification of the conclusions reached during the 1933 Congrès international d'architecture moderne (CIAM) in Athens, devoted to the "functional city," was further simplified in Le Corbusier's 1943 *Athens Charter*. In his preface to this publication, novelist and playwright Jean Giraudoux revealingly displaces the notion of zone from the functional realm to the social one, when he writes,

"the brilliance of the epoch and its sordidness will affect both the bourgeois and the working man alike, according to the whim or the routine of the municipalities. There will be a sordid zone of work and thought and a brilliant zone, and, bound by a lamentable human and national protocol, luminous beings and opaque beings will rub shoulders on the same level." [5]

Zones have survived the demise of functionalism, for instance in post-Second World War France, where a spectrum of technocratic procedures were concocted to denote territories in development and the specific rules to be applied to them. This prescriptive obsession led to an urbanism based on a collection of Z-words: ZAC — *zones d'aménagement concerté*, ZAD — *zones d'aménagement différé*, ZUP — *zones à urbaniser en priorité*, and later ZUS — *zones urbaines sensibles*, or ZEP — *zones d'éducation prioritaires*, in the context of public policies aimed at solving burning social issues. [6] This practice has been parodied by the movements today fighting megalomaniac infrastructure projects, creating in this insurgent context their own ZAD, or *zones à défendre*.

6 See Kenny Cupers, *The Social Project: Housing Postwar France* (Minneapolis: University of Minnesota Press, 2014).

Another, more poetic use of the term *zone* appears in Guillaume Apollinaire's poem "Zone" of 1912. The allusion he makes in his nostalgic/futurist message, in which the Eiffel Tower is "fed up living with antiquity," was fully understandable for all his Paris contemporaries. [7] Along the fortified wall built in the early 1840s, the *zone non aedificandi* was territory meant to be opened up for gunfire in the case of war. **fig. 2** Still strangling Paris in Apollinaire's day, the zone housed fragile shanties and cabarets and would soon, in the 1920s, become home to 50,000 persons. Created in expectation of future wars with Germany and made obsolete by long-range artillery and aviation, its ring shape has

7 Guillaume Apollinaire, "Zone," in *Alcools* (Paris: Mercure de France, 1913), 6.

fig. 2 View of the *zone non aedificandi* surrounding Paris, section facing Malakoff, 1941.

determined the urban form of central Paris to this day, even after its replacement by a belt freeway in the 1970s. [8]
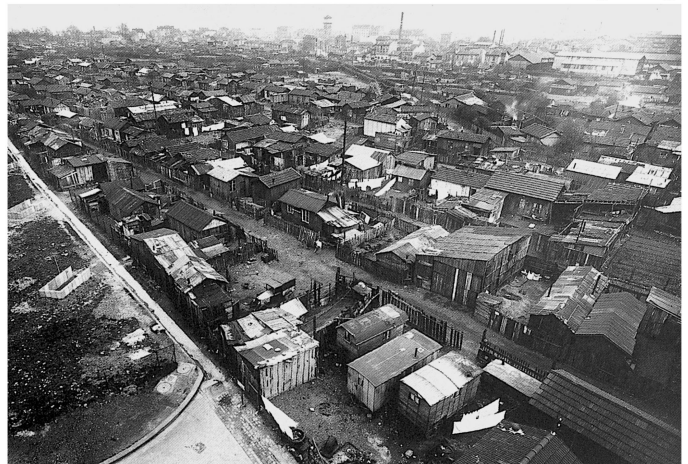
8 See Jean-Louis Cohen and André Lortie, *Des fortifs au périf: Paris, les seuils de la ville* (Paris: Picard/Edition du Pavillon de l'Arsenal, 1992).

9 General Giulio Douhet, *Il dominio dell'aria: saggio sull'arte della guerra aerea* (Rome: Stabilimento poligrafico per l'amministrazione della guerra, 1921). In French: *La Guerre de l'air* (Paris: Les Ailes, 1932). In German: *Luftherrschaft* (Berlin: Drei Masken Verlag, 1935). In English: *The Command of the Air* (New York: Coward-McCann, 1942). In Russian: *Gospodstvo v vozdukhe* (Moscow: Voenizdat, 1936).

The Dissolution of the Front

The changes introduced by modernity in the realm of warfare have had, from the beginning, a precise spatial agency. Since the First World War, the main revolution has been the emergence of strategic air bombing (first attempted before 1918), which was theorized by the Italian air general Giulio Douhet in his classic book *Il dominio dell'aria: saggio sull'arte della guerra aerea*, first published in 1921 and rapidly translated into many languages, including Japanese. [9] Following Douhet, French Lieutenant-Colonel Paul Vauthier, whose books were no less popular internationally, indicated most clearly in his 1930 book *Le Danger aérien et l'avenir du*
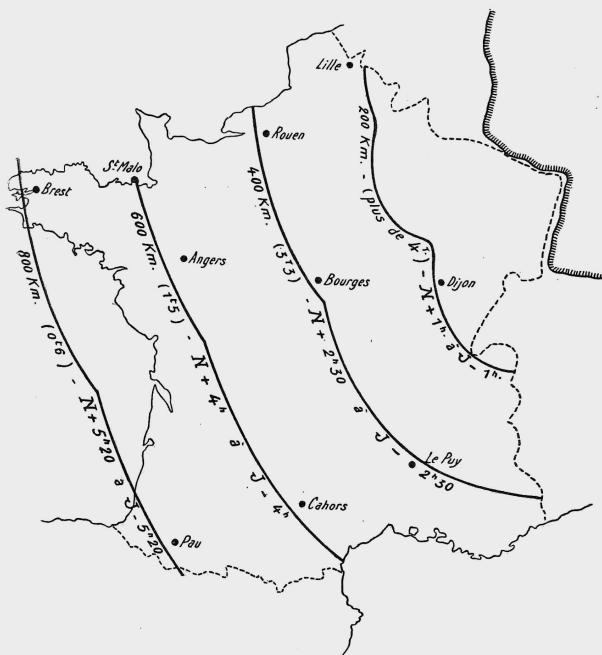
Fig. 4. — Cârte de renseignements n° 2.

▨▨▨▨▨ Frontière dangereuse.

╱ ━━━━ Courbes lieux des points du territoire national à 200, 400, 600 et 800 km de la frontière dangereuse.

Nota. — Sur chaque courbe on a noté trois indications :
1° la distance à la frontière dangereuse ;
2° le tonnage q ue peut porter aujourd'hui un seul avion à cette distance ;
3° les heures pendant lesquelles l'attaque est possible, en supposant que l'ennemi ne peut attaquer que la nuit. Exemple : N + 1 h à J — 1 h. Lire : « l'ennemi peut attaquer de 1 h après la tombée de la nuit jusqu'à 1 h avant le jour ».

pays how the geography and the topography of war had changed:

"*the airplane has little concern for lines on the ground; it can cross borders to bring the battle into enemy territory; after that, it returns to its own field. All territory within range of the enemy's aircraft can suddenly find the enemy in the sky above, despite the presence of troops to guard the ground; the entire region subject to the insult of enemy aircraft is in fact an aerial border. But the crucial fact is that this border is no longer a line; it is a surface.*" 10/fig. 3

Hence the concept of "front" became if not obsolete, then at least a limited category in the geometry of modern war theaters. Since the Spanish Civil War, all conflicts that have relied on the use of aviation—even more so those using surface-to-surface missiles—have confirmed Vauthier's visionary interpretations. The French officer was eager to find architectural strategies that promised to improve the resilience of cities during an air war, and he became a vocal agent of Le Corbusier's schemes, which he published in his book. Symmetrically, the author of the Plan Voisin for Paris and the Ville radieuse put Vauthier's endorsement of his designs to wide use in his own communications. 11 But the relevance of *Le Danger aérien* went well beyond this mutual acknowledgment. Vauthier insisted on the importance of civilian defense and the implementation of deception through camouflage, including at the urban level. In this respect, he defined several of the main fields in which architects were active during the Second World War, including the design of bunkers for civilians and the reinforcement of existing buildings, as well as the design of fake buildings, landscapes, and city parts meant to fool bomber crews. fig. 4

The Scope of Total War

Local wars—that is, wars that are geographically limited and involve belligerent states—differ from worldwide wars, which extend to a broad range of theaters. More significant, wars fought by professionals differ from total wars, in which all strata of society—all age groups, genders, and social classes—are mobilized. The total wars that took place from 1914 to 1918 and then from 1939 to 1945, with their curtain openings in China and Spain, are now viewed as a single continuous war spanning thirty years and engaging populations, disciplines, and professions in multiple ways.
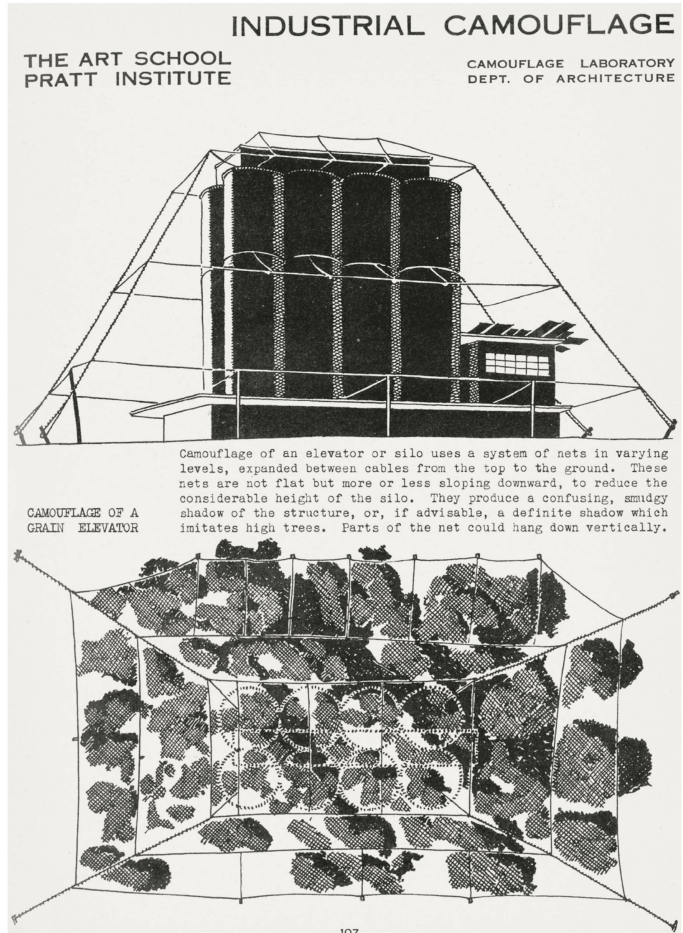
The Second World War was characterized by a widespread use of architecture and architects. The engagement of the latter, however, started with rather banal construction programs; that is, with professionals continuing their business as usual. The imperative for quality seems to have taken on an almost ethical dimension, as suggested by the journal of the Royal Institute of British Architects (RIBA) in 1939: "We must make it absolutely clear, to ourselves no less than to others, that first class architecture is necessary in war, not just for our fun or to line our pockets, but because good buildings can help to win the war." [12]

The longing for good design was further expressed by E. J. Carter, librarian of RIBA, upon the occasion of *Britain at War*, an exhibition at New York's Museum of Modern Art a few months before the Japanese bombing of Pearl Harbor. In the exhibition catalogue, Carter writes, "It is something in war time to have the machines of civil defense neatly designed. This neatness is a sign of order and of something clean and good which survives the inevitable disorder and mess of war." [13] A visit to the formerly forbidden zone of Peenemünde, the rocket production and testing range the Nazis created on the shores of the Baltic Sea, led me in 2010 to comparable considerations. Despite

fig. 4 Konrad Wittmann, camouflage of a grain elevator, plate from *Industrial Camouflage Manual*, 1942.

12 "What Architecture Can Do," *RIBA Journal* 46, no. 30 (1939): 996.

13 E. J. Carter, "Architectural Reconstruction and War-Time Forms," in *Britain at War*, ed. Monroe Wheeler (New York: Museum of Modern Art, 1941), 74.

the fact that this enclave, carved into a beautiful landscape of dunes and pine forests, was off-limits to the general population, and therefore not meant for visual propaganda, it was exquisitely designed, as if it were embodying a drive toward an aesthetic perfection perceptible to only a tiny minority. And it has survived war.

What the Second World War revealed, through the mobilization of several generations of professionals in a wide range of positions, was the extent and variety of the usable expertise they brought to the war effort, both on the front and at the rear. Technological expertise, especially in the field of construction, proved useful for the design and implementation of engineering works, military buildings, and the installation of wartime facilities in previously civilian premises. Such efforts were complemented by materials expertise, which manifested itself in at least two domains: adapting existing civilian parts, components, or processes for military use; and searching for new materials and manufacturing techniques, such as plastics and glues. In times of scarcity, when the search for substitution solutions may well prove decisive, practical knowledge is a most precious commodity.

The visual expertise acquired by professionals trained to observe and record buildings and landscapes, and to interpret their representation, became essential in a war where detailed knowledge of the enemy's territory was a necessary condition for the planning and monitoring of operations. Paul Virilio underlines the importance of "transparency, ubiquity, [and] total and instant knowledge." [14] Visual competence has several dimensions, one of them being artistic expertise put to good use in the realm of camouflage design, which remains one of most extraordinary fields of war-related design, even as architects replaced the painters who were drafted into the first units engaged during the First World War, tasked with producing dazzling works for their navies, and frontline art for their land forces. [15]

The other fields in which the expertise gained at school or in practice was put to good use are communications and logistics. Architects were recruited to work in the countless offices opened for the design of posters or exhibitions, introducing in the discourse of propaganda radical aesthetics hitherto limited to the space of art galleries. The most lucid evaluation of this engagement was written in 1943 by the young German architect Gerhard Kallmann, who was working in London. [16] Last, but not least, in an extremely bureaucratized war, the practical knowledge of organization acquired by architects familiar with the management of building sites proved to be most precious in the development of logistics, a key contribution of those years. [17]

14 Paul Virilio, *Bunker archéologie* (Paris: Editions du Centre Georges Pompidou, 1975), 29.

15 See, for example, Henrietta Gooden, *Camouflage and Art: Design for Deception in World War II* (London: Unicorn Press, 2007); Timothy Newark, *Camouflage: Now You See Me, Now You Don't* (London: Thames & Hudson, 2007).

16 G. S. Kallmann, "The Wartime Exhibition," *The Architectural Review* 94, no. 562 (1943): 95–106.

17 Alan Gropman, ed., *The Big "L": American Logistics in World War II* (Washington, D.C.: National Defense University Press, 1997).

All these positions have ethical dimensions attached to them, their concrete exercise at the service of the belligerent states and in response to specific programs having different connotations. To take only the most obvious example, within the same generation there is significant distance between the work of young German functionalists who were active in designing officer's quarters or hangars for the Luftwaffe and those designing gas chambers for the concentration camps.

Lasting Effects

In a total war, citizens are not only drafted and used by the military, but every aspect of professional life is transformed, generating lasting experiences. Much has been written about the peacetime recycling of wartime technologies, which has almost become a field per se. This recycling has taken many forms, from the use of existing hardware—the term *surplus* became popular soon after the Second World War—to the transfer of new materials and the transformation of entire production lines, as in the successful case of the AIROH houses manufactured by British aircraft makers. Richard Neutra, who spent the war in Los Angeles, a city widely transformed by the production of aircraft and naval vessels, signaled in a text on "Housing, Defense and Postwar Planning" that "New industrial plants and implementation, new useful methods of production and products, improvised substitutes as ancestors of valuable new materials, above all new skills and attitudes have been the best residuum of wars." [18]

Among the legacies of involvement, an important one for the development of architecture was camaraderie, relationships shaped in the drafting office but also in the trenches and in the cockpits of airplanes. A classic example is the meeting in the same U.S. Army Air Forces unit of Elliot Noyes and Thomas Watson Jr., son of the founder of IBM, which would result in endless designs by the former for the latter. [19] Perhaps the most fundamental effect of the Second World War on architecture has been the development of research. The participation of Erich Mendelsohn, Konrad Wachsmann, and Antonin Raymond in the methodical preparation of the cruel incendiary air raids over Japan has long been acknowledged. [20] But the impact of the experience of operational research should also be mentioned, as it generated a new awareness of usage and, hence, new expectations for design.

An explicit discussion of this important phenomenon is the article physicist J. D. Bernal wrote in 1946 for the *RIBA Journal* after having been engaged in a series of wartime programs:

[18] Richard Neutra, "Housing, Defense and Postwar Planning," undated typescript, in Dion and Richard Neutra Papers, University of California, Los Angeles, Box 176, Folder 4, 1.

[19] Eeva-Liisa Pelkonen, *Eero Saarinen: Shaping the Future* (New Haven: Yale University Press, 2010), 48.

[20] The earliest mention is Mike Davis, "Berlin's Skeletons in Utah's Closet," in *Dead Cities and Other Tales* (New York: New Press, 2002), 64–83. See also Enrique Ramirez, "Erich Mendelsohn at War," *Perspecta* 41 (2008): 83–91.

"in the early days of the war, the whole emphasis of science in war was science in relation to scientific gadgets. ... But, as the war progressed, it became noticed that it was not so much the scientific gadgeteering side which was important; it was the scientific approach to the problems raised by the military situation generally; problems raised in the factory, production problems, planning problems in the preparation of war weapons, and finally, towards the middle and the end of the war, the problems of actual operations."

Noting, for instance, that architects had been unaware of (or uninterested in) the work of women in the domestic interior, Bernal sketched a program:

"the real problem is to analyse bit by bit what the operations that occur in any building are and to see how these operations can most advantageously be carried out so as to give the minimum cost, the maximum speed and the minimum labour hours on the job itself." The conclusions were clear:

"When the rate of change in society goes beyond a certain amount, it cannot be left to the individual genius of the architect, though he may be himself a scientist; you have to bring in the scientist, because he is the person who weighs up and assesses the result of any change." [21]

An example of this attitude relates to camouflage. David Medd, a British architect who worked for Stirrat Johnson-Marshall at the Camouflage Development and Training Centre at Farnham, Surrey, during the war and who would subsequently work on prefabricated schools for Hertfordshire, recalled the constant to-and-fro between the drawing board, production facilities, and operations in the field that was part of the wartime projects:

"We, as designers, were part of a chain in a complete cycle which didn't repeat, but evolved as it went round: policy, thinking, designing, making, using, new policy, rethinking and so on. The designer was a link in a complete chain, not a detached component." [22]

Hugh Casson, also engaged in disguising landscapes and buildings, wrote as early as 1944 that:

"camouflage can help—not in its narrow war-time idiom—but in the broader sense, as the scientific use of texture, tone and colour, to complement instead of to disguise form. The handling of colour in this way to create accents or to emphasise different materials, planes or changes of direction, has been greatly developed recently in interior decoration. Its possibilities in the street have never—at last in this country—been explored. Used with imagination, control and the knowledge gained from war-time experience, it could surely be of the greatest
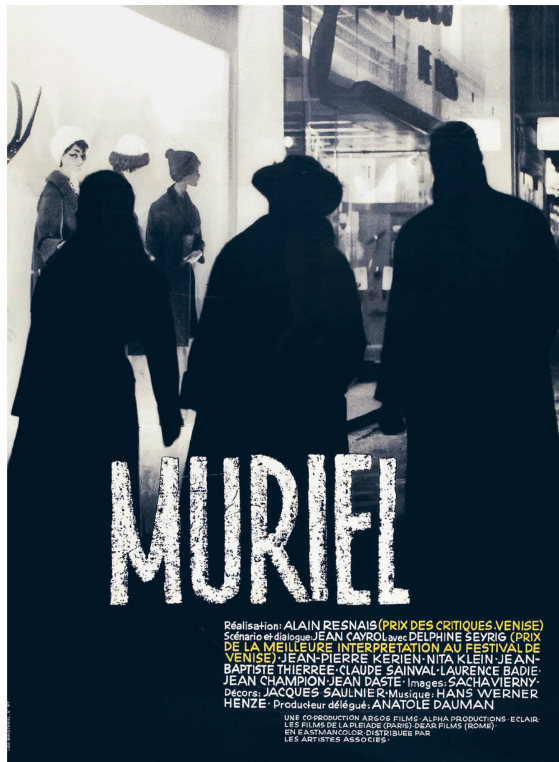
[21] J. D. Bernal, "Science in Architecture," *RIBA Journal* 53, no. 5 (1946): 155–58, here 155, 158.

[22] David Medd, "Stirrat Johnson-Marshall, a Personal Tribute," *Performance*, (April/May 1982): 67–70, here 69.

23 Hugh Casson, "Art by Accident: The Aesthetics of Camouflage," *The Architectural Review* 96, no. 573 (1944): 63—68, here 68.

and most stimulating assistance to those who will be faced with the task of bringing coherence and vitality into the post-war street scene." 23

Casson put his remarks to good use a few years later when designing the colorful Festival of Britain 1951 in London.

Thus, the effect of the Second World War was not only technological but transformative. The echoes of other consequences, documented through interviews or correspondence, can be found in later generations, especially among the young architects or students involved in the late colonial wars, although the extent of engagement achieved from 1939 to 1945 was not again reached. The French war in Algeria, for example, in which youth of all class strata were drafted, generated serious reactions at the École des Beaux-Arts in Paris, where some students, such as Serge Magnien, were jailed for refusing to join the army. Others returned from the conflict deeply disturbed by the French repression and forever changed by memories or guilt they could not let go, an attitude that can be best perceived in Alain Resnais's film *Muriel, ou le temps d'un retour*, released in 1963, in which the allusion to torture is clear. **fig.5** Among the students left traumatized by the war was Bernard Huet, who would become upon his return from Algeria one of the moving forces in the revolt against the old *école*. Documenting the effects of wars such as Algeria or Vietnam on the public consciousness and on the biographies of the young participants who were forever transformed would unquestionably be a useful program for further research.

fig.5 Poster for Alain Resnais's film *Muriel*, 1963.