CULTURAL CONSERVATION IN THE BUILT ENVIRONMENT

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1. Introduction: keywords in the scientific-philosophical research of the 20th century

From 20th century culture we have inherited a variety of terms that are used widely, and all too often improperly, such as “complexity”, “peculiarity”, “uniqueness” and “singularity”. These terms have also played a dominant role in architectural culture, which, since the second half of the last century, has witnessed a profound transformation in the approach to the conservation of the built environment: from the ideology of stylistic “remaking” by which a building, or a portion of a building, had to be reproduced “as it was and where it was”, to present-day interventions geared to the conservation of the physical reality of historical fabrics, which are perceived as non-repeatable tokens of the chronological succession of the cultures that generated them.

The historical roots and the deep significance of these concepts must be sought in those scientific-philosophical studies associated with a vast majority of the Nobel prize laureates of the last century and are associated with the names of celebrated scholars such as - to mention only a few - Murray Gell-Mann, Ilya Prigogine, Sherwood Rowland.

One of the most interesting lines of research surely comes from quantum physics and the episode that marked its beginnings deserves to be briefly summarised: at the end of the 19th century, Ludwig Bolzmann made an unprecedented attempt to account for thermodynamic phenomena in terms of the interplay of particles (not yet actually observed, though), and in this manner shifted the focus of research to the infinitely small. His intuition, originating the new approach which would permeate research

throughout the 20th century (reductionist physics) was fiercely opposed by his contemporaries (Ernst Zermelo and Ernst Mach) and culminated in a tragic event, when, as is known, Boltzmann killed himself. Yet it remains in the history of science as the brilliant reflection that paved the way for subsequent progress. The innovative factor that characterised scientific research throughout the 20th century, in fact, was a new approach to the study of natural phenomena: instead of trying to unravel the rules governing macro-phenomena - already explored in great detail - scientists strove to understand in which ways infinitesimal, seemingly negligible phenomena could give rise to major mutations.

In this connection, we should mention in particular the studies on meteorology conducted by Edward Lorenz at the Massachusetts Institute of Technology, since the Sixties, which are commonly referred to as the famous "butterfly effect". In this specific instance, the idea was to work out a system - involving the use of computers to process non-linear equations - that might serve as a tool to control - albeit to some extent - the interaction of wind, rain and solar radiation: in other words, the system of meteorological effects on the earth: a theme which had already attracted great attention during W.W.II. Much to the surprise of his sceptical colleagues, with the aid of a small, old-fashioned computer, Lorenz discovered that infinitesimal changes were able to give rise to appreciable mutations in the long-term.

Two decades later, Lorenz summarised his findings in his famous essay "*Does the flap of butterfly wings in Brazil set off a tornado in Texas?"* (1979). In many other disciplines, the attention of researchers began to focus on the study of instability phenomena, irreversibility and the flowing of time (the "arrow of time"), thereby breaking through the barrier of determinism which had been the underlying doctrine of all earlier studies. Ostracised by official culture at first, and receiving but marginal funding compared to other research programs, these studies led to sensational scientific discoveries (e.g.: quarks, Murray Gell-Mann, Nobel prize for physics in 1969).

Needless to say, in these studies, regarding the understanding of chaotic, singular, peculiar and complex phenomena, in which time plays a primary role, the impact of computer science and technology - a sector that continues to be on the upswing - has been and still is preponderant, also in the conservation of existing architectural structures (from the use of Autocad, to digital photogrammetry, photo-straightening, survey systems, thermography, etc.).

Many innovative results should be ascribed to the resolution of those pioneers who activated interdisciplinary studies, encompassing research areas which are only seemingly remote from one another. Indeed the sign of 20th century culture could be dedicated to the interdisciplinary nature of research, or, in the words of Gell-Mann: "interest in collaborating across the boundaries of individual disciplines".

A well-consolidated instance of this approach is exemplified by a "family" of scholars working at the Santa Fe Institute (1984), who have been exploring the themes of simplicity and complexity from a variety of points of view (they work in a gamut of disciplines including mathematics, computer science, physics, chemistry, population

biology, ecology, evolutionary and development biology, immunology, archaeology, linguistics, political science, economics and history).

Fig. 1-2 Venice (Italy) the spire of San Marco, the first instance of reconstruction "as it was, where it was". The remains of the old spire, that collapsed on 14 July 1902 (left) and the new spire (1912) identical to the earlier one, but only externally, the interior structure having been reconstructed with r.c.

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Bigraphical Sketch

Gabriella Guarisco (1958), received her degree in Architecture from the Politecnico of Milan (1988) with a thesis titled *Romanico: uno stile per il restauro* (*Romanesque: a style for restoration*), published by Franco Angeli (1991); she completed her PhD program in Preservation of architecture with a thesis titled *L'attività di Corrado Ricci e il restauro dei monumenti ravennati* (*The activity of Corrado Ricci and the restoration of monuments in Ravenna*). In 1994 she began collaborating with the Politecnico of Milan as a researcher in the field of restoration. In September 2000 she was appointed Associate Professor and, since July 2001, she has been permanently teaching at the Faculty of Building of the Politecnico of Milan. She wrote several essays on the topic of restoration of the architectural heritage and, since 1993, she has been collaborating as editor-in-chief with 'ΑΝΑΓΚΗ, quarterly review directed by Marco Dezzi Bardeschi. Since 1999 she has been auditor of the Italian Committee. Her research and teaching activity deals mainly with the deterioration of materials in historical buildings, with the related

methods of preservation and with the arrangement of re-use projects as they relate to the existing conditions (CNR, *Progetto Strategico*, 1994, e *Progetto Finalizzato Beni Culturali*, 1996). Since 2000 she has been coordinating projects of scientific cooperation with the Fine Arts Faculty in Teheran within an agreement drawn up between the Politecnico of Milan and the University of Teheran. She has been practicing as an architect and consulting in the field of architectural survey, completion of preservation projects and management of construction sites. She took part in the project and supervision of works for the preservation of the stones in the facade of Santa Maria Novella station and of the Royal Palace in Florence (1990); she participated in the "Project of preservation and reuse of the former St. Ambrogio Church in Cantù (Co) as a Multimedia Museum of Applied Arts" (1995, in progress).