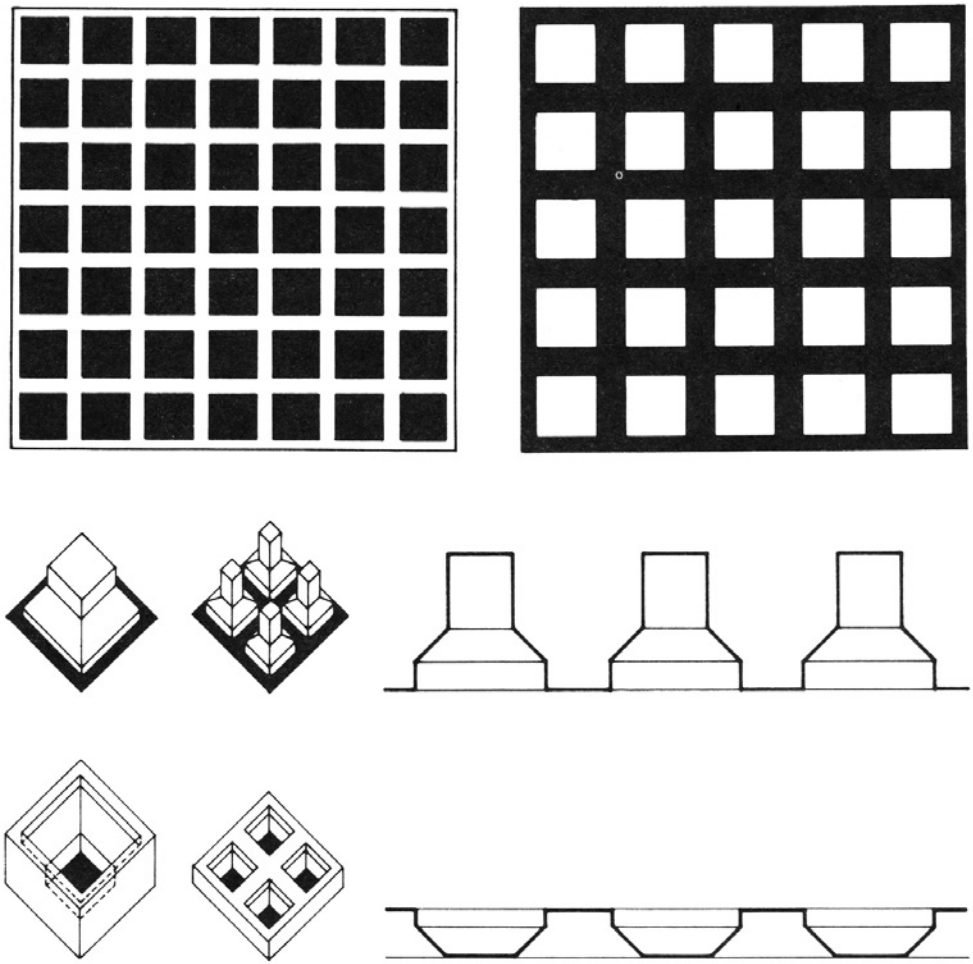

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Court and pavilion theory summarised in a diagram for Martin's essay 'The grid as generator'.

An Outsider's Reflections

PETER CAROLIN

Peter Carolin worked with Colin St John Wilson from 1965 to 1980, from 1973 as a partner on the British Library. He was Technical and Practice Editor and then Editor of the Architects' Journal from 1981 to 1989, and Professor of Architecture and Head of Department at Cambridge from 1989 to 2000. From 1995 to 2003 he was the founding editor of arq (Architectural Research Quarterly).

Architectural research was almost non-existent during the department's first half-century. In Andrew Saint's history, "The Cambridge School of Architecture: A brief history" (www.arct.cam.ac.uk), it features just three times: in the built work of the first professor, Edward Schroder Prior, and his studies of Gothic architecture (still remaining on the first year reading list when I came up in 1957); in the school's short-lived attempt to engage in construction research during World War I; and in the failure, in the early 1930's, of the first PhD candidate, Raymond McGrath, distracted from his research by his celebrated remodelling of Finella, a house in Queens Road.

And there, as far as research was concerned, matters rested until, in 1956, the school's first Professor of Architecture, Leslie Martin, arrived. (Prior had been Slade Professor of Art.) Martin was a practising architect who had headed the largest architectural office in the world (at the London County Council), had a doctorate, and extensive experience in both teaching (at Manchester) and heading an architecture school (at Hull). No other UK head could – indeed, as far as I know, ever has – approached that level of experience.

Saint's history cut off with Martin's arrival – thus leaving the field open for someone

to recount the story of architectural research, post-1956, in Cambridge. It is important that this work should start soon – the Martin Centre documents are in the course of being archived and most of the key participants are still active. For the purposes of this centenary conference, this brief essay (by someone who was merely a distant observer and occasional consumer and publisher of the Centre's research) may, together with some of the other contributions, tell a little of the story of the early, 'heroic' period of architectural research in the department.

EARLY DAYS

In the late 1950's, the amount of research being undertaken in architecture schools was insignificant and it was extremely rare for architecture graduates to proceed to research degrees. The 1958 Oxford Conference, masterminded by Martin and Richard Llewelyn-Davies (shortly to become Professor at the Bartlett School) changed all that. And, when it came, change was nowhere faster than at Cambridge. Three of the first five research students were graduates of other universities – the most distinguished being Peter Eisenman, Colin Rowe's student from Cornell and Columbia, working on Terragni. Two of the others, David Croghan and David Davies had been in the fourth year when Martin arrived. On completing the Diploma, Croghan researched the effect of daylight on housing design and layout, using an 'artificial sky' which he created under the famous silver geodesic dome in the Faculty garden. Starting a little later, Davies studied the impact of housing density on the conception of neighbourhood.

It's hard to believe these days but, in the 1960's, Cambridge architects grabbed the opportunity to have the day-lighting characteristics of their designs tested before construction – all searching for the desired 2% daylight factor. Dean Hawkes (who had arrived in 1965 from Manchester to work as Croghan's assistant on a Building Research Station contract on daylighting and housing) and I first met in the dome when he tested a sectional model of a research laboratory for which I was the job architect. MJ

Long, also working in Sandy Wilson's practice, followed me with a beautiful model of the little Cornford House and Leslie Martin's office had part of the great Manor Road library group tested in model form and, later, checked in built form. Martin's other major building in Oxford, the locally not-so-greatly-loved Zoology and Psychology building was also tested in the dome.

In those days, the form of PhD dissertations was less rigid than today. Dissertations on 'building science' topics were frequently made up from working papers. But one Cambridge PhD followed a rather different route. Jeremy Taylor, a graduate of Martin's first complete Diploma course, became Chamberlin Powell and Bon's job architect on a large lecture theatre complex for Leeds University. The job was cancelled but, dismayed at the lack of information on this building type, Taylor persuaded the Nuffield Foundation to fund some research. Equally dismayed at the level of supervision he was getting back at Scroope Terrace, he de-registered, completed his research (a very early example of the use of computer analysis in architectural design) and was awarded his doctorate on the basis of his published book – all in the space of just over three years.

LAND USE AND BUILT FORM STUDIES

A key figure in these early years was Lionel March. He had been in the first year when Martin arrived and, in 1964, returned to work for him (together with Taylor and Croghan) on the ill-fated Whitehall office study (currently, after nearly 50 years, the subject of research by architectural historians). It was in the course of working on this project that Martin and March started to develop the theories on perimeter development that were to so profoundly influence Richard MacCormac's housing work at Pollard's Hill in Merton, Duffryn in Newport and elsewhere. With the decline, under Margaret Thatcher, of public sector housing, Martin and March's work on housing density was forgotten. In the late 90's, the geographer Peter Hall brought it to the attention of the Urban Task

Force. The diagram published in the Task Force report to this day amazes local authority planners – who have no idea that it is based on Cambridge research of the 1960's.

Martin was particularly interested in '… what seems … important to the architect: … the intentions and the processes that cause forms to exist and give them significance and meaning' and, in 1967, at a time of optimism and expansion in the public sector, he secured three key research contracts – at the scale of the building, the campus and the city. The Ministry of Buildings and Public Works (MOPBW) funded a study on offices, later used in connection with a large public sector offices programme; the Nuffield Foundation funded a study on space allocation and time-tabling in universities, subsequently used by the University Grants Committee; and the Centre for Environmental Studies funded a contract on urban systems, producing the first land use/transport model in the world.

The three teams were combined into a Centre for Land Use and Built Form Studies (LUBFS), initially under the direction of Martin, soon devolved to March, succeeded in time by Marcial Echenique. With few direct applications of its research outcomes, the Centre could be described as a 'think tank'. 'Models' or 'constructs' were a common theme of the time in parallel disciplines and there was a growing interest in the potential of computers. The MOPBW was particularly intrigued and Hawkes' environmental model, developed for the office work, became a computer model, later developed for hospitals and housing. Hawkes and Philip Tabor led the offices team; the trio of Nick Bullock, Peter Dickens and Phil Steadman – all graduates of the same Scroope Terrace cohort – led the university study; Echenique, already an assistant lecturer, led the urban systems work.

Following its formation, LUBFS was established in a house in Brooklands Avenue. There, during a period of hectic activity fondly remembered by all its participants, an American lecturer, John Hix, constructed the famous Glass House and, by failing to apply for planning consent, brought the Centre to the attention of the City. The city

itself had already been the subject of Martin and March's attention when, in 1962, they published their proposals for its development, *The Shape of Cambridge*. This rather over-ambitious proposal fell on fallow ground. Forty years later, its successor, *Cambridge Futures*, directed by Echenique, was to initiate a process that would change the shape of the city forever.

THE MARTIN CENTRE

Leslie Martin was succeeded by Bill Howell in 1973. LUBFS, no longer focused on land use and built form, was renamed the Martin Centre and not long after moved to Chaucer Road. Howell, who sat on the Building Research Establishment advisory board and had a passion for theatre and opera, initiated the introduction of acoustic research under Mike Barron. Large models of the National Theatre and Barbican auditoria filled Hix's glasshouse and work began on evolving the fundamentals of acoustic method. Acoustics was to become a strong strand of the centre's research for a decade.

The environmental strand had developed steadily since the early daylight study days and in 1970 was expanded by John Fraser's and Alex Pike's Autarkic House proposal. Fraser left shortly after and Pike continued with Randall Thomas, a physicist, John Littler, a chemist, and Donald Forrest, another architect. Important research was undertaken on long-term energy storage and a beautiful model built, but Pike's ambition to build the house was not something that the research councils were interested in funding. With his death the project faded but the model photographs had been so realistic that, for many years, Japanese visitors would come to Chaucer Road asking if the house was open to view.

But if grants were unavailable for construction there were plenty available for theoretical work and for work related to public sector building programmes. Nick Baker, a physicist, came to join Hawkes and, in 1987 the Department's first MPhil (in environmental

design), was established with the intention of educating graduates for a more specialist role in practice and preparing others for doctoral research. Koen Steemers, the current Head of Department, was a member of the first cohort.

SPIN-OFFS

Almost from its inception, the Centre had slipped into an occasional consultancy role. A fairly dramatic example of this was in 1976, during the design of the British Library, when it was only through the work of Hawkes and David Arnold, breaking the code for the sunlight and daylight protractors, that we (Colin St. John Wilson & Partners) managed to persuade the planning authority that the library's humanities wing would not diminish the lighting conditions in the housing opposite. The very viability of the design had been at stake.

It had been in order to create a vehicle for the increasing amount of consultancy that, in 1969, the Martin Centre staff combined to establish Applied Research of Cambridge (ARC) – one of the early start-ups in the Cambridge Phenomenon. Marketing Hawkes' environmental model, ARC undertook work for a number of clients, such as the Oxford Regional Hospital Board, in the application of computers to hospital design. On a much larger scale, Echenique's land use and transport models were used to model Tehran, Sao Paulo, Bilbao and other cities. This was the period of the 'mini computer' and such was the firm's success that it attracted the attention of the US defence conglomerate, McDonnell Douglas, who acquired it in 1986.

And, as areas of research developed, the potential for the instigators to set up on their own account to apply the results became irresistible. In a sense, this was no different from the arrangement made with the University at the time of Martin's appointment that encouraged him to continue in practice – an example followed both by Howell and Wilson. In 1979 Echenique, following the Economic and Social Research Council's

conclusion that it could not spend nearly all its funds supporting Cambridge research (in economics and architecture), withdrew from the Centre (which he had directed for six years) and set up his own practice. Hawkes succeeded him and in 1983 set up in practice with Stephen Greenberg. Four years later, Cambridge Architectural Research (CAR) was set up by a number of Martin Centre members led by Robin Spence, an engineer with a particular interest in disaster mitigation. CAR has been highly successful and celebrates its 25th anniversary this year.

PUBLICATION – BEFORE RESEARCH ASSESSMENT

My recollection of what I have referred to as the 'heroic' period of architectural research at Cambridge (up to around 1975) is that its vitality, breadth and inter-connectedness was matched by no other architecture school at that time. Llewelyn-Davies' 'new style' Bartlett perhaps came closest but, apart from the architect John Weeks, relied heavily on established building scientists and young researchers who seemed to work within established boundaries. Cambridge, on the other hand, seemed to know no boundaries – reflecting Martin's claim that 'everything is connected' and 'there are no separate subjects' – a perfect framework within which to advance knowledge swiftly and effectively. Other schools which started expanding their research activity post 1958 – Sheffield, Newcastle, Cardiff and Strathclyde – had a far lower level of activity and an initial bias towards building science.

One important characteristic of Cambridge research of the period was the extent to which – very much at the instigation of Lionel March – researchers were encouraged to write up their theoretical reflections and historical reviews. These took the form of working papers and, at one stage, were published as *Transactions of the Martin Centre for Architectural & Urban Studies, University of Cambridge*. There were four volumes of these, published between 1976 and 1980, edited by Phil Steadman and incorporating a dozen or so well-written and interesting papers based on current research. This was before

Overleaf: covers of special issue of Architectural Design devoted to Martin Centre research, May 1971.

Recently in A.D.

10/70
Farrell & Grimshaw flats in Park Road, London.
Cedric Price supplement No 1.
George Oomen bridge housing, Calcutta.
Paper house review.
Minimum structures. D G Emmerich.
Sector: Jean Cousin, Jeffrey Willis.

11/70
Pop festivals. Martin Pawley.
5 Project Award winning buildings: Central London Polytechnics; Pimlico School; housing.
Value-free architecture. Dave Porter.
Credit card dwellings. Ken Allinson.
Shelter systems.
Archigram Instant City in progress.
Sector: A Gutnov, Peter Smith, John McHale, L Z Brafman.

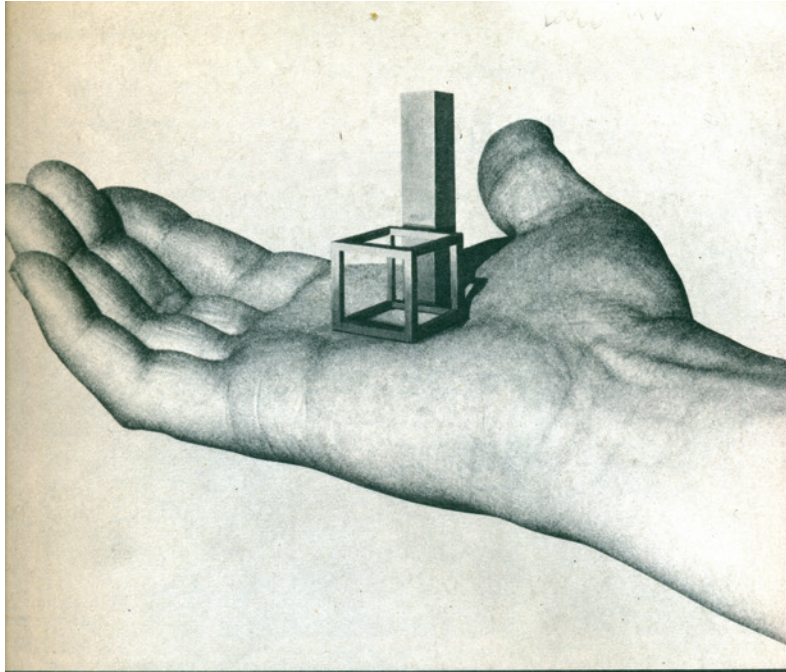
12/70
Chicago à la Carte. Alvin Boyarsky.
Chicago frame. Colin Rowe.
Map guide: Chicago.
Sector: Thomas Blair/Durban.

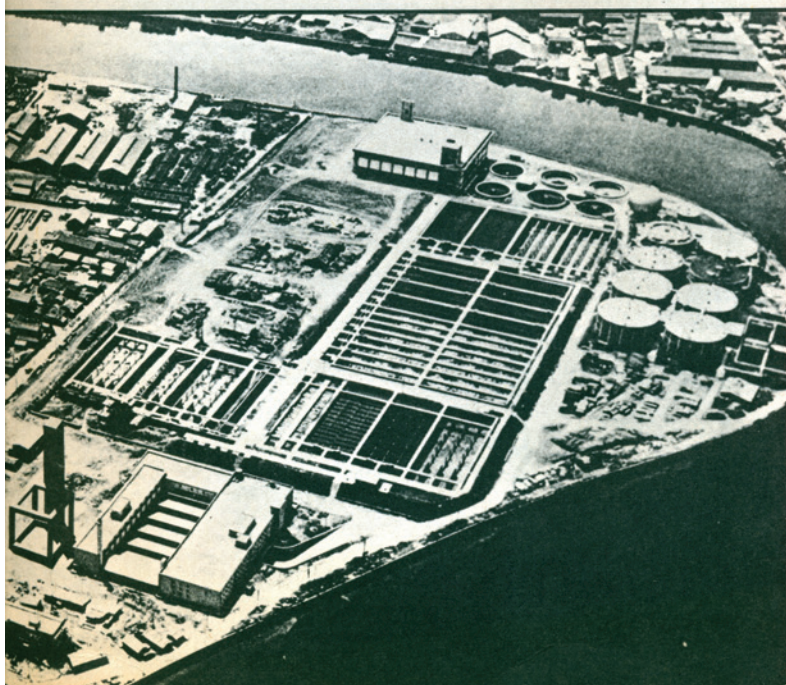
1/71
Boston's Government Centre. Charles Hilgenhurst. Appraisal by Henry Millon.
Le Corbusier à la mode. Peter C. Papademetriou.
Cedric Price supplement. No 2.
Sunderland Town Hall and Civic Centre. Spence, Bonnington & Collins.
Map guide: Hector Guimard surviving works.
Sector: James Anderson, Sam & Sylvia Webb. Dick Bowdler, John Adams.

2/71
St Hilda's College, Oxford. Alison & Peter Smithson. Appraisal by Robin Middleton.
Tube buildings: Eventstructure, Foster Associates, Arup Associates.
Garbage housing. Martin Pawley.
Liberty communes. Brand Griffin.
Summer Session: letter to Warren Chalk. Peter Cook.
Projects: Venturi & Rauch.
Inner space. Farooq Hussain.
Map guide: Brussels.
Sector: Peter Cowan, Peter Smith, Roy Landau.

3/71
Frei Otto at work. Described by himself, Edmund Happold, Lennart Grut, Peter Rice, Theo Crosby, Bertholdt Burkhardt, Rolf Gutbrod, Hermann Kendel, and Koji Kamiya.
System BIB designed by Peter Bühlemann and described by Andrew Rabeneck.
Structural clarity. Peter McCleary.
Notts/Derby report. Robin Thompson.
Pavilions-in-the-park competition winners.
Inside the AA. Martin Pawley.

4/71
Jerusalem's not so golden plan.
TET Centre, Houston. Appraisal by Bill Cannady.
Summer Session, 1970. Contributions from Alvin Boyarsky, Robert Maxwell, Thomas Stevens, Reyner Banham, Nikolaas Habraken, Cedric Price, Brian Richards, Peter Cook and Warren Chalk.
Large enclosures. Albert Dietz.
Economics of change. Maarten Van Emden.





Architectural Design May 1971
40p. Overseas 50p ($1.20)

Models of Environment

the period of research assessment and the papers went through no formal refereeing system. The problem was – and it remains to this day – that collections of papers from individual architecture schools are rarely attractive to the average architect reader. They are costly to produce, difficult to distribute and invariably pile up in storerooms. The *Transactions* suffered a similar fate.

In parallel with the working papers and *Transactions*, Martin and March encouraged Cambridge University Press to develop the Cambridge Urban & Architectural Studies series under the CUP imprint. Between 1972 and 1986 eleven books appeared in this series, all written by members of LUBFS and the Martin Centre, starting with *Urban Space and Structures*, edited by Martin and March, and ending with Hawkes' *Modern Country Homes in England*. Another significant book of the period was March and Steadman's *The Geometry of Environment*, beautifully illustrated by Catherine Cooke.

DISSEMINATING RESEARCH TO PRACTITIONERS

The words 'research and practice' are synonymous with the Cambridge school. They feature in the title of this conference, just as they did for the Martin Centre's 25th anniversary conference 'Research into Practice' – a nicely ambiguous title, reflecting the concern to make research relevant to practice and to ensure that it reaches the drawing board. But just how does one convey research findings to practice? In some areas, urban systems for example, the challenge is not great as the number of persons practising in the field is small and there are well-established, widely-read journals. For architecture it is much more difficult. The profession is large, hugely diverse and definitely averse to reading research papers.

Perhaps the most impressive example of dissemination was in June 1978, when, in a number of the *RIBA Journal* devoted to energy issues, a three-page article, 'Office form,

energy and land use', appeared. Written by Hawkes and MacCormac – both studio teachers – it examined the energy implications of a multi-atria office building type. The study had originated in a casual speculation of MacCormac's on an alternative method of developing a site overlooked by his Covent Garden offices. Based on earlier work by Martin, March and Hawkes and presented in the form of worked examples, and incorporating the latest thinking on office layout, it provided a theoretical basis for the development of what was to become a common building type. As a presentation of this kind of material to an architect readership, it was a model of its kind. (At the same time, the final Diploma year, under Wilson, Nicholas Hare, Tabor and Frank Duffy, was undertaking another building type study, published as *Office Performance* by the short-lived Diploma Publications.)

In the 1980's, as the 'atrium' type developed and buildings were completed, the better examples attracted the attention of editors, none more so than on the *Architects' Journal (AJ)*. Those were the days when new buildings were subject to extensive analysis and it was to Hawkes that the editors turned for many of the key appraisals – particularly on buildings by Peter Foggo (Gateway 2) and Rab Bennetts (Powergen). It was through appraisals such as these that years of research were explained in a manner appropriate for a mass architect readership. Martin Centre research also featured in the form of accounts of buildings such as the Netley Abbey Infants' School in Hampshire – the environmental system of which was based on earlier Martin Centre research developed for Essex schools.

At about this time, Cambridge research of a different kind also regularly featured in the *AJ* in the form of historical studies, by Peter Blundell Jones, Hawkes, John Olley, Eric Parry and others, often based on Third Year technology course case study buildings. This followed the Cambridge tradition – detectable from the earliest days of LUBFS – of placing research in a historical context. In publishing terms it was probably the biggest *AJ* success since the early days of the massive AJ/SfB technical library (which had expired, unremarked and un-mourned, a few years before). Sadly, by the early 1990's,

weekly journal publishing on this scale was no longer possible. The problem of how to effectively disseminate research to architects remains. But, ironically, to the problem, of 'how' must now, I suspect, be added the question of 'what'.

AFTERWORD

When asked to contribute this essay, I was invited to speculate on just what form the department might take in 50 years time. I will refrain from the task but suggest that, with the strong architectural core, common purpose and sense of interconnectedness so evident (to this observer, at least) in the period described, then, surely, there is every reason to be optimistic. Working from a self-confident base and collaborating with other disciplines, architecture should gain strength and attract allies.

Endnote:
Any account of this kind must, by necessity, omit much and conflate more. I regret that – and apologise for my errors.

A school utilising Martin Centre-evolved design strategies featured in a weekly journal.