This article marks the trial introduction of what I hope will become a regular feature in the ACADIA Quarterly, a forum for the debate of opposing viewpoints on various CAD issues. In each issue, I intend to present a controversial, CAD-related topic, and argue it, pro and con, with another ACADIAN. It is my hope that the discussions in this article will cause us all to form knowledgeable opinions on subjects we hadn’t previously considered, examine our views on debatable subjects more critically, make us better informed about differing viewpoints, and perhaps even change a few minds.

The topic of the debate for this issue is inspired, in part, by the Peter Eisenman building that was the site of the ’97 conference, by the works shown by Greg Lynn in his keynote address at the 1999 conference, and by other recent high-profile works. In these projects, the architects used computers in the design process, performing transformations on models, generating splines, or feeding data to fabricating equipment. This resulted in designs that were visually very different from buildings produced by more conventional means. For these architects, use of the computer in the design process had a clearly discernable effect on the final product. The buildings look like they weren’t designed by conventional means.

This brings up what I believe is an important design issue. Should buildings produced with the aid of a computer somehow “look like” they were designed with the aid of a computer? Arguing to the affirmative is Mark Clayton of Texas A & M University. I present the argument to the negative.

Yes: Computer-Aided Design Should Lead to New Forms and a New Aesthetic Sensibility
Mark Clayton

All artists know that the medium affects the result. One does not use watercolor to do cross-hatching, or pencils to do a large mural. Inevitably the computer, as a new medium, will affect our products and our art. Because the computer differs in revolutionary ways from traditional media, its effects will be profound and even explosive. As the computer-adept rise to positions of power, there will also arise a new style of architecture that is as distinctive from 20th century architecture as the Renaissance is from the Medieval. The influence is most dramatic in a freer aesthetic, in new means of construction, and in integration of computing technology into the building itself.

Bruno Zevi wrote two decades ago “Architects are so influenced by inhuman and artificial geometry that it seems ‘natural’ and ‘spontaneous’ to them” (Zevi 1978). Aaron Betsky echoes that sentiment, writing, “The God of Right Angles is dead, and architecture has come alive” (1999). Zevi even predicted that computing would help lead to a truly modern architecture. T-squares and triangles have long controlled our sensibilities and our aesthetics, and led us to restrain our imaginations and limit our demands for function. With computers, architects’ imaginations have been freed. We can design buildings that employ shells, complex curves, and non-rectangular geometries unlike the boxes that are characteristic of our current building stock. We are seeing the pre-sence of Zevi’s predictions of a new, modern architecture in the work of the best architects of today. Gehry’s Guggenheim Museum in Bilbao and Eisenman’s proposal for Razorback Stadium are stunning steps into architecture that is less restrained by the portrayal medium (Giovannini 1997; Havs 1998). The new town for Adidas-Saloman designed by Angelil/Graham/Pfenninger/Scholl Architecture blends with landforms in a way unconstrained by past norms of buildings (Cramer 1999).

Construction methods have also changed, leading us to new design opportunities. With numerical control manufacturing, each part of a building can be unique yet remain mass-produced. There is no real economy to dull, repetitive architecture. As architects internalize this altered reality, we will not have to self-edit our design ideas based on outmoded rules-of-thumb of pragmatism and feasibility. The Kansai Airport designed by Renzo Piano exploits computer technology to create a sweeping curve defined by dozens of unique trusses (Buchanan 1995). The Blur Building, designed by Diller+Scofidio for Lake Neuchatel in Switzerland, will create habitable form out of computer-controlled artificially created fog (Betsky 1999).

Computer-aided design is integral to buildings that are computer-aided. The architecture of the future will incorporate computers and may even be computers. Communication systems will be wired or wireless-ed into buildings. Sensors will detect who has entered and computers will adjust environmental systems to suit. Liquid crystal windows will change opacity or color depending upon functional requirements or occupant input. Walls will move, ceilings dissolve, and furniture will automatically adjust to individual ergonomic requirements. Aesthetics must change to reflect these changes in buildings themselves.

Computer methods have irrevocably changed the way that architecture is designed, constructed and operated. Form and aesthetic sensibility should change too.

No: Design Should be Based on Other Factors
Scott Johnson

Architecture is durability, convenience, and beauty (Vitruvius 1960, 17); it is “the masterly, correct, and magnificent play of volumes brought together under light” (Le Corbusier 1970, 31). As we learn to use new technologies, we must not lose sight of the principles that guide us in our art.
The computer is a wonderful tool—it helps us visualize forms and spaces, analyze performance, and create breath-taking images and detailed construction documents. Increasingly, it can aid in the fabrication of customized building components. But it is still only a means to an end. The end remains the creation of beautiful, meaningful, functional buildings that won’t fall down.

If we work to deliberately express the tool in the product of design, we are making the tool an end in itself. But the client and the users of the building don’t generally care about the tools used to design the building. They care about how the building affects them: how it makes them feel, whether it’s going to fall on them, and whether it accommodates what they need to do in it. A design tool is important to them only in terms of the effect that the tool has on these more relevant concerns.

It’s true that computers have become an integral part of our culture, and that culture is and should be reflected in the forms we build. However, the role of the computer in design should only be expressed in built form when it can be made to mesh with the expression of other aspects of our culture, and with function, structure, historical precedents, and even the philosophical objectives of the client and architect. We must be careful to do this with the sensitivity, good artistic judgment, and common sense that have always marked good design. The expression of computing should never be done just for the sake of doing it. We must be careful to avoid making a false idol of the technology, even though it may seem “cutting-edge” to do so.

We must similarly be careful with the subtler influences the computer can have on designed form and space. By facilitating different design tasks unequally, a tool steers the designer toward certain decisions. As architects, we need to be cognizant of the subtle side effects of our tools, and be careful not to let them rule us. Graph paper can also be a useful tool for laying out spaces, but when a design comes to look like it was designed on a sheet of graph paper, we tend to consider this a Bad Thing. Control of the design has slipped from our grasp, and our tool is having unintended aesthetic and symbolic effects.

So then, what is the purpose of using the computer in design, if not to facilitate a new design aesthetic for a new era? The purpose is the same as the purpose of design has always been: to create beautiful, safe, meaningful, buildings, which respond to the needs, ideals, and cultural backgrounds of the client and users. If we express the use of the computer, whether deliberately or accidentally, at the expense of achieving these purposes, then we are using the right tool for the wrong job.

Clayton’s Rebuttal

Perhaps architecture responds to timeless imperatives. However, function itself is changing as a consequence of computing and digital communications. The living room may metamorphose into a home theater. Due to Web-based delivery services, kitchens may no longer be necessary. Shopping districts may vanish into the Web. The office may simply be wherever one’s laptop resides. A computer-influenced aesthetic is not merely a fashion superimposed upon an unchanged context of social, economic and personal forms. Brick and mortar architecture must change as a consequence of changes to human lifestyles brought on by computing.

Technology need not be a false idol, but instead it can be an agent of our ideals. The global reach of the Web provides new opportunities for segments of society that have been disenfranchised. A new architecture can help discredit the institutions of an oppressive social and economic order and usher in a better society. The zeitgeist of our era is the leveraging of the mind through computers. As the mind expands, new imaginations will lead architecture towards better environments for a better society.

Architects have no choice but to embrace a new aesthetic and design buildings that look like they were designed with computers. Resistance is futile.

My rebuttal

Our aesthetic and functional values reside in our minds and our society, not our tools. Abandoning our parallel rules doesn’t mean we should abandon our architectural principles. Straight lines, right angles, and repeated elements were used long before parallel rules were around. Likewise, non-rectilinear, biomorphic, and non-regular designs are not really the results of computer-aided design, either. Architects like Gaudi, Mendelsohn, Le Corbusier, and countless others were designing such forms long before the computer age.

Historically, new technologies alone have never motivated new styles—a combination of factors has always been responsible. A Gothic cathedral wasn’t just a result of improved building techniques; it was a highly symbolic expression of religious views, and it fit the needs of the clergy and their congregations. Even the form of a skyscraper wasn’t solely a response to structural steel and elevators; it was also a response to the need and desire to build higher. Furthermore, it represented more than one architectural style.

Stylistic changes will surely occur again, and the computer may well be a part of what inspires the transition. But such changes must be the product of many factors, not a deliberate expression of a tool far removed from the end-users of a building.

Final Comments

Mark Clayton presents a well-reasoned argument that buildings designed with the aid of a computer should look like they were designed with the aid of a computer. I present what I hope is an equally well-reasoned argument in opposition. Rather than provide a parting commentary on the discussion, I will leave the arguments as presented above. It is left for the reader to weigh the points made, and I hope this will be done. It is my hope that these opposing viewpoints will provoke careful reflection on the subject and spur insightful, productive debate in halls, classrooms, and offices.
I hope to make this column a recurring feature of the Quarterly. I am therefore actively soliciting feedback from readers, as well as asking for volunteers for future columns and ideas for future debate topics. Please e-mail me with any suggestions.

References:

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