Fulcrum

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commercial avant-garde.

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Fulcrum: *We've been trying to trace the origins of computational design in architecture for some time (#11, #18, #19/20, #38, #39/40), which has been surprisingly difficult. Could you tell me about SOM's Computer Group?*

Nick Adams: As you say, it's hard to take the history of computers in architecture back beyond... perhaps, the 1980s. The reason is because until then computing was a decentralised activity taking place in very unusual environments. Computers were either developed at a governmental level, as with the Internet. Or they were built in people's garages, as with Gates, Jobs, or whomever, and the pursuit of the personal computer. Computing in architecture begins in neither of these places, but in a highly commercial setting — which is not at all where we think of experimentation as generally occurring.

By 1967 SOM was fascinated by the idea of using computing to optimise design. A lot of their work involved towers, the design of which began with cores and elevators, in collaboration with Otis. But Otis took several weeks to produce its evaluations, so SOM employed their newly formed Computer Group to computerise the spec book. What they produced was a [parametric] design system, the Building Optimization Programme (BOP). There was a continual sense from 1969 up through 1976 that there was something big out there involving computers, and SOM wasn't alone in investing money in this.

F: *I wanted to pick up on the diversity of the programmes produced. There's BOP in '68, then PLUS (Planning and Land Use) shortly after.*

NA: There was also AUTOSPEC, which was really proto-BIM. Another programme for space programming was developed in 1975... Hospitals were a particular concern. They have a zillion functions, a zillion rooms; if you reconfigure a floor, you have to reconfigure all the specs. The computer seemed to offer opportunities for simplifying that. With this programme, when you redesigned a room, doubled the size or something, the furniture requirements, lighting fixtures, number of outlets, etc, all changed.

The adoption of the computer was a very slow process, and uncertain at every moment. There were logistical issues, like how do you make a computer programme operate using just 16kb? On your desktop you've got more computing power than the entire office of SOM had in 1975. The amount of computing power you have in your handheld device would have cost more than $500,000 back then — it was $8000 a kilobyte in the 70s.

F: *Fulcrum #20 features a picture of a 1956 IBM, weighing 2 tonne, with a 5mb hard drive. The physical scales of that transformation are phenomenal.*

NA: The physical changes are fascinating, and really intriguing. The challenges for the people who sat down and worked on resolving them were significant. That is to say, how do you come up with something new under extraordinary limitations? We live in a period of what seems to be limitless computing power, and yet everybody buys off-the-shelf. Firms buy Autocad, or Revit, or whatever, and don't even think about the limitations. Or if they do, they say, ok, well, I'll work with it.

It's interesting to see how much imaginative power was unleashed under the technological limitations of the 60s and 70s, as opposed to how people now use programmes without thinking of them as limited.

F: *What about hacker culture? At a mainstream level, even other AA students often adapt, or write plug-ins, to extend their creative capacity.*

NA: At a hacker level that's right, and imaginative people will always do this. But the large firms tend to use technology out of the box. There are relatively few firms prepared to pay for experimentation. That's also interesting about the entire cultural period that this takes place. SOM is a money-making firm. They are so because they do things effectively, efficiently, and at a large scale. But they were also willing to pay people to do original experimentation. And these people were looking to identify and solve architectural problems.

One of the most interesting problems in the latter period, is that computerised drawings looked like shit.

F: *It seems like there are essentially two periods to be defined. Perhaps up to '78 or '80, where there was much more of an interest in the parametrics of design, and then a second period which seems to be more concerned about the development of graphics.*

NA: Up to about 1980 the burning question was "what can computers do, and how should they work?"

Following 1980, a couple of things happened. One, the price of the technology drops significantly. Machinery becomes more easily available. This permits for the first computer movie, a flythrough of the city of Chicago, and all of a sudden the interest shifted to presentation, away from working out the techniques of the system. The Chicago flythrough looks today absolutely banal. But in 1980, it was what was needed to convince laypeople of the value of computers in architecture. The best of the later SOM programmes, DRAFT for example, actually had the ability to manage structural design, the HVAC and the surface at the same time. The problem SOM had was: alright, you've got this great idea, but how do you sell it? You have to go back into the market with this thing you've developed. That was a thing architectural firms were not used to doing. SOM sold DRAFT to IBM, which I suppose seemed like a sensible thing to do at the time. But IBM attached it to a machine that they were trying to sell, with the result that it didn't take off. The programme cost about $25,000 — Autocad cost $1000 to $1500 at the time.

F: Alejandro Zaera-Polo (#40) was one of the first students to use a computer for design at Harvard, for a studio with Diller+Scofidio in 1990 — he had to convince them to let him use it. Within 12 months the school bought a whole bank.

NA: The cost was largely prohibitive for individuals at that time, which is why the transition first occurs from firms to schools. Around then SOM had spent in the order of $250,000 for just a few workstations, and of course these computers then needed their own darkened rooms, with air-conditioning and so on.

When it came to the development of graphics in early computing there were two questions. First, how can we make it look like a real drawing, and then, what can it do that a drawing can't do? That's the two sides of the problem. On the one hand you have these people developing a computer-generated quavering line style. The truth is, it doesn't look like its done by hand, but it has a kind of fake "hand drawn look". On the other hand, you have people working on things like 3D Boolean polygon processing, which allowed for movement. Or dBase systems with natural language attached, which allowed people to create complex perspectives.

F: *I'm interested in the Bishopsgate Exchange House from 1989-90. The intention had initially been to use the digital 3D model as a base for photo-collaging, but in fact only the raw renders were shown. It seems there was quite an important moment of confidence in the raytraced render to convincingly represent a project.*

NA: All of a sudden, the skills reached a certain level. This new confidence is kind of late, in a funny way. We're talking about 1990 — just before the Computer Group closes.

That is the moment when two things have happened: the IBM sale has gone through, and IBM is now taking over the production of SOM's programmes. The other thing is that commercial software is becoming available that challenges SOM's own reason to maintain a group.

In 1990 SOM mastered a kind of 3D mode of representation, the digital raytraced render, and they were prepared to offer that to clients instead of these hard, line drawings. After 25 years in operation, the Computer Group experiment, intended to introduce computers to architecture, had worked.

Except that it wasn't SOM popularising the technology. So, the completion of their task was also the moment at which they became obsolete.

A younger generation began to come through with their own ideas about computers, and very quickly the nature of the possibilities changed.

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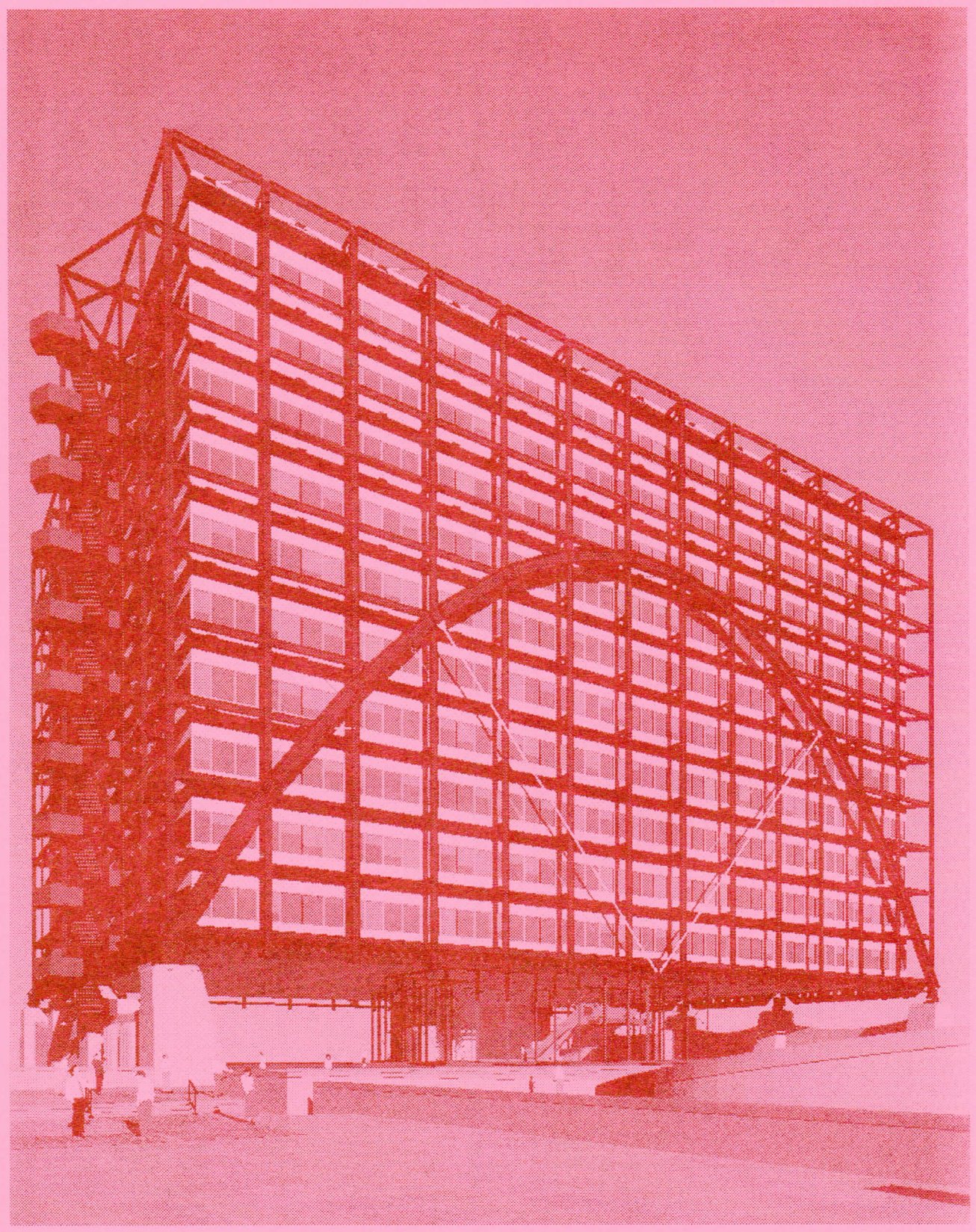

Raytraced perspective for Bishopsgate Exchange House, produced at the moment SOM first became confident with 3D renders. ©SOM 1989

Ed note: A fuller treatment of the subject will appear in SOM Journal 8, in 2013.