

MODULARITY, PREFABRICATION, + BUILDING MANUALS IN POSTWAR ITALY: SCENES FROM AMERICA

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INTRODUCTION

This paper exposes the American origins of the postwar Italian building text the *Manuale dell'Architetto* (The Manual of the Architect). One of its chief authors, Italian architect Bruno Zevi, was forced to leave Italy during World War II, and came to the United States. He first studied at Harvard University and was then employed as an architect in the Design and Engineering Section of the Office of the Chief Engineer in the United States Army. In July of 1944, he was reassigned to a post in England, awaiting his return to his native city of Rome until its liberation in 1945. Zevi, with his combined experience in the United States and then working for the U.S. Army in Britain, was exposed to cutting edge modular construction used for temporary and emergency housing, and for hangars and other prefabricated military buildings. He was also exposed to a scientific approach to the design process through *Architectural Graphic Standards* (first published in the U.S. 1932) and other building manuals, which offered a modular and systematized approach to the design and production of buildings. Because *Il Manuale dell'Architetto* came into being at the crossroads of political change in Italy, it reveals to us the problem of the relationship between political theory and building design and method.

Italy, which was in immediate need of housing and other structures in the postwar Reconstruction, did not have the unified approach to building of the United States. In contrast, Italy's building techniques were strictly *in situ* traditional methods of construction—and predominantly on site construction. A notion of modularity, if any existed, referred only to the brick, concrete block, or gypsum panels used, but nothing that contained any sophistication in terms of prefabrication of building components off site or intelligence about systems of modular construction.

Upon his return to Rome after the war, Zevi brought this American know-how of modular construction to his position working for the Rome-based American Government outreach service, the United States Information Service (U.S.I.S.). He was stationed as Chief of the Technical Bulletin Section with the Office of International Information and Cultural Affairs in March 1946. Under this umbrella organization, Zevi, along with experts, engineers Bruno Buongioannini and Pier Luigi Nervi and architect Mario Ridolfi, were tasked with the development, based on American building

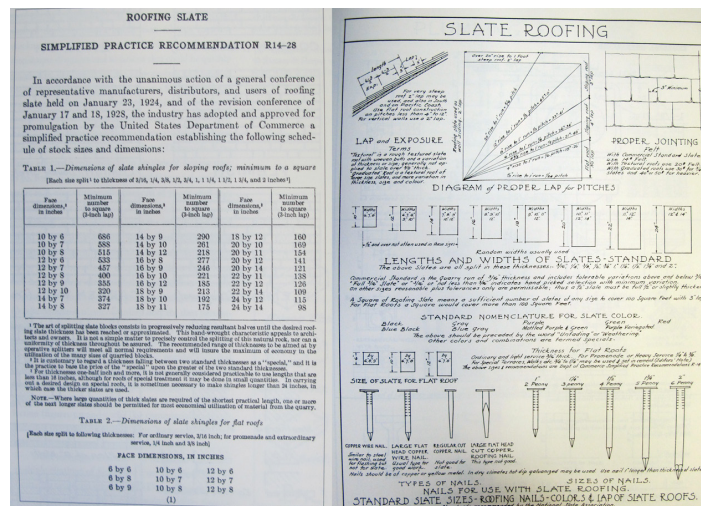


Figure 1. Left: Excerpt from “Roofing Slate, U.S. Department of Commerce, Simplified Practice Recommendations R14-28,” 1928. Right: “Slate Roofing,” from *Architectural Graphic Standards*, © Ramsey & Sleeper 1932. Reprinted in George Barnett Johnston, *Drafting Culture: A Social History of Architectural Graphic Standards* (Cambridge: The MIT Press, 2008), 162-3.

standards, of the *Manuale dell'Architetto* (*The Manual of the Architect*) to be completed in a rapid 6 month period. This *Manuale* was distributed free of charge by the U.S.I.S to 25,000 architects, engineers, builders, and technicians throughout Italy. It was written with the intention of adopting a systematic approach, through modular dimensional systems and prefabricated elements, to the urgent need for housing and other civic structures.

This early work was important for the future of prefabrication and modular construction in Italy and spawned extensive studies and further manuals for construction in rapidly developing and industrializing Italy. Among these are several texts by Giuseppe Ciribini, G. Mario Oliveri, Piero Spadolini, and others who furthered the rapid spread of modular construction in Italy through the late 1970s. These later works emphasized the issue of prefabrication at a theoretical level as a “system,” an orchestration of the various parts that are logical in their combination. This emphasis on system provides an interesting context in which to examine contemporary research and the proliferation of parametric modeling and BIM systems of integration and fabrication.

This paper takes as its methodological frame the idea that a historical study provides a critical lens with which to analyze contemporary research. These historical trends toward modular design were important steps at the time, and they remain relevant to research today. This paper will focus in detail on the *Manuale dell'Architetto*. I argue that the *Manuale* represents a moment in which modern, and modular, building technique existed in the tension between totalitarian and democratic society. Because modernism had first flourished in Germany, and modular design used in horrific ways, in particular the building of extermination camps, the Italian reception of such techniques was uncertain. Yet Zevi's American influences encouraged a new association of modular design with democratic, egalitarian governance.

II “Manuale dell'Architetto”

The *Manuale dell'Architetto* was a joint effort by the C.N.R., the Italian national research board (*Consiglio Nazionale delle Ricerche*) and the United States Information Service (U.S.I.S.). In the introduction, architect Mario Ridolfi clarifies the necessity for Italian architects to have an easy-to-consult modern building construction manual which would outline practical criteria for construction, something, he asserts which was missing in the bibliography of technical manuals in Italy at the time. Other manuals that were currently in use, such as *Donghi* and *Briemann*, were too voluminous and antiquated to be of use with the current needs of modern construction. And he states that while there are numerous general publications of a scientific and technical character, that there was something missing: some were short articles and too limiting; others published in other languages restricted access. In addition, the cost was prohibitive, especially for young architects to have access to such a large and costly series of publications.



Figure 2. Left: Cover of the original *Manuale dell'Architetto*. Right: photograph of Buongioannini, Ridolfi, Nervi, and Zevi at work in Rome on the *Manuale dell'Architetto*. Bruno Zevi Archive, via Nomentana 150, Rome. Box: 04.01/02 United States Information Service (USIS). Note the original drawing of window header sections on the wall and some of the completed plates to the right.

The most common construction manual intended for use by architects in Italy at the time was that of Ernst Neufert, but particular difficulties in its use were tied to the German text, compounded with differences

in technical vocabulary, as well as the problem of different building rules and regulations in Italy.¹ One can also imagine, that in light of the recent occupation of Italy by German troops, that there would be a predisposition to turn to influences from America. For the Italians, America represented the democratic ideals that would come to replace the prewar alignment between order and rationality of Fascist Italy and their alliance with Hitler's Germany.

But the *Manuale dell'Architetto*, for all its American influence, has a German precursor. Neufert's *Bauentwurfslehre (Architects' Data)* of 1936, a design and construction manual, was published before the outbreak of hostilities and had an enormous reach in proposing standardization of parts and methods of construction assembly that had similarities to the rationality and abstraction as seen in the Taylorist approach of American factories.² Neufert emigrated to the United States in the same year, but returned to Germany at the behest of the architect Albert Speer who worked for the German Reich.

In this time Neufert designed numerous industrial projects and developed various systems of standardization such as the *Das Oktametersystem*, which divided the meter into eight equal units of 12.5 cm. which became the new metric norm in industrial production and modular building materials such as a new dimensional size for bricks with a larger mortar joint to produce 12.5 cm. centerline dimensions.

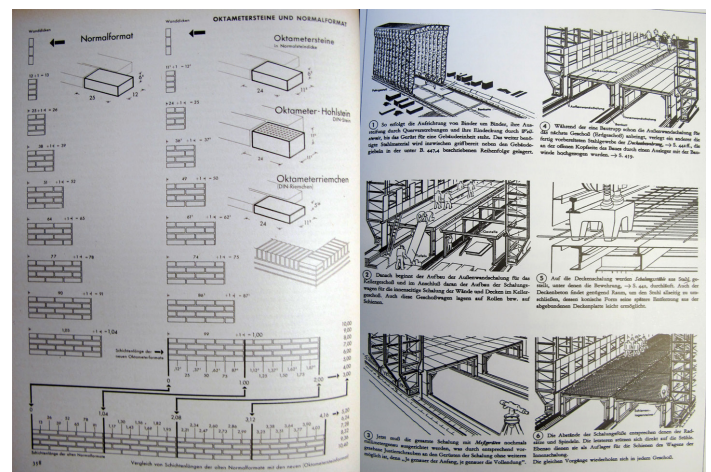


Figure 3. Below Left: Ernst Neufert, plate showing the new brick sizes the *Oktameterseine* which conformed to the new *oktameter* system dividing the meter into eight 12.5 cm. units. (Reproduced from Jean-Louis Cohen, *Architecture in Uniform: Designing and Building for the Second World War* (Montréal: Canadian Centre for Architecture, 2011), 358). Below Right: Ernst Neufert, detail of his “House Building Machine” built on rails and showing the erection process. This project was published in his *Bauordnungslehre* of 1943. Reproduced from Leon Krier, trans. Christian Hubert “Vorwärts, Kameraden, Wir Müssen Zurück” (Forward, Comrades, We Must Go Back) in *Oppositions 24*, (Spring 1981). This project is also well detailed in *Architecture in Uniform: Designing and Building for the Second World War*, 276-77.

He also was the designer of methods of standardization for building typologies, and was the author of the similarly influential

Bauordnungslehre (Berlin: Volk un Reich Verlag, 1943). Some have speculated that Neufert appears to have remained untainted by his work during the war in Germany and his association with the Reich. After the war, he moved to the western part of Germany (to become the Federal Republic of Germany) and was a professor at the Technische Hochschule in Darmstadt and continued to practice until his death in 1986.³

Neufert's work in Germany brings to the foreground the problem of design's association with more abstract political import. Many arguments abound in the discussion of the formal implications of standardization. Does the reduction of architecture to its minimum functional aspects of standards and norms strip architecture of some greater use/function/ representation?⁴ Is there some way that the reduction in fact invites a reading that is politically neutral? Or is this inherently political as is the case of the *Manuale dell'Architetto* in promoting democratic ideals?

In his chapter "Backwardness and Revolution: Italy, Russia, Spain," in *The Taylorized beauty of the Mechanical: Scientific Management and the Rise of Modernist Architecture*, Mauro F. Guillén looks at what he terms the "(fleeting) triumph of the modernist movement in three relatively backward European countries during periods of acute social and political upheaval: the late 1910s and the 1920s in Italy and Russia, and the late 1930s in Spain."⁵

One could say that in the early decades of the twentieth century in Italy, the arrival of Art Nouveau, the construction of large hydroelectric dams made possible by new methods of construction and the new materials of reinforced concrete and steel, the automobile and other signs of modernity had a profound effect on the reception of modernism. Prior to World War I, the visionary work of Antonio Sant'Elia and the other Futurists and the work of Virgilio Marchi after the war influenced the architects who worked during the long period of the Fascist Regime beginning in 1922 with Mussolini's March on Rome to the outbreak of war.

In the postwar period however, modern architecture, especially in Rome, was viewed with suspicion. A number of important works have discussed this suspicion, such as Maristella Casciato's essay "Neorealism in Italian Architecture,"⁶ which looks at the immense need in postwar Italy for reconstruction. With factories destroyed, agriculture decimated, and cities bombed, there was a real and true need for rebuilding. The mission of the *Manuale dell'Architetto* to utilize locally found materials and to provide a manual that would streamline the construction trades, within the context of material shortages. But it was also meant to be an inspiration for a new future economy that was the intention of the C.N.R., the Italian national research board (*Consiglio Nazionale delle Ricerche*) and the United States Information Service (U.S.I.S.). This mission was paralleling the initiative for prefabricated houses that the Tennessee Valley Authority, also under the auspices of the U.S.I.S. The plans for these projects were also shown at an important exhibit in Milan on housing, with a section curated by Bruno Zevi for the U.S.I.S. on

villaggi di guerra (American cities of war) under the United Nations relief efforts for people made homeless during the war.⁷

Roberto Dulio recounts that, according to comments made by Zevi at the time, it was the intention of the U.S.I.S. to fill the lacunae that Italy had accumulated in various fields during the isolation caused by the war. Even if the "closure" was never total, it was profound and had a deep impact upon architectural culture. Zevi, with extensive experience as an architect in the U.S., felt that, on a more subtle level (or at times not so!), that the U.S.I.S. sought to propose cultural and social models to a rebuilding Italy that were akin to those in America.

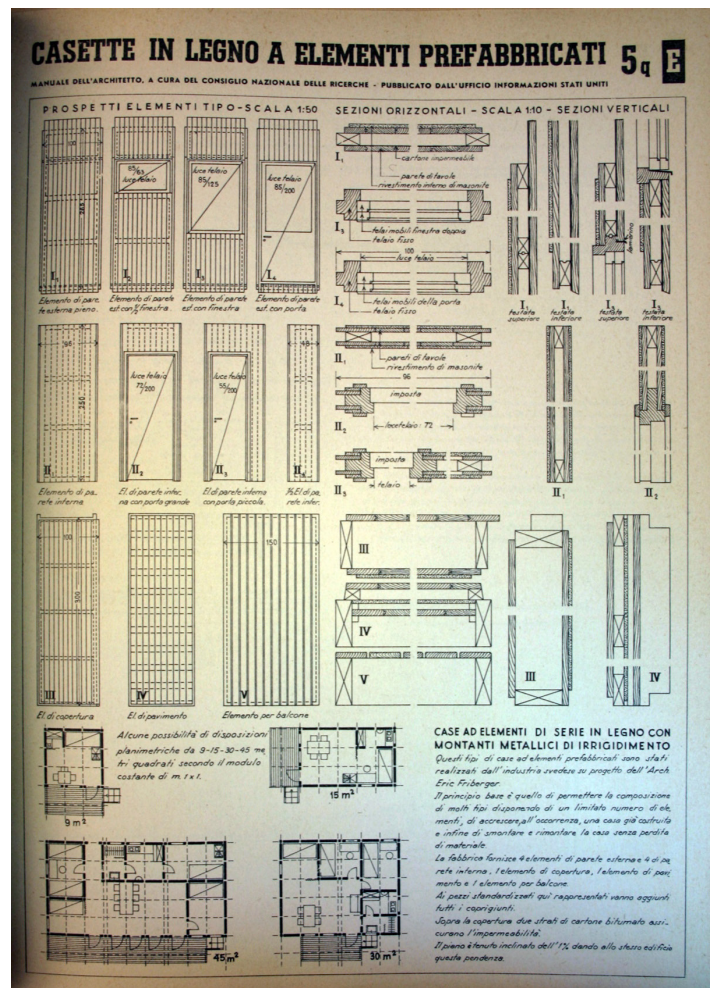


Figure 4. A page from the *Manuale dell'Architetto* of 1946 showing a modular house inspired by Swedish architect Eric Friberger, constructed from prefabricated wooden elements with metal stiffeners. In the *Manuale dell'Architetto*. Archivio Bruno Zevi, via Nomentana, Rome.

Zevi stated, "Italians can find a direct, practical, and immediate utility from the study of wartime American housing."⁸ The *Manuale dell'Architetto* was part of this agenda. The work of the U.S.I.S. signaled an ethical necessity to deal with urgent political-

organizational problems, specifically in instilling the idea that it was necessary for the rebuilding to have standards and guidelines in construction and design, but also that this effort must take a cue from American models of administrative cooperation and centralization such as evidenced in the T.V.A. Beyond the application of new construction systems, and in particular on prefabrication, in some ways it was a utopic ideal in a country that was struggling to get on its feet. But Zevi felt it was *necessary* to understand the American experience as a democratic model for change.⁹

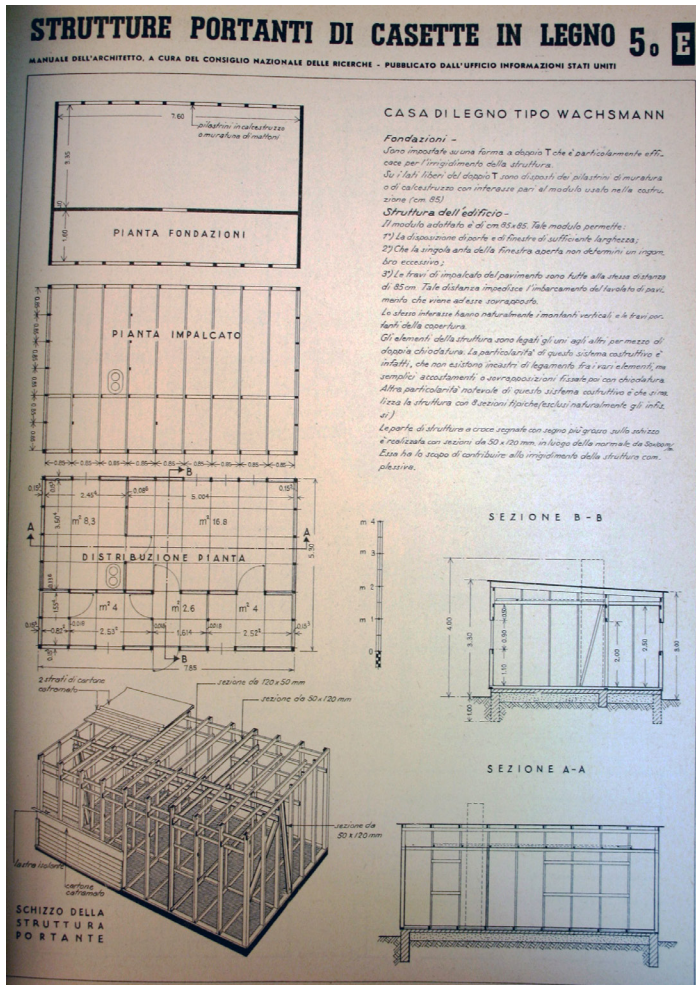


Figure 5. Prefabricated wooden framed house with infill panels based on Konrad Wachsmann’s research in his book the *Holzhausbau: Technik und Gestaltung* of 1931 (*Building the wooden house : technique and design*) as reproduced from the *Manuale dell’Architetto*. Archivio Bruno Zevi, via Nomentana, 150 Rome.

The *Manuale*, as had *Architectural Graphic Standards*, drew from an extensive array of sources, including patented prefabrication systems, trade brochures, tables, and guidelines, all redrawn for direct and immediate access for the design professionals. It is also likely that Zevi had direct access to the United States War Department/Department of the Army Technical Field manuals while working closely with the U.S.I.S., though only the covers of a few

of these manuals are in his archive. One may surmise however that the range of these U.S. publications were accessed by Zevi and the other members of the team producing *Il Manuale dell’Architetto*.¹⁰

Again, the *Manuale dell’Architetto* represents an important moment in the development of postwar Italy on all fronts, practical, economic, social, and above all political, and was in place at the crucial moment of the postwar economic boom of 1958-63—at which time, it became an important reference for the increasingly industrialized building trades and prefabrication and modularity of component building parts in the 1960s. Moreover, for the contemporary architect, it brings to the foreground the intricate balance of political context and building method. Design is never neutral; as the political stakes grow higher, so do the implications of building.

ENDNOTES

- 1 Mario Ridolfi, “Comitato Organizzativo,” in *Il “Manuale dell’Architetto”* compilato a cura del Consiglio Nazionale delle Ricerche, pubblicato dall’ Ufficio Informazione Stati Uniti in Roma, (C.N.R., U.S.I.S., 1946), 35. Translation from Italian by the author. Consulted in the Fondazione Bruno Zevi, via Nomentana 150, Rome. In the Fondazione Bruno Zevi one can find the first three numbers of the *Ricostruzione Urbanistica*, Bollettino Tecnico dell’Ufficio Informazione Stati Uniti (USIS), 1946. In the file: 04.01/02 United State Information Service (USIS), 29 June 1944-1 August 1947 (with documentation dating from 1937). Zevi was part of the Design and Engineering Section of the U.S.I.S. until 22 February 1944 and was an authorized representative of the Office of War Information in Rome from May 1945.
- 2 Jean-Louis Cohen, *Architecture in Uniform: Designing and Building for the Second World War* (Montréal: Canadian Centre for Architecture, 2011), 100.
- 3 Joseph A. Wilkes, editor-in-chief, Robert T. Packard, associate editor, *Encyclopedia of architecture: design, engineering & construction*, vol. 3 (New York: Wiley, 1989), 359-60.
- 4 Joseph A. Wilkes, editor-in-chief, Robert T. Packard, associate editor, *Encyclopedia of architecture: design, engineering & construction*, vol. 3 (New York: Wiley, 1989), 360.
- 5 Mauro F. Guillén, *The Taylorized beauty of the Mechanical: Scientific Management and the Rise of Modernist Architecture* (Princeton: Princeton University Press, 2006), 68.
- 6 Maristella Casciato, “Neorealism in Italian Architecture,” in Sarah W. Goldhagen and R. Legault eds. *Anxious Modernisms. Experimentation in Postwar Architectural Culture* (Montréal: Canadian Centre for Architecture, The MIT Press, 2000), 25-53.
- 7 See Marida Talamona, “Dieci anni di politica dell’Unraa Casas: dalle case ai senzatetto ai borghi rurali nel Mezzogiorno d’Italia (1945-1955). Il ruolo di Adriano Olivetti,” in Carlo Olmo, ed. *Costruisce la città dell’uomo. Adriano Olivetti e l’urbanistica* (Turin: Edizioni di Comunità, 2001), 176-178. See also Bruno Zevi, “L’insegnamento delle costruzioni di Guerra americane,” in *Ricerca scientifica e ricostruzione*, XV (1945), n. 6 (C.N.R.) 532-43; Bruno Zevi, “Per un centro di pianificazione urbanistica ed edilizia nella Organizzazione delle Nazioni Unite,” in *Metron*, n. 6, (Rome, 1946): 2-11; J. L. Harper *L’America e la ricostruzione dell’Italia 1945-48* (Bologna: Il Mulino, 1987). Translation from Italian by the author.
- 8 Roberto Dulio, *Introduzione a Bruno Zevi (Rome: Laterza, 2008)*, 43-51. Translation from Italian by the author.
- 9 Roberto Dulio, *Introduzione a Bruno Zevi (Rome: Laterza, 2008)*, 46-47.
- 10 This paper presents early research on this theme. Future research will include a study of the U.S. Technical manuals especially the U.S. Army

Field Manuals in the late war and immediate postwar period. A list and index of War Department publications may be found at the U.S. Gov. site: <http://www.loc.gov/rr/scitech/SciRefGuides/technicalmanuals.html#inventory> (Accessed Nov. 4, 2012). Also to be consulted are the Field Manuals in *Series 5: Corps of Engineers* which cover such topics as Carpentry, Construction and Surveying, the Universal Grid System, Grid and Grid References, Construction in the Theater of Operation, General and Construction Drafting (in the 1970s only), and especially a 1946 publication #5-609 and #5-610 *Buildings and Structure, Grounds, Roads and Pavements, Railroads*. War Dept, Sept. 1946, LC #U408.3.A13 TM 5-610 Sep. 1946 or #5-744 *Structural Steelwork*. Dept. of the Army, June 1944, LC #U408.3.A13 TM 5-744, June 1944. See also Robert L. Bolin, *Army Manuals Listed in the Bibliography of Scientific and Industrial Reports, 1946-1949*. [http://www.unl.edu/Bolin_resources/bsir/Army Manuals Listed in BSIR, 1946-49.htm](http://www.unl.edu/Bolin_resources/bsir/Army_Manuals_Listed_in_BSIR_1946-49.htm) (Accessed Nov. 4, 2012). The link between the U.S. Army Field Manuals, potential links to the *Architectural Graphic Standards*, industry publications and the influence on the *Manuale dell'Architetto* still remain to be clarified through further research.