Theoretical Research and Practical Design

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Marcial Echenique is professor of Land Use and Transport Studies. An international expert in urban and regional planning, he has been involved in the development of cities across the world. He is particularly interested in the role of transport and pioneered the integration of land use and transport models. He has acted as a consultant to numerous governments and international bodies, including the World Bank and the United Nations. He was Head of Department at Cambridge from 2004 to 2008.

Now that the Department of Architecture has reached its centenary, I realise that I have been involved with it for nearly half of its existence. During this last half century the school has continued to confront the same problem that it faced during the first half – the dichotomy of its existence – how to combine a vocational subject with the demands of a highly academic university. The teaching of architecture requires both; the vocational teaching of design which is learnt through practise, and the academic research that advances knowledge through deduction and experimentation. It is quite remarkable that this little school – the UK's smallest – has managed to survive within Cambridge – a world leading research university. But it has always been able to combine pioneering research with practical design, which is the core of its ethos.

The first crisis in the school's recent history emerged in the mid 1980's when the UK government was determined to close one of the nine academic university schools of architecture in the UK (as opposed to the vocational teaching by polytechnics). The

Photograph by David Butler.

University at that time was trying to cut its deficit and there was the suspicion that it was prepared to propose the closure of the school as the balance of teaching was too much towards practical training. In the 2000's the school confronted its most critical episode when the University decided to close it with the argument that it was not sufficiently research oriented to be part of Cambridge. These crises culminated in the reinforcement of the research orientation of the Cambridge School, returning it to the position of leading research institution of the built environment in the UK, admired internationally.

This strategy has paid off as the permanent staff are all now actively involved in research, which is the basis for their teaching, and in turn increases their ability to critically appraise the students' work. The teaching of design is lead by part-time teachers coming from practice – design fellows who should eventually be funded entirely by external sources. This compromise allows the academic and professional aspects of teaching architecture to live reasonably comfortably together within a demanding research university.

Contrary to many people's beliefs, research innovations lead quite rapidly to applications in practice. Very soon after the creation of the research centre, new consultancies sprung out of the university – the so called "Cambridge Phenomenon" – commercialising pioneering computer software for buildings and urban design, which now form part of the daily tools of architects and planners. Designs of buildings and cities were also the product of innovations in research. Cambridge fingerprints are present in many housing and office complexes from Milton Keynes to Beijing in the form of courts, which were demonstrated to have a superior performance compared with other building forms. Many cities, included Cambridge, have benefited from the computer models developed at the Martin Centre.

I was influenced by the pioneering work of Alex Pike and his design for an "autonomous house" (i.e. a house not connected to services). This was ground breaking work during

a period when the issue of sustainability in architecture and urban design was not fashionable. I became interested in the use of renewable materials, the embedded energy in buildings, the value of insulation and the use of natural sources for shading buildings in summer and allowing the sun to improve the comfort of the buildings in winter. These ideas, plus the studies of modular coordination by Bruce Martin, and Walter Segal's experimental work on saving cost and time in building construction, helped me with the design of my own house in Chesterton Road, Cambridge, in 1971.

Later in 2005 the same ideas about sustainability lead me to propose the extension of the school in the form of a new studio at the back of Scroope Terrace. From the first instance I wanted to use timber; a wonderful renewable material, strong in compression and tension, lightweight and beautiful. But one of the problems with a lightweight structure is that it does not have mass and is therefore very prone to fluctuations in temperature. This problem was solved by the use of water as a form of temperature stabiliser in the ceiling panels. The use of a ground source heat pump also helps to keep the building comfortable using very little energy. The studio is highly insulated with natural ventilation and natural light. Apart from the flexibility offered by the open plan, the structure can be extended if the school one day manages to acquire the car park of the hotel next door.

The history of the Cambridge School is the living demonstration of Russell's dictum that "nothing is more practical than a good theory". It avoids costly trials and flawed experiments and moreover builds the stepping stones for new advances in good living. Hopefully the balance between theoretical research and practical design will continue to be the trademark of the Cambridge School.