2. Aesthetics of Many-Valued Logic

Needless Needles with Gotthard Günther

> The subject is, as we know, not simply identity with itself but identity of reflection with the other. On other words: Object being is existence without a gradient of reflection, but subject being is existence based on a gradient of reflection.[1]
> *Gotthard Günther, 1959*

In Mary Bauermeister's copy of *Idee und Grundriss einer nicht-Aristotelischen Logik* (Idea and Outline of a Non-Aristotelian Logic), the passage cited in the epigraph is underlined and marked with the note "That is the most important thing."[2] It is understandable that she saw this as one of the core points of Günther's philosophy. In general, he describes a difference between the subject's reflection process and that of the object: With a thought process that takes place in a subject, there is reflection on something outside of it that can be called the object. At the same time, there is an "inner" process that Günther calls "identity of reflection." That merely means that we as subjects have the opportunity to think about our own thinking, to reflect on our own reflection. Günther comes to this description, on the one hand, by means of the philosophy of Georg Wilhelm Friedrich Hegel and, on the other hand, by way of a thought experiment that takes a subject that is not itself as the starting point of reflection.[3] Namely, if I think of something from my subjective position, it is a simple object. If, however, it comes to reflect on another subject, by the implications of classical logic, according to Günther, it must also become an object. Likewise, if

1 Gotthard Günther, *Idee und Grundriss einer nicht-Aristotelischen Logik*, vol. 1, *Die Idee und ihre philosophischen Voraussetzungen*, 3rd ed. (Hamburg: Felix Meiner, 1991), 330. The pagination of the third edition cited here is identical to the first.

2 Bauermeister's edition is filled with underlined passages and notes such as "gut," "very good," "excellent," and "very elegant"; in addition, Bauermeister wrote in the margins both exclamation points and question marks as well as expressions such as "Nonsense" and "Flop Doodle."

3 See Günther, *Idee und Grundriss* (see note 1), 96–102.

the other subject thinks of me, I would then become merely an object. Another subject, a "you," however, is not "dead and causally linked" but rather "transparent and alive" and also has the potential to relate itself to its own reflection.[4] With these descriptions of the "gradient of reflection," Günther seeks to reject the core axioms of classical logic, which for him means Aristotelian logic, in order to develop the "foundation" for a many-valued logic.[5]

Bauermeister was not a metaphysician illustrating the equivalent of Günther's thought processes in her works; rather, she drew several conclusions from her reading that decisively conditioned the pictorial themes and appearance of *Needless Needles* and subsequent works. One sees references to many-valued logic in individual works even prior to 1963, but they do not seem to have been necessary for the overall conceptions of the works to the same degree. It is plausible to assume that Bauermeister read Günther's book in 1961 and later. The first references appear in her sketchbook on those pages that must have been written in approximately that time frame: "Yes, no […] either or etc. see Günther" is found on a page between the combination principle for the works of art that she had planned before or during a stay in Sicily. A second essential reference—"1+1=3"—first occurs several pages later, in the context of the *Needless Needles* light sheet.[6] Bauermeister was more explicit in the sketchbook's "theory section." It includes more text and fewer drawings; moreover, issues of art theory are explained here in aphorisms rather than presenting conceptions for individual works. The texts seem like a multilayered conversation of the artist with herself. This section has twenty-six pages, and, in contrast to the orientation of "Skizzenbuch/Quaderno," it begins in the back and the writing has been rotated 180 degrees. In a lengthy paragraph in January 1962 the artist notes:

> "The question is true like the answer. 'Yes or no' or 'yes and no' or 'neither yes nor no' or something (absurd beyond all that) that is also beyond 'neither yes nor no,' = tautologies 1+1=3 not two-valued thinking."[7]

Through Günther's book Bauermeister found her self-empowerment as an artist to express in a specific way her radical doubt about categories, which had already ex-

4 Ibid., 103–4.

5 Gotthard Günther, "Die Theorie der 'mehrwertigen' Logik" (1971), in *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 2 (Hamburg: Fritz Meiner, 1979), 181–202, esp. 181.

6 See Mary Bauermeister, "Skizzenbuch/Quaderno, 1961–1963," unpublished source, paginated by the artist, pp. 64 and 105.

7 Ibid., T5. The page numbers in this sketchbook are prefaced by the letter T; the underlining in this passage is original; that is the case for all quotations from Bauermeister's sketchbooks.

isted before she read it; moreover, the publication had a crucial influence on her working out her personal aesthetic.[8]

The consequences of that reading are comparable to Marcel Duchamp's attending a theatrical production of Raymond Roussel's *Impressions d'Afrique* in 1912; perhaps even to John Cage's use of the *I Ching* for his compositions.[9] The universal validity and the inferences in the cases of Duchamp and Cage have to be categorized just as carefully in Bauermeister's case. A comprehensive legitimation of the strategies employed can never be obtained from reference points, since a work of art is composed of manifold entities and the creative process has its own dynamics yet again. Nevertheless, much evidence can be identified in the works of art with which we can get close to Günther's thought processes and the conclusions that Bauermeister draws from them. In order to present them in what follows, many-valued logic according to Günther's view is contextualized with a group of works that reveals one of the first of all the consequences that Bauermeister derived from the metaphysical approach.

2.1 *Needless Needles*

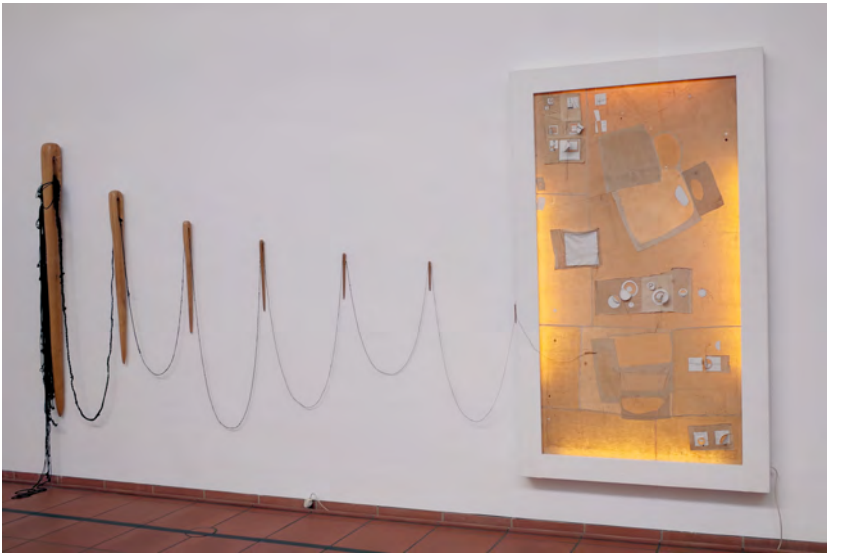
The works of the *Needless Needles* group are closely connected thematically: sewing, embroidering, and patching as a cultural and artistic technique is addressed in all of the works that belong to it. The motif of the seam in harmony with and distinction from the drawn line as well as the specific theme of the needle are among the constants. Its title, *Needless Needles*, contains an error for the sake of alliteration: Bauermeister wanted to translate "Nutzlose Nadeln" into English, which would have been

8 For decades she repeatedly emphasized the importance of this publication and its rejection of two-valued thinking. "I am interested in a pluralistic view of the world—not an Aristotelian, dualistic approach." Mary Bauermeister quoted in "Powerhouse [Interview with Mary Bauermeister]," *New Yorker* (July 31, 1965): 24–27, esp. 26. In an interview in 2017, Bauermeister emphasized this again: Susanne Boecker, "Mary Bauermeister: Dubio Ergo Sum," *Kunstforum International* 252 (February–March 2018): 218–27, esp. 223; see also Mary Bauermeister, *Ich hänge im Triolengitter: Mein Leben mit Karlheinz Stockhausen* (Munich: Bertelsmann, 2011), 108.

9 On the significance of Roussel's play based on the eponymous novel of 1909, see Lars Blunck, *Duchamps Readymade* (Munich: Silke Schreiber, 2017), 48–49; Calvin Tomkins, *Marcel Duchamp: A Biography* (New York: Henry Holt, 1996), 90–93; Alexander Streitberger, *Ausdruck, Modell, Diskurs: Sprachreflexion in der Kunst des 20. Jahrhunderts* (Berlin: Reimer, 2004), 51–52. In 1950 Cage was given an anthology of Chinese texts and thereafter repeatedly referred to these writings, from which he developed his compositional principle of "indeterminacy"; see John Cage, *For the Birds: Conversations with Daniel Charles*, trans. Richard Gardner (Boston: Marion Boyars, 1995), 43–46; Julia Robinson, "John Cage and Investiture: Unmanning the System," in *The Anarchy of Silence: John Cage and Experimental Art*, exh. cat. (Barcelona: Museu d'Art Contemporani de Barcelona, 2009), 54–111, esp. 81–83.

"Useless Needless." This "error" was, however, made deliberately and already points to the significance of writing in her works. The potentials in imprecisions and slight shifts are integrated in order to open up new levels of meaning. Newly created expressions or phrases are then developed in order to become part of the creative process. That also explains why "Needless Noodles" occupies a prominent place in one of the *Needless Needles* works. The point of departure for this group of words included a light sheet, a drawing, and a Lens Box produced in the years 1963 and 1964. They already contain all of the themes that the later *Needless Needles* works will take up again, which is why the three works are included here. In the early 1970s she made ten more Lens Boxes on the subject; in addition, there are lithographs of the drawing that Bauermeister reworked; and, finally, more Lens Boxes were added in 2016.[10]

Fig. 1: Needless Needles, 1963–64, found linen sheet, fluorescent tubes, canvas, ink, sewing needle, wooden objects and painted wood construction, 350 x 700 x 11 cm, Museum Ludwig, Köln/Cologne, Donation Gesellschaft für Moderne Kunst am Museum Ludwig e.V. with Support from the Stadtsparkasse Köln, 2004 (ML/SK 5151).



10 The total number of identified works with the title *Needless Needles* is currently seventeen. There is a light sheet titled *Needless Needles Junior* from 1963; it was clearly given this title by Bauermeister later and does not have the specific themes.

The *Needless Needles* Light Sheet

This group of works has its origin in 1963 with a work that belongs to the so-called *Lichttücher* (Light Sheets) (fig. 1). Their source material is patchwork bed sheets that Bauermeister found during a stay in Sicily in the autumn of 1963. The myth told by the artist says that the sheets were hanging on the clothesline to dry and the sun shining through them emphasized the pattern of the patches.[11] It is essential that the patches were not applied intentionally but rather a random collection resulted because the bedsheets had to be repaired in places. The Sicilians made these repairs so the sheets could continue to be used. Bauermeister stretched the light sheets out in wooden boxes and lit them from behind with neon tubes and other lighting to emphasize the patterns and evoke the situation of their discovery. This raw material was used by the artist for a number of works, including the light sheets in the 1960s but also for sculptures beginning in the 1980s.[12] The light sheets were sometimes left unworked, that is, merely spanned in the wooden boxes, but sometimes Bauermeister added new patches to intensify their structure or to form words, as in the case of *Perhaps (Light Sheet)* of 1963 (fig. 2). There it is clearly evident that the middle patches were placed so it could continue to be used as a bedsheet while the top and bottom patches were sewn on afterward—after Bauermeister had cut the word "perhaps" or "yes" into them, for example. For other light sheets several sheets were sewn together to create larger formats.

11 See Bauermeister, *Ich hänge im Triolengitter* (see note 8), 126–27.

12 The catalogue raisonné database registers a group of forty works using this material.

Fig. 2: Perhaps (Light Sheet), 1963, found linen sheet, fluorescent tubes and painted wood construction, 153.4 x 115.9 x 13.3 cm, Mary Bauermeister Art Estate.

The *Needless Needles* light sheet was reworked the most. Not only were additional patches applied but also canvas cutouts on which Bauermeister wrote or drew; in addition, she worked additional seams into the sheet.[13] There is also an installation of wooden "sewing needles" that begins in the work and together with wool, which is intended to simulate yarn, crosses the borders of the frame on the left. The needles spread out horizontally on the wall, increasing in size but with the same distance between them. Together with the needle installation, the work measures approximately 350 by 700 by 11 centimeters, making it one of the largest light sheets. Several bedsheets had to be sewn together just for the dimensions of the box. The seams Bauermeister worked in by hand with needle and thread are ubiquitous. They mirror the patches already found on the sheets and become visible only on closer inspec-

13 For a study of the work based on the aesthetics of materials and for the interpretations that result from the use of fabric, needles, and yarn, see section 4.2.

tion. The dark yellow of the light sheet, which transitions almost into the greenish-brown, is crucially related to the work's lighting situation. The light sources in the box consists of four less intense neon lights; with the other light sheets, the sheets are light with a clearly brighter shade.[14] The sewn-on pieces of canvas consist largely of square or round forms. Several cutouts also simulate the contours of the scraps of fabric applied and are arranged in a mirroring of them, for example, in the top third of the work on both the left side and the right. The square and round canvas cutouts are not always sewn completely to the sheet. In the circular forms in the center, the round cutout has a cutout of its own, which is then folded out to a different extent. Seen beneath it is either another canvas cutout or the bedsheet. It is equivalent to the square pieces of canvas in the top left corner as well as at bottom left, though the latter have circles, semicircles, and quarter-circles cut out of square forms. Several of these canvas cutouts are marked with drawings, symbols, words, series of natural numbers, or short sentences that refer to the needle motif or to sewing and thus evoke networks with other works in the group.

In addition to these connections outside of the work, there is also a commentary system on a microlevel: In the top left corner various forms are drawn on a square canvas cutout; it looks as if the seams on the sheet are approaching the piece of canvas from three directions and transforming into drawings when they meet the canvas. The wooden border that meets the canvas from the right is initially continued by drawn lines. An arrow and the word "good" comment on these abstract forms as being worthy of depiction. The further the lines penetrate into the center of the canvas cutout, however, the more they transform first into circles and then look increasingly like hearts; above these forms stand the words "too sentimental." When the forms have become two small hearts, the word "bad" stands above them, clearly larger and with an arrow. With this small detail in the work Bauermeister was referring to contemporaneous artistic debates. Above all at the Hochschule für Gestaltung in Ulm, which followed in the tradition of the Bauhaus, representationalism was strictly rejected and romantic symbols like the pictogram of a heart would have been inconceivable. Bauermeister not only was trained in that climate but the first years of her work were also characterized by abstraction. Deliberately integrating such elements and then questioning them is one of the changes in her work that begin in the early 1960s and culminate in the Lens Boxes. It is a deliberate ambiguity intended to reflect doubt not only about her own categories but also about the dogmas of art.

The conceptions on this work can be found on page 104 of the "Skizzenbuch/Quaderno, 1961–1963," and they reveal that Bauermeister reflected in detail, giving herself instructions for executing a specific work, which she then tried to implement

14 It is, moreover, reasonable to assume that the light sheet was exposed to some difficult conservational conditions before entering a museum collection. The bedsheet had changed continents several times and was also stored in Bauermeister's studio.

(fig. 3).[15] This approach can often be identified by looking at her sketchbook. In this case, however, the concept was only brought to bear when the work was already "1/2 fertig" (1/2 finished), as is written at the beginning of the page. Bauermeister had to "noch einarbeiten" (still work in) the subsequent dots. Listed below that are several more aspects such as "Nähanweisungen einfügen" (Insert sewing instructions) or "Flicken polstern" (Upholster patches), which are found in the final work; other points, such as "Geschichte des Tuchs" (History of the sheet) or definitions from a "dictionary," were not incorporated. This example is typical of Bauermeister's way of working: The concept does not have to stand at the beginning; rather, the idea for a work or a group can have been begun already in physical form. That is followed by conceptualization, which can also mean a refinement of an already existing work. Then parts of the written recording from the sketchbooks are implemented; all of the aspects are used only rarely. Many of the "refinements" of already existing works were never executed but remained in a conceptual state. The combination principle is also brought to bear here, which means that specific aspects of the planned works are later distilled out and used for other works.

The *Needless Needles* light sheet was first exhibited in a group show at the Galeria Bonino in New York City.[16] The exhibition, titled *2 Sculptors, 4 Painters*, was the first gallery show in her new adoptive country and was held at the turn of the year in 1963 and 1964. The art critic Brian O'Doherty called the light sheet a "trick psychological mirror" and the best work in the exhibition; he also honored it as a "distant cousin" of Duchamp's *The Large Glass*.[17] In this group exhibition and the first solo exhibition at the Galeria Bonino that followed it in 1964, the light sheet was being still shown under the title *Linen Nähbild* (Linen Sewing Picture).[18] In addition, it was also presented in a way that two light sheets were stretched out in a double box. It stood in the gallery space so that *Linen Nähbild* could be seen in front and another work, the

15 See Bauermeister, "Skizzenbuch/Quaderno" (see note 6), 104.

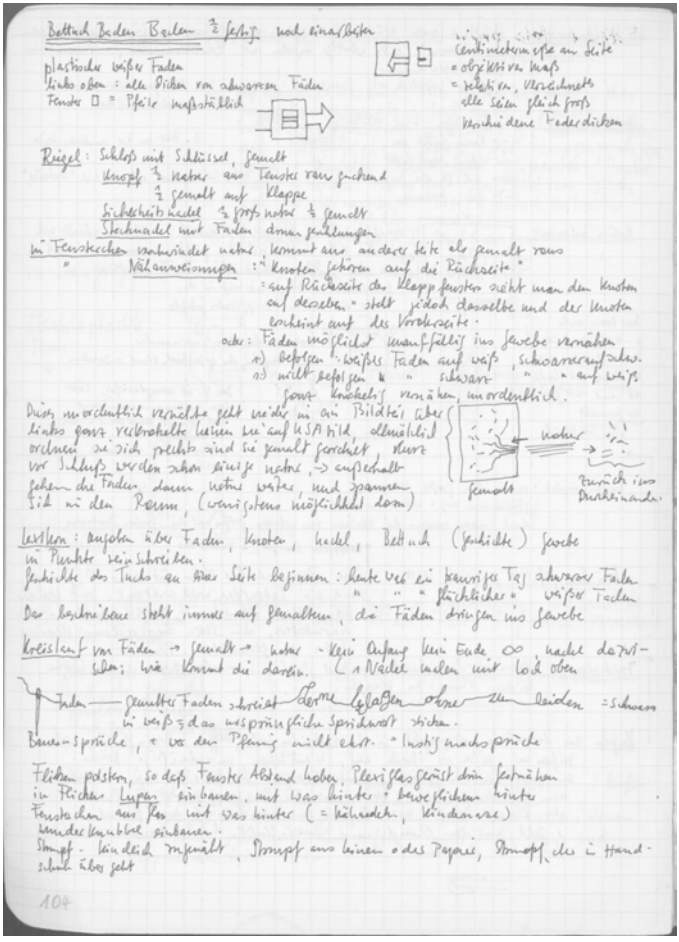
16 The Galeria Bonino was Bauermeister's first gallery in New York; their collaboration continued until the early 1970s and there were several museum exhibitions and institutional acquisitions during that period.

17 See Brian O'Doherty, review of a group exhibition at the Galeria Bonino, *New York Times* (December 29, 1963). The comparison to Duchamp's so-called *Large Glass*, officially titled *La mariée mise à nu par ses célibataires, même* (The Bride Stripped Bare by Her Bachelors, Even) of 1915–23, was particularly important to Bauermeister, who deeply admired Duchamp as an artist. In 1965 she created the Lens Box *Hommage à Mar-bert Du Breer*, whose title is a composite of the names Marcel Duchamp and Robert Breer. Duchamp also admired Bauermeister's works; for example, in a letter to his gallerist Arturo Schwarz he recommended that he put Bauermeister under contract as an artist, and that collaboration began in the early 1970s; Hauke Ohls, "Interview to Mary Bauermeister by Hauke Ohls," in *Mary Bauermeister: 1+1=3*, exh. cat. (Milan: Galeria Gariboldi, 2017), 6–44, esp. 43.

18 See *Bauermeister: Paintings and Constructions*, exh. cat. (New York: Galeria Bonino, 1964).

so-called *Linensculpture*, on the back. The illustrations in the catalog and the exhibition views show that the work was not further reworked by Bauermeister—apart from the installation of wooden needles and removal from the double box. The thematic fields of needle, sewing, and their transformations were already mature.

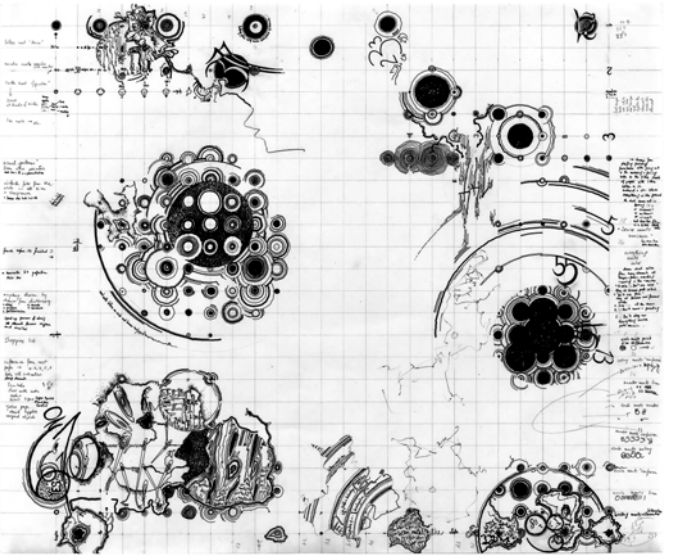
Fig. 3: Skizzenbuch/Quaderno, 1961–1963, unpublished source, paginated by the artist, p. 104.



Needless Needles Drawing

The renaming of the light sheet from *Linen Nähbild* to *Needless Needles* very probably happened during or just after the end of Bauermeister's solo exhibition in 1964, given that she produced the *Needless Needles* drawing at that time (fig. 4).[19] That work treats the same theme as the light sheet. The drawing is graphite and ink on paper and measures 49.8 by 60 centimeters. Largely in black-and-white, it also contains several red and blue passages. It seems typical of Bauermeister's approach to drawing, which is a combination of carefully executed elements and scribbling. The use of writing, numbers, and their distortion comes into it as well. The graphic, spatial arrangement is just as important, so that the voices are integrated as a productive part. Accordingly, on the work on paper highly dense sections appear alongside several areas without drawings.

Fig. 4: Needless Needles, 1964, pastel, ink on paper, 49.8 x 60 cm, The Museum of Modern Art, New York, Gift of John S. Newberry, 1964, 269.1964.



As in several other works as well, "instructions" were prominently inserted into the work that Bauermeister apparently regarded as thematic directions to herself and as guidance for viewer's reception in equal measure. They are distributed on

19 It is also conceivable that Bauermeister integrated the drawing after the exhibition opened; neither the catalog nor other documents of the exhibition show the work.

the left and right edges and limited to the rectangular boxes that are offshoots of the square lines of the grid on the entire ground of the drawing. The system of instructions is complex and cannot be decoded completely, which is probably what Bauermeister intended. It seems more like a conceptualization that was set up in advance to counter the potentiality of an open drawing space to be filled with specific themes and networks with other works. Several of the instructions can be easily understood, such as "circle meets 'figuration" in the upper left corner, because in the grid a drawing circle is transforming into a face. Written directly above that are the statements "numbers meet operation with numbers" and "letters meet 'sense.'" Here the situation is already less clear, because although the grid begins with a number or letter, at least from the third square onward a conglomerate of letters results in the middle of which the word "No!" is clearly legible. In connection with lines and arrows, everything is framed in a circular structure that is breaking down. The effort to interpret the instructions literally is already reaching its limits here; other scraps of writing are fraught with ambiguity, for example, "finish before it's finished!!" or "shopping list"—both also on the left edge. In addition, the instructions need not be carried out visibly but rather, it seems, as if they could also lie "under" the drawing's support: words and drawing in circular form break out illusionistically in the center at the bottom. Another hint supporting this assumption can be seen in the open area in the lower right corner. Among other things, the statements "number meets line" and "circle meets number" have lines pointing to the bordered open areas, as if these processes were occurring in them. Following the instructions literally contributes less to understanding the work than looking at the transformed elements in the work and their connections: to other works of the *Needless Needles* group, and to the theoretical concepts treated in them.

One crucial such concept—many-valued logic—will be examined elsewhere. It is clear from the grid that it cannot be considered in isolation. It reflects Bauermeister's reading of Wolfgang Wieser's book *Organismen, Strukturen, Maschinen: Zu einer Lehre vom Organismus* (Organisms, Structures, Machines: Toward a Theory of the Organism), published in 1959. In it the zoologist and evolutionary biologist Wieser illustrated, with the aid of a "coordinate system," a "spatial" and "temporal plan" of the growth of living creatures.[20] If one of the two factors is shifted—for example, if there are "changes in speed" in a process—this necessarily leads to "changes in form" in general.[21]

As it relates to the *Needless Needles* drawing, this means that the circular structures in the middle on the left resulted from changing one of the two factors. Within the grid, either the spatial or the temporal determinants were changed, which then

20 Wolfgang Wieser, *Organismen, Strukturen, Maschinen: Zu einer Lehre vom Organismus* (Frankfurt am Main: Fischer, 1959), 149–50.

21 Ibid., 156–57.

transformed the shape of a simple circle. The "change in form" produced not only additional circles but also the pattern of semi- and quarter-circles as well as the circular connecting lines. Overall, it looks as if the process of growth is not yet completed. There seems to be rampant growth on the left side; it has a deformed circle that contains the information of the process in the words "circle composing." Wieser's statements make it clear, however, that the drawn structures should not be seen as uncontrolled deformations: "The principle is always the same: a simple transformation of the coordinate system changes the inscribed type of animal in such a way that it resembles another type that exists in nature."[22]

Bauermeister's applications of principles of biological growth to the art of the drawing is intended to result in a new harmony of the components, despite all the superficial disorder. The artist is given the opportunity to experiment freely with forms, strokes, symbols, numbers, and words and to legitimize this with the theory she has studied—that is to say, to work beyond (self-imposed or historical/art-inherent) restrictions. On the one hand, a metaphorical change to one component of the coordinate system radically changes the "speed of growth," that is to say, the transformation can continue in any direction. On the other hand, despite this change, everything in the grid is a controlled result—it simply results in a new form.

Another aspect of Wieser's work that can be seen as inspiration for the drawing is the principle of the "surface" and the underlying "causal connections": this applies to the illusion that there is a layer of drawing "under" the painting's ground that conditions the visible. According to Wieser, that which lies under it increased "the diversity but also the order of the phenomena."[23] The circular drawing with red parts, arrows, and words that is breaking out in the center at the bottom edge thus has a dual function. Not only does it stand for the manifoldness of the surface, with words such as "include anything," but it also increases the order. The open areas of the drawing, which convey some calm in this otherwise unmanageable and intricate composition, only seem at first glance to contain no pictorial elements. They are not neutral voids but rather signs of an intensified manifoldness. Because nothing can be seen in these places, the drawing becomes even more complex. Bauermeister is referring here to a scientific publication that in turn tries to describe natural processes using philosophical terminology.

22 Ibid., 157.

23 Ibid., 11.

Needless Needles Lens Boxes

Needless Needles Vol. 5 was also created in 1964, as the last of these three works (fig. 5).[24] This work is an upright-format Lens Box measuring 96 by 63.5 by 10.7 centimeters; although it is overwhelmingly in shades of gray and white, just a few red lines and spheres in black or the color of the untreated wood break through its homogeneous look. The materials are typical of many of Bauermeister's Lens Boxes: two panes of glass have been inserted, one after the other, into the boxlike recession of the wooden construction, and the convex and concave lenses were glued to them. In addition, wooden spheres and hemispheres are mounted in and on the Lens Box—several of the spheres have been drawn and written on. The work has a broad frame spanned by canvas that is integrated into the overall composition as picture surface of its own. In the background of the Lens Box photographs reproducing details of the *Needless Needles* light sheet have been inserted. Drawings, symbols, numbers, years, and writing are strewn over not just the recession in the Lens Box but also the panes of glass and the spheres; the frame is also covered by them. Inside the Lens Box are three sewing needles and several small stones. The stones in the lower right third of the recession are sorted by form and color and then glued on, becoming ever smaller. They have been selected for their flat, oval form.[25]

The Lens Boxes are a genuine invention by Bauermeister, and together with the so-called Stone Pictures they are among her best-known groups of works.[26] They form the largest corpus of works in Bauermeister's oeuvre; around 350 of them were made in highly diverse forms.[27] Their construction always follows a similar pattern, with the exception of a few Lens Boxes whose housing is stainless steel, they are wooden, boxlike constructions into which several panes of glass have been inserted,

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24 The *Needless Needles* Lens Box and drawing are illustrated in the catalog of Bauermeister's solo exhibition at the Galeria Bonino in 1965: *Bauermeister: Paintings and Constructions*, exh. cat. (New York: Galeria Bonino, 1965). The two works cannot be identified in the views of the exhibition, however.

25 On stones as a material in Bauermeister's art, see section 4.3.

26 Contemporaneous critics were already describing the Lens Boxes as innovative works exclusively associated with Bauermeister; see Howard E. Smith, "Mary Bauermeister," *Art and Artists*, 6, no. 7 (November 1971): 40–41, esp. 40. In her dissertation Skrobanek speaks repeatedly of the Lens Boxes as the artist's "unique selling proposition"; see Kerstin Skrobanek, "'Die Jacke Kunst weiter dehnen': Mary Bauermeisters Aufbruch in den Raum," PhD diss., Frankfurt am Main, 2009, Univ.-Bibliothek 2014, http://publikationen.ub.uni-frankfurt.de/frontdoor/index/index/year/2014/docId/35011, pp. 5, 64, 80, and 112 (accessed April 17, 2019). There is also a myth of found materials as the starting point for the Lens Boxes; according to Bauermeister, she was able to purchase the lenses for the first Lens Boxes from the widow of a Dutch watchmaker; Bauermeister, *Ich hänge im Triolengitter* (see note 8), 78.

27 The works on paper, which represent the largest group of works, are not included in this number.

one behind the other. Lenses, wooden spheres, and sometimes also stones, straws, or found objects have been glued to them, and the spheres and panes of glass are written or drawn on. The background of the Lens Box can also have drawings, writing, spheres, stones, objects, and photographic reproductions, as can the frame, if there is one, like *Needless Needles Vol. 5*, and depending on its width. Several Lens Boxes do not have a background, so that they are placed in the room free-standing like sculptures rather than being fastened to the wall of the exhibition like a painting. The artist referred to a Lens Box without a background as a "look-through," since it is partially transparent.

Fig. 5: Needless Needles Vol. 5, 1964, ink, offset print, glass, glass lens, wooden sphere, canvas, photographs, sewing needles and painted wood construction, 96 x 63.5 x 10.7 cm, Mary Bauermeister Art Estate.

The structure of the Lens Boxes multiplies the possibilities for alienation, distortion, and transformation within the works, since the (written) drawings of fine lines and words are influenced by the lenses. Depending on whether the lenses are convex

or concave, and how the viewers are positioned in relation to the work, they result in enlargements, reductions, or reflections, so that sometimes the direction of the words is from right to left, for example. The slightest change of focus or a movement during the act of viewing results in a completely new view; the resulting facets of interpretation are one of Bauermeister's primary goals.

Art critics reviewing the Lens Boxes have repeatedly described them as challenging and unsettling. This is due to their compositional density, the themes they treat, and the distortions caused by the lenses, which make a static, focused gaze more difficult. In 1965 David Bourdon described the experience as that of "looking in on a Wagnerian cycle from the wrong end of the opera glasses."[28] More than fifty years later, the reception of the Lens Boxes still has a challenging effect, which Holland Cotter has described as follows: "The effect is like looking underwater, but also into an ungraspable fourth dimension."[29]

Viewing the Lens Boxes (*Linsenkasten*) as closely related to the medium of the box, which was very widespread in art after World War II and at the latest from the 1960s onward, seems obvious at first. Bauermeister's work has been included in group exhibitions that tried to classify artistic experiments with the medium of the box.[30] The most recent survey of this kind, titled *Welten in der Schachtel: Mary Bauermeister und die experimentelle Kunst der 1960er Jahre* (Worlds in a Box: Mary Bauermeister and the Experimental Art of the 1960s), was in 2010.[31] The aspects of ordering and appropriating objects and processes through the medium are particularly significant here. Boxes initially introduce distance between the objects and the viewers; at the same time, they produce an overview. The objects presented are raised to a level of equal hierarchy; in addition, a contextualizing of them occurs—both these things are employed by Bauermeister in her Lens Boxes. Historical connections have been made between Bauermeister's art and the works of art by Joseph Cornell and George Brecht, both of whom created arrangements with chains of subjective associations, and an association with the use of boxes in High Modernism, whether by

28 See David Bourdon, "More Is Less, More or Less," *Village Voice* (April 1965).

29 Holland Cotter, "Mary Bauermeister 'Omniverse,'" *New York Times* (May 5, 2016), https://www.nytimes.com/interactive/2016/05/06/arts/design/art-galleries-nyc.html (accessed April 20, 2019).

30 See Lucy Lippard, "New York Letter," *Art International* (March 1965): 63–64. The exhibitions were, among others: *The Box Show*, Byron Gallery, New York February 3–27, 1965; *Contemporary Boxes and Wall Sculpture*, Museum of Art, Rhode Island School of Design, September 23–October 17, 1965. See *Contemporary Boxes and Wall Sculpture*, exh. cat. (Providence: Museum of Art, Rhode Island School of Design, 1965).

31 The exhibition *Welten in der Schachtel: Mary Bauermeister und die experimentelle Kunst der 1960er Jahre* was on view from October 2, 2010, to January 16, 2011, at the Wilhelm-Hack-Museum in Ludwigshafen am Rhein.

Kurt Schwitters, Marcel Duchamp, or the Surrealists.[32] Likewise, there have been efforts to contextualize the Lens Boxes within the playful challenges to audience participation and quotidian gestures of the Fluxus movement, which employed the medium of the box as a democratic approach.[33]

In what follows, however, I do not attempt to rehearse the theme of the "artwork in a box," since Bauermeister has already been associated with that; such interpretations cover, at best, only some aspects of her work. Although the Lens Boxes are close to boxes in formal terms, "a shared aesthetic of simultaneous suspension and order" is not crucial to them.[34] The frame of *Needless Needles Vol. 5* is integrated completely into the composition, so that the boxlike recession does not provide an impetus to ordering.[35] The constructions filled by Bauermeister—even those without a frame—are an extension of the space of the compositions in which it is possible to create connections between objects and are by no means intended to be permeated by private mythologies. Moreover, there is no "sealing" of the Lens Boxes with a pane of glass; rather, several layers of glass are inserted one behind the next, each of which has objects, writing, and other compositional elements. At most, they work with Michel Serres's understanding of the "box" (*boîte*); he speaks of a "box for generating images."[36] The box serves him as a metaphor for perception in general. For example, as a philosopher he creates a box of "thinking" filled with images—just as Bauermeister did as an artist. We need these limited housings to achieve perception and knowledge at all. As soon as it is created, however, we have to find a way to leave it: we lock our reason in a box and then try to escape it.[37] These nestings ramify further and become more complex, but no escape is possible. In this view, the Lens Boxes are an outsourced box of thinking and of (metaphysical) knowledge.

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32 See Alexander Eiling, "Worlds in a Box: From Reliquary to 'Boîte-en-Valise,'" in *Worlds in a Box: Mary Bauermeister and the Experimental Art of the Sixties*, EGLS Judith Rosenthal, exh. cat. Ludwigshafen am Rhein, Wilhelm-Hack-Museum, 2010–11 (Bielefeld: Kerber, 2010), 23–30; Kerstin Skrobanek, "Worlds in a Box: Mary Bauermeister and the Experimental Art of the Sixties," in ibid., 65–80. See also Skrobanek's dissertation, the final chapter of which concerns the medium of the box in Bauermeister's work in comparison with earlier and contemporaneous artists: Skrobanek, "'Die Jacke Kunst weiter dehnen'" (see note 26), 138–73.

33 See Kerstin Skrobanek, "Stone Towers and Magnifying Glasses: Mary Bauermeister's Years in New York," in *Mary Bauermeister: The New York Decade*, exh. cat. (Northampton, MA: Smith College Museum of Art, 2014), 17–51, esp. 44. For a discussion of how Bauermeister's art relates to Fluxus, see section 3.4.

34 See Jennie-Rebecca Falcetta, "Acts of Containment: Marianne Moore, Joseph Cornell, and the Poetics of Enclosure," *Journal of Modern Literature* 29, no. 4 (2006): 124–44, esp. 128.

35 The frames of the Lens Boxes will be analyzed and interpreted in section 6.3.

36 Michel Serres, *The Five Senses: A Philosophy of Mingled Bodies*, trans. Margaret Sankey and Peter Cowley (London: Bloomsbury Academic, 2018), 147.

37 Serres, *The Five Senses* (see note 36), 147–48.

Fibonacci Networks

As in the eponymous light sheet and drawing, the themes of needles and sewing and their transformation are omnipresent in the Lens Box. The diverse connections between these works should be thought of in terms of many-valued logic and will be contextualized accordingly below. There are, moreover, elements that point far beyond the *Needless Needles* group and are found in many of Bauermeister's works. One of these can be linked to the addendum to the Lens Box's title: *Vol. 5*: to the left of the recession stands the full title on two lines: "Volume 5 / needless needles." This does not mean that it is the fifth work in the group; for example, no "Vol. 4" was ever executed or even planned. The number refers to the Fibonacci sequence, a recurring feature in Bauermeister's art, which, along with the omnipresent numbers, also reflects her interest in natural processes.

Beginning with one, each number is always added to the previous one, resulting in the following progression: (0), 1, 1, 2, 3, 5, 8, 13, 21 … The Fibonacci sequence has been known since antiquity and was first described by Leonardo da Pisa, known as Fibonacci, in his publication *Liber Abaci*, published in 1202 and then in a revised version in 1227.[38] With this sequence of natural numbers he tried to determine the growth of rabbit populations. Following da Pisa, the Fibonacci sequence has been described as fundamental to many natural growth processes, such as flowers, shells, and even fatty acids. The connection between the golden section and the Fibonacci sequence is that as it progresses the quotient of the sequence moves ever closer to the ratio of the golden section (1.6180339887). There is a long tradition in art and architecture of employing that ratio of numbers as the basis for a composition.[39] In recent years doubt has repeatedly been expressed about the validity of these discussions that associate the Fibonacci sequence and the golden section and attribute "natural" proportions to both. A harmony "based on nature" probably does not exist.[40]

Of Bauermeister's contemporaries, Mario Merz is probably the artist most associated with the Fibonacci sequence, which he first employed in an exhibition of his works in 1970.[41] Bauermeister was probably interested in the mathematical se-

38 See Huberta Lausch, *Fibonacci und die Folge(n)* (Munich: Oldenbourg, 2009), 1–3.

39 The golden section is the solution to a mathematical problem introduced by Euclid. On the golden section's connection to art and architecture, see Priya Hemenway, *Divine Proportion: Phi in Art, Nature, and Science* (N.p.: Sterling, 2005), esp. 90–120; Albert van der Schoot, *Die Geschichte des goldenen Schnitts: Aufstieg und Fall der göttlichen Proportion* (Stuttgart: Frommann-Holzboog, 2005).

40 See Clement Falbo, "The Golden Ratio: A Contrary Viewpoint," *The College Mathematics Journal* 36, no. 2 (2005): 123–34, esp. 134.

41 See Elizabeth Mangini, "Solitary/Solidary: Mario Merz's Autonomous Artist," *Art Journal* 75, no. 3 (2016): 11–31, esp. 25. The Fibonacci sequence "would become a lasting trademark of Merz's

quence, as Merz was, because it could be used to make natural processes visualizable in an abstract way. Whether this can in fact be seen as given or merely represents a generalization is of less interest than the reasons why Bauermeister integrated the sequence into her works, whereby historical knowledge of Fibonacci numbers has to be included as well. Bauermeister employed the sequence in her compositions from the mid-1950s onward and always saw a connection to natural processes in them.

Needless Needles Vol. 5 should therefore be seen as the next step in the growth of the sequence and not just as a numbering. Moreover, the numbers of the Fibonacci sequence are found all over the Lens Box: In the upper left corner inside the box its numbers up to thirteen are written one above the other on glass. Part of the sequence is also placed in the lower left, on the frame, marked with arrows, to the left and right of the edge of the canvas that is glued to the frame. This part of the canvas has an illusionistic function. On the left side of the Lens Box's recession, the canvas appears to emerge from the glass area as if "opening up like a book"; where it is glued to the wood frame, Bauermeister drew repeated cross-stitches to make it look sewn on. Drawing techniques on its upper edge are used to suggest that the canvas consists of three sides "opened up like a book," once again partially sewn on with cross-stiches. On the ends of the three drawn sides are a "1" on the middle one, a "3" on the back one, and on the front one, which is "opened up" for us, a "5." These three Fibonacci numbers thus indicate the three different "volumes" of the Lens Box; the viewer sees only *Vol. 5* because that is the side that is "opened up."

The *Needless Needles* drawing also refers to the Fibonacci sequence. The numbers up to fourteen are written, one below the next, on the upper right edge of the grid, as if they were constituent of the transformation of the circular elements within the drawing. In addition, numbers from the Fibonacci sequence can be found all over the drawing's ground: 144 appears several times, for example; upside down between the three circular structures, as if to suggest it is "flowing downward," because its digits are elongated and intertwined. This detail is also seen in the upper right corner, between the 3 and the 5, on the edge of the grid. The progression of the sequence is thus part of the transformation of the higher Fibonacci number 144. Two other aspects come into play, namely, the instructions on the left and right edge, at the same height: whereas on the right a "dream" of the artist is written in which she plants "little sheets of paper with ideas written on it," and images evolve out of that, in the left offshoots of the grid we read "visual 'patterns' from other painters." In addition to the Fibonacci numbers 3 and 5, the idea of the natural growth of ideas turning into art affects the number 144, as do art historical borrowings. One may speculate that Bauermeister had Salvador Dalí's painting *La persistance de la mémoire* of 1931 in mind for her "downward-flowing" numbers. At the very least its clock motif is one

artwork" (ibid., 11). The composer Béla Bartók and the architect Le Corbusier also emphatically employed both the sequence and the golden mean in their works.

such "visual pattern." The combination of the individual elements triggers chains of association that can be continued endlessly. The highest number from the Fibonacci sequence that can be identified in the work is the 610 that appears several times in the lower right corner. In the *Needless Needles* light sheet the Fibonacci numbers are written one below the next on square canvas cutouts sewn on to the upper right corner of the work. The sequences of numbers are half covered, because the canvas is folded open, and hence it is primarily the verso that is seen. Another manifestation of the Fibonacci sequence on a light sheet concerns the installation with the wooden sewing needles: their dimensions are based on that sequence of numbers, so that every subsequent "needle" is the sum of the two previous ones.

By employing the Fibonacci sequence in all three works, Bauermeister manages to link parts of the composition to a principle that, at least at the time, was thought to describe growth processes in nature. By doing so she is reflecting on her own role as an artist who, though she makes the decision to use the Fibonacci sequence, delegates the aesthetic result—as in the example of the wooden sewing needles—to the progression. Moreover, the Fibonacci numbers establish on a first, basic level a network with the other works of the *Needless Needles* group because they are in all the works. The different formulations create a connection of "identical" elements between the works of art. In many other works by Bauermeister, this mathematical sequence was either used for the composition or written in them as numbers. They also turn up in the Stone Pictures and in works composed of several natural materials. In the sketchbook from 1961–63 one even sees experiments with developing a modified sequence in which the Fibonacci numbers are taken as the point of departure in centimeters and then a millimeter is deducted at each step.[42] In general, the Fibonacci sequence represents for Bauermeister an aesthetic abstracted from natural processes that moves away from the dependence of the subject, because it is a principle derived from nature. The number sequence responds only to the steps of growth by describing them and thereby making them intelligible. When using the Fibonacci sequence, Bauermeister does not run the risk of falling into a subjective dogma, because it permits (alleged) insights into principles that stand outside of the sphere of influence of subjects and are accessible to them only in a mediated way.

Thanks to the "opened" canvas page of *Vol. 5*, on the left next to the recession in the Lens Box, a passage of text becomes visible that refers to another element in Bauermeister's art: the text is concerned with reflecting on art and its historical trends. In writing backed with black one read there: "towards a (one or several) (brand) new academism." The words "one or several" and "brand" are arranged so that they can be read as additions. Two asterisks behind the statement refer to the multipart question further down. There stands "what do you have against" with a

42 See Bauermeister, "Skizzenbuch/Quaderno" (see note 6), 42–43. The sequence is employed in *Sand Stein Kugel* (Sand Stone Sphere) group; this is discussed in section 3.4.

listed numbered "1–8," one below the next. The words denote artistic parameters such as "perspective," "beauty," "ugly," and "colour" but also personal ones such as "me" and "you"; in addition, "eg." as an arbitrary continuation is seen several times. The dot on the i in "academism" is in the shape of a heart, which was already described as "bad" on the *Needless Needles* light sheet. The entire passage is intended to comment on the artistic positions of the neo-avant-garde, who, depending on the context, were thought to be developing avant-garde trends or to be institutionalizing them and therefore failing.[43] In 1964 Bauermeister was not trying to propagate a new academism but rather pointing out that the strict rejecting of something always entails the risk of running into a new "constriction," that is, of producing a new academism.[44] As strategies against "modernist orthodoxies" Bauermeister designs a system of "radical inclusiveness" in her art.[45] "Radical inclusiveness," by contrast, includes, contrary to dominant contemporaneous trends, one's own subject, complex structures internal to the work, playing with perspective, illusion, and words in order to reflect on them on another level of equal value. Directly below the eight questions on academism on the *Needless Needles* Lens Box a line reads that Bauermeister's "radical inclusivity," the status of unconditional polyvalency, should not

43 Examples of positive, almost teleological models of development include Benjamin H. D. Buchloh, "Michael Asher and the Conclusion of Modernist Sculpture" (1980), in *Neo-Avant-garde and Culture Industry: Essays on European and American Art from 1955 to 1975* (Cambridge MA: MIT Press, 2003), 1–39, and Rosalind E. Krauss, *Passages in Modern Sculpture* (Cambridge MA: MIT Press, 1981). The moment of failure is prominently described in Peter Bürger, *Theory of the Avant-Garde*, trans. Michael Shaw (Minneapolis: University of Minnesota Press, 1984), 55–59. Hal Foster attempts to show that the idea of the avant-garde is not a historical one. He describes five positions in contemporary art that continue with avant-garde legacy with adapted strategies; see Hal Foster, *Bad New Days: Art, Criticism, Emergency*, 2nd ed. (London: Verso, 2017).

44 This skepticism can be observed even with respect to her own art. When she pursued a particular approach, she automatically tried to integrate its opposite. This derives, on the one hand, from her study of critical theory; two books in particular are cited by her as important: Herbert Marcuse, *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* (Boston: Beacon, 1964). Contradictions are not resolved; rather an "illusory unification" of opposites follows from a general "character of the refusal" (ibid., 256). Equally important for Bauermeister's doubts is Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment*, ed. Gunzelin Schmid Noerr, trans. Edmund Jephcott (Stanford: Stanford University Press, 2002). On the other hand, Bauermeister identifies an essay by Henry David Thoreau, who inspired her, already as a young artist, to resist prescriptions, even self-imposed ones: "Law never made men a whit more just; and, by means of their respect for it, even the well-disposed are daily made the agents of injustice." Henry David Thoreau, "Civil Disobedience" (1849), in *Civil Disobedience and Reading* (London: Penguin, 1995), 1–41, esp. 4.

45 See Liz Kotz, "Language Upside Down," in *Mary Bauermeister* (see note 33), 59–77, esp. 66. In her essay Liz Kotz also attempts to locate Bauermeister within trends in the evolution of art in New York in the 1960s.

be understood literally but as a strategy: "don't in-/ex- clude metha-/para-/item-physics." Not including and excluding is the paradox that the Lens Box demands. In the works, however, it seems rather as if Bauermeister is initially including very much in order to cause metalevels and networks to emerge from it. Metaphysics experiences an emphatic incorporation in the composition of her works although the historical trends would lead one to expect rather analytic philosophy, structuralism, and critical theory.

The "gradient of reflection" in the subject described by Günther only becomes clear when two subjects reflect on an object at the same time, since that results in awareness that processes of reflection exist outside of oneself that cannot be seen by me. The simultaneous movement of reflection by two subjects can in the case of *Needless Needles* cause elements to result in the works of art that may seem contradictory according to common principles of logic but impart knowledge here. "Simultaneous movement of reflection" should not be understood literally here, because the works of art are not an application of philosophy and potentially always have the possibility of finding themselves in such a situation.

2.2 "A Trans-Aristotelian Human Type": Many-Valued Logic according to Gotthard Günther

> To a non-Aristotelian logic must correspond a trans-Aristotelian human type and to the latter in turn a new dimension of human history.[46]
> *Gotthard Günther, 1959*

Gotthard Günther originally planned two volumes for his "non-Aristotelian logic." The first volume of 1959 was intended to challenge the philosophical axioms of classical logic and in part refute them in order to illustrate the necessity to describe a new "transclassical" logic. In that book a second volume is repeatedly announced that would use the philosophical foundation to develop a many-valued logical calculation based on it that would legitimize with formal logic the new "rational form of thinking."[47] This second volume was never published, for which Günther cited several reasons: First, the "backbone" of many-valued calculation, which he had previously tried out in an essay, turned out "on further reworking not to be sound enough."[48] Gün-

46 Günther, *Idee und Grundriss* (see note 1), 114.

47 Ibid., 306 and 363–68. Bauermeister's copy still has "Erster Band" (First Volume) in its title, which was removed in later editions.

48 See ibid., XXII. The essay with the many-valued calculation on which the second volume was to be based was published in 1958: Gotthard Günther, "Die Aristotelische Logik des Seins und

ther had no doubts about his theoretical discussions and his insights, which he had attained above all from a reading of Hegel, but it was not possible for him to produce the relevant truth tables. Second, he described his contact with cybernetics and biophysical computer theory as crucial, because they made it obvious that his theory cannot be simple a place-value system in classical logic. It required rather a general extension of bivalency that, he hoped at least, could be undertaken by mathematicians.[49]

Because Günther refers to metaphysical thinking in his philosophical principles of extension, his name is not primarily associated with "non-classical logic."[50] Jan Łukasiewicz, Emil Leon Post, Rudolf Carnap, and also Gottlob Frege are repeatedly mentioned by Günther as trailblazers of a "New Logic," but at the same time also rejected, since none of them challenged the ontological principles of bivalency.[51] Günther, however, continues to see this as a given, even if it is merely "ignored" by logicians, with the result that they subliminally tag along as an assumption. For Günther, the goal is not to "relativize" or "gradate" true and false but rather to create an extended situation. When many-valued logic is addressed in what follow, it refers to a metaphysical approach.[52]

The line between the two terms "metaphysics" and "ontology" is, according to Günther, a categorization. He understands ontology as the symmetry of subject and object, in which everything given can be traced back to a root of its being, so that, on the highest level, thinking and being form a unity.[53] For Günther, this basic assumption of Western philosophy has to be challenged. To achieve this, it is first necessary

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die nicht-Aristotelische Logik der Reflexion," in *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 1 (Hamburg: Fritz Meiner, 1979), 141–88.

49 See Günther, *Idee und Grundriss* (see note 1), XXIII; and Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 184. Only the introduction and the unfinished first chapter were published as essays in the second volume. Günther seems to have broken off writing on it before getting to the logical calculations; see Gotthard Günther, "Logistischer Grundriss und Intro-Semantik" (1963), in *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 2 (Hamburg: Fritz Meiner, 1979), 1–115.

50 Günther is not mentioned in Graham Priest's "standard work"; in the section on the history of "many-valued logic," Priest identifies Jan Łukasiewicz as the "inventor" of many-valuedness and discusses Stephen Cole Kleene, Emil Leon Post, and Saul Kripke; see Graham Priest, *An Introduction to Non-Classical Logic: From If to Is*, 2nd. ed. (Cambridge: Cambridge University Press, 2012), 139–40. Other publications on the subject do not mention Günther either, e.g., Siegfried Gottwald, *Mehrwertige Logik: Eine Einführung in Theorie und Anwendung* (Berlin: Akademie, 1989), esp. 5–9.

51 See Günther, *Idee und Grundriss* (see note 1), 94 and 167; Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 182–84.

52 See Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 182. Günther calls "probability logics" a "pseudo-many-valued logic"; Günther, *Idee und Grundriss* (see note 1), 137–38.

53 See Günther, *Idee und Grundriss* (see note 1), 14–19.

to have a (many-valued) metaphysics without ontology, that is, without the basic assumptions of the Platonic-Aristotelian tradition.[54] The "being of the entity" cannot be traced back to a final unity into which thinking is ultimately assimilated; the excess of reflection in the subject escapes this dissolution. What is supposed to happen is using the means of metaphysic to describe the world as "ontologically many-valued" so that a "new ontological picture of reality" results that is no longer two-valued with a primordial root.[55]

Günther's Aristotelian Axioms

Aristotle—at least according to Günther—provided the structures of two-valued logic. By borrowing and extending the ideas of Plato, the ancient philosopher is responsible for our interpretation of the world and the order that goes hand in hand with it. We can trace back to him not only the juxtaposition of thinking and being, whereby being is the higher-level authority, but also the value interpretations of "true" and "false" and the separation of "form" and "content." The whole of Western logic until Günther attempts to satisfy bivalency without rejecting its principles.[56] Günther is simplifying a great deal here, since there is extensive criticism of Aristotle's axioms of logic, probably the first of which were made by the Greek polymath himself, who doubted the principle of bivalency in statements about the future.[57]

In addition to the philosophical unique selling proposition that Günther would like to claim for himself, his apodictic statements on the subject should be under-

54 See ibid.

55 See Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 184 and 198. Following Günther, here too I operate with the term "metaphysics" to avoid presuming bivalency with the term "ontology." Aristotle understood metaphysics to be "the knowledge of the most knowable," from which all other knowledge can be derived; Aristotle, *Metaphysics, Books I–IX*, trans. Hugh Tredennick (Cambridge, MA: Harvard University Press, 1933), 11–13, esp. 15. In 1965, in his lecture on metaphysics, Theodor W. Adorno offered a less optimistic prognosis for that philosophical discipline: "Today metaphysics is used in almost the entire non-German-speaking world as a term of abuse, a synonym for idle speculation, mere nonsense and heaven knows what other intellectual vices." Theodor W. Adorno, *Metaphysics: Concept and Problems*, ed. Rolf Tiedemann, trans. Edmund Jephcott (Cambridge: Polity, 2001), 1.

56 See Günther, *Idee und Grundriss* (see note 1), 241–42. In this view Aristotelian logic is merely a term Günther chose; elsewhere he writes himself that Aristotle did not inaugurate logic but merely crucially "further developed" it—nevertheless, Günther calls everything two-valued "Aristotelian"; see ibid., 92. In his preface to the second edition of his *Critique of Pure Reason*, Kant criticized logic since Aristotle since it "seems to all appearance to be finished and complete." Immanuel Kant, *Critique of Pure Reason*, ed. and trans. Paul Guyer and Allen W. Wood (Cambridge: Cambridge University Press, 1998), 106. Kant's philosophy is characterized by the determination of a new metaphysics as science; ibid., 148.

57 Aristotle, *On Interpretation*, trans. Harold P. Cooke, in *The Categories, On Interpretation, Prior Analytics* (Cambridge, MA: Harvard University Press, 1962), 114–79, esp. 131–41.

stood to mean that by generalizing he would like to focus attention on precisely the one point. Not only his book of 1959 but also the essays that address this complex of themes are a recurring reflection on the fact that logic is two-valued and needs a metaphysical extension. He ignores the existing formulations in philosophical and mathematical logic because no one has described his train of thought on the different qualities of reflection and self-reflection from the three positions "I," "you," and "it"—that is, "subject," "other subject," and "object." "Classical logic," which for him merely describes the processes between a subject and an object, is accordingly merely a "special case" of logic; only "transclassical logic" completes it.[58]

The "trans-Aristotelian human type" from the epigraph of this section manages to avoid bivalency. His thinking and hence also the determination of true and false take on a new dimension that is closer to the complexities of reality: "All philosophy until now, in the East as well as in the West, is characterized by this strange ignoring of the 'you' as an index for an autonomous philosophical motif."[59] In the context of this study, however, a discussion of the clarity of Günther's discussion in comparison to other positions of (many-valued) logic will not lead us to our goal; rather, Bauermeister's succession to his ideas and their productive applications are of interest.[60] She has studied Günther's book from 1959; there are no indications that she read his previous or subsequent writings, even on the subject of "trans-Aristotelian logic."

For Günther, the fundamentals of logic are the four propositions (axioms) that Aristotle defined for metaphysics, "for they apply to all existing things, and not to a particular class."[61] This "philosophical core axiomatics" consists of: the principle of (non)contradiction, the principle of identity, the principle of the excluded third (*tertium non datur*), and the principle of sufficient reason.[62] If they could be refuted in whole or part, then it would be possible for Günther to base his "non-Aristotelian logic" on that.

Aristotle sees the principle of noncontradiction as "the most certain of all principles" and hence as the foundation for the other axioms.[63] He says: "It is impossible for the same attribute at once to belong and not to belong to the same thing and in the same relation."[64] In this view, a double coding that something at once is and is

58 Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 198.

59 Günther, *Idee und Grundriss* (see note 1), 69.

60 For efforts to place Günther within the discourse on logic, see Kurt Klagenfurt, *Technologische Zivilisation und transklassische Logik: Eine Einführung in die Technikphilosophie Gotthard Günthers* (Frankfurt am Main: Suhrkamp, 1995), and Cai Werntgen, *Kehren: Martin Heidegger und Gotthard Günther; Europäisches Denken zwischen Orient und Okzident* (Munich: Wilhelm Fink, 2006).

61 Aristotle, *Metaphysics* (see note 55), 159.

62 Günther, *Idee und Grundriss* (see note 1), 123.

63 Aristotle, *Metaphysics* (see note 55), 161.

64 Ibid.

not does not seem possible under any circumstances. Likewise, something logically positive cannot at the same time contain its own negation: if a statement is considered true, its opposite is necessarily false. In "trans-Aristotelian logic," however, this strict contradiction no longer seems to apply fully, since two logically positive values that induce their opposite stand side by side, and both can hold true. A situation that can result from the process of reflection when not only a subject and an object serve as the point of departure of the observation. Bauermeister illustrates this on a first, basic level in her works with the constantly recurring use of the string of words "yes, no, perhaps," which should likewise not be understood as a mutual contradiction.

The process of reflection is closely tied to the principle of identity: an object of reflection must always be identical with itself, since that is the only way we as subject can make a separation and recognize it as an object; if this identity did not exist, it would be impossible to have knowledge of something.[65] Günther leaves this principle untouched at its core, although he attempts to refute. This is done, however, via a detour that again implies the reflection process. This connects to the principle of the excluded third, to which Günther devotes the most attention: To achieve a many-valued logic, it is above all necessary to undermine the strict *tertium non datur*. As soon as it is necessary to assume a "trinitarian metaphysics," the next step to a "system of infinite values" is easy to make.[66]

The principle of the excluded third shows that there cannot be any intermediary "between contrary statements" that takes on the value of the statement or its contrary.[67] It must therefore remain separate from the principle of noncontradiction, although they refer to each other. Günther defines the excluded third as a situation in which "between two contradictory predicates, of which one identifies the object and the other represents the situation of reflection of the logical subject as its negation, a third (predicate) is excluded systematically and on principle."[68]

The third is for Günther another subject with its own reflection process. In Bauermeister, a third is perhaps most readily visible by means of the word "perhaps"; it does not just stand for an uncertainty but is also the mediation between "yes" and "no" as an autonomous value. It is similar with the formula "1+1=3," which Bauermeister at times even uses as a signature and which is found repeatedly in her oeuvre in different forms of visualization.[69] This formula reflects a nucleus of

65 Ibid., 121–25.

66 Günther, *Idee und Grundriss* (see note 1), 91 and 313.

67 Aristotle, *Metaphysics* (see note 55), 199.

68 Günther, *Idee und Grundriss* (see note 1), 127.

69 The line "1+1=3" is found repeatedly in Bauermeister's Writing Drawing. There is also a work with that title form 1964, a Writing Drawing that Bauermeister distorted with lenses. *1+1=3: An Exhibition of Retinal and Perceptual Art* was, moreover, the title of a group exhibition at the University Art Museum of the University of Texas in 1965 that included Bauermeister; it is possible that the curators were inspired by Bauermeister in choosing the title: "1+1=3 is not good

Bauermeister's thinking comparable to "yes, no, perhaps." The apparently simple and immediate understandable sum "1+1" is made illogical by the number "3" after the equal sign. Because of the simplicity of the formula and its all-too-clear mistake, it could be dismissed as a trivial Surrealist game. But "1+1=3" should be read as a challenge to the principle of the excluded third. The two numbers before the conclusion cannot really incorporate a "third," but here it is plainly the number "3" to reveal the extension of bivalency. An inference from the theory of many-valued logic that Bauermeister derived from her reading and that is also suggested in Günther also comes into play here, namely, that the negation of a conjunctive meaning does not automatically signify the loss of conjunction.[70] That means that the small calculation "1+1=3" is not necessarily wrong; it is only if the principle of bivalency is assumed as the foundation.

Two-valued thinking is completed with the fourth axiom, the principle of sufficient reason: The sufficient reason describes that a subject has a compelling reason to think puts itself in a negatively separated sphere opposite the positive entity—that is to say, is not assimilated by it. Here we see a close connection to the principle of identity, since, for example, it is only the ability of objects to identify with themselves that results in the separation of subjects, which are now given a sufficient reason to reflect on the object from a subjective position. All four axioms are structured to stabilize bivalency.[71]

Günther's Relationship to Hegel

For Günther, being as the positive is identified with the object, whereas the subject is to be described with the negative or the nothing; this leads to a "metaphysical gradient" that favors being.[72] Günther bases his definitions of positivity and negativity on Hegel's terminology. For the philosopher of German idealism, "absolute negativity" emerges in contrast to being through the subject's reflection process.[73] The "nothing" that results for Hegel should not be understood as a marginalization compared to positivity but rather as the manifestation of "essence" in an ontological sense: "The

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or bad, right or wrong; it is an experience." Robert Engman, "Some Thoughts About Values," in *1+1=3: An Exhibition of Retinal and Perceptual Art*, exh. cat. (Austin: University Art Museum of the University of Texas, 1965), n.p. In 2017 there was a solo exhibition titled *Mary Bauermeister 1+1=3*; see *Mary Bauermeister 1+1=3*, exh. cat. (Milan: Studio Gariboldi, 2017).

70 See Günther, *Idee und Grundriss* (see note 1), 355.

71 See ibid., 236–37.

72 Ibid., 322.

73 Georg Wilhelm Friedrich Hegel, *The Science of Logic*, ed. and trans. George Di Giovanni (Cambridge: Cambridge University Press, 2010), 342 (11.245).

negativity of essence is its self-equality."[74] The important thing is that the "negativity" and "equality" of the "metaphysical gradient" described by Günther shift in favor of the subject, because being can penetrate the sphere of essence (negation) through the process. It is possible for all of us as subjects to create a situation in which we use our cognitive faculties to approach an object though reflection. Now we must define ourself with positivity when we place the object, being, in negation to it in order to make the epistemic movement. According to the axioms of logic, being is not only identical to itself, to make distinguishing possible, but, beyond that, also opens up the sufficient reason for the thought process. In a next step the "reflective movement" enters; it is a negation as such, that is, a reference to itself that has its own being.[75] "Pure, absolute reflection" is a "movement from nothing to nothing," which in turn neither means that being should continue to be sought in something else nor that it comes to a dissolution, "but its being is its own equality with itself."[76] The process of reflecting on the negation of the negation leads to a situation in which, according to Hegel, "shine" is left behind. It is precisely the rest from the sphere of being and hence a privileging of the subject; it participates in being based on the double movement while it is actually located in the realm of the nothing.

Günther intensely engaged with Hegelian logic already in his dissertation, laying the cornerstone for his later theory of "non-Aristotelian logic."[77] The impetus for extending bivalency into many-valuedness was Hegel's description of thinking being capable of uniting nothing and being in itself. Günther identifies as another reason for the necessary extension the "breakdown of the mathematical, physical image of the world" by discoveries in the natural sciences and the emergence of quantum physics in the early twentieth century. The research of Albert Einstein and Werner Heisenberg had in his view ensured that the subject could no longer continue to be marginalized or generalized when describing phenomena.[78] But this is more of a marginal note in Günther, since his approach lies in the metaphysical determination of the subject. (German) idealism failed, in his view, because the identity of reflection in the subject could not be adequately determined: Kant's transcendental, logical subject has a privileged position relative to the empirical subject and object and thus the possibility of absorbing both in it.[79]

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74 Ibid., 344 (11.247). Hegel defines "essence" as the process in the subject: "Essence is *reflection*, the movement of becoming and transition that remains within itself." Ibid., 345 (11.249).

75 Ibid. (11.249).

76 Ibid., 346 (11.250).

77 See Gotthard Günther, *Grundzüge einer neuen Theorie des Denkens in Hegels Logik*, 2nd ed. (Hamburg: Felix Meiner, 1978).

78 See Günther, *Idee und Grundriss* (see note 1), 60 and 186–88.

79 See ibid., 174. "Thus such objects are nothing further than the transference of this consciousness of mine to other things, which can be represented as thinking beings only in this way"; Kant, *Critique of Pure Reason* (see note 56), 415.

The Hegelian attempt to determine the excess of reflection that results from two-valued reflection within the subject is for Günther too strictly tied to the dialectic approach, so that the logical step out of bivalency is not taken.[80] Moreover, Hegel's transcendental subject did not have the opportunity to posit its own reflection process as an object and thus obtain trivalency, because the "predicate calculation" of the discipline of (mathematical) logic had not yet been developed in his day.[81] That Hegel "suspected" a many-valuedness but was unable to draw the necessary conclusions from it and therefore had to remain in bivalency is a speculation by Günther that can be traced back to his massive admiration for the idealist philosopher—an attribution that need not necessarily hold up. Günther derived his own interpretations from the "excess" described in Hegel's logic, which results from the reference to one's own reflection.

Many-Valued Logic

In order to present a "non-Aristotelian logic," Günther first rejects "intersubjective universal validity": he defines this as a consensus that when two subjects have one concept of an object the concept should be regarded as accurate for all subjects.[82] The construction of a universally valid subject may stabilize two-valued logic but it ignores the double reflection process described by Hegel, since "external reflection begins from immediate being, *positing* reflection from nothing."[83] The "positedness" of reflection, which is nothing other than "immanent reflectedness"—according to Günther's insight—would have to take place not only in my own subject but also in another subject if both focus on one object.[84] It is not that I as subject reflect on the thought process of another subject, which could only be speculation on a process not accessible to me. It can rather be assumed that if I as subject have the double reflection process in me another subject must necessarily have it as well—provided that we do not assume strict solipsism.

Subjectivity should therefore be divided into the situation of I, that of not-I (you), and that of the object, whereby the understanding of "you" must be seen as an infinite multitude of "I's" if misunderstanding is to be avoided.[85] "I am neither the other that I encounter as impenetrable and dead, nor am I the other than I encounter as transparent and alive, since it is not *my* life."[86] This point is crucial to

80 See Günther, *Idee und Grundriss* (see note 1), 100 and 176–79.

81 See ibid., 221–26. "At the beginning of the nineteenth century it was simply not humanly possible to do things better than they were accomplished in Hegel's works." Ibid., 226.

82 See ibid., 11.

83 Hegel, *The Science of Logic* (see note 73), 351 (11.255).

84 Ibid., 352 (11.256).

85 See Günther, *Idee und Grundriss* (see note 1), 53–66.

86 Ibid., 104.

Günther's metaphysics, seen all other descriptions and conclusions set out from it. It is also closely connected to the passage that Bauermeister identified as the "most important" one in her copy of the book. Intersubjectivity would result in a (transcendental) higher-order subject. Because we as subjects bear within us the reflective identify described in relation to Hegel, and that makes the status of the subject possible in the first place, there can be, according to Günther, no generalization. We have no insight into the "alien" identity of reflection but must assume that it exists, since the other subject would have to be categorized as an object. Günther argues that this happens in Kant, who does not distinguish between objects and other subjects, since for him both are unattainable things, which results in an equation of everything outside of one's own reason.[87] In a later essay Günther attempts to get closer to the thought process with the metaphor of the "space of consciousness": Every individual is a self-contained world, and there exist many of them.[88] Two "space of consciousness," that is, too subjects, can meet and in each an individual chain of reflection takes place that the other cannot see. If the two subjects turn to an object, they form a "compound contexture" which "has a higher logical complexity" then when only the two-valued separation of subject and object dominates.[89]

Because theoretically any subject could experience this situation with any other, and this is also possible in turn with any object, there must be "infinitely many ontological places."[90] This description cannot be resolved because the different reflection processes must necessarily remain opaque: "The reflective difference between 'for oneself' and 'for us' remains unexplained."[91] This should not be confused with an "understanding" between two subjects about what they see, because Günther is operating in metaphysics and its axioms, so that epistemological questions about the structures of our thinking and the conditions of reflection that we must have are always intended. What follows from additional processes of reflection in subjects other than oneself is the challenge of the principle of the excluded third. For another subject—a you—performs the same processes as I as subject and cannot therefore be understood as mere object. Günther therefore sometimes also speaks of a "second-order object," which subjects become when they integrate one another into a situation.[92] In the case of the excluded third, however, it is impossible for such a "second-order object" to be integrated into the reflection process as well, because

87 See Günther, "Logistischer Grundriss und Intro-Semantik" (see note 49), 2–4.

88 Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 191.

89 Ibid., 192.

90 Ibid., 199.

91 Günther, *Idee und Grundriss* (see note 1), 341.

92 See ibid., 83.

it can only consist of a positivity and the negation to be contrasted with it, there is no room there for a second (autonomous) negation that would mean a third predicate.

> "The you is not an I-like object either. Since when I make myself my own object in reflection, I do not yet become the you. The you is therefore neither a simple object nor is it no more than the I turned into the object of reflection. It is rather a third, which is excluded from the two-valued structure on principle."[93]

This relaxed exclusion represents a challenge to the axioms of logic and is closely connected to another principle, namely, that of sufficient reason. It is not sufficient to distinguish our own thinking from the positive entity so that we form an opposite pole to it. The other subjects, the "second-order objects," are also a reason, which is, however, structured differently. Subjects literally force their existence upon us, since they are "equipped with autonomous thought processes" that "we must parry in our own reflection."[94] If we have a sufficient reason to distinguish ourselves from objects, there must be an extended one to create the mutual distinction of other subjects, since they are a third and may not be unified with objects that lack reflective determinations. It already follows from these descriptions that metaphysics based on logic and all the certainties that we derive from it must be called into question.

This is, however, only the first step that Günther takes, because the course of double reflection in every subject as formulated by Hegel also leads to many-valuedness. The "most important thing" in Bauermeister's copy of Günther's *Nicht-Aristotelische Logik* is the passage that a subject is "identity of reflection with the other." Contrary to initial appearance, there are two parts to this step that build on each other and refer to Hegel's logic:

> "In this determination, it [reflection] is doubled. At one time it is as what is presupposed, or the reflection into itself which is the immediate. At another time, it is as the reflection negatively referring to itself; it refers itself to itself as to that its non-being."[95]

Günther summarizes this and other similar lines of thought in Hegel with the formulation "reflection in itself of the reflection in itself and in others."[96] When a subject refers to an object, it results in a first process of reflection in the subject that incorporates an "other" along with it. If this situation is reflected on yet again—what Hegel described as negation of the negation—it results in a second "reflection in itself" that contains the first process of reflection as its foundation. Thinking no longer

93 Ibid., 277.

94 Ibid.

95 Hegel, *The Science of Logic* (see note 73), 348–49 (11.252–53).

96 Günther, *Idee und Grundriss* (see note 1), 259.

has a simple object as it does in two-valued logic; rather, it is assumed that the subject in the process of reflection is aware that it has in its thoughts an object identical to itself and then reflects anew on that situation. The "double reflection in itself" must theoretically take place in subject and objects; it is merely expressed differently in subjects, since they are capable of cognitive acts; nevertheless, for Günther it is "the whole metaphysical world process itself."[97]

The antithesis between subject and object that is a pillar of (two-valued) logic repeats itself again in the subject itself. What follows from this identity of reflection is the renewed rejection of the principle of the excluded third, except that here the third is found in the process of reflection itself and does not require another subject. The second thing that joins the subject and the object is process of reflection that depends on thinking and is a "derivative." Günther also develops from this the challenge to the principle of identity. By means of "reflection in itself and in the other," the subject takes in to itself the object of thinking. If identity of reflection results, that is, double reflection, the original object changes; the first process becomes a "'merely' thought one," while the second process represents the thinking.[98] In the process of thinking identity of being faces a challenge by means of identity of reflection.

Both anomalies of two-valued logic that Günther—the recognition of the you and identity of reflection—aspire to challenge the axiom of the (non)contradiction that Aristotle calls the foundation of the others. The contradiction that something is in a certain way and at the same time is not, because it can also be different, becomes acceptable. This seems to be a conclusion behind Günther's texts, but he rather merely suggests it and does not derive further conclusions from it. By rejecting the axioms, the "true" can now occur in "two forms": "an 'immediate' one and an 'altered' one."[99] "Aristotelian" and "counter-Aristotelian" exist at the same time by means of double reflection in itself, and not only in one's own subject but also in every other. The process of reflection occurs individually in every subject without the possibility of reciprocal insight. A simple exchange of two subjects on something supposedly objective is thus no longer valid, since each of them runs through its own reflection at the end of which stands a personalized knowledge. There is, however, no indication that this process always proceeds the same way. Günther merely sees it as given that the double negation in the subject can reinstate the "original positivity."[100] The process that proceeds solitarily in every subject creates a statement that leads back from the identity of reflection to identity of being again: "The new

97 Ibid., 267.
98 Ibid., 348–51.
99 Ibid., 359.
100 Ibid., 382.

values now serve not to relativize the difference between absolutely true and absolutely false but rather to connect new two-valued contextures to the classical original contexture."[101] This quotation, which is one of the few in which Günther permits a conclusion that derives from many-valuedness is significant in two aspects: First, for him it is emphatically not about gradations to be located between the fixed points of true and false that thus represent a gray zone; rather, it is about a situation that goes beyond that. Second, the connection of new two-valued contextures does not result in the subject-object dichotomy continuing to be the final authority. By rejecting the classical axioms, there is a multiple true and false, which can be traced back to many-valuedness. It may be concluded that one consequence of Günther's theory is that two equally valuable concepts of an object exist when two reflect on one and the same object—even contradiction is possible.

2.3 A Trans-Aristotelian Type of Artist: The Many-Valued Aesthetic of *Needless Needles*

One passage in Bauermeister's sketchbook permits inferences about her understanding of Günther: "Two-valuedness does not grasp our being. Only three-valuedness encompasses this idea."[102] This section transitions into the conclusion that works of art are the "representation of an idea + the idea of a representation. Not either-or but reciprocal."[103] By "idea" (*Vorstellung*) she means the identity of reflection, that is, the process that occurs in every subject. What follows from reciprocity is the transgression of bivalency in the artistic visualization. Bauermeister calls it the "outer" or also "external being," which one must try to depict, along with "being" and "nonbeing," in the work of art.[104] All aspects relate to one another equally and are the three-valuedness described by Günther.

Perhaps the first direct attempt to visualize it in Bauermeister's oeuvre is the small written passage in the work *Gestalt zu Struktur* (Form to Structure) of 1961 (fig. 6). This work is at the transition from Bauermeister's abstract works to the drawings with writing and the Lens Boxes. Written on the right side of the diamond-shaped area in the center are the words "ja-nein-vielleicht-entweder oder ausserdem" (yes-no-perhaps-either or moreover). This string of words is also one of the first examples of writing in her art, although with Bauermeister one can never rule out that the words were added by her quite some time after the work was completed, since many examples of such later revisions can be found. Just two or

101 Günther, "Die Theorie der 'mehrwertigen' Logik" (see note 5), 192.

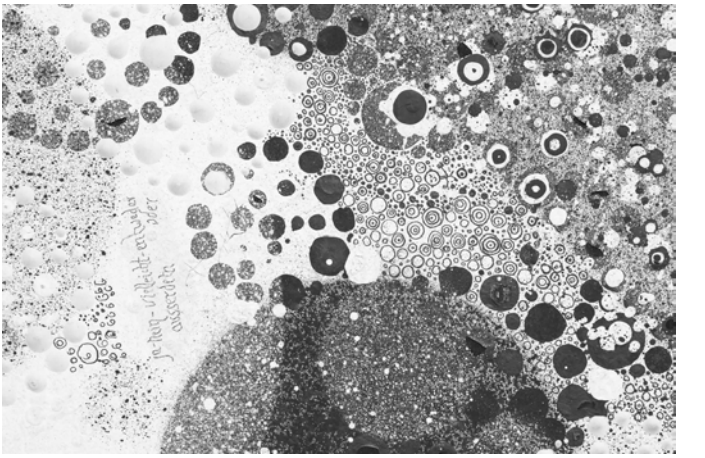
102 Bauermeister, "Skizzenbuch/Quaderno" (see note 6), T12.

103 Ibid.

104 See ibid., T13.

three years later, this had become the formula "yes, no, perhaps"; the transformation into English as her main language took place with her move to New York.

Fig. 6: Gestalt zu Struktur (Detail), 1961, casein tempera and ink on canvas, 98.5 x 98.5 cm, Mary Bauermeister Art Estate.



Many-Valued External Being

The many-valuedness initiated with the introduction of a third value, "external being," is revealed in different ways. "Yes, no, perhaps" is found several times on the *Needless Needles Vol. 5* Lens Box, for example, on the left side beneath "academism." Here the words "sold out" have been added as well as "some perhaps still available"—this strategy of ironic commentary is omnipresent in Bauermeister's work. A certain predictability of specific themes is also commented on by the artist. For example, in the lower right corner of the recession on a wooden sphere one reads: "idea for next painting No Yes Perhaps." The sequence undergoes a slight change to point to the corset into which artists—including Bauermeister—force themselves when they follow a style. The instruction on the right side of the *Needless Needles* drawing— "Don't obey me"— refers to a passage in Bauermeister's sketchbook, in which there are several instructions, one below the other, such as "Don't use: colors, forms, space, time, art, kitsch, nature," which are affirmed again and again with "Yes Sir!" The final instruction is "Don't obey me!!," which plunges the artist

in the doubt of "Yes Sir, No? Sir?" and then transitions over into Günther's many-valuedness.[105]

Many-valued logic is thus also employed to avoid getting caught up unreflectively in one's own categories or at least to try to allude to them. The formula "1+1=3," with its emphasis on incorporating the excluded third, can also be found in her works. On the *Needless Needles* light sheet, "1+1=3 janein" (1+1=3 yesno) is written on a canvas cutout in the right section of the center. The Lens Boxes contain "1+1=?3" on a layer of glass, though the "3" is part of the Fibonacci sequence written vertically. The light sheet and the light box also include the line "1+1≠1+1," which can be regarded as a simple rejection of the (prohibited) contradiction. Much like on the Lens Box, the statement "don't exclude metaphysics" is written on the *Needless Needles* drawing. It need not be assumed that there is "no thinking free of metaphysics";[106] rather, Bauermeister intends these lines for herself in order to continue to remain open to this direction of thinking (as well).

"Yes, no, perhaps" and "1+1=3" are, however, merely signs of many-valued logic on a first level that is the easiest to spot. Bauermeister's "external being" is revealed in very different ways that tally only in their motivation. Transformations of individual elements and networks between the works are the result of many-valuedness: Each of the three works of *Needless Needles* contains the "same" elements of the needle motifs but their formulations differ. The basic constant "needle" transitions in the drawing into distortions, sometimes with roots, or into the written word "Needle," and the light sheet is extended into the wooden installation along with drawn needles. The Lens Box contains glued in sewing needles and drawn, transformed needles that evolve, for example, out of drawn seams; one also finds the written word "Needle." Bauermeister shows that a simple element like a needle not only can take out a number of forms but also carries them around; the works have available a simultaneous multiple perspectivity that ordinarily sets out from a single viewer's standpoint. They reveal the consequences of a many-valued metaphysics. Every needle, whether written, drawn, glued on, or made of wood, is a logical form of the idea of "needle" as an ontological object. All visualizations in her works have an equivalent reality that concerns not only their materiality but also their form, which is "prior […] and more truly existent"—their "essence."[107] From the perspective of many-valuedness, this contradiction is possible; all of the elements can be viewed metaphysically as equally "true." The discussions of the Fibonacci series and the grid of the drawing being influenced by the natural sciences make it clear that one aspect of Bauermeis-

105 See ibid., 64. The aforementioned first mention of Günther in Bauermeister's sketchbook is found here.

106 Armen Avanessian, *Metaphysik zur Zeit* (Leipzig: Merve, 2018), 46.

107 Aristotle, *Metaphysics* (see note 55), 317 and 125.

ter's work can never be viewed in isolation; many-valuedness is a basic constant in her work.

The drawn, sewn, and reproduced patches are another example of transformation and networking: Although they can be found at least drawn in all three works, the light sheet is strewn with embroidered seams. In addition to those that were already there at the moment of the finding, Bauermeister added a number of them. Günther's logic also explains the reflections of the patches that are distributed across the entire upper half of the work. The point of departure for them could be the dark, nearly square patch in the upper third of the work to which is attached a nearly semicircular fabric cutout on the right. On the bottom, a somewhat larger square with a white, oval piece of canvas sewn on and, to the right of it, a patch that is the mirroring of the piece of canvas. From this combination of patches, Bauermeister used needle and thread to add the outlines to the bedsheet. On the upper edge of the work, for example, a partial outline of the dark, square patch and the cutout on the right loom into the work. The outline reaches almost to the two "original patches" and is rotated several degrees. Copies of these two patches, rotated about 270 degrees, are embroidered at bottom left, where the outline leads through the patches with the square piece of canvas and the white one. Another mirror starts from the two oval cutouts of the group of patches; their clipped contours loom in below it on the right. This strategy of reflections and shifted arrangements of embroidered copies of patches can also be described for the central group of patches on the lower third of the light sheet; the overall effect is similar to that of the needles; it clarifies a many-valuedness as equivalency of the individual parts. Accordingly, none of the patches is the starting point; all of them can be seen as equals, with no prototype and no copy. In this polycontextual perspective, the simultaneity of the appearance is significant; the work offers several "insights" simultaneously.

In the Lens Box, parts of the patches of the light sheet are inserted into the background of the recession in the form of photographic reproductions in order to illustrate another level of networking and possible many-valued forms. In the upper right corner of the Lens Box, parts of the upper left corner of the light sheet can be seen. This middle passage, which consists of nested, circular canvas cutouts, also forms the center of the recession of the Lens Box. To that end Bauermeister used enlarged details of photographs that had been taken for her first exhibition catalog at the Galeria Bonino in 1964.[108] That also explains the different perspective of the reproduction and hence also the background of the Lens Box. In order to develop the transformation further, Bauermeister sketched lines on the layers of glass as if they were the outline seams of the light sheet or as if the reproduced patches were "sewn on" by lines. Because the lines are drawn on the layers of glass, however, the movement of the viewer results in a minimal shift vis-à-vis the "real" embroidered

108 See *Paintings and Constructions* 1964 (see note 18), n.p.

lines that are reproduced here—in this way the transformations of the individual elements are pushed further and further. The next level of intricacy results from the use of lenses, which add a level of distortion to the existing complexity. The type of lens is crucial here—whereas the convex ones enlarge, the concave ones reduce—and the viewer's angle and movement. The *Needless Needles* drawing also takes up the distortion, but does so in a way specific to the medium. For example, the lower left corner shows not only needles and the suggestion of sewn lines but also circular forms with distorted elements that seem to evoke a lens. In addition to convex and concave effects that can be seen throughout the drawing, this section at lower left contains a distortion as if the act of viewing were captured in the process of changing.

The goal is to create a great diversity of elements that build on networking and transformation that despite the contradiction in their appearance are not mutually exclusive but rather, viewed metaphysically, logical. The variety of visualizations corresponds to the potentially infinite complexity of many-valued reflection. According to Günther, identity of reflection produces a reflective object, "an image of reflection" on a "level of the object."[109] This is literally the case in Bauermeister's work: the many images of reflection are concretized in her works of art and then, for example, influence one another through their spatial proximity, which makes them come together again in the viewing. Here too, moreover, the lenses are crucial: on another level they illustrate the identity of reflection for the viewers since they make impossible a reception that would be static and potentially always the same.

Of the numerous other elements in the *Needless Needles* works for which a similar status could be described, one stands out in particular: The work "Holy Bible Edition Redigue" is contained in the light sheet and in the light box but was never realized. In the light sheet it is drawing on the back of a square piece of canvas that is simply sewn on to an edge and for that reason looms forward into the room. It is labeled "Holy Bible edition rediguées" and dated 1963, and an opened book is drawn above it. In the Lens Box the title is written on the left of the recession, here as "Holy Bible redition edigué" and directly followed by the question: "how is that spelled?" In addition, the title shines through the opened page 5 in mirror writing. If it were possible to turn back the illusionistically drawn three pages of the Lens Box, the page in the middle would cover the recession but expose the work "Volum:1 'Holy Bible edition redigué 1964." The many allusions to the work of art continue in the catalog of Bauermeister's first solo exhibition in New York; here number 7 in the list of exhibited works is titled "Holy Bible edition Redigue" of 1964, but its size is not indicated in centimeters, as is the case with the other works, but given as "different sizes."[110] It is not possible to say with certainty whether she originally planned to execute the work, or whether these were supposed to remain symbolical; both are possible in Bauermeister's approach.

109 Günther, *Idee und Grundriss* (see note 1), 335.

110 See *Paintings and Constructions* 1964 (see note 18), n.p.

The revised edition of the Bible at least has the status of an autonomous work of art in the exhibition catalog and is inserted in various sizes in the light sheet and light box.

First, it becomes clear that the networks between the works can also exist on extended levels, not just with the themes specific to the work. Second, this now reveals a new level of many-valuedness: not only can individual elements be changed by identity of reflection within a work and yet have an identity of being that remains the same. But (planned) works of art like the "Holy Bible Edition Redigue" can go through this process, but they need not exist independently to do so but can be just a concept. With her own interpretation and continuation of many-valued logic Bauermeister creates a personalized aesthetic; the understanding of the term "aesthetic" used here is crucial to this: "The real must be fictionalized in order to be thought."[111]

An Aesthetic Concept of Many-Valuedness

Two components seem indispensable to describe a many-valued aesthetic for Bauermeister's artworks: First, recognizing objects as works of art so that the meaning derived from it experiences a fictionalization; second, viewers proceed by identifying within the conglomerates of signs, constructing their own interpretations accordingly. Works of art have the ability to illustrate a philosophical, metaphysical model as a speculative metaphor, because they can be active conveyors of contradictions—researching activity in the aesthetic can "thanks to their inherent contradiction illuminate something which cannot otherwise be asserted."[112] The recipients' own individual interpretation is necessary since a large number of subjective perspectives is one of the conditions for conceiving many-valuedness. A large majority of these qualities can be determined with the art theory of Jacques Rancière and his discussion of aesthetics.

In the widely ramified discourse of aesthetics, Rancière adopts several independent positions. The evolution of art since antiquity is for him tied to three "regimes": In the "ethical regime," which can be largely traced back to Plato's philosophy, the way of being of images corresponds directly to the way of being of individuals and of society.[113] Accordingly, the "poetic" or "representative" regime is determinant; it begins with Aristotle and in his work mimesis becomes the determining factor: it gives the arts autonomy in their own field.[114] The "aesthetic regime" follows as the third,

111 Jacques Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*, trans. Gabriel Rockhill (London, UK: Bloomsbury Academic, 2013), 34.

112 See Silvia Henke et al., *Manifesto of Artistic Research: A Defense against Its Advocates* (Zurich: Diaphanes, 2020), 49.

113 Rancière, *Politics of Aesthetics* (see note 111), 16–17.

114 See ibid., 17–18.

beginning in the early nineteenth century and lasting into our present.[115] Works of art have a specific way of sensible being; they are no longer tied to mimesis; rather, their identification as objects of art is the active achievement of the spectator; Rancière calls this "aesthetics."[116] His use of the word "sensible" should not be confused with a sensory experience or visual perception. The "distribution of the sensible" that occurs by means of aesthetics is the production of "sense," which is created by a community when it arrives at a mediated distribution of phenomena.[117] Here Rancière's theory of aesthetics is tied to his view of "dissensus." People share the work of interpreting their shared world or when redistributing sense. "Dissensus" is temporary nonagreement that results when two individuals or groups meet and negotiate commonalities.[118]

For the French philosopher, the concept of aesthetics is tied to an active transaction of individuals who make determinations and only thereby produce the sense that would not exist without these processes. Rancière is thus distancing himself from the discipline of aesthetics as conceived by Alexander Gottlieb Baumgarten, who made the perceiving subjects and the "perfection" of their sensory experiences the center of his theory.[119] The Greek term "aisthesis" is also less important for Ran-

115 See ibid., 18–19.

116 Jacques Rancière, *Aesthetics and Its Discontents*, trans. Steven Corcoran (Cambridge, UK; Malden, MA: Polity, 2009), 8.

117 Jacques Rancière, interviewed by Jan Völker and Frank Ruda, "Politique de l'indétermination esthétique," in *Jacques Rancière et la politique de l'esthétique*, ed. Jérôme Game and Aliocha Wald Lasowski (Paris: Éditions des Archives Contemporaines, 2009), 157–75, esp. pp. 159–60.

118 This status of two "heterogeneous processes" is described by Rancière as "politics"; Jacques Rancière, *Disagreement: Politics and Philosophy*, trans. Julie Rose (Minneapolis: University of Minnesota Press, 1999), 30.

119 See Alexander Gottlieb Baumgarten, *Ästhetik*, vol. 1 (1750), ed. Dagmar Mirbach (Hamburg 2007), 521. Rancière does not do historical work on the discourse of aesthetics but merely employs eclectically several elements; he starts out from his understanding of the word as a kind of container that can be filled with various set pieces. This is surprising insofar as he engaged more with the writings of Aristotle when developing his concept of politics, so there he certainly worked with a fixed point of political theory. His division of art into "regimes" also seem ahistorical, since it unifies all genres, epochs, and forms of media. It is even conceivable that instead of "aesthetics" he could choose another term; for example, he would write about an "epistemology" of art as its active identification. The close association of the term "aesthetics" with art, the multitude of associated interpretations, and its "relative" openness probably motivated Rancière to operate with this word as well. For a survey of the discourse on aesthetics, see Norbert Schneider, *Geschichte der Ästhetik von der Aufklärung bis zur Postmoderne* (Stuttgart: Reclam, 1996). On the complex, changing history of this this discourse in the field of art history, see Peter Bexte, "Anmerkungen zum Verhältnis von Ästhetik und Kunstgeschichte," in *Denken und Disziplin: Workshop der Deutschen Gesellschaft für Ästhetik*, ed. Juliane Rebentisch, 2017, http://www.dgae.de/wp-content/uploads/2017/06/dgaeX_dud_bexte.pdf (accessed April 21, 2020). One specific quality of Rancière's concept of

cière; in his publication of that name he speaks of a "mode of experience" for art in the past two centuries.[120] With his statements he positions himself contrary to a number of trends in aesthetics that have emerged in various forms since Baumgarten.

"Aesthetics […] denotes neither art theory in general nor a theory that would consign art to its effects on sensibility. Aesthetics refers to a specific regime for identifying and reflecting on the arts."[121] In Rancière's view, this ordering effect is initiated by recipients whom he calls "spectators": When they encounter an object, they not only have to turn it into a work of art but, in the "role of active interpreters," truly "develop their own translation."[122] The work of art is introduced into a field of tension that opens up between the artist and the "emancipated spectator." Only that leads to the situation in which independent interpretations and the working out of sense can occur. Accordingly, artistic works are a "third thing," in which no "uniform transmission," that is, the introduced intentions, is automatically evoked. According to Rancière, the work of art excludes any identity "of cause and effect."[123] In Kant's aesthetics, too, awareness is assumed for the identification of art: "art can only be called beautiful if we are aware that it is art."[124] In his view, however, the determination must be made independently of nature and should produce an unintentional, dis-

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aesthetics, and the reason it is used in what follows, is his view that each spectator is entitled to his or her own interpretation in order to work out the "sense" of it. This counteracts a potential finitude of interpretation, a determination that is crucial to many-valued logic. Rancière's cannot be reconciled with the discourse on the "aesthetics of perception," in which the qualities of experience define the work of art; see Stefan Deines, Jasper Liptow, and Martin Seel, eds., *Kunst und Erfahrung: Beiträge zu einer philosophischen Kontroverse* (Berlin: Suhrkamp, 2013).

120 See Jacques Rancière, *Aisthesis: Scenes from the Aesthetic Regime of Art*, trans. Zakir Paul (London: Verso, 2013), ix–xvi, esp. x. Aristotle frames it in a more specific contest as an epistemic mode of perception; see Aristotle, *On the Soul*, in *On the Soul*, *Parva Naturalia*, *On Breath*, trans. W. S. Hett (Cambridge, MA: Harvard University Press, 1935), 8–203, esp. 103. On the Aristotelian theory of the senses, see Wolfgang Welsch, *Aisthesis: Grundzüge und Perspektive der Aristotelischen Sinneslehre* (Stuttgart: Klett-Cotta, 1987). For an attempt to describe Aristotelian *aisthesis* as aesthetics, see Peter Mahr, "Das Metaxy der Aisthesis: Aristoteles' 'De anima' als eine Ästhetik mit Bezug zu den Medien," *Wiener Jahrbuch für Philosophie*, no. 35 (2003): 25–58.

121 Rancière, *The Politics of Aesthetics* (see note 111), 4.

122 See Jacques Rancière, *The Emancipated Spectator*, trans. Gregory Elliott (London: Verso, 2009), 22. Or as Rancière expresses it elsewhere: "everything that exists is always a construction or a configuration of the sensual." Jacques Rancière and Peter Engelmann, *Politics and Aesthetics*, trans. Wieland Hoban (Cambridge: Polity, 2019), 65.

123 Rancière, *The Emancipated Spectator* (see note 122), 15.

124 Immanuel Kant, *Critique of the Power of Judgment*, ed. Paul Guyer, trans. Paul Guyer and Eric Matthews (Cambridge: Cambridge University Press, 2000), 185.

interested purposiveness. The "beauty of art" is tied to the movements in reason and their categories, because it is considered a "beautiful representation of a thing."[125]

What happens in Rancière can be called "fictionalization": "testimony and fiction" constantly get closer in the twofold movement of identification and interpretation; they "come under the same regime of meaning."[126] Works of art—and for Rancière in particular the image—can express more with their "silent speech" than is possible in a discourse.[127] For him, the transfer occurs not in the sense that there is an active statement of a work of art that need only be received by the spectators; that would contradict their role. Nor is it the case for Rancière that an interpretation is intrinsically tied to an artistic work or that the latter is fitted out with ideas. The "pensive image" he describes merely evokes a previously unthought thought in us.[128] The marginalization of the sensible, as the influence of external factors on our sensory experience, is not resolved according to Rancière. It may be that it does not happen to avoid a double coding and to be able to pursue rigorously his interpretation of art's "creation of sense." Hegel's statement that a work of art contains additional means that do not show themselves "within the immediate appearance," so that one must always assume a connection of sense and the sensible, can nonetheless be the basis for this.[129]

To understand Bauermeister's many-valued aesthetics, Rancière's approach needs to be extended, since the production of meaning in works of art must have an intrinsically epistemic force in order to participate in the metaphysical. Dieter Mersch describes this episteme as "reflexive knowledge" of the arts.[130] It is the opportunity to make statements with works of art that need not be discursive and are not bound by scientific truth conditions but rather open up a way of imparting knowledge that has an independent, equally valuable mode: "But artistic knowledge is neither prereflexive nor prelinguistic, it is simply unsayable. Rather it is just as presentable as it is reflexive."[131] The statements of works of art arrive "unexpectedly" or in a "flash of inspiration"; moreover, the "singular paradigms" do not refute each other; instead, with each work a new, equivalently valid statement is made that can be experienced in it.[132] The individual elements in the work of art form the context in which one can proceed by identifying.

125 See ibid., 189.

126 See Rancière, *The Politics of Aesthetics* (see note 111), 34.

127 Jacques Rancière, "The Future of the Image," in Rancière, *The Future of the Image*, trans. Gregory Elliott (London: Verso, 2007), 1–31, esp. 13.

128 See Rancière, *The Emancipated Spectator* (see note 122), 107.

129 Georg Wilhelm Friedrich Hegel, *Introductory Lectures on Aesthetics*, ed. Michael Inwood, trans. Bernard Bosanquet (London: Penguin, 1993), 23.

130 Dieter Mersch, *Epistemologies of Aesthetics*, trans. Laura Radosh (Zurich: Diaphanes, 2015), 30.

131 Ibid., 42–43.

132 See ibid., 53 and 137.

The three works that represent the origin of the *Needless Needles* group have the opportunity to make statements individually and in combination because they are works of art. With them a meaning is produced that cannot appear elsewhere to the same degree and is moreover a "reframing of material and symbolic space."[133] On the first level a many-valued meaning in *Needless Needles* is visualized but what emerges, because art has the potential to take things further, is a "structural metaphorization."[134] Bauermeister's works of art do not illustrate Günther's philosophy; it is rather an active appropriation of a concept in order to derive from it compositional principles for her own art, which are then—in combination with other theoretical positions—a continuation of many-valued logic. It is crucial to this not only that objects must be defined as works of art but that this identification is based on a subjective and fictional meaning: "She [the emancipated spectator] composes her own poem with the elements of the poem before her."[135]

Many-Valued Aesthetic

This makes it clear why it was necessary to connect a many-valued aesthetic to Rancière's theories. The active identification of objects as works of art takes place separately in each subject; the "creation" of a work of art connects separated processes of reflection that undermine the principle of the excluded third. Bauermeister's aesthetic of "external being" first requires for many-valuedness the reflection of two subjects each of whom is permitted to have an individual interpretation. This is the case on a first level with Rancière's aesthetics: every subject performs its own act of interpretation that is granted equivalent significance by the "equality of intelligence."[136] Günther achieves an extension of the axioms according to a logical definition already with the implementation of a second subject in the situation of reflection: it is the second or potentially infinite subject what is indispensable to Rancière's aesthetics.

In this view, there is a second level, since for Rancière the work of art is the "third thing," which stands between the recipient and the artist. In his interpretation he refers not to the principles of logic according to Aristotle, and such a reinterpretation would not be productive. Crucial are simply the parallels in the intention of undermining existing dualisms by introducing a third, independent value. If the work of art is interpreted as a third, following Rancière, this leads to the extension of a

133 See Rancière, *Aesthetics and Its Discontents* (see note 116), 24.

134 See Umberto Eco, *The Open Work*, trans. Anna Cancogni (Cambridge, MA: Harvard University Press, 1989), 88.

135 Rancière, *Emancipated Spectator* (see note 122), 13.

136 See Jacques Rancière, *The Ignorant Schoolmaster: Five Lessons in Intellectual Emancipation*, trans. Kristin Ross (Stanford, CA: Stanford University Press, 1991), 38.

many-valued aesthetics: not only do two subjects and an object (the work of art) permit contradictions and the rejection of identity but in the situation of artist and recipient the work of art becomes the included (excluded) third.

Especially in her Lens Boxes, but also in her drawings, Stone Pictures, and material paintings, Bauermeister drew or glued-on portraits of herself or of details, such as her hand or her eyes.[137] The audience encounters when viewing the visualized subject of the artist, who is often depicted while working, and the object. In this situation it is not crucial whether a second subject is reflecting at the same time, since it already contains three values. In the triad of artist, viewer, and work of art, all three can be considered a third excluded by the others, but none of them can be left out by them. In Günther's work, the step of identity of reflection follows; through it the logical contradiction becomes a metaphysical fact. As soon as a subject reflects on an object, the object changes in the renewed reflection. What is crucial about the description of identity of reflection is that there are other entities with the potential to reflect to establish "three metaphysical roots."[138]

Bauermeister's many-valued aesthetics, which is immanently executed in her works, participates in the identity of reflection and the introduction of several logical values that are not substitutable. Both things "reveal" themselves, since they are composed of elements that are transformed by reflection. In her works the phases of the rejection of the axioms described by Günther are not clearly identifiable; rather, various elements of the book are bundled and illustrated. In the work of art something metaphysically impossible happens on a metaphorical level: the simultaneous visualization of different acts of reflection. For Rancière works of art are the only objects with sufficient potential to do that: "It [art] is the transcription of an experience of the heteronomy of Life with respect to the human."[139] The (illustrated) production of reality in works of art and by means of its networks is the production of the synthesis of disparate processes—the immeasurable multitude of possible reflections crystallizes in an object.

Many-Valued Aesthetics by means of the Identity of Reflection of the Object

It has already been pointed out that in Günther's view the identity of reflection in the subject and object must occur, because it is a metaphysical constant; the German philosopher sees this as given only in subjects, however. He orients himself around the Kantian separation of subject and object, whereby the excess of reflection lies on the side of the individual. In Bauermeister's work, an extension follows here: the

137 See section 6.2.

138 Günther, *Idee und Grundriss* (see note 1), 91.

139 Jacques Rancière, *Dissensus: On Politics and Aesthetics*, trans. Steven Corcoran (London: Continuum, 2010), 181.

intrinsic process of a "double reflection in itself" shifts, so that it can also come from the object. This shift into the works of the art will be described here as the "identity of reflection of the object" and joins the many-valuedness or identity of reflection presented by Günther. The identity of reflection of the object—that is to say, the double reflection of elements within the artistic work—occurs when a work of art incorporates an object that already represents the first level of reflection and then reflects on it again through transformation, distortion, or commentary.

Bauermeister's Lens Boxes are full of such processes. They occur in miniature on seemingly very basic levels, for example, to the right of the recession in *Needless Needles Vol. 5*: Here the canvas-stretched frame shows two semicircular, brown shadows that stand out against the gray background. Each has a drawn arrow pointing at it above which the word "screw" is written. This tiny detail represents the integration of an extrapictorial object—namely, a screw on the back of the frame, which was intended to stabilize the Lens Box but here penetrates into the picture's ground. This results in a tautological commentary on what can be seen there in order to secure the detail's status as art. Without this renewed reflection, the first integration—the visible imprint of the screw—might be considered a mistake.

In addition to such miniature events there are also "more obvious" examples of this kind of reflection. That is the case with the reproduction of the middle section with circular canvas cutouts of the *Needless Needles* light sheet that is glued to the background of the Lens Box and then transformed by lenses or by lines drawn later. This manner of integrating her own artistic works by means of photographic reproductions, drawing, or written title and then commenting on them again is a common motif in Bauermeister's work.[140] The situation in which the "double reflection in itself" within the object is reflected on again can also occur. Not only is the reproduced section of the light sheet in the Lens Box transformed by lenses but one can also read "foto canvas" on one of the panes of glass. This indicates that the pieces of canvas are first photographed and then inserted into the Lens Box, then they are transformed by lines and lenses, and finally that which can be seen is commented on. The renewed reflection on the identity of reflection of the object shows that many-valued aesthetics is not a strict separation of three levels, but neither should it be interpreted as a sequence.

The extension by a third value—whether that of two viewers or the trinity of artwork, viewer, and artist—is just as necessary as the process of double reflection in the subject and in the object. All processes run parallel in the works of art, which therefore produce not a "true-false dichotomy" but rather a "conjunctionality."[141] Its

140 This approach and the conclusions drawn from it are discussed further in section 6.1 using the Lens Boxes *Square Tree* and *Square Tree Commentary* as examples.

141 Mersch, *Epistemologies of Aesthetics* (see note 130), 46. Umberto Eco had already pointed out in a different context that works of art challenge classical metaphysics: "Informal art calls

status as art does not demand the articulation of provable hypotheses, which is why the *Needless Needles* works are able to unite in themselves various many-valued processes and extend them. The overlapping of metaphysical processes in the works and the challenges of viewing them were also described repeatedly in contemporaneous art criticism.[142]

The identity of reflection of the object gives works of art an agency that Günther would not have attributed to an object. In Bauermeister's work, it becomes evident because works of art contain manifold simultaneity. Not only are situations shown in the works that cannot be visualized in their juxtaposition, but the individual elements seem to circulate between the works and influence each other mutually with a dynamic of their own. Bauermeister noted in her sketchbook accordingly: "Everything is what it is but can also be changed completely by the thing to which it has been related."[143] A shift of the double reflection into the work of art itself was never discussed in detail by Bauermeister in her writings; here again it is the events immanent to her art that suggest it as well as the texts she read as a young artist.

The identity of reflection of the object may have derived from Bauermeister's study of the British philosopher and mathematician Alfred North Whitehead, especially from his "cosmology," which he outlines in *Process and Reality*: Whitehead argues for taking one's own subject as the starting point, which in principle unites him with Günther, and abandoning "subject-predicate forms of thought" in metaphysical study.[144] With his concept of "actual entities," which are considered the final and most elemental entities, the British philosopher is transitioning into a situation in which all phenomena are treated equally. Every actual entity consists of countless others and therefore has an unlimited potential for being interpreted. They are all engaged in a process of becoming and heterogeneous individuality: "No two actual entities [can] originate from an identical universe; though the difference between the two universes only consists in some actual entities."[145] Not only are the entities radically different from one another, but from that quality follows, first, that every actual entity can influence every other, therefore adding or removing one results in

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into question the principle of causality, two-valued logics, univocal relationships, and the principle of contradiction." Eco, *The Open Work* (see note 134), 87.

142 See Emily Genauer, "Mary Bauermeister," *New York Herald Tribune* (April 17, 1965). The art critic John Gruen aptly noted with regarded to Bauermeister's works: "It is a case of drowning in one's own metaphysics." John Gruen, "Mary Bauermeister," *New York Magazine* 3, no. 18 (May 4, 1970): 58.

143 Bauermeister, "Skizzenbuch/Quaderno" (see note 6), T9.

144 Alfred North Whitehead, *Process and Reality: An Essay in Cosmology; Gifford Lectures Delivered in the University of Edinburgh during the Session 1927–28* (New York: Macmillan, 1929), 34–38.

145 Whitehead, *Process and Reality* (see note 144), 44. Each of the actual entities is in its own universe so that completely new universes result when their combination is changed.

a completely new situation that requires a different interpretation. Second, Whitehead describes the connectedness of actual entities to one another: in it all elements have adopted a position that knows no exclusion.[146]

If Whitehead's actual entities are included, performativity is no longer limited to subjects' activity of reflection: One example would be the detail in the lower right corner of the *Needless Needles* light sheet. Here a thread embroidered into the bedsheet leads to a canvas cutout and transitions into the drawn seams and needles into which a "real" thread is threaded. As soon as the seam transitions back into the bedsheet, the thread again transforms into an embroidered one. In this constellation, following Whitehead, every element should be viewed as an actual entity, and they would influence one another. Connected with the reflection of the object, the real thread undergoes via renewed reflection a transformation into the drawn one. It is suggested, moreover, that the needles used to sew are included. They too have, however, already been transformed into drawn ones—only the real thread is still in the eye. The (many-valued) contradiction is revealed by the object.

Seen metaphysically, it is impossible for a subject to visualize this plurality simultaneously, which is why the object takes over the metaphorical substitution. After reading Günther with Whitehead in mind, Bauermeister's intentions seem to extend the potential she illustrated in her compositions to the object level (as well). This is in keeping with the artist's approach, since the effort to remain always undogmatic leads to the hybridization of philosophies. Furthermore, by harmonizing the actual entities it is possible to focus more on the conjunction of the elements in the works and the fragile equilibrium among them. Adding an object changes the whole composition. In the *Needless Needles Vol. 5* Lens Box, for example, several small stones are glued on top of one another and then inserted into the recession on one of the layers of glass. Around the piles of stones Bauermeister drew circles that look like the outlines of more stones, and written next to them are the words "Stein" (stone) and "St. Pierre." The latter is a compound of an abbreviation of "Stein" or "stone" and the French word for stone: "pierre." At the same time, it is a pun on Saint Peter, or St. Pierre in French. The artist is behind all of her compositional decisions, of course, but they were made in an effort to realize a "trans-Aristotelianism," which in turn takes its own forms in the works of art, since the distortions of the lenses and the proximity of the elements to one another create new (many-valued) connections. The elements can be viewed individually as well as in a group, which means that they have the opportunity to influence one another. In this speculative situation the (drawn) outlines can exist first, then small stone towers grow out of several of them and ultimately result in trilingual combinations of words. In the identity reflection of the object this scenario makes sense metaphysically. It is an occurrence that can

146 Whitehead, *Process and Reality* (see note 144), 72–73.

have recourse to the potentiality of actual entities and adds another layer to many-valued aesthetics.

As already stated, Bauermeister's strategies cannot be separated. The three levels—the extension to a third, the double reflection in the subject, and the double reflection in the object—are not mutually exclusive; rather, they are intertwined in the work of art. Depending on the nature of the microevents in her works and her approach, different strategies stand out; only together, however, can they decode the muddled situations of reciprocal reference, transformations, networks, and metalevels. For that reason, the three many-valued approaches cannot be sharply distinguished because Bauermeister's works are not a metaphysical treatise. The introduction of a "non-Aristotelian logic" into her compositions is, however, of a fundamental nature that can be described as a foundation of her artistic procedure. Her general doubt about bivalency turns her into a "trans-Aristotelian type of human being and artist"—this leads to reflection on the object and networking. One question that inevitably raises is whether in attempting to escape bivalency Bauermeister crates a new (many-valued) dogma. We will continue to look at that in the chapters that follow, but it can already be seen that Bauermeister tries to avoid that danger by introducing her own subject into her works and thus making it available. The goal of her strategy of "anything anywhere always anyway all things involved in all other things" is to postpone as long as possible any potential limitation.[147]

In a publication coauthored with Bertrand Russell—another book on the young artist's reading list—Whitehead defined the "complex object."[148] The complex object consists of parts that are connected to one another: "Broadly speaking, a *complex* is anything which occurs in the universe and is not simple."[149] This passage suggests a view that, following Deleuze and Guattari, can be called an assemblage and has had a renewed boom in theoretical treatises in recent years. "Heterogeneous elements" are brought together in an assemblage and held together by "consistency";

147 This quotation was the working title for a third solo exhibition at the Galeria Bonino in New York, which was held from February 7 to March 4, 1967: *Bauermeister: paintings and constructions*, exh. cat. (New York: Galeria Bonino, 1967), n.p. The title can be found in Bauermeister's sketchbook from this period: Mary Bauermeister, "Skizzenbuch, 1965–67, USA," unpublished source, paginated by the artist, p. 11. The radical inclusivity in her works is one reason why Kerstin Skrobanek sees the roots of Bauermeister's art in the European avant-gardes, for example, in the Merz collages of Kurt Schwitters; see Skrobanek, "'Die Jacke Kunst weiter dehnen'" (see note 26), 19. The Dadaists' approach to found materials influenced Bauermeister, as she herself repeated confirmed in statements. Nevertheless, these discussions of many-valuedness should have made it clear that Bauermeister was pursuing other intentions.

148 Alfred North Whitehead and Bertrand Russell, *Principia Mathematica*, vol. 1 (Cambridge: Cambridge University Press, 1910), 45.

149 Whitehead and Russell, *Principia Mathematica* (see note 148), 47.

it creates "coexistence" and "succession."[150] The situation in which various forces simultaneously affect connections will be made fruitful for Bauermeister's strategies later, along with extensions of the concept of the assemblage. This is related to more recent philosophies, such as New Materialism. This position is echoed in a later essay by Günther in which he addresses his theory of polycontextuality:

> "In a poly-contextural Universe we do not have to consider Life as an element totally alien to inanimate matter, because matter in itself already contains the seeds of Life in its dialectical contraposition of Being and Nihility."[151]

In Günther's work polycontextuality evolved out of his research into many-valuedness and cybernetics and suggests an extension of the understanding of the object or the material that was still unimaginable in his outline for "trans-Aristotelianism."

I have concentrated on more recent philosophical studies to avoid sticking solely to sources that Bauermeister read at some point in her career. This provides a basic framework that offers insight into her initially inscrutable oeuvre and her compositions. But because works of art cannot be traced back exclusively to the artist's intentions, as Rancière already makes clear in his discussion of the "third," we cannot restrict ourselves to interpreting Bauermeister's specific sources. From the early 1960s onward, her discourse evolved, which is why the Lens Boxes, light sheets, stone works, and material works exist in an expanded resonating chamber. Working with the artist's historical sources and concepts is just as important as integrating more recent scholarship.

Because the theory of many-valuedness may be considered a basic constant in Bauermeister's oeuvre, however, it has to be continually cited and will be discussed in the detailed descriptions of the works. What follows will focus more on individual aspects of various works by Bauermeister, though it will also return to the *Needless Needles* series. In the next chapter the focus of the analysis will shift to the period in Bauermeister's oeuvre that predates many-valued logic. That look at several stations of her early work is intended to illustrate the strategies she pursued in her German period and in the context of the postwar avant-garde of Europe. It will shed light on the combination principle on which her work is based that led to many-valuedness. This helps us to understand the connections that are constituent of the evolution of Bauermeister's oeuvre.

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150 Gilles Deleuze and Félix Guattari, *Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis, MN: University of Minnesota Press, 1987), 357, 364.

151 Gotthard Günther, "Life as Poly-Contexturality" (1973), in *Beiträge zur Grundlegung einer operationsfähigen Dialektik*, vol. 2 (Hamburg: Felix Meiner, 1979), 283–306, esp. 304.