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YESTERDAY'S METHODS, PRESENT-DAY CULTURE

When drawing up the detailed plan to apply established scientific knowledge and methods to the San Lorenzello case study, we found that there is currently a profound mismatch between the nature of the item to be protected and the instruments employed in our efforts to understand it or in the actual measures taken. Cathedrals were designed and built using methods for which adequate funds were available and teams of workmen were trained to maintain, modify and embellish. The vernacular architecture which we now value is the result of continuous additions and transformations which reflect the changing needs of its users. But assuming this is our objective, how are we to develop techniques which will be "appropriate" and will at the same time enable us to protect both monuments and ordinary buildings from the long-term ravages of time?

This mismatch was probably the original point of divergence between the technical aspects of protection and its political and administrative aspects. The natural consequence is that the technical experts complain that the system fails to apply the proper methods, whilst the administrators fall back on the excuse that the central authorities make them draw up plans but will not give them the money.

In an attempt to reverse the failure of our present-day culture in its "contradictory" attitude towards older methods, we usually follow one of two courses: we can make our techniques more sophisticated and seek to reproduce, using modern materials, the performance of older materials (by laboratory simulations of those tests which, over the centuries, have led people to choose the methods best suited to the context, purpose and resources available); or we can replace the empirical knowledge of earlier times - which was comprehensive and complex - by an inter-disciplinary approach which is specialised and complementary.

In effect, the problem today is not (or not only) how to devise more sophisticated methods, increase funding and disseminate information, but rather how best to draw on knowledge and economic resources through procedures which will *make the system behave in the way which first brought it into being*.

Similarly, it is important to transfer between specialised areas not (or not merely) information and knowledge, but the *methods* used to analyse the system and devise the best plan of action, with a view to understanding the "shape" of the territory and/or the

structure of the community which uses it, but also the behaviour of the system which first produced and then modified that shape.

Analysis of how the "system" behaved in earlier times, as a method of defining global protective measures for the present day, is thus a "unifying" method which makes interdisciplinary action far more effective.

The historian is asked not only to trace a building's history from what we know of earthquakes and repairs and reconstruction work; he is also asked about the resources and procedures used at the time. The archaeologist is asked not just to "recreate" the buried areas of the historic centre, but also to show the architects how a construction "anomaly" can help us identify the requirements and day-to-day problems of the community which produced it.

The economist is asked not just to give us a cost-benefit analysis of a protective measure, but also to come up with technical and financial procedures which can steer entrepreneurs and property owners towards a policy of rehabilitation which is, of course, beneficial to them but will also make a point of respecting features of the local culture.

The simulation specialist is asked not only to compare different courses of action but also to check with historians the continuity of and any changes in the behaviour of the system. And so on and so forth.

The virtue of a multidisciplinary approach to research derives not so much from the sum and/or comparison of specific bodies of knowledge as from the use of a common methodology in analysing and defining projects, a methodology which proved easier to transfer from one discipline to another than we had originally thought. We found, for example, that when a problem was looked at from the point of view of the people using the territory (what could they see at ground level? below ground level? how could they evaluate the resistance of buildings, of the group as a whole, etc.?), this showed up traditional analyses in a new light and led to new findings (cf. Figures 16, 17).

The San Lorenzello Research Project showed that when everyone used the same form and methods of present-day knowledge the result was a good recreation of the local earthquake culture, all the more effective in that it was produced by the local system and not merely by the experts involved. But experience in the field showed that comparison with earlier forms of understanding can create further avenues for research.

As we have seen, most of the covered passageways and outside staircases were built after the original buildings and served the dual purpose of static reinforcement and

improving amenities. If the same techniques were adopted today, publicly owned land would have to be given over for use by private individuals, and it would be harder to predict the dynamic behaviour of groups of buildings. This would necessitate new technical and administrative procedures, methods for calculating and verifying static reinforcement carried out outside (rather than inside, where it was always done previously without anyone ever questioning it), or analytical protocols for the recording of data on environmental history where modelling is not possible.

The direction of our Research Project and its theoretical reflections on the recreation of an "earthquake culture" and the behaviour of the system does not mean that we neglected the conventional specialist approaches. On the contrary, we took the view that these were even more useful if they were made part of a systemic analysis. The sophisticated analysis techniques available today can help to recreate an earthquake culture when they are applied using interpretative criteria: computers, for example, make it easier to crossmatch historical sources on earthquakes with monuments; photogrammetry identifies "rules" in ordinary buildings which do not follow any apparent order, etc.

A standardised methodology is thus necessary but cannot on its own recreate the full complex range of understanding possessed by the people of earlier times. In order to do that effectively and totally, each discipline involved must have knowledge which is far more detailed and far more complete than the usual level of expertise.

The architect, if he is to differentiate between local architectural features specifically designed to improve earthquake resistance and features imported in emulation of outside cultural models, must have a very thorough knowledge of the vernacular buildings of a huge region. The structural expert used to doing calculations on a computer will have trouble identifying the lines of stress in the convoluted structure of a medieval building restored after an earthquake. Analysis of the environmental history of buildings - what resources could the community draw on to meet the needs of the time, in relation to its knowledge, cultural influences, etc. - requires a thorough understanding of the methods used in archaeology, economics, psychology, behavioural science and systems analysis. And no provision seems to have been made for such knowledge in the training programmes followed by town planners.

The systemic approach, far from reducing its subject or concentrating only on a few specific phenomena, requires the technical expert to combine a thorough mastery of his own area of expertise with a multidisciplinary awareness which enables him to ask the "right" questions of other experts.

It would thus appear useful to list here the interdisciplinary "questions" which arose in the course of the Research Project and formed the basis of the seminar held in December 1988.

Some of these questions were answered on the spot, others during the seminar and subsequent debate. Those still outstanding can perhaps be answered by you, the reader...

QUESTIONS

Historical seismicity is a specialised subject viewed primarily in macroseismic terms. It is very difficult to scale down its methods and findings.

- *How can historical analysis help to identify how the community behaved in response to the event?*
- *Can the discovery in the field of material traces of earlier earthquakes help historical analysis and vice versa?*
- *Do material data unequivocally provide an overall interpretation of the (physical and social) behaviour of the system?*

The absence of a common methodology and common codes makes it difficult for the **various specialists in architecture to interact** effectively (geologists, town planners, architects, etc.). Knowledge is fragmented and it is harder to appreciate and recreate an earlier earthquake culture which was once widespread and all-encompassing.

- *Which conclusions of geological analyses would you like to see reproduced on the technical and thematic maps used in regional administration?*
- *Which indices provided by geological observation may be useful in regional administration?*
- *Which indices, readily identifiable on the ground, may empirically have influenced the decision to build historic centres on those particular sites? Can these indices be used in specialist analyses today? Can they be used to encourage the community to revive and use its earlier earthquake culture and actually reduce the overall vulnerability of the system as a result?*

In old vernacular architecture the poor quality of materials, the lack of documentary records and the complex and heterogeneous nature of buildings all make it difficult to identify building "rules" and know how they were adapted to the needs of the

community, etc. Nowadays specialists can draw on **modern techniques** (photogrammetry, non-destructive testing, eco-historical analysis, etc.) rather than the culture built up from tradition.

- *Can modern methods be routinely used to identify earlier rules? To encourage the community to recreate them? Update them?*
- *Can one apply to architecture the methods of eco-historical analysis hitherto used in regional administration?*

A good plan requires a sound **technical understanding** of the architecture of earlier times.

- *Is the analysis of earlier techniques enough to understand the relationship which existed at a given time between needs, available resources and techniques employed? What is that relationship today?*
- *How has an understanding of architecture and its methods helped or modified the methodology you use in your own discipline?*

The community which produced the old buildings had **social "rules"** very different from ours, which sometimes makes it hard for us to take measures which are "adequate". In old buildings, for example, we often see reinforcement which has been carried out by the addition of features which encroach on publicly owned land.

- *What is the reaction of officialdom in regard to:*
 - *modern buildings in a traditional context? the protection and conversion of typical older structures (garages, vertical/horizontal units);*
 - *publicly owned land being encroached on or covered as part of the reinforcement of privately owned buildings?*

The requirement to confine measures strictly **within the limits** of the property necessitates new techniques (tie-beams, injection, etc.) and there are official prices and charges for these. This leads to the gradual abandonment of traditional techniques even though these would often be the most appropriate.

- *What are the difficulties to be overcome in avoiding distortions caused by legislation, grant criteria and recent techniques and in reducing the vulnerability which these create?*

Town planning rules for old buildings often insist on a degree of flexibility so that

measures taken can be adapted to the specific needs of the context. Flexibility is an advantage to discerning technical experts and broadens their options, but it also means that the damage caused by less capable specialists cannot be limited. Consequently the danger is that legislative control becomes a discretionary power, with no guarantees of the quality of measures taken.

- *What form do you think town planning rules should take?*
- *Might rules defining a standard protocol (analysis - examination of the earlier rules - updating - technical plans) reduce the difficulties and improve the quality of measures taken, at the same time ensuring that proper scrutiny is exercised?*

Under the current procedures property owners are responsible for maintenance whilst reconstruction work is paid for by the community. Economists and psychologists suggest that as a result people find it **easier to wait until disaster strikes rather than take measures to prevent it.**

- *How might the resources of the system be used to encourage preventive maintenance of buildings instead of funding their reconstruction and/or permanent rehabilitation?*
- *Which people and types of behaviour need to be tackled?*

During our research work, the process of **correlating the various analyses** proved fruitful.

- *Are the maps developed to this end sufficiently pertinent and useful in analysing and reducing the overall vulnerability of the system? Might others usefully be developed too?*