B SERIAL CONSTRUCTIONS AND COMBINATORIAL FUNCTIONS: A TRANS-HISTORICAL PATTERN

1   THE BECHER PROTOCOL

Bernd and Hilla Becher's *Fachwerkhäuser* series exemplifies the core articulation of the couple's typological endeavor. The series' specific formal features and their differentiation from most photographs of industrial buildings – the presence of grids *within* the image and the geometrical equivalence of the façades with the surface of the photograph – exemplifies their formal and conceptual strategy through the rigorous application of their protocol. Martina Dobbe, who has exhaustively studied this "ideal" form of the Becher typology, shows how building and depiction mutually influence each other. Commenting on one of the earliest occurrences of the couple's common work[63] – *Rensdorfstr. 5, Salchendorf*, 1959 (Fig. 44) –, she notes that while "the façade seems to be inscribed into the grid of the camera's viewfinder," the structure of the building itself is reinforced by the strict and geometrical photographic depiction.[64] The relationship between depicted subject and apparatus, induced by the protocol, thus emerges at the very onset of their visual production. This "Ur-form" of their typological work already bears the full extent of a pre-defined set of rules, invariably applied throughout half a century, which can be understood as a paragon for protocols in photography. Technically, it can be defined by various parameters, all of which pursue a specific purpose. The Bechers use large-format cameras, often

63   The couple met in 1959.
64   Martina Dobbe, *Bernd und Hilla Becher. Fachwerkhäuser*, op. cit., p. 9.

with zoom lenses, in order to provide images with a good resolution. Their infinite amount of fine tuning (plane shifting between lens and film, etc.) further allows for control over perspectival distortions and for the avoidance of any out of focus area. A transparent and verisimilar depiction constitutes a paramount formal precondition for a "documentary" claim. The buildings are mostly photographed frontally, from a low or high point of view, and are always shown in a flat manner, "filling" the images with always similar type forms. While the approach to photographing *Fachwerkhäuser* is invariably the same in terms of perspective and camera angle, some constructions (especially large factories with differing shapes) are depicted in various scales and with varying camera angles, in order to provide comparable objects. The *Kalköfen* taken between 1964 and 1997 for example, vary considerably in size, but the protocoled depiction (high and low camera angles, various sizes condensed into similar shapes, etc.) merges them into comparable images.[65] Light conditions are as neutral as possible – images are mostly taken in winter or spring in early morning –, avoiding high contrasts or shadows and guaranteeing that the gray scales are as linear as possible.[66] More generally, every contextual element is removed from the picture. The buildings depicted fill the frames of the photographs almost entirely. The scarce patches of sky and ground around them provide little contextual information. There is no visible vegetation and hardly any cars or people, which produces an extreme geographical, temporal and cultural decontextualization: hardly any clues allow dating the photographs or associating them with any particular country or region.
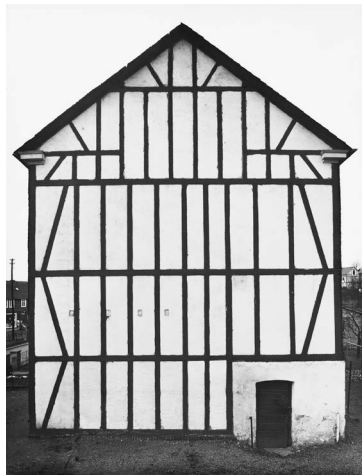

Fig. 44: Bernd and Hilla Becher, *Rensdorfstr. 5, Salchendorf*, 1959 (b/w, 40 × 50 cm)

65   Carl Andre had described the phenomenon in 1972 already. See Carl Andre, "A Note on Bernhard and Hilla Becher," *Artforum*, Vol. 11, No. 4, December 1972 (issue edited by John Coplans). Reprinted in James Meyer (ed.), *Carl Andre. Cuts. Texts 1959 – 2004*, Cambridge (MA), MIT Press, 2005, p. 65 – 66.
66   Rolf Sachsse, quoted by Martina Dobbe, op. cit., p. 11.

The rigorous declination of the Becher protocol, combined with the implications of the typological display of the photographs merged into multiple-image tableaus, provides a model that will have a considerable influence on the visual production of the young generation of photographers of the Kunstakademie Düsseldorf. However, the Bechers' paradigmatic comparative mechanism, the typological display, does not exist as such in their students' work. However, the notion of series as a gathering of thematically similar images endures. Thomas Struth's jungles or Andreas Gursky's globalized architecture constitute subjects both photographers have pursued over long periods of time. Although thematically similar, single images of the series are not intended to be visually comparable with one another. On the other hand, Thomas Ruff's small-format *Porträts*, commonly hung next to each other horizontally in displays of five to twenty images, in one or two rows, are among the few examples that seemingly reproduce a comparative mode similar to the Bechers' typologies. The display of Jörg Sasse's *Speicher* series – a horizontal set of single images (see Fig. 107) – works similarly. The numerous color backgrounds of the early *Porträts* and the variable camera angles (frontal and diagonal), or the formal variety in Sasse's case, prohibit a similar comparison effect as in the Bechers' work. Their display never produces a unique, coherent tableau: the association doesn't span above two or three images the viewer looks at while moving along the exhibition. The perception of the large format *Porträts* proceeds similarly, as only a few can be compared from a distance, considering the large size of the prints.

Fig. 45: Thomas Ruff, *Zeitungsfoto 351*, 1991 (b/w, detail)

As it seems, the legacy of the Bechers primarily resides in the protocoled depiction, rather than in comparative mechanisms. All Becher students have adopted their teacher's geometrical approach to the depicted objects (with orthogonal or 45-degree angles), working predominantly with frontal compositions in a very controlled representational space. As in architecture photography, every line is adapted to geometrically correspond to the light-sensitive surface of the large-format

camera in order to build a plane surface coinciding with the produced image. The two-dimensional contingency of the photographic apparatus spans to the choice of the frame and the object, in order to produce "two" analogue plane surfaces. Much as the grid system of the *Fachwerkhäuser* matching the camera's viewfinder, Düsseldorf photography subordinates the produced photographs to the depictive medium. As pointed out earlier, even organic subjects, such as the plants in Thomas Struth's *Paradise* series (see Fig. 109), reveal an underlying structuring grid, which decomposes the image into geometrical patterns: although a three-dimensional forest is depicted, the numerous leaves blend into planar surfaces. The often reflected upon concept of "surface without depth" – for example, the two-dimensional character of Thomas Ruff's portraits – yields productive interpretative angles, but it does not fully reflect the underlying processes of these formal developments. The Becher protocol and the single-image autonomization process, the consequence of typological constructions, constitute another prism through which to address the formal construction of Düsseldorf photography. Its formal outcome, the raster grid, constitutes the underlying structure most produced images rely upon. But if that grid remains central, it operates primarily by structuring single images and not – as in the Bechers' – multiple-image systems. A distinctive feature of young Düsseldorf photography thus resides in the importing of a multiple-image architecture into single photographs that inherit the single-image autonomization – a process which dissociates image from depiction – from their typological "counterpart."

Grids and grid levels

Thomas Ruff's *Zeitungsfoto 351* (1991, Fig. 45) constitutes one of the few examples of a unique image in the Becher students' work, which integrates a typology (if one considers the first images of the series) or a sequential construction based on time (if one considers all sixteen). His photograph of pictures of bicycle riders pinned on a wall[67] is one of the rare occurrences of an image with a comparative grid structure with multiple photographs. Its loose formal construction – the camera angle is not orthogonal and the grid does not correspond to the surface of the photograph – almost ironically comments upon serial imagery and its use by photo-conceptualists.[68] Save for a few examples, the main difference of the Becher students resides in their investment of the single image, or single image systems. But within these single photographs, a multiple-image structure can be found, on various levels. Andreas Gursky's *Paris, Montparnasse* (1993), for example, is formally based on a grid structure which, as Peter Galassi pointed out, is reminiscent of grid patterns found in American abstract

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67   The photograph is reminiscent of Hans-Peter Feldmann's book *9 Bilder* (1971), based on bicycle riders.

68   Ruff's *Zeitungsfotos* provide visual models for his photography but also address photography in a self-reflexive stance, commenting upon the medium itself. See below, chapter "Thomas Ruff's *Häuser* series." The complete series is featured in a publication initiated by Christoph Schifferli and Lex Trueb, *Thomas Ruff. Zeitungsfotos/Newspaper Photographs*, Zurich, Bookhorse, 2014.

expressionist models or non-figurative paintings by Gerhard Richter, such as *1024 Colors* (1973).[69] But if we consider the abundant images of apartments (i.e., Fig. 76), geometrically arranged around the orthogonal architecture of the façade, we are confronted with the same formal construction as the Bechers' tableaus, where comparable elements are multiplied and opposed. In this case the discrete elements can easily be associated with autonomous images – every apartment is defined by a square frame, which produces an evident analogy between the interior view and a photographic image. But that grid structure varies considerably across Düsseldorf photography, and such an evident correspondence is not always possible. In many architectural images, such as Thomas Ruff's *Haus Nr. 5 I* (1988, Fig. 46), the discrete component corresponds to a part of a building, in this case one concrete panel with one window. But the meshes of the grid are often tightened considerably, sometimes leaving only minuscule elements as distinct components. In Andreas Gursky's *Pyongyang I*, the smallest denominator is a gymnast with a colored board; in his *Untitled I* (1993), the nominal element is a knot of the carpet of a Düsseldorf museum.

Fig. 46: Thomas Ruff, *Haus Nr. 5 I*, 1988 (216 × 208 cm)

If Thomas Ruff's *Haus Nr. 5 I* (Fig. 46) enacts the formal construction based on the association of discrete elements *within* the single image, its comparison with the Bechers' *Kühlturm, Stahlwerk*, *Ebbw Vale*, *Südwales* (1966, Fig. 47) reveals a second level of grids, present within the Bechers' *single* image as well. As previously mentioned, the grid is overt at various levels in their work, most obviously in the *Fachwerkhäuser*. It also appears at that time on different levels in the work of photo-conceptualists, as well as in non-photographic forms. Chuck Close's photorealist paintings or drawings are based on a structuring grid that remains invisible in his 1960s and 1970s hyperrealist paintings

69   Peter Galassi, "*Gursky's World*," op. cit., p. 31–32.

but that gradually appears in his later work.[70] Several photographic works and sketches already show the decomposing grid before it becomes a prevalent formal strategy (e.g., Fig. 48). Sol LeWitt depicts physical grids or reveals grid-like structures in architectural elements. Gerhard Richter focuses on the picture elements themselves, producing a series of color field paintings (*Farbfelder*) whose genesis can be followed through the drafts found in his *Atlas* (see Fig. 49).[71] His study of colors echoes categorization systems such as Pantone (created in 1866) or RAL[72] (created in 1927), and thus addresses the image as a rationalized codifying apparatus based on discrete elements. Although made in the mid-1970s, it is clearly reminiscent of a pixelated image for a contemporary viewer, a decade before the first mainstream computers were built.[73] Those experiments can all be inscribed in an implicit attempt to reflect upon the mechanical depiction of the world and its nascent digitization, and can be paralleled with the geometrically rigorous Becher protocol.
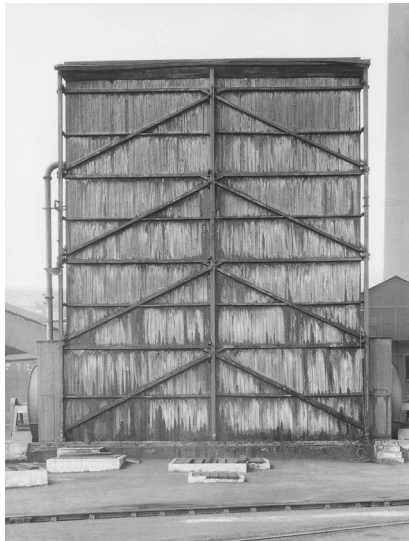

Fig. 47: Bernd and Hilla Becher, *Kühlturm, Stahlwerk, Ebbw Vale, Südwales*, 1966 (b/w)

70   Chuck Close's recent woven photorealist series (e.g., *Kate*, 2007, Jacquard Tapestry) echoes Gursky's reduction of his raster grid into wool knots.

71   Panels 272–286 and 292–296. See Helmut Friedel (ed.), *Gerhard Richter. Atlas*, Cologne, Verlag der Buchhandlung Walter König, 2011 (2006).

72   RAL (acronym for *Reichsausschuss für Lieferbedingungen*) was developed in order to rationalize industrial production. See for example www.ral-farben.de, accessed on June 13, 2018.

73   The mosaic of the south transept of the Cologne cathedral based on the *Farbfelder* (2007) even pushes further the analogy, as the "pixels" are backlit, much like a screen. See http://www.gerhard-richter.com/art/paintings /other/detail.php?paintid=14890&tab-artwork=notes, accessed on May 8, 2014 and Helmut Friedel (ed.), *Gerhard Richter. Atlas*, op. cit., panels 755–756.

Fig. 48: Chuck Close, *Self-Portrait, 9 parts*, 1978 (polaroids)

The ultimate reduction of that grid, mostly apparent in Thomas Ruff's late 1990s work with digital compression technologies, is manifested by the irreducible element of every digital imaging system: the pixel. In Ruff's *jpeg* series, the smallest formal component tallies with technological contingencies, which in the large-format prints are blown up to considerable proportions. While revealing a grid on another level – a kind of mega-pixel, the outcome of the compression algorithm (see Fig. 124) –, Ruff addresses the photograph in the context of its circulation on the web and questions the jpeg as a format central to that circulation. By revealing its architecture, Ruff focuses primarily on the image as an autonomous object and not a depiction of something. The *jpegs* address the re-presentation or depiction of pre-existing images whose references are not to be found in the physical world but in our visual culture. In this particular case, the use of a grid as an underlying structure serves Ruff's interrogation of the (supposed) evidentiary power of photography and the gradual shift from a direct connection with the world to a condition defined by an interrelation between the viewer and the depiction of the world. Ultimately, all these projects stress the visual nature of the images themselves. Their geometrical formalization emphasizes the nature of their referent: as the confrontation of Chuck Close's *Big Self-Portrait* and *Study for Big Self-Portrait* shows, the primary source of these images are images, which seemingly inscribes them in a new paradigm. They are not mimetic (at least they do not depict physical reality), they are not autotelic; they embody an alternative status. And in that respect, Krauss' model proves productive. Although she theorizes mimetic visual forms *against* autonomous grid structures, her concept allows for an apprehension of a context she wasn't explicitly addressing. The merging of mimetic capabilities of mechanical reproduction with the grid as an autonomous model hints at a visual reconfiguration in which images constitute the primary entities mediating reality.

2   IMAGE DECONSTRUCTION AS ARCHAEOLOGY OF COMPUTATION

Numerous previously discussed conceptual works entail a systematic declension of a pre-determined function, form or concept. The conceptualization of such processes translates the aspiration to understand and formalize an idea systematically, exploring all possibilities of the transcription of a given precondition. Sol LeWitt's numerous open cube variations aim to visually transpose all possibilities of a given system; these possibilities are mathematically defined – and arithmetically limited – as such systems are either intrinsically (e.g., every variation of an open cube viewed from a set angle and displayed on a paper sheet, see Fig. 50) or artificially (e.g., a picture of every building on the Sunset Strip) determined by the possible variations. But within the set rules, the proposition fulfills every possibility. Besides that conceptual model, a further body of works addresses the very same issues and enforces the understanding of serial strategies of photo-conceptualist artists as archaic computing mechanisms: early computer art of the 1960s and 1970s.
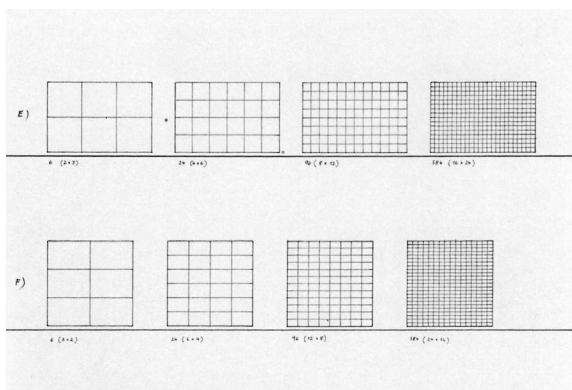

Fig. 49: Gerhard Richter, *Sketch for Farbfelder series* (*Atlas* panel 272), detail, 1971

The comparison of Sol LeWitt's *Incomplete Open Cubes* (1974, Fig. 50) and a screen print of A. Michael Noll's *3-Dimensional Projection of a Rotating 4-Dimensional Hypercube* (1962, Fig. 51) shows evident formal and conceptual affinities, despite their respective (and dissociated) contexts of emergence: conceptual art and computer art. Both images systematize the representation of a geometrical form, in a visual system short of one dimension. LeWitt shows a cube (3D) in 2D, in a series of drawings. Noll, a pioneering engineer in computer visualization methods and input devices,[74] shows a rotating

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74   See for example A. Michael Noll, "Computer-generated three-dimensional movies," *Computers and Automation*, Vol. 14, No. 11, November 1965.

tesseract[75] (4D) in a 3D computer application, which is displayed on a 2D screen. Less than the complex interrelations between dimensions in these representation systems, it is the systematized visualization process, the methodical declination of geometrical forms (or in Le-Witt's case, of a concept), which proves productive in the context of digital imaging systems. LeWitt – an artist – chose the cube because it was the "least emotive" geometrical form,[76] fitting his conceptual strategies. A. Michael Noll worked as an engineer at Bell Labs in the 1960s, and while he was an expert in digital imaging systems, he clearly had aesthetic aspirations as well. Associated with the nascent computer art, he generated various digital forms such as the hyper-cubes or complex curves, showcased as screenprints of computer animations. In 1965, Noll exhibited his computer-generated images with fellow researcher Bela Julesz in the Howard Wise Gallery in New York, one of the first shows to display computer-generated images in an artistic context. A few years later, the Musée d'Art Moderne de la Ville de Paris exhibited the work of Manfred Mohr, an Austrian com-puter artist and engineer (1971), in a solo show titled *Manfred Mohr. Computer Graphics. Une esthétique programme*[77]. The odd point of convergence of these artists lies in the fact that all three – LeWitt, Noll and Mohr – produced variations of cubes (or hypercubes), with "typo-logical" or serial modes of presentation.[78] Although it is not stripped down to that fundamental element, Mel Bochner's *36 Photographs and 12 Diagrams* (1966) operates very similarly, declining a cube con-taining 343 ($7 \times 7 \times 7$) smaller cubes. Similar to the grid, which despite its omnipresence in conceptual art is hardly discussed or reflected upon by artists or theorists, the "digital" (i.e., numerical) base of these few examples remains underexplored, and the proximity between an-alogue processes based on computation and processes that are dig-ital on a technical level is also overlooked. While both can only be paralleled in an attempt to understand a broader context they emerge from, hybrid projects further allow discussion of the relevance of that confrontation, while focusing on the role that conceptual proximity might play in photographic representation.

75 A tesseract is a hypercube with four dimensions. Hollis Frampton was probably the first to claim the tesseract as a theoretical model to address photography in its relationship to time, while circumscribing an early photograph of Muybridge: See Hollis Frampton, "Eadweard Muybridge. Fragments of Tesseract," op. cit., p. 76.

76 Sol LeWitt, "Paragraphs on Conceptual Art," op. cit., p. 15.

77 His first exhibition had also taken place in 1965 at the Galerie Paul Facchetti, Paris. See *Manfred Mohr. Computer graphics. Une esthétique programmée,* exhibition catalogue, Paris, Musée d'Art Moderne de la Ville de Paris, 1971.

78 Sol LeWitt and Manfred Mohr's roughly contemporary visual sequences sharing "three themes: the cube, seriality and incompleteness" have occasionally been read in conjunction. See especially Grant Taylor, "Reception and Criticism of Early Computer Art," in Hannah Higgins and Douglas Kahn (ed.), *Mainframe Experimentalism. Early Computing and the Foundations of the Digital Arts*, Berkeley, University of California Press, 2012, p. 24 – 25.
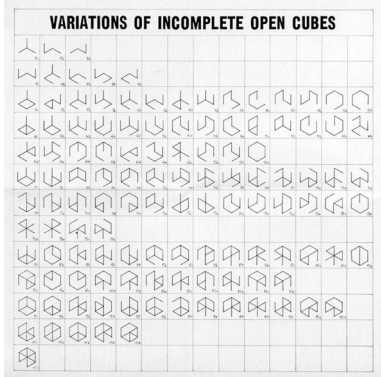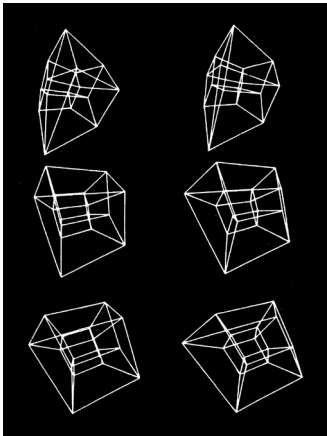
Fig. 50: Sol LeWitt, *Incomplete Open Cubes*, 1974

Fig. 51: A. Michael Noll, *3-Dimensional Projection of a Rotating 4-Dimensional Hypercube*, 1962 (screenshot of animation)

During a residence at Singer Corporation (a telecommunications company), Mel Bochner pushed his generative experiments even further. In *Roll*, part of Bochner's "transduction" experiments, the artist arranged four wooden cubes on a horizontal grid, filming them with a video camera and displaying them on a TV screen (Fig. 52). However, in this case the modulation or permutation was not generated by rotating the cubes themselves or by changing the point of view from which they were perceived (as in Mohr or LeWitt's projects), but by the manipulation of the depiction itself: Bochner would play with the horizontal hold adjustment knob[79] in order to generate various alternatives that were captured with a (photographic) camera. This

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79   On analogue TV sets, synchronization of horizontal and vertical hold had to be done manually; an out of sync horizontal hold would result in an image rolling up or down the screen. See the *Wikipedia* entry on "analog TV." Available at http://en.wikipedia.org/wiki/Analog_television, accessed on June 27, 2018.

"proto-digital"[80] project clearly conceptualizes the convergence of image and generated processes. But Bochner wanted to proceed even further, as his account of that period shows:

> *One of my projects was to feed numbers into the computer and the computers would generate permutations of those numbers which would be printed out as photographs. […] Unfortunately [it was] a bit too early, because they didn't have the technology to do it.*[81]

The interconnection of digital technologies and conceptual art in the 1960s and 1970s unveils a contextual common ground in which formalization and codification, as much through concrete examples as through self-reflexive experiments addressing the mechanisms of these procedures, play a central role. These few examples show how the visual production in an artistic context, through multiple processes (serial imagery, typology, permutation, etc.) and visual outputs (grids, numbers, etc.), reflected the mathematical formalization of the world. If one considers photography, it has to be emphasized that an analytical approach to the medium addressed and interrogated its depictive abilities, eventually focusing on the image itself.
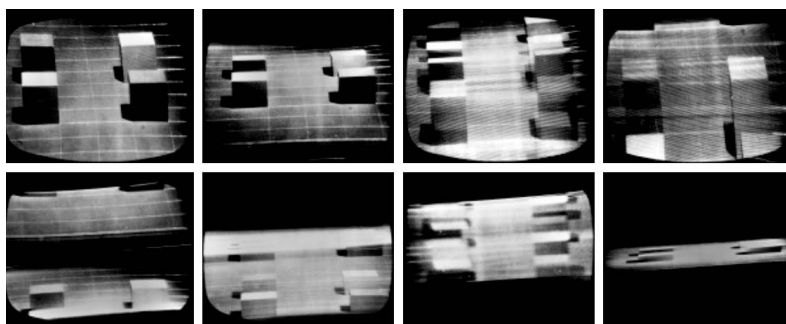

Fig. 52: Mel Bochner, *Roll*, 1968 (8 photographs of TV screen, 50 × 60 cm each)

All these projects clearly reflect the systematized declination of a discreet element through mathematical computation. As such, they echo algorithmic calculations of nascent digital technologies, either explicitly, through technical mechanisms (i.e., computer art), or on a more abstract level, through the emulation of its processes (i.e., conceptual art). But rather than using the binary system of 1s and 0s of every

80 Luke Skrebowski uses the "proto-digital" to describe the generated video output. In Luke Skrebowski, "Productive Misunderstandings. Interpreting Mel Bochner's Theory of Photography," *Art History*, Vol. 32, Issue 5 (Special Issue: *Photography after Conceptual Art*, edited by Diarmuid Costello and Margaret Iversen), December 2009, p. 923.
81 Interview of Mel Bochner by Hans Ulrich Obrist and Sandra Antelo-Suarez, on *e-flux*, n.d. Available at http://projects.e-flux.com/do_it/notes/interview/i003.html, accessed on June 27, 2018. Quoted by Luke Skrebowski, "Productive Misunderstandings. Interpreting Mel Bochner's Theory of Photography," op. cit., p. 920.

computational system as the smallest denominator,[82] they address these combinatory mechanisms with one of the smallest three-dimensional elements, whose declination produces a *visual* outcome in two dimensions: the cube. Doing so, these strategies literally emulate the functional principle of the computer, which transforms binary data into an image, an experiment conducted by Jörg Sasse's generative *Speicher* forty years later.
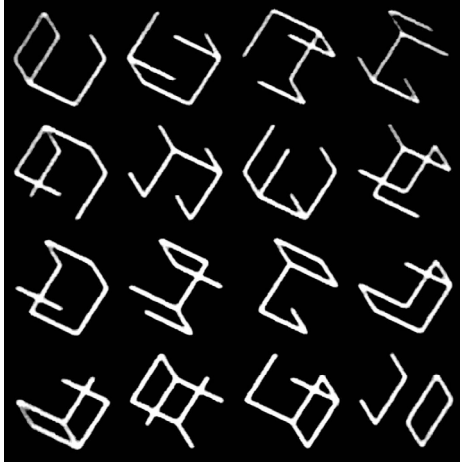

Fig. 53: Manfred Mohr, *Cubic Limit*, 1973 – 74 (computer animation transferred on 16 mm film, 4 min., screenshot)

At this point, the correlation between the graphical computed outcome and the photographic image ought to be clarified. Throughout the 1960s and the 1970s, photography has been singled out as an autonomous object through various strategies. Both Ed Ruscha's *Los Angeles Apartments* and the Bechers' *Fachwerkhäuser* were subordinated to serial sequencing or typological classification, and their photographs were imbued with an increased autonomy as images. But as the comparison of LeWitt's *Four Basic Kinds of Straight Lines and Their Combination* (1969) and *Brick Wall* (1977) has shown, both the photographs and the drawing constitute a graphical outcome of a concept. As such, both are images, but the photograph remains a codification of reality, which leads to its inscription into another history and tradition. Despite having gained autonomy as images, the Bechers' typological photographs arranged in orthogonal grid systems remain depictions. If we admit that similar comparative processes underlie the cube variations of Mohr, Noll or LeWitt and the Bechers' photographs, then the depicted buildings can be interpreted as discrete units like these cubes. The industrial structures were often photographed from various points of view – as the cube permutations –, but these images

82   That binary pair, called the bit, constitutes the primary unit in computing, based on the two values it can embody: either true (1) or false (0).

were hardly shown together after the 1960s,[83] and the frontal depictions dominate the reception of their work in the artistic field. The typological image as theoretical unit, interpolated in the grid system, could consequently be correlated with the conceptual and formal denominators of Noll or LeWitt (i.e., the cube) on the one hand, and with its equivalent in digital imaging systems, the pixel, on the other.
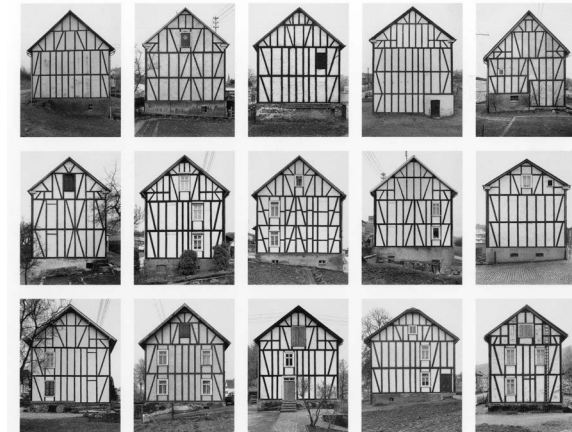

Fig. 54: Bernd and Hilla Becher, *Fachwerkhäuser* typology, 1993 (b/w)

Obviously, the comparison cannot be supported on a strictly technical level. But all these generative processes possess a similar computational framework. Manfred Mohr's generated cubes, such as the 1976 *Cubic Limit*[84] (Fig. 53) emulate every possible variation of a rotating cube, depicted in 2D. A pixel stands for every possible color a digital imaging system is able to produce (see Fig. 55), which varies from 1 bit (black and white screen) to 24 bit (16.7 million colors). An image of a water tower in a typological system embodies every shape a cooling tower can express: "structures with the same function (all water towers); structures with the same function but with different shapes (spherical, cylindrical, and conical water towers); structures with the same function and shape but built with different materials (steel, cement, wood, brick, or some combination such as wood and

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83 There are various types of views in the Bechers' work besides the typologies, but the latter seem to have polarized interest and focus throughout the decades, primarily because these type-forms enacted the single-image autonomization and the convergence with conceptual art. Their "industrial landscapes," for example, do not try to depict individual buildings but rather aim at "contextualizing heavy industrial plant[s] in [their] urban and rural environment" (See Heinz Liesbrock, "*Bernd und Hilla Becher. Coal Mines and Steel Mills*," in *Bernd und Hilla Becher. Coal Mines and Steel Mills*, Munich, Schirmer/Mosel, 2010, p. 5). But such views were gathered for the first time in the 2010 exhibition *Coal Mines and Steel Mills* in the Oeuvre of Bernd and Hilla Becher" in the Josef Albers Museum in Quadrat (Ruhr), which suggests that they were to a certain extent underevaluated, compared to the typologies.

84 The animation created on a CDC 4600 computer is rendered on 16 mm with a Datagraphix 4460 microfilm camera. It was first exhibited at Galerie Weiller, Paris, in 1975. See *Manfred Mohr. Dessins génératifs. Partie 1, travaux de 1973 – 1975*, exhibition catalogue, Paris, Galerie Weiller, 1975.

steel); structures with the same function, shape and materials," as Carl Andre systematically notes in 1972.[85] Every one of these three denominators has a different status in its relation to imaging systems or photography. But all three maneuver within a set framework, working with the same generative processes within grid patterns, legitimating the comparison.
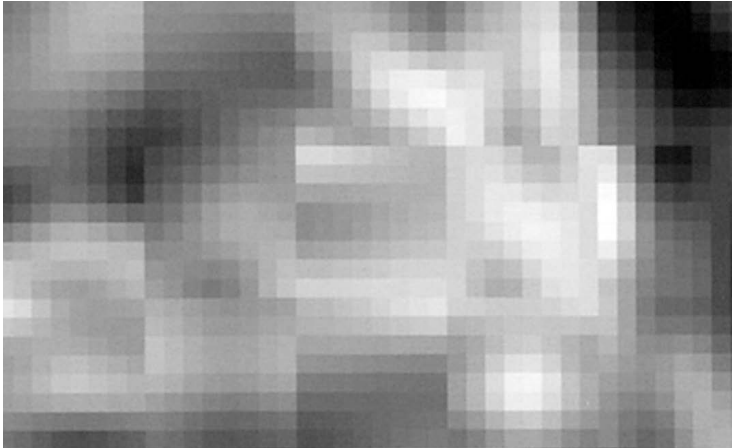

Fig. 55: Thomas Ruff, 3 × 5 squares with double-pixel structure, detail of *jpeg msh01*, 2004

The explicit connection of the Becher students with the context of the emergence of digital computing systems and conceptual strategies in the 1960s has hardly ever been mentioned. Although Thomas Ruff is commonly posited as an "experimental" or "conceptual" photographer, Kate Busch is one of the few scholars to connect his work with the historical figures of conceptual art.[86] Gursky has occasionally been called a "post-conceptual" photographer,[87] as will be discussed below. Despite its omnipresence, the grid is primarily mentioned in their historiography as a compositional structure and is related to painterly models rather than the typology. An essay by Jens Schröter is one of the rare texts in the historiography of the Düsseldorf School to refer to Krauss' text,[88] and which for instance addresses the grid not only as a formal model but also as a conceptual entity in the work of Jörg Sasse. The "digital" work of Ruff, Sasse and Gursky will thus be examined subsequently from that perspective, with the intention of establishing the definitive correlation between digital processes and their proto-digital forerunners.

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85   Carl Andre, "A note on Bernhard and Hilla Becher," op. cit., p. 66.
86   Kate Busch, "The Latest Picture," in Douglas Fogle, *The Last Picture Show*, op. cit, p. 262.
87   Mark Godfrey, "Roni Horn's Icelandic Encyclopedia," in Diarmuid Costello and Margaret Iversen (ed.), *Photography after Conceptual Art*, Chichester (West Sussex) and Malden (MA), Wiley-Blackwell and Association of Art Historians, 2010, p. 141. Ibid., p. 51.
88   Jens Schröter, "Das ur-intermediale Netzwerk und die (Neu-) Erfindung des Mediums im (digitalen) Modernismus. Ein Versuch," op. cit., p. 597 – 599.