Questions about the nature of research—how it is, how it might be, how it should be—abound in the Leonardo community. At this time, for example, Ken Friedman and Jack Ox are leading a publication project investigating The PhD in Art and Design. That project is looking at the role of practice in research, the significance of the artifact within research and, as an outcome, the relationship between art/design research and, for example, scientific research, and so on. Thus, in this context, a book proposing a new approach to research by a pioneer of human-computer interaction and author of Leonardo’s Laptop—a book that promoted the use of computers to support creativity—must be worth a read.

Shneiderman quotes Goethe: “Knowing is not enough; we must apply. Willing is not enough; we must do.” Researchers in art and design will surely agree. But how? Two principles guide much of the argument of the book: Combining Applied and Basic Research (ABC) and Blending Science, Engineering and Design (SED). The fundamental proposition is that by somehow combining basic and applied research, we will be more successful at making advances that will enhance lives. To do this, Shneiderman argues, we need to adopt methods that enable this combination, encourage collaboration and (given that the focus is essentially in the scientific domains) blend science, engineering and design. The book presents recent history, very relevant case studies and examples to make its case. A good portion of the book presents well-founded advice. We are reminded of the scientific paradigms that have shaped research funding and initiatives over the last century. The powerful argument that Thomas Kuhn made in his 1962 book The Structure of Scientific Revolutions is cited as an important influence on the accepted narrative of scientific development and, hence, desirable research processes. However, policy makers and funders of research may not have noticed that Kuhn actually saw science as a social enterprise. Since then, historians of science have increasingly turned to social and anthropological methods to understand research. They have found that artisans and craftspeople, for example, have often played an important part in scientific discovery. Applying and doing, as Goethe recommended, matters in advancing knowledge. The historians fundamentally back Shneiderman’s conjecture.

Attitudes toward research—the relationships between basic and applied forms—differ around the world, and whilst examples are taken, for example, from Europe, the focus of the book is research in the United States. The book addresses policy makers as well as practitioners, so it was important to pay particular attention to making an argument that will be understood in Washington, D.C.

It is interesting to notice, though, that research in some countries is a little closer to Shneiderman’s model than in others.

This book’s ABC seems close to what is, in Australia, known as Strategic Basic Research, “work undertaken to acquire new knowledge directed into specified broad areas in the expectation of useful discoveries.” On the one hand, it does not emphasize blue-sky research that might by chance prove useful but, on the other hand, does not press for limited applied research that reaches for short-term goals. In the EU’s funding programs, Strategic Research Agendas are set, and these agenda would probably find favor in the context of this book.

Kennedy’s challenge to put a man...
on the moon was a grand version of the sort of goal at which ABC research might aim. Strategically we can conceive a mission, whilst in practice we pursue research programs that point in that direction without pretending to specifically hope to directly reach the goal. To solve big problems, we need to build up a big bag of knowledge—much of it “basic”—that can put us in the position to understand just what needs to be done: to understand exactly which detailed problems need to be solved.

So what about design? Well, of course, Shneiderman’s book very directly and strongly brings design into the center of his proposed new research. To be specific, he advocates the incorporation of design research methods into his program and, equally, he argues for collaborative research teams. In fact, collaboration is central to the argument, as combining and blending approaches, methods and disciplines can hardly be done without it. So the New ABC of Research requires research collaboration between designers, scientists and engineers, which I suspect will also feature in Friedman and Ox’s project. Designers may have to read the advice given carefully and, at times, may have to interpret it in a way that fits their particular context, but they will certainly find it valuable.

So what about art? It does get a mention from time to time in this book—and it is clearly a respected discipline—but the idea of adding art research to the trio proposed in ABC is not articulated. However, the Leonardo community will, I think, see that the practice-based research that we are currently debating could easily be added with value. Art often explores design options and opportunities years before they are exploited in design itself. Art challenges our understanding of ourselves and of the world around us. It helps frame the very questions that design (and other) research investigates and, as Edward Tufte said, in a passage quoted in the book, “The choice of problem is often the most important act of all.”

The New ABCs of Research should be read by anyone concerned with research and particularly by anyone with influence on policy or funding. It provides strong arguments and clear thinking about the value and the approach that should be taken in research that crosses boundaries, not least the research central to the journal Leonardo.

WHEN MOVIES WERE THEATER: ARCHITECTURE, EXHIBITION, AND THE EVOLUTION OF AMERICAN FILM


Reviewed by Jan Baetens. Email: <Jan.Baetens@arts.kuleuven.ac.be>. doi:10.1162/LEON_r_01434

This is a book that will change our thinking on cinema and will prove of vital importance to the study of all art forms that are based on a dialectic relationship between an object and presentation context, with all the material, economic and cultural aspects the latter involves. The starting point of William Paul’s book is as simple as it is powerful: taking its departure from the commonly accepted idea that film has to be studied in the long-term history of the projected image (an idea that is key to the standard work of Charles Musser on the emergence of cinema), Paul focuses his research—a very ambitious rereading of more than 50 years of cinema, from the very beginnings of film to the appearance of widescreen movie theaters in the 1950s—on the influence of this projection context on both form and content of the movies that were produced and shown.

Let me define first what Paul means by this projection context, which he defines as a combination of different elements. First of all, there is of course architecture—that is, the spatial and built environment in which the projections were taking place. Architecture, however, is a very complex and multilayered notion. In this book, it mainly refers to the relationship between exhibition space and screen. It has to do with issues such as the distance between screen and seats, the size of the screen, the angle of vision as determined by the “good” or “bad” seat chosen by the spectator, etc. Second, there is the tradition of theater and live shows, the new medium of film appearing within a well-established tradition, that of the vaudeville show, which it eventually superseded while at the same time becoming a strong competitor of more prestigious forms of theatrical entertainment. Yet both vaudeville and elite drama did not take place in an architectural and economic vacuum: Both had their own venues and were part of specific policies and social traditions that film could not ignore. Third, there is of course the element that is so taken for granted that it is systematically overlooked: The very material features of the screen, which is anything but a passive surface, as Paul demonstrates throughout his book. Yet When Movies Were Theater not only discloses many unknown aspects of film architecture, the common history of film and theater, and the evolution of the film screen as a material object, it also emphasizes the productive influence of all these elements on what was actually shown in the theaters,
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and that is of course what makes this study so dramatically innovative. While very modestly following the major trends in film theory (Paul does not claim to bring a revolution), When Movies Were Theater proposes many exciting new readings of hitherto neglected or misunderstood elements of film history and succeeds in challenging commonly accepted ideas that are based on the omission of the theatrical context.

Let me give immediately two examples of such a critical rereading. First the technique of the close-up, traditionally read in terms of (psychological) distance and hence interpreted in the larger framework of the shift from cinema of attractions to narrative cinema and the necessity to offer the spectator new possibilities to identify with the characters. For engineers, architects, film executives, directors and also spectators, a very different aspect was essential, however: size, that is, the possibility to enlarge the material presence of the character on screen so that spectators seated at a greater distance from the screen (and as Paul clearly shows, the dimensions of the screen in the first half of the 20th century were much smaller than today) could have the impression that these characters were more or less "life size" (a convention inherited from the stage performance). Second, the strong preference of classic Hollywood cinema for locating the center of the action in the very center of the image, that is of the screen. Here as well, this tendency—often challenged if not rejected by certain forms of art cinema—has been subject to ideological overinterpretation. The visual centrality of narrative action is traditionally linked with the overemphasis on purely plot-driven storytelling and so-called invisible editing in Hollywood cinema, as if only European or art-house cinema was capable of taking into account the material complexity of film and taking up the challenge of resisting an all-narrative approach of cinema. However, When Movies Were Theater shows that very different elements explain this basic feature of classic Hollywood, such as the distortion of the images for spectators seated beyond a 60-degree line in front of the screen or the reduced reflectivity of the less-well-lit angles of the screen. Since the film industry was keen to offer a good-quality experience to all viewers, even those having to occupy a bad seat, the very production of the images had to take into account the material features of the theatrical context, and directors "naturally" tended to shoot their images in such a way that they could "survive" suboptimal viewing conditions.

The major achievement of Paul's book consists of the meticulous reconstruction of the progressive emancipation of film projection—and hence of film in general as an art as well as a cultural industry—from theater and live entertainment. This longue durée history (for after all, six decades in the permanently and always rapidly shifting history of cinema is a lot of time) has three major periods. In the beginning, movies had to fit into the existing infrastructure (first that of vaudeville, eventually that of elite theaters). This integration is far from evident, since these existing theaters privileged proximity (to the stage) at the expense of issues of angle (when seated in a lateral balcony, one could enjoy the 3D performance as long as the acoustics were good, but the 2D silent movie screen had completely different demands). In a second period, the movie industry generated new types of specific movie theaters, which rejected the horseshoe structure of existing theaters but proved to be still strongly influenced by all kinds of architectural and cultural conventions of live entertainment, as demonstrated for instance in the continuing presence of the proscenium and the curtain (this second period evolved toward what Paul rightly calls a dual system, defined by the coexistence of theaters that continued to mix movies and live performances on the one hand and theaters strictly reserved to cinema on the other). Finally, the introduction of a new form of architecture that abolished the difference between screen and stage: In these new theaters, built after the war, there was no longer a stage hosting a screen (among many other elements); the screen itself became the stage—and this is where Paul's story ends.

When Movies Were Theater does not tell a single history. It stresses the historical complexity of each place at any time, since there have always been competing models, and the evolution from one type to another is never clear cut. It also addresses the exciting diversity and multilayeredness of each of its key elements. Vaudeville theater, for instance, is not only studied in terms of class (popular) and content (a medley of fragments belonging to a wide range of genres); it is also studied in relationship with, for instance, the form of the place where it was performed (with a key role for issues such as proximity to the stage and the preference given to sound rather than image), the presence of certain pre-cinematic genres (such as the tableau vivant, which often supposed the literal presence of a gift frame, a feature that the first movie houses will reproduce—and after the reading of Paul's book it is no longer possible to call this reproduction "strange" or "bizarre") or the habit of continuous representation (which allowed spectators to come in at any time—a habit that explained in some cases the resistance to multi-reel feature films, a resistance all the more vivid since it reinforced the producers’ initial fear to be incapable of producing sufficient high-quality features). However, it is always the link with actual film production that is at the heart of Paul's study: This is not a book on the history of film theater architecture or screen technology; it is a broadening of our views on the history of cinema as a cultural practice at the crossroads of many different fields: theater, architecture, technology, economy and art. When Movies Were Theater is a decisive contribution to the collective effort to rethink cinema in the expanded field, and it deserves a pre-eminent place in compulsory reading on the history of cinema.
Despite how intertwined emotions are with our lives, we cannot definitively say what they are either scientifically or contextually. The complexity of this conundrum is ably captured in Emotions: Pain and Pleasure in Dutch Paintings of the Golden Age, a catalog that accompanied an exhibition at the Frans Hals Museum 2014–2015. A carefully constructed book, it includes an introduction to the subject by Ann Demeester (the director of the Frans Hals Museum), informative essays by Gary Schwartz and Machiel Keestra, a fully annotated descriptive catalog for the exhibition and an overview of an interactive Emolab installation that accompanied the show while it was on view. The sum total offers a perspective on emotions in art and science that covers a broad range while successfully placing their depiction within both the Dutch Golden Age and our own time. Anyone who has tried to weave a far-reaching statement together with a narrowly defined topic knows how perilous this kind of aspiration is. In this case, I applaud their results.

The project’s success was no doubt due to a careful crafting of elements. Schwartz’s essay makes the point that our current views of 17th-century art (or the Dutch Golden Age) often fail to capture how important the expression of emotions was to the artists of that time. As he notes, if our tendency is to associate the art of that era with domesticity, intimacy and the quiet enjoyment of material pleasures an artist like Vermeer might convey, contemporary viewers wanted to experience emotions when they look at paintings. He then argues this point by combining his reading of historical science, philosophical and artistic approaches to the subject so as to convey that Dutch work does indeed express a range of emotions. After reading the book, I realized how little thought I had given to the emotional triggers in many of the brothel, social and religious narratives I identify with Dutch art of that time. In addition, as I looked at the emotional range within this volume, it was clear that the Dutch art of the Golden Age is worth reevaluating in terms of Schwartz’s arguments. Moreover, having a show that excavates this range at the Frans Hals Museum underscored Hals’s particular gifts in this area, as works like his well-known Laughing Cavalier remind us.

One excellent element of the catalog was the way the book’s commentary compares and contrasts the art historical examples with the views of broadly known figures outside of art (such as St. Augustine and St. Thomas Aquinas). Many Dutch writers less well known globally are mentioned as well. Thus, we learn that the Dutch artists of this time would have known and used the work of people like Karel van Mander and Franciscus Junius. If broad-based source materials aid Schwartz in showing how artists integrated the ideas of their time with their presentations of emotionality, it is also worth noting that he explains that many of our popular generalizations about 17th-century thinkers are actually mischaracterizations, further complicating our analyses of individual contributions. For example, writing about Descartes (1596–1650), who lived in the Netherlands from 1629 to 1649, Schwartz says:

Descartes’s reputation as a hard-headed proponent of a strict dualism, in which our bodies function as machines, stands in the way of understanding his ideas about the emotions. The translator into Dutch of his book, Theo Verbeek, puts it this way: “We have passions exactly because we are not machines, which is to say that we are free. Passions are the price that we pay for our freedom, and this price, to Descartes, can never be too high. All in all, it is the passions that make us truly human. All good and evil in life depends on them” (p. 14) [1].

Organizing emotions around several themes further adds cohesion to the expansive effort. Selected paintings were grouped to convey Suffering and Despair; Mourning; Lust and Desire; Fear, Fright, and Amazement; Rage and Revenge; Regret and Disappointment; Rapture, Love, Joy and Delight. Chronological elements complemented the thematic groupings. Schwartz asserts that there was an apparent decline in the intensity of emotional display over time: “What was normal in the mid-sixteenth century [when the exhibitions start], would have seemed weird and exaggerated to artists and audiences of 1700” (p. 37). Although I have no reason to dispute this, it seems that the emotions were high throughout the catalog, so I’m not precisely sure that the Reformation’s antagonism toward holy images is as evident as the statement seems to suggest. That said, Schwartz does mention the Council of Trent (1545–1563) resolutions to “repress the turbulent emotions of desire [and] to subject our sensual appetites to the voice of reason” (p. 51) as one contemporary influence. I found certain sections of the book more thought-provoking than others, and I imagine each reader will weigh the segments differently as each brings his or her own research interests and/or points of puzzlement to the volume. In my case, I was drawn to the discussion on the difference between actual portraits and tronies because I am fascinated by the research challenge in explaining generalized perspectives on emotion in a way that fully applies to any particular individual. Artists, unlike statisticians, seem in a better position to meet the challenge of how we bring common and individual traits together and thus convincingly speak about our uniqueness even when making generic or universal pronouncements. More precisely, in art a tronie is a character study that...
offers a generic statement through using an unnamed person to present a certain type of character rather than a particular individual. Tronies thus offer—and offered artists of the Dutch Golden Age—a means to portray individuals in the throes of emotion with a lack of specificity precisely because they did not endeavor to represent a particular person. A few examples of tronies included in this exhibition catalog are *The Mulatto* (c. 1628) by Frans Hals and Judith Leyster’s *Pekelharing* (Mister Pickled Herring, 1639). Schwartz claims the value of this kind of broad coding device is twofold. Since the norm was to suppress emotions in portraits of specific individuals in an effort to achieve a dignified likeness, the tronie offered an opportunity to make an alternative type of portrait. That said, and the book notes this as well, some painters (e.g., Rembrandt) did capture their sitters in actions that seemed to include their feelings in the representations.

Group paintings and double portraits also seem to include more evident emotion, as the book’s 1639 example of Hals’s *Officers and Sergeants of the George Civic Guard* shows. Rembrandt’s *Night Watch* isn’t discussed, but I wondered if it further makes this point. Rembrandt added a number of extras characters to the 18 paid portraits for the work. The additions further animate the group and provide striking variations that liven up the portraits. The dynamic the added figures provide also help the viewer step into the narrative.

Commenting on the tension between an animated presentation and a staid one is this volume’s major accomplishment as it speaks to how a painting’s narrative and emotional detail work in tandem. We see that compositions frequently tell political, moralistic, Biblical or mythological stories. Even when there is no obvious story at first glance, emotional elements touch us on their own terms. It is also striking to see how a narrative’s emotional elements help interweave disparate topics. For example, as noted above, Schwartz, an art historian, asserts in the book that interpreters tend to associate the art of the 17th century with domesticity, intimacy and the quiet enjoyment of material pleasures, whereas there is in fact a large body of depictions of high emotions in varied contexts. While this book offers some corrective material, it also is part of a larger trend that is now updating earlier histories.

In terms of the current trends, I wish they had more fully developed our changing relationship to emotions, pleasures and pain over time in medical and technological terms. A few paintings grouped in the Suffering and Despair section serve as a good example of an element that could have received more attention in this regard. In terms of technological advancements, one work, Jan Steen’s painting of *The Tooth-Puller* (1651), ably shows how times have changed our emotional relationship to dentistry [2]. Steen depicts 17th-century procedures. The catalog notes: “Whether physical pain should be considered an emotion is the subject of old philosophical debate and new neuroscientific research” (p. 114). While it is obvious that the patient is in agony, it is also clear that this tooth extraction, the prevailing form of dentistry then, is far from the anesthetized, sterilized environment of today.

Similarly, it seems that the interpretation of *The Removal of a Stone in the Head* (*Allegory of Touch*) (c. 1623) is underdeveloped. Here the authors missed an opportunity to link the allegorical, biological and contextual themes together. This painting, from Rembrandt’s allegory of the senses series, is among the earliest known works by the artist. It shows that even in his teens Rembrandt already had a genius for representing human character and emotion—and for packing amazing amounts of detail into his renderings.

The painting itself shows a barber-surgeon operating on a man who is cringing with pain. This patient is also clenching his fists as a lancet is inserted into his scalp [3]. Schwartz
speaks of the painting's ability to depict a powerful manifestation of a physical sensation that ignited an extreme negative feeling and claims that the treatment he is receiving is a moot point because having a stone in one's head means being out of one's mind. He tells us that the removal of the stone was a popular device for illustrating human folly. I'm not exactly sure when the literature began to associate this particular work with stone operations in terms of human folly, but I find the association misplaced or incomplete in this instance in light of what we know about medical treatments at that time. Unlike the obvious allegorical connotations presented in a work like Bosch's Extraction of the Stone of Madness (c. 1624–1625), like the Allegory of Smell, the work on smell seems to have fainted. This is shown by the painter having a heavily wrinkled woman holding a cloth with smelling salts under his nose in the hope of reviving him. The man's pale forearm suggests that his unconscious state might be due to a bloodletting procedure, another procedure typical of that era. The bearded man on the left is probably the barber-surgeon, and the recently cleaned work now also shows his surgical instruments hanging on the back wall. Since Rembrandt produced many works within medical environments—for example his visceral group portrait of anatomy lessons (those of Dr. Deijman and Dr. Tulp)—it seems likely that the Allegory of Touch simply uses a medical scene and depicts the pain that accompanied a typical procedure of that era.

Unfortunately, I missed the exhibition and thus this review loses some of the project's flavor. One component of the actual show mentioned in the book that I am sure deserves more attention is the Emolab that accompanied the exhibition. Here visitors had an opportunity to test their impressions of emotional expressions against images in which bodies, faces and contexts were presented in manipulated combinations. Thus visitors could compare their own feelings with the digital "opinions" of psychological programs. Similarly, the catalog encourages the reader to ask what an emotion is and how we experience/explain emotional reality. In doing so, this catalog does a good job in aiding readers as they address the possibilities of the philosophical, religious and political narratives. I wish that historical medical and scientific practices were more broadly addressed, but of course one can only do so much in any one project. It is a worthy effort and definitely one that has broad appeal due to the subject matter.

References
1 Descartes wrote: “Finally, the machine of our body is constructed in such a way that a single thought of joy or love or the like is sufficient to send the animal spirits through the nerves into all the muscles needed to cause the different movements of the blood which, as I said, accompany the passions. It is true that I found difficulty in working out the movements peculiar to each passion, because the passions never occur singly; nevertheless, since they occur in different combinations, I tried to discover the changes that occur in the body when they change company.” René Descartes, “Discourse on the Method,” in The Philosophical Writings of Descartes: Volume 3, The Correspondence, J. Cottingham, R. Stoothoff and D. Murdoch, eds. (Cambridge, U.K.: Cambridge Univ. Press, 1991).
3 The images that compose the series are available at <http://www.ashmolean.org/exhibitions/sensation/about/>. The four known works are The Three Musicians (Allegory of Hearing), The Stone Operation (Allegory of Touch), The Spectacle Seller (Allegory of Sight) and the recently discovered fourth painting in that Rembrandt series on the senses, The Unconscious Patient (Allegory of Smell). Since Rembrandt produced many works within medical environments—for example his visceral group portrait of anatomy lessons (those of Dr. Deijman and Dr. Tulp)—it seems likely that the Allegory of Touch simply uses a medical scene and depicts the pain that accompanied a typical procedure of that era.

Repainting the Walls of Lunda begins with discussion of the impact of a Portuguese scholar-curator in the declining years of Europe's colonized Africa. José Redinha's 1953 book The Painted Walls of Lunda was illustrated with Redinha's drawings or paintings of Chokwe art, his signature prominent upon them. The book was
sponsored by Diamang, the Portuguese diamond mining company, which also issued heavily retouched and often romanticized photographic documentation of its facilities and “company town” Dundo. Sentimental, manipulated photos included African people working there alongside white employees but separated from them in status, compensation, residence and social life.

In a moment of postcolonial cultural assertion five decades later, a website with the book’s contents digitized, but with Redinha’s signature removed from his paintings of Chokwe motifs, went online in an act of reclaiming indigenous cultural heritage to accompany the Trienal de Luanda international art exhibition. Yet any website has its own contradictions in a nation with very limited online access, to say nothing of a less-than-equitable society and opaque governance (cozily tied to Angola’s communications infrastructure and industries).

Collier broadens our understanding of contemporary and recent Angolan art with examples of consciously postcolonial artist Viteix, who tried to work with traditional motifs in new combinations and Western art forms (drawings, easel paintings). John Berger lamented in The Success and Failure of Picasso (1965) that Pablo Picasso didn’t travel the world to appreciate and encourage African and other nonwestern artists to explore the new freedoms to reclaim imagery and forms that he had exemplified in his best Cubist work; Viteix was one artist attentive to those possibilities.

Many of these actions and contradictions in authenticity, ethnicity, photography, public walls and hand versus digital reproductions in Angola described here have long been roiling through the community mural movement in California and other multicultural cities. Mention is made of how African artists today use digital imagery, music and performance in expressive, political works, as Delinda Collier briefs us on six decades of Angolan cultural struggle and self-assertion well and clearly.

Departing Angola and the continent, phenomena over the half-millennium of the diaspora of African people are examined by Louis Chude-Sokei in The Sound of Culture. While properly deploring its brutal content, he appreciates Futurist poet-polemist F.T. Marinetti’s rich, jagged and evocative texts—some of which celebrated Mussolini’s military and the aesthetics of aerial bombardment of village populations in the Ethiopian campaign.

We’re taken to P.T. Barnum’s exhibition in the 1830s of Joice Heth, a black woman who appeared, suitably aged, as “George Washington’s nurse.” When her authenticity was questioned, Barnum jiujitsu-ed the interrogator’s doubt by placing a news item questioning if Heth was even human and not a clockwork “mechanical Turk” (a phrase whose orientalism the book’s author then unpacks). This leads to a comparison with Karel Capek’s 1920s concept of the robot, the tireless working machine he introduced in the play R.U.R.: Rossum’s Universal Robots. Chude-Sokei notices its parallels to robotic work requirements made on black workers, at first slave and then semifree.

Chude-Sokei avowedly works in the arena Mark Dery termed “Afrofuturism” and brings Donna Haraway’s posthuman evocations of the cyborg to the topic of antebellum showbiz minstrelsy. Casting a wide net, he dusts off a popular 19th-century novel, The Coming Race by Edward Bulwer-Lytton, examines its racialized assumptions concerning “the other” and those carried by heroes like Edgar Rice Burroughs’s John Carter of Mars, then defines “A Caribbean Pre-Posthumanism” running through both the surrealism of Wilfredo Lam, and the critique by Sylvia Wynter of the Bard’s grand old resonant figure of Caliban.

The cruelties of history—colonial conquest and exploitation, enslavement of so many Africans and their dispersal across the Atlantic—are disheartening and unresolved (or uncompensated) to this day. However, the curious cultural landscapes in their wake inspire scholars like Delinda Collier and Louis Chude-Sokei toward admirable work like these two books.

**COGNITIVE ICONOLOGY: HOW AND WHEN PSYCHOLOGY EXPLAINS IMAGES**


Reviewed by George K. Shortess.

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This book synthesizes and extends previous investigations that have looked at important psychological—that is, cognitive—capacities involved in explaining visual art. As such it serves a valuable function for contemporary visual studies.

The author makes the case for what he calls cognitive oncology as a necessary component in the explanation of a work of art, while not denying the value of neural processes along with social and environmental factors. In doing so he follows the Gestalt psychologists, emphasizing the work of Rudolf Arnheim as the most systematic Gestalt psychologist, whose work focused on the psychology of the arts.

In the Introduction, the author lays
out the overall basis of his approach and the organization of the book. In chapter 1, he distinguishes between understanding and explanation and develops the idea of stratified explanations in which biology, psychology and social sciences come together, with psychology providing the “cognitive glue.” Chapters 2 through 6 then develop these ideas in specific areas as follows: chapter 2: the various uses to which images are put; chapter 3: the modifications of perspective for a more satisfying image; chapter 4: the persistence of presence in painting; chapter 5: the unique problems of mural painting; chapter 6: group responses to images, including veneration and magic. This is followed by a short conclusion titled “Cognitive Proclivities for the Study of Art.”

However, from a personal perspective, there are a number of issues I found annoying that could have been corrected by a better editing and proofing effort. Overall, I feel the writing is somewhat overblown at times. Points could be made and ideas described more directly and therefore in clearer terms. Other more specific annoyances include, but are not limited to, the following examples. Many of the figure captions and descriptions could be clearer and more complete. For example, in Figure 4 in chapter 5, if the letter designations on the figure were used in the discussion of the illusion, the reader could see immediately its relevance. In Figures 10, 11 and 12 in chapter 5, the line drawings of the elevations are clear, but the reproductions of the ceiling paintings are too indistinct to be useful. In chapter 5, the author refers to the fresco Visions of Thrones as Figure 9, when in fact Figure 9 is Dream of Innocent III.

Nevertheless, the book makes a significant contribution to the study of the visual arts and should be an important resource in visual studies.

**REDUCTIONISM IN ART AND BRAIN SCIENCE: BRIDGING THE TWO CULTURES**


Reviewed by Amy Ione, director, The Diatropie Institute, Berkeley, CA U.S.A. Email: <ione@diatropie.com>.

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Reductionism in Art and Brain Science: Bridging the Two Cultures by Eric Kandel, like his study The Age of Insight [1], builds on earlier efforts to couple science and art, particularly those of Alois Riegls (1858–1905), Ernst Kris (1900–1957) and Ernst Gombrich (1909–2001). These three men, he tells us, endeavored to establish art history as a scientific discipline by grounding it in psychological principles. Riegls emphasized the “beholder’s” involvement, stating that art includes the perceptual and emotional involvement of the viewer. Kris studied ambiguity in visual perception, concluding that every powerful image is inherently ambiguous because it arises from experiences and conflicts in the artist’s life. Gombrich extended Kris’s ideas to include the inverse optics problem: how our brain takes the incomplete information about the outside world that it receives from our eyes and makes it complete. This is a problem that arises because the brain reconstructs the images we see. It should be noted that Gombrich’s positioning in his well-known Art and Illusion [2] is, like Kandel’s, more concerned with beholders than artists or the community.

Kandel defines art as unconscious and subjective and endeavors to present a reductive and objective rendering of it. Thus, he poses questions like: “Can any aspect of art, which is a creative and subjective experience, be studied objectively?” (p. 17) Within this confine, he assumes that although the reductionist approaches of scientists and artists are not identical in their aims—scientists use reductionism to solve a complex problem, and artists use it to elicit a new perceptual and emotional response in the beholder—they are analogous (p. 6).

The artworks narrative is largely focused on the viewer’s brain operations in relation to sensation and perception, although memory and learning are discussed as well. His presentation centers on artists who employ simple design elements such as form, line, color and light in their compositions. His claim is that these kinds of works allow the beholder to reductively understand how the brain responds to art because “rather than depicting an object or image in all its richness, they often deconstructed it, focusing on one or, at most, a few components and finding richness by exploring those components in a new way” (p. 9). (He does step out of this box in his presentation of Chuck Close, as I will explain shortly.) As the author correctly notes, many artists (e.g. Kandinsky) have explained their art using reductionistic statements.

Clearly, Kandel read extensively in developing this volume, and sections outlining historical psychological studies and contemporary neuro-scientific research offer informative background as he interprets selected artworks; but the cohort is quite limited. The argument is largely focused on the Abstract Expressionists of the New York School and the color-field painters (Willem de Kooning, Jackson Pollock, Mark Rothko, Morris Louis and others) who worked in America in the mid-20th century and includes a few artists who worked after them (e.g. Alex Katz, Andy Warhol, Dan Flavin, James Turrell, Chuck Close and others). Leonardo readers will quickly discover vast lacunas in terms of his assumptions about what art is and the range of media artists employ. Similarly, the author seems unaware of the kinds of collaborative projects that often drive art and science in tandem.

While the bulk of Kandel’s art analyses relies on the writings of contemporary mid–20th-century art critics and historians, an intriguing feature is that Clement Greenberg’s theoretical formulations most closely
align with Kandel's view, although it should be noted that Greenberg emphasized form, gestural painting and deeper truths, and Kandel relies more on Riegl/Kris/Gombrich with his "beholder" and ambiguity emphasis. If Greenberg seems like a strange advocate for a science of art, one need only recall that this art critic presented the artist's studio as functioning like a scientific laboratory: "It's as though they undertook to do this as in a laboratory, spelling out everything the way it's supposed to be done in a laboratory (though nothing could have been further from their conscious minds)" [3]. As noted, Kandel claims these artists used a reductive approach that reveals their subjective and unconscious. Yet he also claims that "By reducing images to form, line, color, or light, abstract art relies more heavily on top-down processing—and therefore our emotions, our imagination, and our creativity" (p. 58). If the goal of reductionism is to reduce things to the simpler, bottom-up elements, Kandel's top-down explanation of how these artists accomplished their goals, to my mind, only serves to conflate things. This kind of interpretation also reinforces the mythologies and religious overtones that have often plagued art historical commentary. In other words, Kandel's proposal, like Greenberg's ideas, rests upon an "unconscious" element, even as the scientist adds a wealth of scientific detail about how the observer's brain perceives elements like shapes and color to the mix, as the following summary from Reductionism shows:

Each work is highly ambiguous, as great poetry is, and each focuses our attention on the work itself, without reference to people or objects in the external environment. As a result, we project our own impressions, memories, aspirations and feelings onto the canvas. It is like a perfect psychoanalytical transference, where the patient imposes upon the therapist a replay of experiences with parents and other important individuals, or like the repetition of a word or a tone in Buddhist meditation (p. 178).

Given Kandel's claim that abstract art offers entry into the imagination, unconscious and subjective states, the question of how we evaluate his scientific proposal is front and center. In other words, can we test (or falsify) Kandel's claim that this small sample offers entry into reductively thinking about art so as to see it more in terms of science? In his autobiography, Kandel quotes John Eccles to emphasize the importance of Karl Popper's ideas about falsification to the scientific process. I would think this idea would equally apply to scientific proposals that aim to establish a reductive approach to art. He writes:

I learned from Popper what for me is the essence of scientific investigation—how to be speculative and imaginative in the creation of hypotheses, and then challenge them with the utmost rigor, both by utilizing all existing knowledge and by mounting the most searching experimental attacks. I learned from him even to rejoice in the refutation of a cherished hypothesis, because that, too, is a scientific achievement and because much has been learned by refutation [4].

Ironically, although Kandel does not mention it, the very cast of art characters he includes in this volume asked whether falsification pertains to abstract art within the context of their time, the mid–20th-century zeitgeist in which scientific thinking was ascendant. At that time Gombrich (a close friend of Karl Popper's) and Greenberg brought opposing views to the table, conducting their dispute within the contours of the positivism and falsification debates [5]. Unlike falsificationism, which advocates for an ongoing questioning of all hypotheses, positivism holds that every rationally justifiable assertion can be scientifically verified or is capable of logical or mathematical proof. The difference between the two is a matter of emphasis, one that speaks to how falsification is positioned and the difference between falsification and verification. It is easier to grasp contextually.

Essentially two issues divided Greenberg and Gombrich. The first was the question: What should a science of art include? The second was whether a theory of art could fulfill Popper's falsification criteria. To oversimplify, Gombrich claimed we cannot falsify abstract art because there is no external correlate through which we can evaluate its credibility. This is because the products deviate from the kinds of objects that compose our communal experience. Clement Greenberg argued exactly the opposite. For him the validity of the abstract work could be determined precisely because the art objects were both material products and nonobjective. The lack of an external correlate for evaluation was thus presented as a positive rather than a negative feature, since known elements would not distract the viewer from engaging with precisely what the artist presented. This is not a falsifiable position methodologically because it rests on the logical proposition that essentially claims the artist is revealing deeper or a priori truths. Together, these two positions raise the question of how does one disprove an ambiguous, subjective or a priori truth—and who decides?

Popper's falsification theory assumes that it takes only a single counterinstance to falsify a statement. So if one sees a black swan, this falsifies a statement such as "All swans are white." In terms of what art is or who decides what art is, social context and society are often the arbiters of an artist's statements. As it turned out, and to grossly oversimplify, Greenberg's actions raised concerns about his evaluations of art and how we evaluate what comes out of the artist's laboratory (the studio). Essentially, this critic lost a great deal of credibility and raised questions about critical evaluations of what an artist does after it came out that he had mutilated artworks in his care to bring them closer to his
aesthetic preferences [6]. This was also one reason that styles outside of the abstract genre once again became more acceptable to the art elites in the late-20th century. Indeed, the toppling of Greenberg’s authority played a role in encouraging the pluralism of that era.

Greenberg’s loss of stature as a viable and believable aesthetic arbiter additionally underscores that Popper introduced the falsification process precisely because there is no way to “prove” how individual and cultural biases enter scientific analyses and/or the so-called truths people attribute to or align with “higher,” “deeper” or “spiritual” intuitions. I would add that this is particularly true when the subject is art, which includes artists with various goals who express themselves in various ways. Reductive studies of learning, memory, sensation and perception, while valuable on their own terms, do not seem robust enough to explain art’s complexity. In other words, why are people—even people within the small art community cohort—of many minds even when it comes to evaluating the small sample of work Kandel presents?

This brings me to creativity. By casting art in terms of a “ beholder’s” response to objects and how these objects somehow expose the nature of self, Kandel significantly and repeatedly conflates art objects with the many nuances of artistic creativity. In doing so he surprisingly seems to lose sight of the creative aspect of art, even as creativity is so eloquently elucidated in his autobiography, In Search of Memory. In Search Kandel writes about his early interest in psychoanalysis and how he shifted his focus to the biology of the brain, which eventually led him to biology of mind. A key event was a medical school exercise:

I had greatly enjoyed the course on the anatomy of the brain that I had taken during my second year in medical school. Louis Hausman, who taught the course, had each of us build out of colored clays a large-scale model that was four times the size of the human brain. As my classmates later described it in our yearbook, “The clay model stirred the dormant germ of creativity, and even the least sensitive among us began a multihued brain” [7].

According to Kandel, this model gave him his first three-dimensional view of how the spinal cord and the brain come together to make up the central nervous system. He found that “it was hard to look at the brain, even a clay model of it, without wondering where Freud’s ego, id, and superego were located” [8]. After explaining his urge to locate these areas to a professor, Kandel was told that probing the brain one cell at a time was a better strategy. Over the course of his life, Kandel’s research led him from cells to molecules and genes before neural science offered a means to experimentally return to the biology of mind questions that so intrigued him when he first discovered Freud’s work. As an Austrian-American neuropsychiatrist, Kandel (b. 1929) made through his studies a tremendous mark on science. He won the 2000 Nobel Prize in Physiology or Medicine for his research on the physiological basis of memory storage in neurons. His autobiography delineates a creative individual who brings a great deal of passion to his work.

Kandel’s description of how a hands-on anatomical project stirred the medical students to think creatively brings to mind the wax models of artist/anatomist Anna Morandi Manzolini (1716–1774). She worked in Bologna, a community where men and women, artists and scientists, engaged one another, much like they did in the fin-de-siècle Vienna that Kandel described in The Age of Insight or as we do in the Leonardo community of today. Trained as a sculptor, Morandi went on to make renowned objects that were collected throughout Europe during her lifetime due to the artistry she brought to her studies of the body. For example, her exquisite self-portrait with a brain presents her dissecting the organ in period clothing and jewelry, even as it fails to show that her nimble fingers led to original discoveries. Her piece does show her hands in a revelatory posture as if to suggest she is explaining the brain she has just dissected, however [9]. This piece also reminds us that, even when brain studies were limited to the gross cortical anatomy, cross-disciplinary projects were a part of our cultural evolution. Indeed, Luigi Galvani, an early contributor to our understanding of the brain and the father of electrophysiology, held Morandi’s art in high regard. For him, her works did not bring to mind the putrid smells that accompanied dissections. Rather, as Galvani wrote, these elegant, beautiful models would please viewers so much that they would be drawn to undertake the study of anatomy.

Reductionism in Art and Brain Science does not capture this kind of interface or how sketching out an idea or making a model might help an artist begin to conceptualize compelling directions for a work as she develops it, much as the model of the brain Kandel built in medical school helped him ponder possibilities—bootstrapping, if you will. Nor does the book capture how one’s personal context and the community at large aid (or hinder) in bringing an artist’s presentation together.

Because disciplinary interweaving exists today, as it has throughout history, the popularity of the Two Cultures meme has always puzzled me [10]. It was particularly puzzling to find it in Kandel’s subtitle, Bridging the Two Cultures. Yet, after reading this volume, it made more sense, because Kandel’s creative mind and personality, so evident in his autobiography, seemed somewhat remote in this recent book. Both books are engaging, clear, concise, easy to read and well written. Yet, while his autobiography suggests a man who easily bridges art and science—he is an art collector and loves music—he comes across more as a science educator in Reductionism. This makes the book a valuable tool for those who want to
learn more about brain operations, particularly visual perception, but it is unclear what role he thinks art and artists play in discussions combining art and science—other than providing products scientists can explain and interpret to a limited degree. After reading the volume I was unable to conceptualize why those of us on the art side of things would want to reduce art to a reductionistic methodology that largely treats art as objects that others "behold." In other words, his approach largely excludes the nuances of artistic praxis, the variety of media artists use, the collaborative projects that often accompany creative insights as paradigms change, the range of artistic styles, how tastes change and our differing experiential preferences when we engage with art. Of course, and perhaps needless to say, many on the art side of things also do not see art as a problem we need to solve or resolve.

While it is perhaps an impossible task to speak to the uniqueness of each individual, the strongest section of the book, on Chuck Close, does not rely on metaphorical or historical canards. Rather, Kandel looks at how Close came to do the kind of work he does. A dyslexic who suffers from the neurological condition of prosopagnosia (face blindness), this artist can identify a face as a face but he cannot look at someone's face and recognize that person. Kandel discusses the role of this brain deficit in Close's art, and thus we see how traits specific to this artist's person have translated into his creative projects over the years. He developed a style that centers on the elaboration of details in faces. Although unmentioned in the book, when Close decided to paint faces early in his career, it was a radical departure from Abstract Expressionist tenets because it defied Greenberg's pronouncement that portraiture was no longer a legitimate subject for painting.

I would have liked more examples like Close and more engagement with open-ended questions. While not integrated into the art analyses, Kandel does mention recent research that offers avenues for positioning art and the brain in novel ways. Scientific work related to brain modification during our lives is an intriguing area precisely because it lends itself to the range of art people produce and the plurality within the hard-to-categorize projects we call art. Similarly, studies showing that the architecture of each individual's brain is unique—because each of us has a different life experience—hold promise. Moreover, because artists produce throughout their lives, biological changes within them are mirrored in their oeuvre's evolution over the course of their lives. Although he mentions studies showing the brain's potential for modification with age, for example, he did not pursue this line of thinking.

Finally, how an individual's context influences her views is evident even within this review. I became interested in art and the brain during the Decade of the Brain, the 1990s. As an artist myself, and a practitioner of the kind of abstract work Kandel celebrates in Reductionism in Art and Science, I made my turn to the brain because both art history and the psychology of art Kandel references as his starting point for this study failed to address something I thought was important but was unable to state. In the 1990s my art historians were developing broader, contextual and more pluralistic approaches. Those within the cross-disciplinary cognitive neuroscience purview, by contrast, were simply perplexed that an artist was interested in the brain. Indeed, I quickly learned that the easiest way to end a conversation with a cognitive neuroscientist then was to say that I was interested in art and the brain. Before turning away, the person would usually say something to the effect that art is not a valid component of the biology-of-mind approach. If there was not total disdain, the scientist or philosopher might add that this is because art is about emotions and deeper truths. So, on some level, reading this book was like watching my entire life pass before my eyes. Kandel's Reductionism is now one of many recent books demonstrating that art is finally on the map of cognitive neuroscience. I applaud this even as I find many of the volumes remind me of how difficult it is to work in this area. Suffice it to say that as an artist I, strangely, found the narrative Kandel presented in his autobiography more in line with my thinking about who artists are and what I, and artists I know, do—even though art was not the subject of that earlier book.

So, in summary, those who want to learn more about brain operations, particularly visual perception, will find a great deal of excellent material in Reductionism in Art and Science. As for art per se, I think reader responses will vary based on who they are and what their own vision of art is. Needless to say, building bridges that aid communication is always a worthwhile endeavor. I applaud his effort to reach out.

References

7 Kandel [1] p. 44.
MASS EFFECT: ART AND THE INTERNET IN THE TWENTY-FIRST CENTURY


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Mass Effect is a state-of-the-art compilation on the ongoing debates on the relationships between art and the Internet. The publication commissioned new scholarship and also republished other previous relevant articles on these debates.

As the editors make clear on the first page of their Introduction, this intention emerged as the response to the evident fact that the Internet is no longer a new media for artists but has already become a mass media in its own right. In this sense, the work aims at providing a historical background for a moment like the present: one in which the use and abuse of expressions like “post-Internet art” proliferate. In this regard, most of the authors agree about the fact that talking about “post-Internet” is somehow imprecise. The book is addressed mainly to artists and scholars who are already familiar not only with the topics addressed but also with the terminology, because as a collection of short articles it may not provide enough context and technical or academic definitions for newcomers.

The book features 38 articles, five of which are transcriptions of round tables, interviews and discussions, an artist’s work commissioned for the volume (Paul Chan, p. 233) and a selection of images from DIS Magazine (p. 393). Perspectives are varied: Some articles implement a more art-historical approach (Paul Slocum, p. 123; Ceci Moss, p. 147; Mark Leckey, p. 199; Alex Kitnick, p. 213); some analyze artists’ works (Tina Kukielksi on Cory Arcangel, p. 29; Alice Ming Wai Jim on Cao Fei, p. 90; Rebecca Solnit on Trevor Paglen, p. 243; David Joselit on Seth Price, p. 268; Michael Wang on Ryan Trecartin, p. 401; Morgan Quaintance on Lotte Rose Kjaer Skau, p. 419; Domenico Quaranita on Eva and Franco Mattes, p. 425); some are artists talking about their own work and interests (Guthrie Lonergan, p. 167); some present ongoing or updated theoretical discussions (Olia Lialina and Dragan Espenschied, p. 1; Marisa Olson, p. 159; Ed Halter, p. 231; J. Maier-Rothe, D. Kafafi and A. Feizabad, p. 289; Claire Bishop, pp. 337, 353; Borys Groyos, p. 359; Martine Syms, p. 369; Hito Steyerl, p. 439; Karen Arche, p. 451); some are reprinted articles of earlier date (Seth Price, p. 51; Alexander R. Galloway, p. 69; Raqs Media Collective, p. 79; Gene McHugh, p. 185; Alex Rizan and David Levine, p. 303); and in several, more than one of these approaches overlap. In this sense, the publication can be considered as a polyphonic book, which is undoubtedly part of its relevance and interest. However, as is easy to imagine, the level of the articles is sometimes uneven: Most of them pose many key questions, respond to others and are pertinent and compelling; just a few cases are not.

Lialina and Espenschied’s article “Do you believe in users? / Turing complete user” begins by confuting the conception of the personal computer and the Internet “as mere extensions of pre-computer culture” (p. 1). According to the authors, the whole effort of the industry in making the medium invisible or transparent in fact aims at hiding “computer culture,” that is to say, what actually happens inside the computer world. Computer culture then is hidden to foreground “computer technology,” namely, computers understood as mere instruments for doing something else faster, more efficiently, better.

In response to this state of affairs, the authors elaborate the concept of “Digital Folklore,” which they define as “the customs, traditions, and elements of visual, textual, and audio culture that emerged from users’ engagement with personal computer applications during the last decade of the twentieth century and the first decade of the twenty-first century” (p. 2). The concept and time frame are grounded on the intention of opposing it to Home Computer Culture, which “ceased to exist by the end of the 1990s.” Thus the article delineates the passage from a computer culture that considered users as those who were “self-taught experts” who “created their own culture,” who created the programs and used them, to a conception of “users” as “Real Users” or “Naïve Users” who used the computer as a tool but were not actually interested in it or in its systems (pp. 2, 3). Lialina and Espenschied thus recognize and search to highlight the emergence of Digital Folklore together with the emergence of the Naïve User, underpinning the interest of understanding a pervasive culture that, as they point out, “despite their low social status and technical limitations” at this point happened to exceed the output of hacker culture (p. 3).

Instead, Cory Arcangel dedicates his article to retracing the work of the art group Paper Rad, which was active approximately between 2000 and 2008 (p. 15). With a nostalgic and involving tone, Arcangel retraces the
origins and works of the collective, recalling how the oblivion to which it was subject was partly due to “the fine art industry—the dominant mechanism for the archiving of creative culture—which has a limited amount of patience for practices that color outside the lines of its own dialogue”; consequently “Paper Rad’s dispersion led to their work slipping out of the art historical discussion” (p. 17). Apart from bringing Paper Rad back to this context, the author also succeeds in transmitting the enthusiasm and euphoria felt by all of those who, like himself, took part of the second generation of Internet artists.

Although it doesn’t exhaust all the topics addressed, as it is easy to expect from a conversation, Caitlin Jones’s conversation with Aleksandra Domanovic and Oliver Laric (p. 107) brings interesting insights on several issues, the first of which being that of “primary experience.” Laric states that although he considers the work on his website “the real thing” (p. 107), both the work online and that in the gallery space can be considered for him as primary experiences. Coherent with this statement was also their website (<vvork.org>), developed together with Christoph Priglinger and Georg Schnitzer. The project worked for seven years as an online exhibition space (p. 108) on which the four artists accumulated posts exclusively of images of artworks they chose, with their corresponding captions. Asked about how VVORK influenced their own practices, Domanovic is illuminating as she states that at a certain point she simply stopped caring if what they posted on VVORK was documentation of “real” artworks or not: She realized that for her it was just one thing and that one enriched the experiences of the other.

Ceci Moss’s article “Internet Explorers” focuses on the works of a network of artists who between 2005 and 2010 started using mainstream user-generated content as the primary subject matter of their artistic practices, in a somehow pop turn following the pervasive spread of social media (p. 147). With an art-historical approach, Moss gives an overview of the most relevant exhibitions, artists and projects that arose at the time, concluding that the label “post-Internet” art, or “Internet-aware” art, whichever one might prefer, does not apply any longer to artists working online but more broadly refers to artists and artworks that are constantly intertwined and traversed by information culture.

In 1969, Harold Rosenberg argued that modern art had never allowed for a direct access to the experience of the work—for a purely phenomenological relationship between artwork and viewer—because it always needed some kind of textual support that completed, or better, allowed to access to the whole sense of the work. Ed Halter picks up on Rosenberg’s article to analyze the works in “Free,” an exhibition on postconceptual and post-Internet art (pp. 231–233), making clear the continuity between Conceptual Art, Minimalism, Land Art and other artistic practices that fall under the category “Modern Art,” and that of the kind of works that can be found in “Free,” and evidently not exclusive to them: All the featured works, according to Halter, needed some kind of additional information, that is to say, of an explanation to “achieve full significance” (p. 233).

Halter highlights the continuity between conceptual practices and that of art that “responds to the internet” (p. 233), which is without doubt a great part of the relevance of the article. However, he puts the accent on the fact that the Internet has thoroughly changed our relationship with ideas through the Internet, leaving aside that it has also, or maybe even in a greater measure, changed our relationship with objects, precisely, the phenomenological relationship between artworks and viewers (or users). In this sense, he poses the right question (or one of the questions of interest) when he asks if an Internet art piece (Legendary Account by Joel Holmberg) should be exhibited only online or if exhibiting its documentation (printouts of the website) should be accepted—thus the question is about what kind of phenomenological relationship with the object should be proposed and eventually accepted. What needs further reflection is the answer, Halter states: “The answer depends on whether Legendary Account is seen from a medium-specific point of view—Legendary Account as work of internet art—or a Post-Conceptual one” (p. 234). So, can the considerations about an artwork, about how it should exhibit, change depending on the label one applies to it? Halter’s answer seems to be affirmative, if one says the piece is Post-Conceptual it would be right to exhibit the documentation, if not, it wouldn’t (p. 234). Possibly the problem lies in that the article very acutely traces the continuities between conceptual practices as described by Rosenberg and post-Internet practices, but misses the fractures: The difference doesn’t lie in the novelty of the combination of material and immaterial in Rosenberg’s time—one only needs think of the works of László Moholy-Nagy, Naum Gabo and Marcel Duchamp, just to name a few—but in how the viewer (and curators) understands and relates to it. The problem is being still modernist (to think in terms of medium specificity), or postmodernist (to think in terms of postconceptualism) to consider works and artists that have already overcome both paradigms.

Precisely in this regard, it seems necessary to also comment on the somehow harsh discussion that took place on the pages of Artforum between September 2012 and January 2013 between Claire Bishop, Lauren Cornell and Brian Droitcour about Bishop’s article “Digital Divide: Contemporary Art and New Media,” which has been included in this volume (p. 337) along with her response “Sweeping, dumb, and aggressively ignorant! Revisiting ‘Digital Divide’” (p. 354). The discussion is possibly “famous” by now, but briefly, for those who may be not familiar with it, it focused on Bishop’s assertion at the time that mainstream art was...
not acknowledging in its productions the real influence of new media and the digital in its practices; but on the contrary, the author maintained that most of the artists (at least those quoted by Bishop) were retreating, so to speak, to modern and analogue media, such as film, archival forms and the like. In their coauthored response, Cornell and Droitcour argued that “the divide [Bishop] describes is actively being bridged and, because of a critical blind spot she is forcing it back open.” In fact, the critical blind spot is actually there, but possibly on both sides: Each of them defended their position from the point of view of mainstream art, in Bishop’s case, and from the point of view of digital art, in Cornell’s and Droitcour’s case, but without being able to bring both points of view together, that is to say, without considering the artistic field as one. As in Halter’s case, what seems to be missing is the possibility of considering current artistic practices, whether “mainstream” or “new-media based,” as intertwined, and as part of a new paradigm, which, I dare say, is that of the posthuman, one of the great absences of the book. Possibly, the presence of just one article that addressed some of these topics in terms of conformation of (new) subjectivities could have cast light on discussions like the one quoted above and offered a broader perspective on several others.

It is however understandable that any book proposes a certain view according to which many issues and topics need to be left aside. It is also the case in this review: Many more articles and discussions would be worth mentioning, however a selection needs to be made because of constrictions of space and time.

*Mass Effect* is undoubtedly a comprehensive survey; it brings forth an exhaustive view not only on theoretical issues but also on current concrete artistic practices and artworks. In fact, some of the most compelling views and critiques come from artists themselves, on their own works and on those of others. Cornell and Halter provide a required reading for anyone wishing to keep up with the accelerated pace of the theoretical and practical developments in the field.

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**ANNOUNCING**

**Art and Atoms**

**Leonardo eBook**

Edited by Tami I. Spector, *Art and Atoms* explores the cutting edge of the chemical sciences, art and aesthetics. Tracking chemistry through the 40 years of *Leonardo*’s archives reveals a chronological transformation in the manifestations of “chemistry and art.”

In general, the earliest papers, from the 1960s and 1970s, concern themselves with the development of new chemicals and chemically based methods for creating art. Many of the more recent papers have a theoretical slant, with the most recent emphasizing nanoscience. Based on changing trends in the field since the 1960s, the articles in this ebook fall naturally into the following four topic areas:

- Chemical Materiality and Art
- Atomic and Molecular Representations
- Chemical Concepts, Analogy and Metaphor
- Nanoscience

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