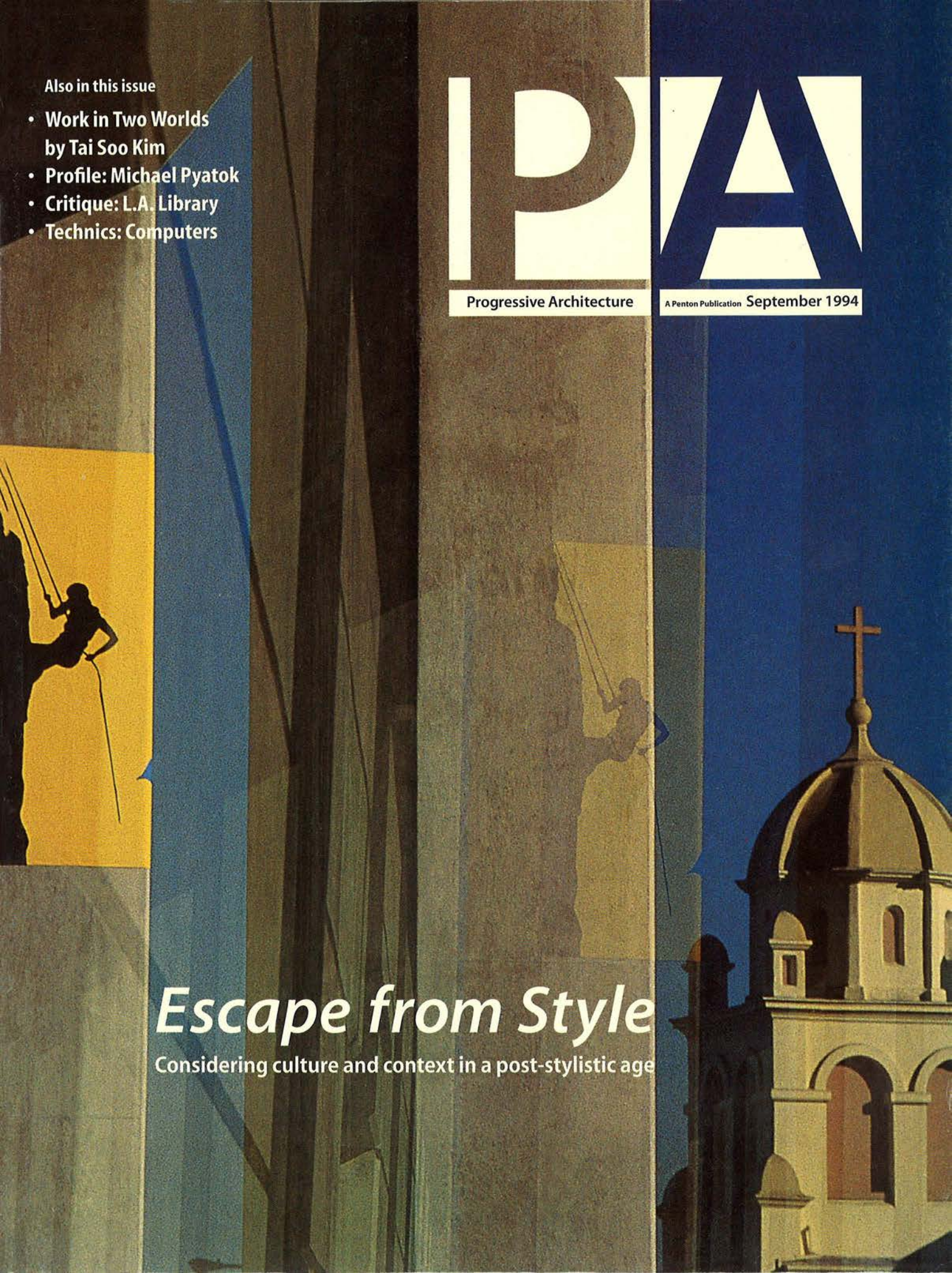


Also in this issue

- Work in Two Worlds by Tai Soo Kim
- Profile: Michael Pyatok
- Critique: L.A. Library
- Technics: Computers

PA
Progressive Architecture
A Penton Publication September 1994

Escape from Style

Considering culture and context in a post-stylistic age

Emerging CAD Centers

Rather than investing in expensive equipment and training, architects can call on "CAD Centers." *by Teresa P. Davidson*

Abstract
Clients are demanding more computer sophistication on the part of architects. "CAD Centers," which offer a range of computer visualization and rendering services, along with CAD management and advice, can provide architects with access to the latest in technology without a hefty investment in hardware, software, and staff training. The articles discusses pros and cons of CAD Centers and how architects can best use their services.

Through the downturn of the economy, the market for architectural services has changed drastically, becoming more and more competitive. Day in and day out, architects face a constant struggle to increase productivity and efficiency. As clients become more sophisticated, they expect more for their money. To maintain a leading-edge advantage, the architect must not only be knowledgeable about design issues, building systems, and materials, but must, in addition, use computers more efficiently and effectively.

To the architect's benefit, computer consultants have emerged and are expanding the range of services they provide. Today, service bureaus have evolved to include more than just printing and/or plotting services; these specialized firms are coming into the market as skilled entrepreneurs. Likewise, many consultants have architectural or engineering backgrounds and are forging connections between the design profession and the multitude of available computer technologies.

Among the most valuable and least understood resources for architects are "CAD Centers," which are still emerging and are involved in all phases of design and construction.

CAD Centers Defined

CAD Centers range from one-person offices providing drafting services to sophisticated team-oriented businesses offering consultation, highly advanced computer graphics, training, technical support, supplies, turnkey computer systems, and presentation-quality output products. Their primary purpose is to provide computer support for their clients, though they also serve as dealers for computer companies and occasionally as software developers. CAD consultants must not only have a good network of sources, but they must also have a "vision" of which products will be promising to learn, and worth investment of their time and money.

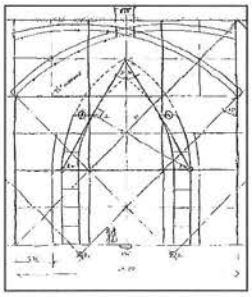
When choosing a CAD Center, architects should choose consultants who have a good understanding of the architectural market, its current trends, and the needs of the architect's client. A CAD Center should also exhibit the desire and initiative to generate creative solutions and design alternatives. Consultants must be extremely knowledgeable and trained to provide input on systems designed to fit the architectural firm's style, and to provide the expected results.

The most important element in dealing with a CAD Center is the establishment of a trusting relationship with consultants. They should be willing to direct the architect so that the design professional's computer resources are utilized efficiently before the billing clock starts ticking. A good relationship will also require loyalty on the architect's part. Trustworthy consultants are eager to invest free time with architects who are not just "brain-picking" or shopping for the lowest quote.

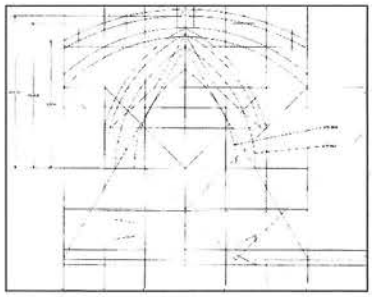
It is possible that an architecture firm will be supported by several computer consultants and/or visualization experts, depending on a project's requirements. The market for CAD consultants is so wide and varied that it demands specialized expertise. Priorities in selecting a consultant should include expertise and the level of support offered.

The author is an associate with Group 70 International, an architecture firm in Honolulu.

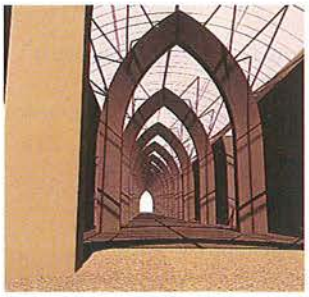
1



2



3



4

5

A finished rendering (1) of a design by Fredenburgh Architects, New York, as developed by Edge Media, New York, is the result of a series of drawings that start as sketches (2) then move to hard-line drawings (3). The scheme for a glass-covered walkway was studied with arches meeting at the ceiling (4) and penetrating the glass enclosure (5).

What a CAD Center Can Provide the Architect

Most CAD Centers have a range of capabilities with a diversity of hardware and software. A typical service involves a 3D model created in AutoCAD that is rendered, animated, and then output to videotape or Photo-CD. The 3D model has to be layered according to the materials to be used. Colors and textures, which have been created or scanned, are then applied to each layer of the AutoCAD drawing file using Autodesk's 3D Studio or Autovision software. Using animation software, viewpoints are selected as "keyframes," and the presentation frames are rendered to videotape.

If a traditional look is desired, artistic filters may be added with image-processing software, and samples provided for client approval. Services such as these are available at $65 an hour (Honolulu rate); hard-copy photo-quality prints up to 34 inches by 47 inches can be generated for $300.

Pros and Cons

One of the most significant advantages of using a CAD Center is that design firms do not have to invest time or money on advanced equipment or training, or hire specialized personnel. Architects gain exposure and access to a variety of specialized hardware and software that provide color, speed, and realistic images. Design firms also gain the capability and the opportunity to experiment, using all these systems to determine which will best suit their style and needs before purchasing them. Owner-Architect agreements usually include the billing and reimbursement

6 CAD Center rendering of a living room, developed by HONCAD of Honolulu.

CAD Center Services

- Training and consultation
- Systems maintenance and repair
- File translations, especially those which require macros to prepare files prior to translation. Because colors, linetypes, blocks, and layers can display inconsistencies during the process, trial-and-error sessions are often necessary to accomplish a clean translation.
- Drawing, scanning, and digitizing, especially large-format
- Plotting: pen, pencil, color, electrostatic, direct-image thermal
- Presentation graphics, including:

  High resolution slides
  Transparencies
  Video production
  Video image capture, where a photo is superimposed onto a file; for example, where a proposed building design is placed, in context, on the project's site.
  Photo-CD, a relatively inexpensive alternative to video image--capture, which will eventually replace slides due to its photographic quality, ability to play on any standard television, and the eventual capability to add a music/sound track.
  Image-processing where "filters" of traditional techniques (watercolors, oils, charcoals, etc.) can be used to render a 3D model, and then print out on various formats and media (slides, transparencies, photo-quality prints, etc.). Other image-processing techniques include anti-aliasing (making edges disappear), color balancing, and digital compositing.

- Architectural visualization: (in ascending order of complexity)

  Photo-compositing is a procedure where photos are combined to add background or foreground in context to visualize the impact of design.
  Conversion of 2D plans and elevations to 3D models.
  Rendered 3D models, where the models become photo-realistic by applying scanned textures to surfaces.
  Animated "fly-bys," where the viewer is flying around the model. Lights are used to cast shadows and to simulate day or night "flights."
  Animated "walk-throughs," where the viewer travels into, through, and around the model. Materials, lights, and detailed interiors are required.

of consultants' charges. This is a viable benefit as it is hard for firms to justify billing for in-house CAD time and output. Finally, architects do not have to dedicate so much time to training and keeping up with the overwhelming advances and changes in the CAD, multimedia, and related markets; they have more time to focus on design.

Nonetheless, architects have to be knowledgeable enough to know how to manage and budget the consultant's time and fees efficiently. Turn-around time will affect scheduled deadlines. If an architect uses services in production, for example, a reasonable amount of time has to be scheduled for quality control and document checking; if one uses plotting services, time must be allocated for script routines, file transfers, collation, and binding. Be sure to ask the CAD Center for the expected turn-around time for these various services.

These services can be costly. Consultants' rates vary depending on the level of complexity and sophistication of the desired project. In Honolulu, hourly rates vary from $50 to $150 per hour; in New York and California, hourly rates on average are $100 to $150, depending on the scope. The cost of deliverables is also spread over a wide range, from a few dollars for color plots or slides, to tens of thousands of dollars for animated, detailed walk-throughs.

Not only are time and money at issue; architects have to exercise open-mindedness and patience to allow for trial-and-error sessions. We need to remember that we are pioneers in a sea of technology. In addition, CAD-proficient architects on staff who can lead and make decisions throughout the process are an advantage. They don't need to be expert users; their value depends on their imagination, creativity, and ability to lead the consultant to deliver the expected high-quality, cost-effective product.

Conclusion

During rough economic periods, it's easy for an architect to assume that CAD consultants offer only superfluous, extravagant services. On the contrary, the positive, value-added services they can provide to the profession outweigh the drawbacks. Architects can share in the learning and enthusiasm of the computer industry and can prepare for a new phase of professional development. Shouldn't we incorporate CAD Centers more in the process of architectural design, and embrace this technological revolution? □