Architectural Representation in the 21st Century
Osher at Carnegie Mellon University
Eric Fisher, Charles Rosenblum
Jun 25, 2020

*(Architects create drawings and other representations of their projects up front in order to demonstrate project concepts and principals. And at their best these creations communicate project ideas in unique and unexpected ways. In turn those drawings affect the architect's design process, allowing it to bend and swerve in response to facts and whimsy.

In our last talk, Charles lay the groundwork for today's lecture by outlining the development of architects' drawings since the Renaissance. Now you have an idea how architectural drawings have been created throughout history and their changing meaning as creative instruments of service.

Today we're going to talk about the future. How will architects' drawings be created in the coming decades and how SHOULD they be created? Over the past couple of weeks, I've undertaken a kind of detective hunt to discover the answer.

Because I am a practicing architect, the concerns and thoughts I will express this afternoon will be largely practical. Bea and I are interested in learning how our architecture practice should best change in response to the conditions of our times. While resisting the urge to knee-jerk our practice in response to each days headlines, it is important that our process be contextual. That is to say, our projects should respond to the sum total of their surrounding conditions, be those conditions political, philosophical, technological, or poetic.
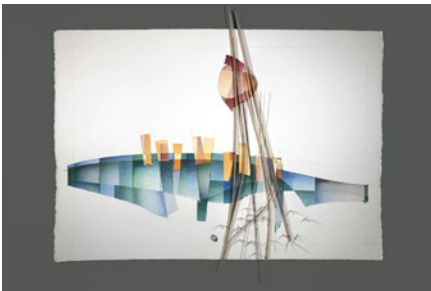
My interest in developing this talk was to investigate ways of using the amazing tools we architects possess, both analogue and digital, in new ways. I agree with Kendra Smith, who has written that "In this age of extensive computer use and the proliferation of visual stimulus, it is essential that architects question and interpret the media they utilize.[1]"

What do folks who know have to say about this issue? How are other architects facing this challenge? This is what I wanted to learn. So I called an expert, thoughtful Pittsburgh architectural historian, Charles Rosenblum, who it turns out, is interested in the same subject. Charles is a careful man. So when I asked him the question he turned it back to me: Well what are your thoughts on the subject, he asked? I may have tried to make something up; but in the end it was clear I had no ready answers.

Why Now?
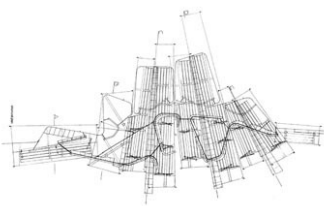
The world is going to hell: The Anthropocene is upon us, bringing with it extreme heat and rabid bugs. The world is turmoil. Why is it important how architects draw their work? Should we even care about such small matters? The astounding thing is this: Thoughtful architects actually BELIEVE that they can change the world. I believe that. We have the temerity to suggest that because we are the folks who

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1 Smith, Kendra: Architects' Drawings - Dialogue and Design Architectural Press 2008

design the world, <u>what we draw matters</u>.

For sure, most architecture is pretty bad. Banality and repetition rule. And ninety percent of the built environment isn't even designed by architects. It's always been that way.

Of course, our profession as a whole doesn't exactly encourage divergent thinking. Potential clients shop for architects on the web like they are browsing at Target. They find images they like and call me.   When they "purchase" my services, they believe they are purchasing a future building that resembles buildings I've designed before. So I'm constantly pressured not to diverge from what has worked in the past.

Also, my in-house design process fails to reward original thinking. I know well how to draw parts of buildings that resemble parts I've designed before. A longer process means less money. So it's easy to fall into a rut and cut corners.

Therefore, it's especially concerning that the methods of representation that architects like myself employ don't fight these inclinations. My tools are like signposts that only point towards well-travelled routes. It's the opposite of Robert Frost's point of view in "The Road Not taken" which has served as inspiration to creative folk since he wrote it in 1915, more than a century ago.

The poem however, is more complex than it appears. A sort of doubling occurs. The poem advocates that we take the less travelled road but questions the nature of choice and, as one writer put it, "the choice itself[2]" And so it is with our tools.

Even as we use them and direct them to produce architecture, they are in turn forming us in ways we cannot know or comprehend at the time.

The FUTURE...

Every work of art follows, in its own way, the philosophy and science of its day. In turn, architecture follows art. So the way to uncover the meanings contained within architectural drawings is to look at the way they've developed over time:

The Issue of Objectification

Many detective novels begins with a crime. In this case, the crime is that the drawing process I employ in the office as I design doesn't encourage divergent thinking.   My computer-driven process is object-driven: overtly literal from a production point of view, too literal to encourage the ambiguity that produces fresh solutions. And the hand drawings I used to do the 1980's are no longer relevant.

So why is this the case? Behind every good crime is a criminal with a motive:

At first look, it appeared that my issues were caused solely by the computer; but further research quickly revealed that these problems have been brewing for a long time.   Harvard professor, Peter Gallison, who writes about the history and philosophy of science had this to

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2 Orr, David The Road Not Taken: Finding America in the Poem Everyone Loves and Almost Everyone Gets Wrong. Penguin Press 2015

say: In the 18th century, scientists depicted bodies and objects "as they should be."   Influenced by Kant and his emphasis on differentiating between appearances and their absolute truth, they were idealists who were interested in the essential purity of form."[3].

In the 19th century, scientists became interested in depicting things the way they actually were. Call them Realists. In particular, Pugin's texts, especially "The True Principles" of 1841, "presented a theory of a rational, comprehensive architecture derived from an intimate knowledge of medieval buildings[4]". But their interests were overly mechanical and perhaps even a bit soulless. In fact, "realism was eventually defeated by its own obsessiveness and detachment from the motives that had inspired it.[5]"

In the 20th century, scientists were still objective, but rather than communicate information as though it was being spewed from a copy machine, they brought their own interests to the table as they organized/framed the info they produced. You could call these folks curators or perhaps "trained experts[6]"
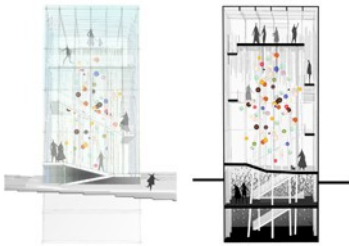
My favorite architectural critic from back in the day when I was learning theory, Alberto Perez-Gomez, had this to say on the subject of objectification and our digital present:[7] Architects who are concerned w/ ethics, he writes, care about creating "places where fully realized lives can take place." Although drawings matter for this sort of architect, the relationship between architectural drawings and the things they describe is changing.

Much, he argues, has been lost with digital production methods. Computers, Perez-Gomez writes, represent the things they describe in an overly systematic manner, leaving little room for the invisible. He suggests that an "intangible loss", has occurred. What is that loss: "That of a culture's power to express through a building its total mathematical, mystical, and magical world-view." This, Perez-Gomez suggests, is the culmination of an "objectifying mentality" of modernity that Prof. Gallison described.

Architects' drawings, he writes, should be symbolic as well as pragmatic. His opinion is that, unfortunately for today's architects, objectivity has stolen their meaning.

A Human Touch

Will our computer-driven process continue to limit us or will it become more fluid in the future? There are certainly different point of view on the subject. Our own world is so beautiful, and the people in it are, in a way, an extension of ourselves. We are rooted in it atavistically. Perez Gomez would say that the time spent in a digital world could never be truly equal in human terms to the time we spend in ours.

In a 2016 publication named. "Attunement", Perez-Gomez calls for an architecture that "can enhance our human values and capacities, an architecture that is connected – attuned - to its location and its inhabitants. Architecture, he says, provides a place where people can come

3 https://en.wikipedia.org/wiki/German_idealism
4 https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118887226.wbcha087#:~:text=Functionalism%20in%20nineteenth%E2%80%90century%20Britain,details%20to%20its%20overall%20form.
5 Ibid.
6 Agrest, Diana Architecture of Nature/ Nature of Architecture AR+D Publishing 2018 p 66
7 Perez-Gomez, Alberto Questions of Representation: The Poetic Origin of Architecture p218

together and communicate with one another. "Its beauty and its meaning lie in its connection to human health and self-understanding.[8]"
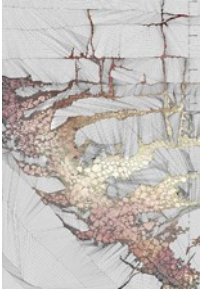
By analogy, architectural drawings, too, should never lose their human touch. Why? Because our imaginations are tied to our memories. As Perez-Gomez once wrote, there is no creation ex-nihilo.

Look Ma, no hands!

That being said, there are those who believe the computer has improved the quality of architects' designs to the extent that drawings are no longer needed AT ALL Why even bother representing buildings in 2D if the whole 3D design already exists in the mind of the computer?

I've recently learned how to program "parametric" architecture using the program, Grasshopper. Grasshopper is the amazing parametric plugin to Rhino that allows you to set up rules (parameters) for drawing stuff without actually drawing lines. The whole program resides in the mind of the computer. The astounding thing about the program is that as you vary the rules, you vary the design output. Those changes happen in real time as you watch.

As a result, the process of developing a design is concerned with 1) setting design rules and 2) varying the rules till you achieve the optimum design output. It truly does change the rules of the game. No sketching is required. I've had a couple interns who will draw no other way. They swear this is the future. No ifs, ands, or buts.

I was nearly persuaded at the time. Now I'm not so sure: Parametric software encourages the development of super-complicated, bendy, foldy designs. Some critics have suggested that complicated designs are appropriate because they reflect accurately our complicated world. But architectural writers like Witold Rybcynski have questioned if that is the kind of architecture that clients actually want.[9]

But that's parametric design's only problem: Like a snake eating its own tail, the parametric process can be overly self-referential. Because the defined project design parameters often have a minimal relationship to our own world, the resulting buildings can be extremely difficult to construct and are frequently accused of being "oblivious to the past"[10].

As well, and this is an important point in these challenging times, the resulting projects most often can be afforded only by the very rich. The democratization that some parametric devotees have promised has not yet occurred.

This might be the time to reintroduce the work of Zaha Hadid. I have been filled with admiration for her work since I first saw it way back in the 1980's. Her 2016 show at the Guggenheim was dynamic, colorful, and above all, optimistic, regarding the continuing power of architecture to inspire and delight. And, as Charles noted in our last talk, her early paintings did inform her work in a direct and, to me anyway, obvious way.

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8   https://mitpress.mit.edu/books/attunement
9   https://www.architectmagazine.com/design/parametric-design-whats-gotten-lost-amid-the-algorithms_o
10 Ibid.

Later in her career, Zaha's has used parametric techniques successfully to create numerous unexpected, expressive, sinuous results. As Patrick Schumacher has written about his experience working with her, she was more than OK with that change:

> *"The fact that the students who came out of the DRL used computational tools changed our working methods. Zaha was, in the end, very clear that our further progress could no longer be expected from hand sketching or painting. She quickly realized that 3D modeling and then scripting was the way forward...She was trying to avoid repeating the signature style of her earlier days."*[11]

Yet despite her firm's claims to the contrary, these buildings ARE super-expensive. One goal of architecture that I, personally never want to forget is to "create a better environment and society for everyone"[12], not just the rich and powerful.

Experiential Tech

So perhaps parametric design is not the over-arching solution that some folks claim. Even so, it is certainly a valuable new tool for designers. Other super-futuristic technologies have also been promoted as architectural game-changers. In particular, AR (augmented reality) and VR (virtual realty) have been touted as tools that could fundamentally change the way projects are developed.

Do you know the difference? I didn't till a couple weeks ago:

Augmented Reality

Augmented Reality uses our existing environment and overlays new information on top of it. Shoppers have been using AR for years. In fact American Apparel has designed virtual fitting rooms that literally allow you to try on clothes before you buy.[13] One use for architects is that you can place a 3D model in it's actual intended location. In 2011, designers in New Zealand used AR to visualize small scale versions of buildings that were destroyed in an earthquake."[14]

Since that time more and more architects have taken the bait. We're already seeing AR applications emerging for smartphone, tablet and headsets. But the real benefits will arrive when this new imagery is liberated from these devices.[15]
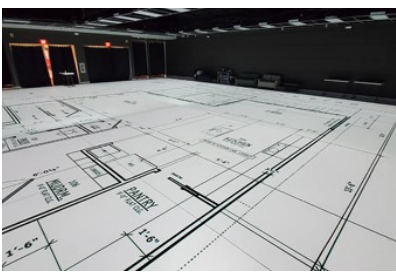
"Help me, Obi-Wan Kenobi. You're my only hope." Holography is another form of AR on the horizon.[16] As of today, there ARE technologies that can translate computer models directly into holographic images with the help of a headset.

Right here in Pittsburgh, I had a meeting just last week with Ron Lyndon, who is the proud owner of a just-opened Pittsburgh Mills facility called Walkable

11 ArchiCreation About my time and work with Zaha - AC's Interview with Patrik Schumacher Venice, Italy, 29 May 2016
12 https://www.architectsjournal.co.uk/opinion/schumachers-vision-is-one-in-which-the-rich-use-the-rest-of-the-world-as-their-playground/10015256.article
13 .https://www.shopify.com/retail/how-these-retailers-are-using-augmented-reality-to-enhance-the-customer-experience
14 https://www.autodesk.com/redshift/what-is-augmented-reality/#:~:text=In%20augmented%20reality%2C%20computer%20software,mobile%20devices%20and%203D%20models.
15 https://www.computerworld.com/article/3249605/the-future-of-3d-holograms-comes-into-focus.html
16 "https://www.architectmagazine.com/practice/architecture-firms-experiment-with-holograms

Plans. For twelve hundred dollars an hour – a steal he says – you can rent his gym-sized room which maps life sized floor plans onto the floor using projection technology. During our conversation, he mentioned that he has access to holographic tech that could transform his facility in the future into a place where architects could truly walk through their creations. This, he says is the future!

<u>Virtual Reality</u>

What about VR? Virtual reality is the only tool that lets us be FULLY immersed in architecture that hasn't been built yet. Based on three-dimensional digital models, virtual reality allows the observer to "enter" into space with the aid of a headset and become part of part of a whole new architecture[17] Programs like Google Tilt Brush actually allow artists to paint in 3D space. Is it a gimmic? I think not.

Bea and I sat mesmerized in front of my computer screen watching artists create new work use this new technology. Online videos show hooded artists with arms sweeping like wizards manipulating and developing virtual space. The creation process is truly fascinating. Multimedia artists like Laurie Anderson are beginning to taking advantage of the technology and tell stories "interactively in a state of total immersion"[18].

Yes, subjects actively engage with the artwork and can determine where they look. Yet the technology has its own set of issues: For one thing, these new process-suitable applications are imprecise. For another, VR has the effect of displacing the viewer's own imaginative engagement. Viewers experience a false sense that they are in control of what they are seeing. That initial perception is quickly followed by a dawning realization that they truly are not. This is called the "illusion of agency."[19] [20] The effect can be chilling, I've read, and disconcerting.

My sense though is that the agency issue is not a deal breaker. While architects are not yet using this technology during their initial design process to create buildings, I can certainly see the possibilities.

<u>Conclusions</u>
Some architects ARE putting these new technologies to use; but of course goggles are required. At this time these platforms are mostly used for 1) selling designs to clients or 2) facilitating construction. There's no need yet to throw out my markers. I really don't see a way this technology will supplant the role of architects' drawings anytime soon.

Drawing by Hand

There is a group of architects who take the extreme opposite position. These architects, usually academics or architects in small practices, have consciously rejected the computer altogether and continue to sketch by hand. (Please note that there is no rejecting the computer when construction drawings are required. CAD and BIM are so efficient that the human hand simply can't keep up.) Even the most conservative of US architecture schools now offer computer drawing classes.

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17 Baratto, Romullo, Trends in Architectural representation: Understanding the Techniques, ArchDaily 2017
18 https://massmoca.org/event/laurie-anderson/
19 .https://en.wikipedia.org/wiki/Illusion_of_external_agency"
20 One critic has suggested that's why movies about immersive futuristic technologies, such as The Matrix have tended to "gravitate to the question of mind-control rather than their potential to free the mind.
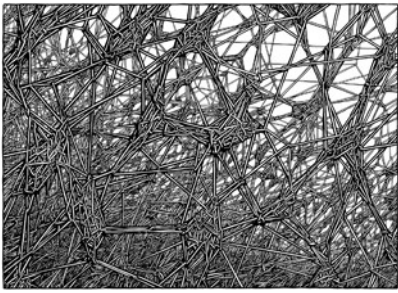
Some of these architects may have grown up before the computer was ubiquitous. Others may not be able to afford the required software. A third group, like the philosopher Martin Heideger in his day, feel intuitively that a "technological understanding of 'being', endangers our human spirit"[21] (His belief was that we "enframe" the world through the lens of technology so that we can control it. This enframing process separates us from a truer, more direct connection to the world.) Still others are environmentalists who believe that technology has ruined our planet and should be stopped immediately in its tracks.
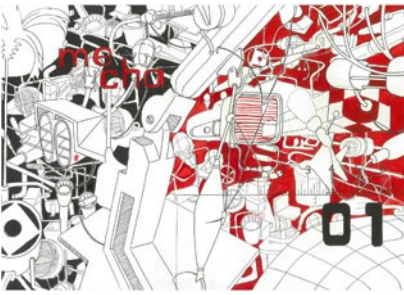
And there are those who still believe firmly that the benefits of direct connection between the human hand and the brain cannot be replaced. As the architect, Lou Kahn, once said about his drawings.

"Sketching is improvising; it is an action that unfolds through time.... In this sense drawing is a necessary act for the thinking architect, not a romantic indulgence" [22]

Any number of studies have verified the benefits of learning to write and sketch by hand before turning to the computer.[23] As Maurice Merleau-Ponty suggested in the "Phenomenology of Perception", our consciousness is tied tightly to our bodies[24]. "The hand speaks to the brain as surely as the brain speaks to the hand."[25]

Amazingly, many of the best experimental architectural drawings being produced this year, even in 2020, are still being drawn by hand. In particular, the work of Ashwin Patel, Katie Shima, Perry Kulper, Bryan Cantley, and Dwayne Oyler deserves special recognition.[26]

Computer Renderings

Yet times change. Because the public consumes information digitally, an architect who does not employ the computer risks becoming irrelevant. To put it as Marshall McLuhan may have, the way projects are produced should relate to to the way the projects are communicated to the public.[27] In the case of architectural drawing, the medium of the computer IS the message.

In other words, as the brilliant British critic, Reyner Banham observed in 1960, if an architect makes the choice not to embrace the technological future, he may find that it will go on without him."[28] (If you haven't yet, you should read his short 1972 New Society essay entitled "Prevento Mori", which concerns the positive design qualities of crash test dummies. It's a great read!)

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21 Verbeek, Peter-Paul, The Technological View of the World of Martin Heidegger, University of Twente
22 Smith, Kendra Schank , Architectural Sketches
23 Bounds, Gwendolyn How Handwriting Trains the Brain 2010 in the "Wall Street Journal"
24 Merleau-Ponty, M, Phenomenology of Perception, Routledge (London and New York), 1962
25 Wilson, F.R. The Hand, Vintage Books ((New Yoork), 1999, p.291
26 Moses, Nalina Single-handedly - Contemporary Architects Draw by Hand Princeton University Press 2019
27 Gorski, Gilbert Hybrid Drawing Techniques – Design Process and Presentation 2014 p. ix
28 Banham, Reynor Theory and Design in the First Machine Age 1960

Most often these days, architects no longer sketch at all. Young architects rely entirely on the computer. Even so, at times a human touch can still be discerned. Certainly it's not an easy task.

Many large firms outsource their work to rendering companies like MIR or Squint/Opera. People often fill these drawings. The drawings, often hyper-real[29], are brought back to earth by their impressive material quality and lighting, reconnecting them to their audience. Still, their shiny perfection can be troubling:

First of all, everyone is happy and well fed. There is no room here for the homeless. "Disabled people are admitted, but only for Health Care center designs[30]" Their meaning has been commodified as their primary goal is to sell the buildings they represent.

Second, I know well the incredible amount of effort it takes to get everything just right. Similar to one problem of parametric design, only the richest of clients can pay for the time it takes to create them. Paradoxically, the very characteristics that attract us to the drawings demonstrate the deep divide between their production and the public they serve.

Third, as the extraordinary amount of detail in these drawings reveal, they are most often created as marketing devices well after the designs are complete. As a result they have lost their value as design signposts: Their designers don't actually learn anything from them.

That being said, most computer generated renderings do not feature this level of detail. Yes, for many architects, adding a human touch to a drawing means adding digital people like bandaids to a rendering in Photoshop after the project has been designed on the computer.[31]

All this is deeply disappointing. I was disappointed. But maybe, it occurred to me, that's not what adding a human touch actually means:

There is a deep connection between the way humans imagine the world and the way we live in it. Perhaps adding a human touch means creating drawings that actually reflect the contents of architects' imaginations: Programs like Rhino and Sketchup have become flexible and intuitive to the extent that strong designs can and DO frequently result.

While highly critical of Revit, I found that the noted SCI-Arc architect and professor, Michael Rotundi embraces the computer: "My teaching", he says, "is a way to get the students back in touch with who they were at a younger age. The objective is to get them to act as spontaneously as they did as a child, but with the intelligence of an adult. That's a lethal combination."[32]

As the writer and Virginia Tech School of Architecture director, Aaron Betsky wrote just last year regarding drawing by hand versus using the computer, "Who cares? Is one better than the other? Should we be sad about the loss of ink wash perspectives? Or of plans drawn on parchment?"[33]

29 Wikipedia, Hyperrealism (visual arts)
30 Colonnese, Fabio The Human Figure as Cultural Mediator in Architectural Drawings 2017. p 122
31 Treib, M (2008) Drawing/thinking: Confronting an Electronic Age. London: Routledge "The insertion of figures floating uncomfortably above the ground or awkwardly attached to its surface, illustrates this reduction of sensitivity and understanding of life"
32 https://archpaper.com/2015/01/michael-rotondi/
33 Betsky, Aaron A Perspective on Perspective, Architect Magazine 2019

Second Self

MIT professor, Sherry Turkle, published a book called "Second Self" in 1984 that "looks at the computer not as a 'tool', but as part of our social and psychological lives; "she looks beyond how we use computer games and spreadsheets to explore how the computer affects our awareness of ourselves, of one another, and of our relationship with the world."

'Technology," she writes, "catalyzes changes not only in what we do but in how we think."' Think how you feel when your phone runs out of juice. Prof Turkle suggests that it's literally like losing a part of your mind. While she is critical of how technology separates us from our friends and families - imagine children texting at the dinner table – she believes that the cure is simply to resist that impulse. Then, she believes the computer can be our friend.

Authenticity
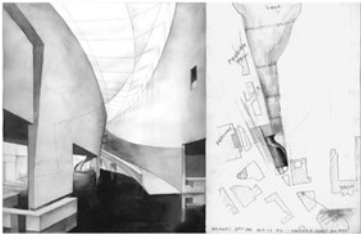
The task then is to create "Authentic" drawings, ones that in an honest way depict the life and times of their creation.

You may remember the work of Hugh Ferris that we reviewed last week. His sketches, with their shadowed mass, lost their authenticity the moment the transparent architecture of Modernism became the norm[34].

 I mentioned the work of Zaha Hadid earlier, Her early paintings were inspired by the work of the Supremetist artist, Kazimir Malevich, who suggested that he wanted to "free art from the dead weight of the world". Different from the Constructivists, Suprematist artists believed that painting should directly express a world of "pure" feeling.

Yet consider this recent rendering by her firm. First of all the rendering no longer expresses the artist's process. In fact it was created out-of-house for the firm by a company called "Flying Architecture". Second, the hyper-real quality of the rendering leaves no room for contemplation of pure feeling. It's all about it's own reality. So is it authentic? It's remarkable certainly. But authentic. I say no.

So what kind of drawings are authentic now?

The New Aesthetic
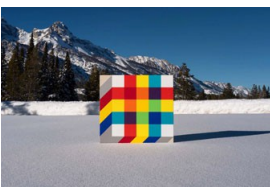
One group of artists believes that authenticity lies within a movement called the "New Aesthetic" that the artist and writer, James Bridle, described in 2012. [35] The idea of the second self described by Professor Turkle presupposes that the digital world is "virtual" and the physical world is "real." Have you seen the Cocteau movie, "Orpheus". You are either here on this side of the mirror or you are on the other side. This is the premise of

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34 Allen, Laura and Pearson, Caspar Drawing Futures 2019 p. 5
35 https://en.wikipedia.org/wiki/New_Aesthetic

The Matrix, among many other films...

New Aesthetic artists and critics are disputing the concept of what they call "digital dualism". Instead they argue that "the digital and physical are increasingly meshed.[36]" A super-readable article by science fiction writer, Bruce Sterling, in Wired Magazine back in 2012 popularized the movement. He wrote that New Aesthetic art must respond to a "shocked society" and turn the changes we're confronting into critical artistic creation:

"Our hardware is changing our lives far more profoundly than anything we ever did to ourselves intentionally. We should heed the obvious there, and get used to that situation. We should befriend one another, under that reality. We should try to see what that means."[37]

This movement seems to have been unplugged as a result of the only-OK artists who took up its mantel. New Aesthetic artwork looks dated to a 21st century eye, a bit too Max Headroom to be relevant today. A quick Google search for "2020 New Aesthetic" revealed mostly links to websites selling clothes, makeup, and plastic surgery...
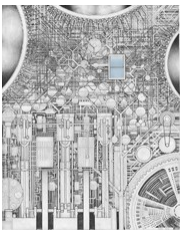

Process

My thought when I started looking at all this is that architects drawings can achieve authenticity only if they stop trying to make their drawings resemble drawings they've seen before and allow them to reflect the digital processes they employ.

Architects frequently romanticize the way things LOOK at the expense of the way things actually ARE. Using new techniques allows architects to see the world in new ways, ways that align with how we live now. These benefits are lost if you simply copy the look of old drawings using new techniques.

Mimicking old techniques with new technology produces what are called "skeuomorphs". You may have heard the term: A skeuomorph is a "derivative object that retains nonfunctional ornamental design cues (attributes) from structures that were inherent to the original."[38] A computer desktop trashcan is the most used example of the term. Electric candles are another. One problem of skeuomorphs is that they "increase users' cognitive load with visual noise while providing little or no value to the user."[39]

And so it is with architectural drawings. The best of the new drawings that architects are now producing have a new look that DOES reflect the way they are created. In turn, those drawings affect the buildings they represent in ways that computer generated drawings that simply copy old techniques cannot.

Hybrid Drawings

Fast forwarding to 2019, Dr. Sophia Banou believes that it's not enough to create drawings that merely resemble their digital process. Like a mirror, she suggests these sorts of results merely

36 https://thesocietypages.org/cyborgology/2011/02/24/digital-dualism-versus-augmented-reality/
37 Sterling, Bruce, An Essay on the New Aesthetic, Wired 2012
38 Basalla, George (1988). The Evolution of Technology. Cambridge, UK: Cambridge University Press. p. 107.
39 "https://en.wikipedia.org/wiki/Skeuomorph

reflect their content back at their audience. They are "tools of prescription" as opposed to what she calls "fields of invention".[40] The recipe for authenticity, she says, and "unpredictable, original results"[41] is to import and combine information from many different relevant sources and disciplines.

  One way to bring a human touch to one's sketches is to create hybrid drawings, drawings that combine traditional hand drawing techniques with digital methods. Gilbert Goski remarked in his book, "Hybrid Drawing Techniques" that "the creative process works best when it involves random variables.[42]"

While the human hand is marvelously imprecise – it's great at "random - the computer can also produce spectacular results. In particular computer software excels at depicting the nuances of physical phenomena, "transparency and reflection, texture and color, light and shadow, and movement – both of the sun and the viewer."[43] So, in the hands of a skilled draftsman, combining hand-drawing techniques with super-precise digital methods can bring out the best of both worlds.

My conclusion is that architects will use many tools in the future, ranging from the digital to the analogical, and from the virtual to the material,[44] providing ways to organize architects' design process that will encourage research and "open new doors to perception."
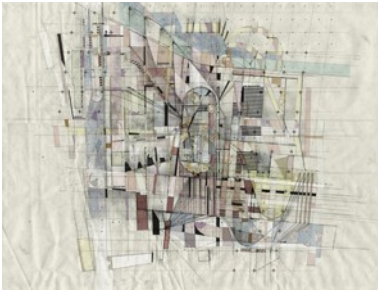
Physical and virtual realms will be blurred. Sometimes architects will create what are called "primitives" on the computer and then sketch overtop by hand. Other times, they will draw lines, scan them into the computer, and then hatch and collage them using digital techniques. These drawings will also freely incorporate materials, imagery, and information that can be collected on the web.

At their best these hybrid drawings will not be sketches that try always for "Perpetual Newness". We've spoken of the problems inheritant in that strategy. Instead they are grounded in the reality of THIS world and its history. That, in turn, liberates them to explore flights of fancy that are actually relevant to both the designer and his audience.

Conclusion

Bea and I have been noticing the goings-on in our backyard perpetrated by our two and four legged neighbors as they hop and dart around our back porch. The other day we noticed a baby sparrow begging for food that was literally twice the size of it's parents. Bea described it as a tennis ball chasing a ping-pong ball. A bit of research revealed that the fledgling was not actually a sparrow. Sometimes, I read, starlings lay their eggs in other bird's nest and are subsequently raised by them as their own. Amazing.

The story reminded me of my search for authentic drawings. Sometimes, as I have blundered about on my detective hunt, I have felt like the fledgling, all too willing to change my

40 Banou, Sophia Drawing the Digital: From 'Virtual' Experiences of Spaces to 'Real Drawings
41 Dr. Banou's writing is dense and academic. I wish it could escape the problems of it's own conventions. Yet she has a point...
42 Gorski, Gilbert, Hybrid Drawing Techniques – Design Process and Presentation, 2014 p.2
43 Ibid.
44 Carreiro, Miguel The Evolution of Representation in Architecture 2013

appearance in order to achieve success. Other times I have felt like the bird's parents, open to embracing the unexpected. Similar to with architectural drawings, appropriateness depend on enframement. It all depends on your point of view.
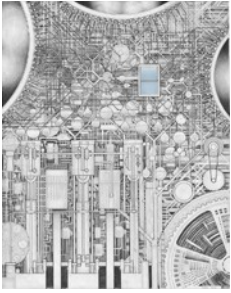

Yet this much we can be sure of: When we consider the architecture of the future, for buildings not yet built, representation is NOT a luxury. It is a "necessity to test, communicate and sell an idea."[45]

In the end, architectural drawings do more than simply represent buildings: Because they deal with, "the materiality of nature and the forces at work on it,"[46] in their own way a skilled architect's drawings represent the entire earth and its history.

I have one more thought to relate: There is a whole world out there that is concerned with more practical design matters. Namely, "How can our firms survive in these crazy times?" Our opinion at Fisher ARCHitecture that the only way for architecture firms to survive in the future is to differentiate. As Bea described it to me, it's like writing a book about Tiki Torches and then advertising yourself as number one in Tiki Torches. Survival depends on uniqueness.

The result is that architecture firms will be both incentivized and, indeed, required depending on their resources, to express themselves uniquely.
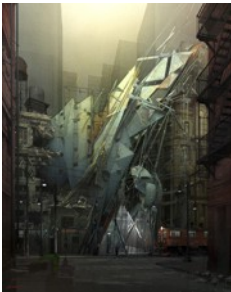
Certainly, most architects will continue to be primarily concerned with production as opposed to quality. That won't change.

Yet as these incredible tools I've been describing becoming increasingly affordable, my opinion is that they will expand ALL architects' vision. How could they not? Architects will put these tools to use not because of some notion of high art but rather to set themselves apart from their peers.

It's not difficult to predict that the quality of architects' work will improve as a result.

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45 Baratto, Romullo Translated by Matthew Valletta, ArchDaily, Trends in Architectural Representation: Understanding Techniques
46 Agrest, Diana Architecture of Nature/ Nature of Architecture AR+D Publishing 2018

<u>Image Credits</u>

1) Simon Stalenhag: Simon Stålenhag (born 20 January 1984) is a Swedish artist, musician, and designer specialising in retro-futuristic digital images focused on nostalgic Swedish countryside alternate history environments. The settings of his artwork have formed the basis for an Amazon television drama series called Tales from the Loop (2020), among other things.

2) John Humphries AIA: Cincinnati, OH-based artist, John Humphries is a Professor of Architecture and Interior Design at Miami University, as well as a visual artist, gardener and designer focusing on translating one media form to another. T

3) Iris Xinyi Wang: Master of Architecture student at University of Toronto Daniels, Canada Winner: Best student work Architecture in Perspective 34.

4, 5, and 6) Enric Miralles: Spanish designer and architect, born in Barcelona in 1955. He trained at the School of Architecture of Barcelona ETSAB until 1974. He was a guest Fulbright professor at the Columbia University during 1980-1981. In 1993, Enric founded EMBT studio with his wife, Benedetta Tagliabue.

7) Dominique Cheng: (b. 1979) is a Canadian architect and illustrator/installation artist. He is the recipient of the OAA Architectural Concept Award (2016) and was a Finalist for the prestigious Arte Laguna Prize in Venice (2016).

8) Rafael Sánchez Herrera: Rafael Sánchez studied Architecture and Industrial Design at the University of Los Andes in Bogotá, graduating in 2015

9) Saraben Studios: London based award winning architecture and design studio founded by Sara Shafiei and Ben Cowd in 2007. Saraben's design practice includes teaching, research and experimental architectural design.

10) Neil Spiller: Hawksmoor Chair of Architecture and Landscape and Deputy Pro Vice-Chancellor of the University of Greenwich, London prior to this he was Dean of the School of Architecture, Design and Construction and Professor of Architecture and Digital Theory at Greenwich University.

11) Anabel Mendt: 25 years old, Fluent in Spanish, English and German. Ms. Mendt possesses an Architecture degree from the Central University of Venezuela and a Master's degree in architecture at FIU.

12) Yosimite National Park, Horsetail Falls

13) Hsing-O Chiang: After earning a Master of Architecture degree from Cooper Union in 2015, Ms. Chiang has been with SGVA Architects, specializing in the residential field and working on a wide variety of residential and institutional projects.

14 & 15) Fisher ARCHitecture: designs thoughtful + progressive + contextual architecture in Pittsburgh, PA. Architect, Eric Fisher AIA LEED AP has a four-year degree in both Engineering and Visual Art from Dartmouth College and a Master's Degree in Architecture from Harvard University.

16 &17) Oyler Wu Collaborative: An experimental architecture and design firm located in Los Angeles, California. The office approaches architecture and design with a critical and rigorous intent that challenges the typical vision of the built environment. Dwayne Oyler and Jenny Wu established their practice in 2004. Since then, Oyler Wu Collaborative has been published globally and is recognized for its excellence in architectural

design, research, and fabrication

18) Zaha Hadid (born October 31, 1950, Baghdad, Iraq—died March 31, 2016), Iraqi-born British architect known for her radical deconstructivist designs. In 2004 she became the first woman to be awarded the Pritzker Architecture Prize.

19 & 20) Augmented Reality

21) Walkable Plans

22) Virtual Reality

Video: Google Tiltbrush Video: https://youtu.be/TckqNdrdbgk

23) Mary Sibande (with Eden Labs) Mary Sibande, born in Barberton, South Africa, in1982, is an artist who lives and works in Johannesburg. Focusing on VR / AR, 3D printing and software development, Eden Labs uses a variety of mixed reality technology and other digital media to "tell captivating and interactive stories."

24) Nataliya Eliseeva: Architect, interior designer Moscow, Russian Federation

25) Oyler Wu

26 & 27) Bryan Cantley: Visiting faculty at SCI-ARC and Woodbury University. He completed undergraduate work at the University of North Carolina, Charlotte, and graduate work at University of California, Los Angeles.

28) Beniamino Servino: Born in St. Joseph in Vesuvius, Italy. He graduated in 1985 from the Faculty of Architecture Federico II, in Naples. In 1994 Servino initiated Serven, a think tank built around the question of the monumental in architecture and in the context of a post-ecological city-territory.

29) Ashwin Patel: Designer based in London, involved in architecture, drawing and storytelling. He graduated the Bartlett School of Architecture, UCL, with a distinction for his Masters of Architecture. Prior to completing his Masters, Ashwin worked with CJ Lim at Studio Eight Architects, at Studio Cullinan and Buck Architects (SCABAL) and Foster and Partners.. Ashwin is currently working for Charles Avery.

30) Prevento Mori

31) Gensler: An integrated architecture, design, planning and consulting firm with5000+ professionals networked across 50 offices

32) MVRDV: A global operating architecture and urbanism practice with an progressive ideal engaged in solving global issues led by Dutch architect, landscape architect, professor and urbanist, Wilhelmus "Winy" Maas.

33) Dorte Mandrup-Poulsen: Danish architect. Founder and Creative Director of the architectural practice Dorte Mandrup Arkitekter A/S that has approximately 60 employees. The practice is based in Copenhagen, Denmark and is behind several internationally acclaimed buildings.

34) Mir: A noted computer rendering firm located in Bergen, Norway founded by Trond Greve Andersen &

Mats Andersen

35) Neoscape: A full service creative agency with offices in Boston, New York and San Francisco specializing in branding and visual storytelling for institutional & real-estate clients.

36) Snøhetta: An international architecture, landscape architecture, interior design and brand design office based in Oslo, Norway and New York City with studios in San Francisco, California, Innsbruck, Austria, Paris, France, Hong Kong, China, Adelaide, Australia and Stockholm, Sweden

37) "Second Self" book cover

38) Steven Holl (born December 9, 1947) is a New York-based American architect and watercolorist. Among his most recognized works are the 2019 REACH expansion of the John F. Kennedy Center for the Performing Arts. Holl is not a recipient of the Pritzker Architecture Prize which is viewed by some in his profession as an omission.

39 & 40) Zaha Hadid

41) Andrew Faris: Lives and works in Jackson, Wyoming, USA. He received his Bachelor of Science and Master of Arts degrees from the School of Visual Communication Design at Kent State University.

42) Chrysler "Woody"

43) Katie Shima: Brooklyn-based artist and registered architect with a B.A. and M.Arch from Columbia University. She is a founding member of SITU, An unconventional architecture practice that uses design, research and fabrication for creative and social impact.

44 & 45) Melanie Fessel - Work with Diana Agrest architect, urban designer and Director at Terreform ONE. Melanie was an associate with the Cooper Union Institute for Sustainable Design. Her process focuses on the synergy of design, urban studies, and ecological science.

46) Johnathon Smith is a 2017 Master's of Architecture Graduate from the University of Florida. After graduating, Johnathon worked at Olson Kundig in Seattle, Washington. He intends to continue producing drawings and to maintain curious questions about fictitious futures.

47) Benjamin Ferns: A project architect for Hopkins Architects Limited in London. Mr. ferns received his March from The Bartlett School of Architecture in 2015

48) Drawing Architecture Studio (DAS): Founded by architect Li Han and designer Hu Yan in Beijing, is a creative platform integrating architecture, art, design, urban study, pop culture,and aiming to explore the new models for the creation of contemporary urban culture.

49) Katie Shima

50) Anton Markus Pasing: (born March 6, 1962 in Greven) is a German architect . He received his diploma in 1989 from the Muenster School of Architecture .Anton Markus Pasing is the founder of the "remote-controlled" office, which has been established in Münster since 1994.

51) Lebbeus Woods: (May 31, 1940 – October 30, 2012) American architect and artist known for his

unconventional and experimental designs.

52) Dennis Allain AIA: A graduate of Wentworth Institute of technology in Boston. Mr. Allain is an architect/illustrator who has been practicing architecture and creating artwork twenty-five years . In 2020, he won the Hugh Ferriss Memorial Prize from the American Society of Architectural Illustrators

53) Fisher ARCHitecture