# PREFACE TO ANTONELLA MARZI'S DOCTORAL DISSERTATION

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The skyscraper is at once a daunting engineering problem that calls for objective and computable structural solutions, and an all-important cultural artefact of the city that must address a host of subjective issues, such as symbolic relevance, urban fit, aesthetic significance, and comfort of its occupants. Antonella Marzi is well suited to undertake this study. As a product of the *Politecnico di Milano*, she was trained to look critically at both architecture and engineering. The *Politecnico* is an institution renowned for its pedagogical program that places as much emphasis on technology and construction as on architectural design. As a scholar and a professional she is ideally qualified to evaluate the full gamut of conceptual and constructional questions related to the Place Victoria. The Tower stands as a brilliant essay in concrete structural design, and as a powerfully expressive work of architecture

Montreal's Place Victoria, also known as the Stock Exchange Tower, was completed in 1967 and became an instant Modernist icon. Few post-war buildings in Montreal have received as much popular and scholarly attention in the world's press and in academic journals as this project. The ever-increasing interest in the building and in the *oeuvre* of its two primary authors, Luigi Moretti and Pier Luigi Nervi, is significant insofar as this new awareness points to a fresh appreciation for mid-twentieth century architecture. Place Victoria was an undisputable architectural and engineering breakthrough in its time. While many its design ideas have been surpassed in several ways during the 50 years of its existence, the project has become an unique exemplar of the marriage between architecture and engineering. Its ideas have transcended time and place.

Marzi's investigative work addresses the very foundation of this bipolar design process by way of defining the link between the architectural and the engineering typologies. She concentrated her investigation on the role of the building as a "fusion of static solution and architectural space".

Most Modernist buildings can be understood independently of their engineering systems. One does not require an in-depth understanding of their structural systems to appreciate the significance of the essential idea of the building. A comprehension of the spatial ideas, of the arrangement of forms and voids, of the materiality, of its environmental setting, of its precedents, of the social circumstances, etc. is typically sufficient to appreciate a building. Notwithstanding their canonical significance, Villa Savoye, the Bauhaus School, the Schroeder House, the Wainwright Building, or the Villa Malaparte, are all esteemed works of Modern architecture in which the engineering considerations play but a secondary role. In contrast to these instances, one cannot speak of the HSBC Bank in Hong Kong, or the Pirelli Tower in Milan, or Place Victoria in Montreal without

an understanding of the all-important structural engineering design concepts. In fact, their structural premise is at least as significant as their architectural form.

Having collaborated in Rome with Moretti and Nervi on the design of Place Victoria for two years, I was party to many inspiring and many difficult moments during the formative phase of the project. Moretti and Nervi confronted the problem of the Tower from opposite perspectives. Nervi was driven by logic, cost considerations, methods of construction, and above all, design clarity. He believed that good engineering produced good architectural forms. He placed his faith in the mathematics of the structural system, and shunned abstract formal ideas and structural acrobatics. Most of all, he wanted his structures to be elegant and self-evident to all. Nervi, the engineer, was the conservative thinker. Moretti, the architect, was the radical intellectual who could not escape his poetic impulses. Intuition and instinct were all-important to him. Poetic logic was as relevant as engineering logic. He understood architecture as a tangible cultural phenomenon in which functionality was only one of its many dimensions. The communicative power and the experiential quality of a building were foremost in his mind. To some extent, the design process in the creation of Place Victoria was a clash between a world of feelings and a world of reason. While Nervi spoke incessantly of "building well" (*costruire bene*), Moretti looked to history for formal justification. To him, Borromini and Gaudi were as modern as Pier Luigi Nervi.

Nervi (together with Gio Ponti) had designed the Pirelli Tower in Milan years before he received the mandate for Place Victoria. Because of this previous experience, Nervi was at ease with the problem of the high-rise. He had a clear grasp of its behaviour under stressful conditions (wind forces, vibrations, earthquake conditions, and moving live loads) and had developed new non-American ideas for its structural system. For Moretti, on the other hand, the design of the skyscraper was a new adventure. He saw the Tower as a fantastic object in the city, a modern totem that required special considerations. He grappled with the idea of the form of the Tower for a long time. This commission was a first opportunity to redefine the North American skyscraper. He never made references to the history of the North American skyscraper nor of its construction principles. I cannot recall a single moment during those years when the Chicago School or New York City prototypes were mentioned. If Moretti shunned the authority of the precedent, it was because of his idealistic but somewhat naïve wish to "reinvent" the modern skyscraper. The Miesian paradigm did not speak to him. The streamlined prismatic form of the North American tower was too abstract and lifeless. Ironically, the paradox in the design process of the Tower is that Nervi and Moretti were ideal and complementary partners. One wanted to invent (or reinvent), the other wanted to make it possible.

As is usual for most new projects, the architect made the first conceptual sketches. These were not so much schematic designs as representations of architectural reveries. Once Nervi came on board, the process became more rational, and the architect's flights of imagination took on a more convincing character. The architect was made to come down to earth. Often their opinions diverged strongly but the relationship remained respectful and productive. Moretti saw himself as the "Master of the Form" and Nervi saw himself as the pragmatic builder. Nervi's often challenged Moretti yet the opposite was rare.

Moretti favoured maximum exposure of the actual structural elements. In that sense, he was a follower of Auguste Perret, who believed in the importance of revealing the essential tectonic elements. The display of “bones” that upheld the building was critical to the understanding of the design and contributed to the expressible character of the building.

Marzi took on the challenging job of navigating through these stormy conceptual waters to understand the joint-creative process and sort out the contradictions as well as the synergetic forces. First, she looked at structural systems in general, and subsequently focused specifically on Place Victoria. She classified structural systems according to types, namely three-dimensional, two-dimensional, and one-dimensional types. Place Victoria fell in the latter category of structural typologies. Yet it could be argued that the tower really belongs to the three-dimensional families of structures, and only the simple pole or mast constitutes a one-dimensional structural system. Ultimately, the precise label is less important than the course of defining a methodology that helps one to understand the governing ideas of this unique building. And that, she does convincingly. Most notably, Marzi understands that both architecture and engineering have their own logic and their own poetic dimension, and that great architecture comes out of the fusion of the two.

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