

Paul Klee. From Structural Analysis and Morphogenesis to Art

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Abstract

This contribution illuminates the meaning of the systematic confrontation with nature in the artistic and art-theoretical thought of Paul Klee. Klee's specific interest lay in the analysis of the morphological and structural principles of plants as well as in the study of the processes of growth and form in nature. A central element of this confrontation—which also manifested itself in nuanced ways in Klee's teaching at the Bauhaus and in his artistic creations—is the reduction of the manifold natural world of appearance to structural and morphological principles which can be freely and creatively reassembled. These principles form the foundation for Klee's process-oriented understanding of nature and art.

Keywords

plants, nature, art, process, Paul Klee, structure, morphology

The examination of nature runs like a thread through Klee's entire work; from his childhood until 1940, his final year of creative work, in which 31 pictures, even though often in a poetically alienated way, refer to plants or flora. In his youth, Klee's relationship to nature was, on the one hand, emphatic, if not even romantic, on the other hand, however, it was likewise characterized by careful observation and a classificatory system, which he had acquired in his zoology and botany lessons at high school. Like all the students at Bern's Municipal High School, Klee had already learned the systematology and classification of animals and plants early, and, as all his school books testify, he had achieved a scientific meticulousness in illustrating not only the outward appearance of animals and plants but also their build and structure. (Fig. 1)

On the other hand, as an adolescent Klee felt excluded from the adult world and regarded the natural world as a place to which he could escape and retreat, and the emotional conflict between his fascination for it and his fear of



Figure 1:



Figure 1: Paul Klee, schoolbook, Zoology I *Avertebrata*, 1895

its chaotic entropy would become a formative experience of his youth. There are numerous entries in his diary that deal with an intensive, almost hallucinatory experience of nature, their themes reminiscent of the German Romantics. "For a long time I had not bothered to look at the landscape. Now it lay there in all its splendor, deeply moving!"¹ And: "In earlier days (even as a child), the beauty of landscapes was quite clear to me. A background for the soul's moods. Now dangerous moments occur when Nature tries to devour me."² These idiosyncratic experiences of nature find their expression in sensitive landscape drawings from 1897 and 1898.

By contrast, Klee's work from 1902 to 1910 is characterized by an attempt to gain a more distanced relation to nature and to focus on the analysis of its perception. From 1898 until 1901 he had accomplished his artistic studies in Munich. In 1901 he made a six-month field trip to Italy in the company of sculptor Hermann Haller. After this he returned to Bern where he lived in his parent's house until 1907 and advanced his artistic formation autodidactically. In 1906 Klee spent more time working in the garden of his parents' house and derived great pleasure from occupying himself with the laws of plant growth such as the propagation of plants through side sprout-rooting, also in putting them into practice. "In our garden," he writes in the diary,

I lavish pious attention on the bergamots that I brought back from Rome and replant them by making a strong branch grow independently. This procedure also provides a neat experiment in the field of capillary action. [Fig. 2]

- A Plant with two branches *a* and *b*;
- B Branch *b* is bent down and fastened to the ground by its middle.
- C After it has struck roots at this point, it is severed from branch *a*.
- D The new plant *bI/bII* grows independently; from now on, the circulation of the sap in branch *bI* is reversed.³

Apart from these proper attempts, Klee was also interested in the technical examination of natural phenomena. He bought a camera and made photographic studies or technical experiments such as the use of a pantograph to

¹ *The Diaries of Paul Klee 1898-1918*, ed. Felix Klee, trans. B. Schneider, R. Y. Zachary, and Max Knight (Berkeley: University of California Press, 1964), no. 564, p. 152. Hereafter cited as *Diaries*, followed by section number and page.

² "Autobiographische Texte 1920," Leopold Zahn, in Paul Klee, *Tagebücher 1898-1918*, textkritische Neuedition, hrsg. von der Paul-Klee-Stiftung, Kunstmuseum Bern, bearb. von Wolfgang Kersten, (Stuttgart: Hatje, 1988), 520 (my translation). Hereafter cited as *TB*.

³ Klee, *Diaries*, no. 770, p. 204.

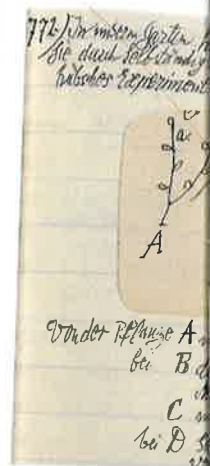


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⁴ *Ibid.*, no. 874, p. 244.

⁵ "Autobiographische Tex

⁶ Klee, *Diaries*, no. 857, p.



Figure 2: Paul Klee, *Diary*, Plant with two branches *a* and *b*, 1906

enlarge, reduce, or distort graphic outlines. His most systematic pursuit of this analysis of perception was in the field of tonal relationships, the so-called "light form": "By this I mean the conversion of the light-dark expanse according to the law by which lighted areas grow larger when opposed to dark areas of mathematically equal size. . . . Now carried through with greater thoroughness by means of a lens (glass eye). This magnifying glass brings into view at the same time the color essence of the natural phenomenon. All detail is simply eliminated."⁴ In deepening and systematizing perceptual analysis by artistic means, Klee was taking the first steps toward what he would later describe as "the first instance of working abstractly from nature."⁵ And in 1909 he wrote in his diary: "Nature can afford to be prodigal in everything," "the artist must be frugal down to the smallest detail. Nature is garrulous to the point of confusion, let the artist be truly taciturn."⁶

This process of reduction went hand in hand with an increasing concentration on visual and creative means as such and led Klee to the momentous discovery that the analysis of the latter was more significant for his work than the study of nature itself: "And now an altogether revolutionary discovery: to adapt oneself to the contents of the paint box is more important than nature and its study. I must some day be able to improvise freely on the chromatic keyboard

⁴ Ibid., no. 874, p. 244.

⁵ "Autobiographische Texte 1919," Willhem Hausenstein II, in Klee, *TB*, 513 (my translation).

⁶ Klee, *Diaries*, no. 857, p. 236.

of the rows of watercolor cups."⁷ In 1910 Klee expanded his experiences in light-dark painting to the realm of color. In so doing he took a freer and more spontaneous approach to technique. He restricted his watercolor palette to a few tones and achieved the creation of outlines, shadows, and spatial depth purely through color by varying the application of paint and contrasting light and dark colors. The process of abstraction in the arrangement of color found its parallels at the compositional level, for example when Klee cut works into two parts. By taking a pair of *scissors* to the work, Klee drastically reduced the image and restricted the field of vision.

The process of artistic abstraction is accompanied by a growing tendency in Klee's theoretical reflections to conceive of his relationship to nature and natural processes in a wider metaphysical and at the same time analytical context. In a diary entry, he thus distanced himself programmatically from the famous definition of Franz Marc's "passionate variety of humanity," by writing: "He [Franz Marc] places himself on the same level with plants and stones and animals. In Marc, the bond with the earth takes precedence over the bond with the universe . . . I place myself at a remote starting point of creation, whence I state a priori formulas for men, beasts, plants, stones and the elements, and for all the whirling forces."⁸ This "remote starting point of creation" also meant rejecting a directly perceptual relationship with nature. In its place, Klee developed between 1914 and 1918 a growing interest in structural patterns or the characteristics of processes of growth and development, which he saw as analogous to the genesis of a work of art: There is, in the first place, a kind of structural inventory of plant organs, which has to be seen in the context of Klee's examination of Cubism. This new analytical look at the visible world that the Cubists had presented manifested itself in Klee's oeuvre—as in *When God Considered the Creation of the Plants*, 1913, 176 (Fig. 3), for example, a work whose title equated the idea of a new world created through artistic means with the idea of divine creation. It is clearly visible how Klee finds, by his own means, his (own) kind of synthetic Cubism, after having engaged himself in the previous years in possibilities on how to break down the world of objects into prism-like component parts and then recombine and interweave them in accordance with purely compositional requirements. Klee had seen Pablo

⁷ Ibid., no. 873, p.244. At about the same time, Vassily Kandinsky also used the metaphor of the chromatic piano in his seminal work *Concerning the Spiritual in Art*: "Generally speaking, colour is a power which directly influences the soul. Colour is the keyboard, the eyes are the hammers, the soul is the piano with many strings" (Vasily Kandinsky, *Über das Geistige in der Kunst* [Munich: R. Piper, 1912], 49; translated by M. T. H. Sadler as *Concerning the Spiritual in Art* (New York: Dover Publications, 1977), 25. Translation first published 1914.

⁸ Klee, *Diaries*, no. 1008, pp. 343, 344.



Figure 3: Paul Klee, *Als Gott die Schöpfung der Pflanzen überlegte* (1913).
Paul Klee, *Als Gott die Schöpfung der Pflanzen überlegte*, 1913.
Pen, pencil, and watercolor.
Eva-Maria Klee, ed., *Paul Klee, Werke* (Zürich: Birkbeck, 1965), 176.

Picasso's early Cubist work. One of the main reasons for Klee's interest in the *Neue Künstlervereinigung* was the belief that Cubism was not the mere outward appearance of things but a construction of reality. Although variously interpreted, Klee was certainly receptive to the idea of construction; at the same time, he was aware of the complexity that occurred when he tried to reduce the critical of Picasso's artistic forms of projection to some of their viability. This is limited almost exclusively to the way he developed his metaphysics of nature in which he

⁹ Paul Klee, "Die Ausstellung der Werke der Künstlervereinigung 'Der Blaue Reiter' (August 1912): 696–704, in *Paul Klee, Werke* (Köln: DuMont, 1976), 696.



Figure 3: Paul Klee, *When God Considered the Creation of the Plants*, 1913, 176

Paul Klee, *Als Gott sich mit der Erschaffung der Pflanzen trug*, 1913, 176

Pen, pencil, and watercolor on paper on cardboard, 15 × 21.5 cm

Eva-Maria W. Worthington Gallery, Inc., Chicago

Picasso's early Cubist works in Munich as early as 1910 at the exhibition of the *Neue Künstlervereinigung* (New Artists' Association), and what impressed him about them was the boldness with which painting managed to forge beyond the mere outward appearance of the visible to an analysis of inner structure.

Although variously inspired by Cubism, Klee's attitude remained ambivalent. He certainly recognized Cubism as a breakthrough in modern pictorial construction; at the same time, however, he lamented the formal destructiveness that occurred when objects were reshaped. In this regard, he was especially critical of Picasso's arbitrariness when reducing the human figure to "primitive forms of projection such as the triangle, rectangle, and circle" that "lose some of their viability with each conversion."⁹ Klee's association with Cubism is limited almost exclusively to abstract constructions of space—from which he developed his metaphor of the "crystalline"—and to occasional depictions of nature in which he dared to deconstruct the organic world, as in *When God*

⁹ Paul Klee, "Die Ausstellung des Modernen Bundes im Kunsthaus Zürich," *Die Alpen* 6, no. 12 (August 1912): 696–704, in Paul Klee, *Schriften, Rezensionen und Aufsätze*, hrsg. v. Christian Geelhaar (Köln: DuMont, 1976), 107 (my translation). Hereafter cited as *Schriften*.

Considered the Creation of the Plants. However after having dismantled the objects in the sense of analytical Cubism, it was rather the structural analysis of natural organisms that mattered to him in terms of the depiction of nature. It is what he described as a remote starting point of creation and *a priori* formulas for men, beasts, plants, and stones.

The analytical and reductive character of works with the somehow enigmatic titles *27523 R arrangement of stalks* or *Creation plan 23436 G blossoms* (Fig. 4) are reminiscent of technical or scientific drawings and show striking parallels to the schematic pictures of Goethe's *Urpflanze* ("original" or "primordial plant") depicted by his follower Carl Gustav Carus in his *Schema der Urpflanze* (Diagram of the Original Plant) of 1861. Klee had a profound knowledge of Goethe's theory of the natural world. In fact, his concept of the subject is based on Goethe's theory of metamorphosis.¹⁰ His understanding of the notions of "metamorphosis" and "genesis" is very close to Goethe's conception of these terms, and these similarities have been researched in detail by Volker Harlan, Werner Hofmann, Richard Hoppe-Sailer, Christa Lichtenstern, and Fujio Maeda and Fabienne Eggelhöfer.¹¹ Further evidence of Klee's interest in the subject has been found in two recently discovered sources. First, Klee attended a lecture given by Rudolf Steiner in Munich in February 1918,

¹⁰ Zentrum Paul Klee in Bern has in its keeping the complete edition of Goethe's writings, the correspondence with Charlotte von Stein and Eckermann's conversations with Goethe. Of particular interest are volume 36 of Goethe's writings comprising texts on plant morphology and (plant) metamorphosis and volume 40 discussing natural science in general. In this regard, Klee's marks and comments in the margins, which have been analysed only partially so far, are illuminating. It is explained by the fact that for a long time scientists conducting research on Klee were not aware that this complete edition had been preserved, because it could only be inventoried while transferring the complete personal estate of the Klee family to the Zentrum Paul Klee.

¹¹ Volker Harlan, "Die Dynamik der 'Urpflanze,' wie Goethe, Klee und Beuys sie sahen," in Ausstellung Katalog: *Paul Klee trifft Joseph Beuys*, hrsg. T. Osterwold (Ostfildern-Ruit: Hatje Cantz, 2000), 116–29; Volker Harlan, *Das Bild der Pflanzen in Wissenschaft und Kunst: bei Aristoteles und Goethe, der botanischen Morphologie des 19. und 20. Jahrhunderts und bei den Künstlern Paul Klee und Joseph Beuys* (Stuttgart: Mayer, 2002); Werner Hofmann, "Ein Beitrag zur 'morphologischen Kunsttheorie' der Gegenwart," in W. Hofmann, *Bruchlinien. Aufsätze zur Kunst des 19. Jahrhunderts* (München: Prestel Verlag, 1979), 55–69; Richard Hoppe-Sailer, "Genesis und Prozess. Elemente der Goethe-Rezeption bei Carl Gustav Carus, Paul Klee und Joseph Beuys," in *Goethe und die Verzeitlichung der Natur*, hrsg. Peter Matussek (München: C. H. Beck, 1998), 276–300; Christa Lichtenstern, *Metamorphosen in der Kunst des 19. und 20. Jahrhunderts. Die Wirkungsgeschichte der Metamorphosenlehre Goethes. Von Philipp Otto Runge bis Joseph Beuys* (Weinheim: VCH, 1990); Fujio Maeda, "Wege des Naturstudiums Goethe und Paul Klee," in *Goethe-Jahrbuch*, Goethe-Gesellschaft in Japan, 28 (1976): 89–108; Fabienne Eggelhöfer, "Paul Klees Lehre vom Schöpferischen," Ph.D. Dissertation, Universität Bern, 2012, pp. 37–47, 170–96 (http://www.zb.unibe.ch/download/eldiss/12eggelhoefer_f.pdf).



Figure 4: Paul Klee, *Creation plan 23436 G blossoms*, 1917. Pencil on paper. Zentrum Paul Klee, Bern.

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¹² Rudolf Steiner, "Das Sin...
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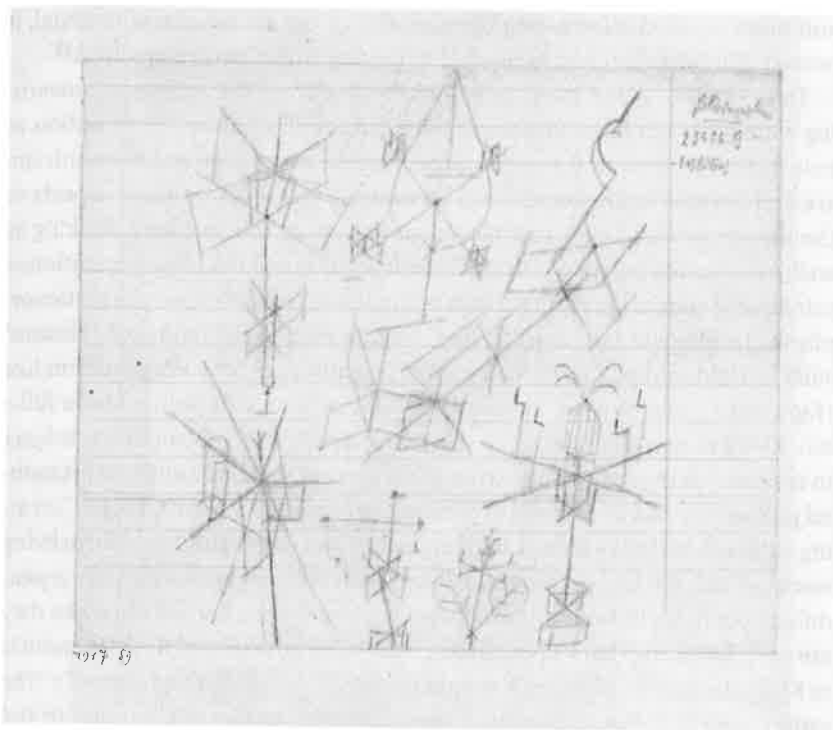


Figure 4: Paul Klee, *Creation plan 23436 G (blossoms)*, 1917, 59

Paul Klee, *Schöpfungsplan 23436 G (Blüten)*, 1917, 59

Pencil on lined paper on cardboard, 14.6 × 17.5 cm

Paul-Klee-Stiftung, Kunstmuseum, Bern

accompanied by his wife, Lily, who had a strong interest in anthroposophy; the subject of the lecture was a detailed exposition of Goethe's theory of metamorphosis. Second, a letter from Klee to Katherine S. Dreier reveals a common interest in Goethe's "archetypal plant."¹² During her visit to the Bauhaus in 1922, Katherine Dreier apparently had an intense discussion with Klee about Goethe's color theory and the original plant and asked him to copy for her color boards of Goethe's color theory and schemes of the original plant at the Goethe Museum. In a letter, dated 21 October 1922, he asks her for some specifications

¹² Rudolf Steiner, "Das Sinnlich-Übersinnliche in seiner Verwirklichung durch die Kunst," lecture first delivered on February 15, 1918, in Munich, published in his *Kunst und Kunsterkenntnis. Grundlagen einer neuen Aesthetik* (Dornach: Steiner-Nachlassverwaltung, 1961), 49–72.

and more detailed information because, due to the abundance of material, it proved difficult to be clear as to what Katherine Dreier really requested.¹³

Thus Goethe is the starting point for answering the question concerning which role models and sources have further determined Klee's notion of nature. Furthermore, the evident connections between Klee and Romanticism are emphasized in the voluminous literature. I will focus on three aspects of the Romantic world view that played an important role in Klee's thinking as well: overcoming polarity, striving for universality, and the already mentioned principle of eternal becoming, which originates in Goethe's theory of metamorphosis. In Klee's library one can find, besides editions of Romantic "classics" such as Hölderlin or Kleist, some books by authors of New Romanticism like Hugo von Hoffmannsthal, Ludwig Otti, Thomas Mann, or Rainer Maria Rilke too. Klee's notion of a work of art as a living, dynamic organism that is subject to constant change also shows striking parallels to Schlegel's universalist natural philosophy and its concept of constant becoming. Art, says Schlegel, "creating autonomously like nature, both organized and organizing, must form living works, which are first set in motion, not by an outside mechanism like a pendulum, but by an indwelling power like the solar system, and which, when they are completed, turn back upon themselves."¹⁴ See how related this statement is to Klee's dictum in "*Wege des Naturstudiums*" ("*Ways of Studying Nature*"): "The artist's growth in the vision and contemplation of nature enables him to rise towards a metaphysical view of the world and to form free abstract structures which surpass schematic intention and achieve a new naturalness, the naturalness of the work. Then he creates a work, or participates in the creation of works, that are the image of God's work."¹⁵

When speaking about Klee's affinity with the emphasis of the Romantic world view, one has to take into consideration at the same time his preference for the ironic mutation of this assertive claim, which was also characteristic for Romanticism and post-Romanticism. This ironic "distance" also saved him from deducing universalist structure and proportion ratios in nature from mathematical laws and division ratios, as his contemporaries, for example,

¹³ Letter from Paul Klee to Katherine S. Dreier, October 21, 1922, original copy in New Haven, Yale University Library, Yale Collection of American Literature, Beinecke Rare Book and Manuscript Library, Katherine S. Dreier Papers / Société Anonyme Archive.

¹⁴ Friedrich Schlegel, *Schriften. Eine Auswahl aus dem Gesamtwerk* (Augsburg, n.d.), 119; quoted in Annika Waenerberg, *Urpflanze und Ornament. Pflanzenmorphologische Anregungen in der Kunsttheorie und Kunst von Goethe bis zum Jugendstil* (Helsinki: Soc. Scientiarum Fennica, 1992), 22 (my translation).

¹⁵ Klee, "Wege des Naturstudiums," 1923, in Klee, *Schriften*, 126.



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Pencil and pen
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Figure 5: Paul Klee, *Number trees*, 1918, 198

Paul Klee, *Zahlenbäume*, 1918, 198

Pencil and pen on paper on cardboard, 16.4 × 12.3 cm

Paul-Klee-Stiftung, Kunstmuseum, Bern

Johannes Itten used to do, because of their affinity with esoteric number mysticism. And despite this profound interest, at the same time also, Klee's ironical view on all these efforts to derive the structure and proportion ratios in nature and art exclusively from mathematical laws and division ratios appears in works like the ironically truncated work *Number trees* (Fig. 5). In this drawing Klee playfully designed tree-like objects of numbers and bills, with which he

used to busy himself in his capacity as an office clerk in an air force unit in World War I. With this in mind, the aforementioned examples also can just as well be understood as parodies of the possibilities of a regular structuring of art and as serious attempts. From this perspective, Klee's scepticism towards any kind of number metaphysics as propagated by Rudolf Steiner, whose book Lily Klee had given to him, also has to be understood. In this context, he noted: "I was reading Steiner's book for a little while. If only everything was said more shortly, on twenty pages. I admit that it contains a lot of intellectuality, but even more nonsense and things that cannot be universally valid. . . . the hints at formal structuring are downright funny. The numbers are impossible, because they are futile. Any simple equation makes more sense."¹⁶

Klee reacted to Steiner's esoteric claim to scientificity just as sceptically as he did to any form of attempted intrusion of natural sciences into the art field. On a related note, an art-political controversy, which arose in the context of the Bauhaus, is revealing. It was caused by an oral presentation by chemist and Nobel Prize winner Wilhelm Ostwald on the occasion of the *First German Color Day*, which had been organized by the German Work Federation in September 1919. With regard to art, Ostwald propagated a color theory based on scientific evidence and grounded on measurable data through the normative harmonization of equal tonalities. By saying this, he had entered a field artists considered their very own.¹⁷ What followed was their swift negative reaction. Art historian Hans Hildebrandt, head of the *Free Color Art Group* of the German Work Federation, which was supported by Bruno Taut and other forward-thinking artists of the Work Federation, became the mouthpiece of Ostwald's opponents and in summer 1920, he asked Klee to join the *Free Color Art Group* to confront Ostwald's scientific-technicist notion. Klee agreed to side against Ostwald in public as a representative of the artist group in a *special edition on colors* published by the Work Federation. Reversing a reproach that was usually levelled against him and invoking his artistic experience, Klee reasoned confidently: "Scientists often see something infantile in artists. This time, the case in question enables a mutuality. . . . The whole whitewash [as recommended by Ostwald] furthermore goes past all transparent mixtures [glaze]. Not to mention the ignorance about the relativity of the color values. To universally stan-

¹⁶ Letter of Paul Klee to Lily Klee, in *Paul Klee, Briefe an die Familie 1893-1940*, vol. 2: 1907-1940, ed. Felix Klee (Köln: DuMont, 1979), 882 (my translation).

¹⁷ Wilhelm Ostwald, *Einführung in die Farbentheorie* (Leipzig: Philipp Reclam, 1919). Vgl. Wolfgang Kersten, "Paul Klee: 'ich und die Farbe sind eins.' Eine historische Kritik," *Kunst-Bulletin des Schweizerischen Kunstvereins*, no. 12, (Dezember 1987): 10-14.

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¹⁸ Paul Klee, "Die Farbe
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¹⁹ Klee, *Diaries*, no. 943.

²⁰ Klee, "Schöpferische

standardize the one possibility of harmonization through equal tonality is to seize any mental sanity. We say thank you!"¹⁸ Klee's polemics served its purpose: On 4 April 1921, Hildebrandt told him that Ostwald had quit the German Work Federation as a consequence of the article.

In January 1921, Klee started giving lessons at Bauhaus Weimar after having been appointed by Walter Gropius on 29 October 1920. In his lectures on "Pictorial Theory of Form," structural analysis and morphogenesis were crucial elements of his theory of art. Central to it were the terms "metamorphosis" and "genesis" as constant movement and development, which he considered a kind of reductionism of natural and artistic growth and form processes. Already in 1914 he had written in his diary: "Genesis as formal motion is the essential thing in a work."¹⁹ The affinity between processes of artistic creation and processes of natural growth and development was one of the central postulates of Klee's first published work of art theory, his essay "*Schöpferische Konfession*" ("Creative Confession") for Kasimir Edschmid's anthology of 1920. By systematizing creative material, by "reducing the contingent to its essence," the artist creates a "formal cosmos" that is similar enough to the "great creation" that "a breath suffices to make the religious expression religion itself."²⁰ In this context, the work of "reducing the contingent to its essence" is symbolically related—far more than any formal or technical understanding—to a morphogenetic concept of creation. This can be illustrated by an example taken from a lecture "*Beiträge zur Bildnerischen Formlehre*" (Contributions to a Theory of Form), delivered on 22 February 1922 (Fig. 6), in which Klee accentuated—by analogy with morphogenesis in nature—the correct ratio of the individual elements of design and their "correct emphasis" respectively. "Wrong," as he explains by depicting the parts of a plant, is the "emphasis" as it is shown on the lower right hand side—an undifferentiated static stringing together of elements: root, shoot axis, leaves, blossom. Correct, however, is the dynamic genesis of form generated by the powers of growth, in which the following three main complexes have to be distinguished: First, the potential of the seed, which is held in the ground, and its active principle evolves by warmth and nutrient—illustrated by arrows flowing toward it and transforming it into the active principle, symbolized by the arrow pointing up. Complex 2: The sprout emerges, and by absorbing light and oxygen, the respiratory organs develop, and so

¹⁸ Paul Klee, "Die Farbe als Wissenschaft," *Das Werk: Mitteilungen des Deutschen Werkbundes* 1, Farben-Sonderheft (Oktober 1920): 8 (my translation).

¹⁹ Klee, *Diaries*, no. 943, p. 310.

²⁰ Klee, "Schöpferische Konfession," 1920, i: Klee, *Schriften*, 121 (my translation).

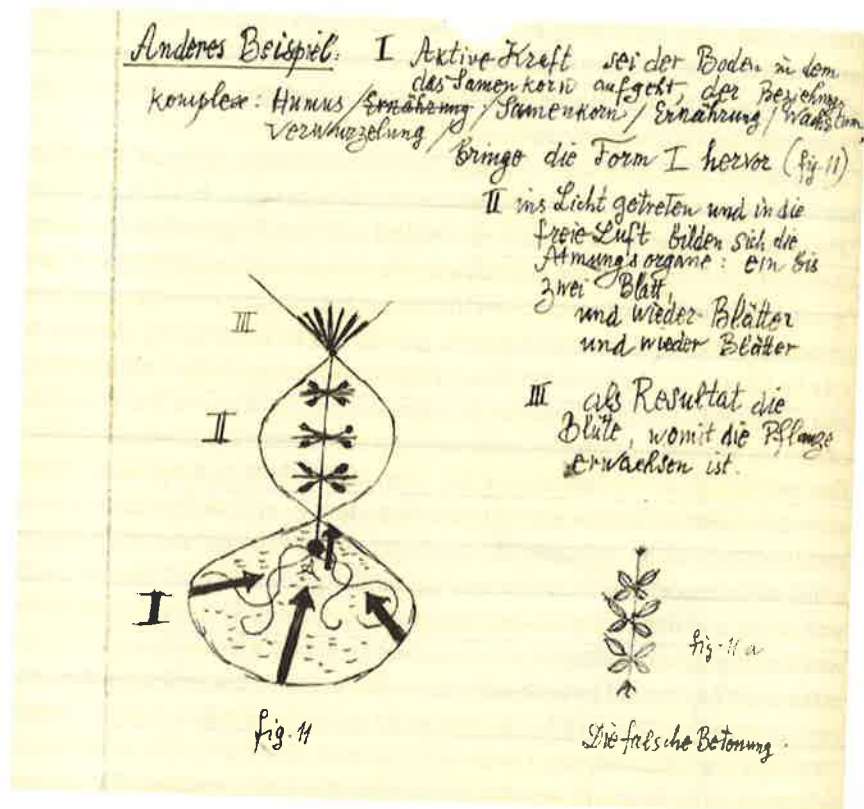


Figure 6: Paul Klee, *Beiträge zur Bildnerischen Formlehre (Contributions to a Theory of Form)*, delivered on 22 February 1922

do the leaves, which multiply in a repetitive manner. Third, as a result of this growth and form process, the blossom eventually develops, as a sign that the plant—as Klee writes—has “grown up.”²¹

Under the new prerequisites at the Bauhaus, which was then aiming at a wider social acceptance, the focus of attention was, in contrast to the controversy with Ostwald four years ago, not an explicit demarcation from science anymore but a methodological approach to the parallels between the artistic and scientific analyses of the natural world. The artist, so Klee, subjects to his penetrating examination “the finished form which nature places before him. The deeper he looks, the more readily he can extend his view from the present

²¹ Paul Klee, *Beiträge zur bildnerischen Formlehre*, hrsg. Jürgen Glaesemer (Basel: Schwabe, 1979), 92 (my translation). See: www.kleegestaltungslehre.zpk.org.

to the past.”²² For the artist, the microscopic—observable objects that are not accessible to the microscope refers to the perception: “And is it not the microscope reveals to the imaginative if we were to sense to understand them? Is it not a sensational manner supposed to be nature? Is it not research in condensed form of *Studying Nature*), which Bauhaus Week of 1923. “Fonditio sine qua non,”²⁴ declares an account of how ways of Starting with a “barely different form of seeing, Klee outlines nature, the investigation of the natural object: “knowledge of the object beyond its material perception,” there are, “relationship of resonance” optics. Klee presented this “common rootedness in the third and highest level unity.”²⁶ Klee inscribes all regarding circle and hence in. Nevertheless, no romantic are the structures of its manifold of *Studying Nature* features places just as much value on lectures at the Bauhaus.

²² Paul Klee, *On Modern Art*, trans. (London: Faber and Faber, 1948). Or Benteli, 1945), 45. German page number

²³ Ibid., 47–49.

²⁴ Klee, “Wege des Naturstudiums,”

²⁵ Ibid., 125 (my translation).

²⁶ Ibid.

to the past."²² For the artist, just as for the scientist, analytical—even, as it were, microscopic—observation reveals insights into the genesis and structure of objects that are not accessible to the superficial gaze. The comparison with the microscope refers to the limited nature of conservative forms of seeing and perception: "And is it not true that even the small step of a glimpse through the microscope reveals to us images which we should deem fantastic and over-imaginative if we were to see them somewhere accidentally, and lacked the sense to understand them? Your realist, however, coming across such an illustration in a sensational magazine, would exclaim in great indignation: Is that supposed to be nature? I call it bad drawing."²³ Klee offered the results of his research in condensed form in his article "Wege des Naturstudiums" (*Methods of Studying Nature*), which was printed in the magazine published for the Bauhaus Week of 1923. "For the artist, the dialogue with nature remains a *conditio sine qua non*,"²⁴ declares the introduction; there follows a short historical account of how ways of seeing the natural world have changed over time. Starting with a "barely differentiated study of phenomena," a purely optical form of seeing, Klee outlines the way to a progressively deeper perception of nature, the investigation of which is now focused on the "inner" structure of the natural object: "knowledge of its internal structure reveals the significance of the object beyond its mere appearance."²⁵ Beyond these "methods of internal perception," there are, finally, the approaches that bring the "self" into a "relationship of resonance" with the object, and which go beyond its basis in optics. Klee presented this way of seeing as a holistic system that integrates a "common rootedness in the earth" with the visual relationship, and which at the third and highest level incorporates the "metaphysical routes of cosmic unity."²⁶ Klee inscribes all responsibilities and levels of perception in an integrating circle and hence in a holistic system: world, me/eye, you, and earth. Nevertheless, no romantic amalgamation arises; however, what is shown here are the structures of its manifold connections. Even though the text "Methods of Studying Nature" features an all-embracing, ethical, cosmic worldview, it places just as much value on structure analysis, which he had developed in his lectures at the Bauhaus.

²² Paul Klee, *On Modern Art*, translated by Paul Findlay, with an introduction by Herbert Read (London: Faber and Faber, 1948). Originally published as *Über die moderne Kunst* (Bern-Bümpliz: Benteli, 1945), 45. German page numbers are cited.

²³ *Ibid.*, 47–49.

²⁴ Klee, "Wege des Naturstudiums," in: Paul Klee, *Schriften*, 124.

²⁵ *Ibid.*, 125 (my translation).

²⁶ *Ibid.*

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geht, der Beobachtung
Ernährung/Wachstum
I hervor (Fig. 11)
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Fig. 11 a

die Betonung

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In his classes at the Weimar Bauhaus, Klee tried to link his analytical view of nature with his wider metaphysical view of the world. In addition to his early lectures from 1921–22 in the Contributions to a Theory of Form, his second cycle of lectures from autumn 1923 to spring 1924 dealt directly with a variety of growth and development processes in nature. This was particularly true of the chapter from his *Principielle Ordnung* (*Principal Order*), which Klee introduced with sketches of the structures of plants and leaves. He explained their morphology in terms of the energies prevailing in the organism in question. The sketches are referred to as “observational drawings of leaves showing the structural energies in leaf veins.”²⁷ The tense relationship between energy, which is linear . . . and mass, which is extensive—elsewhere Klee also speaks of the “the power of linear radiation”—produces an individual typology of leaf forms, which includes three principal “energetic” types: an oval *Urform*, or “original form,” which results when the flow of sap is equally distributed, a “transitional form,” and a “hybrid form,” such as the maple leaf, whose contours are “produced” and fundamentally determined by the strength of their energy, causing individual inner forms to emerge (Fig. 7). This derivation of a variety of forms from a single *Urform* is another indication of Klee’s affinity with Goethe’s model of a “metaphysical *Urpflanze*,” where the variety and the “variations in plant forms” themselves “allow one to imagine a totality.”²⁸ Works like the watercolor *Illuminated Leaf* (*belichtetes Blatt*), 1929, 274, for example, contain essential elements from Klee’s investigation into the morphology of leaves in his *Principielle Ordnung*: the outline of the leaf appears as a variable, almost as a series of formal possibilities, which is as much determined by the incidence of light (photosynthesis) as it is by the morphogenetic energy of the flow of liquids.

In his Bauhaus classes, the relationship between Klee’s artistic work and his analysis of structures and forms was a reciprocal one: findings from his analytical studies of the natural world were incorporated into visual structures, while observations derived from his work processes or his experiences influenced his artistic theoretical reflections, as is evident from the example of his color theory. In his “*Schöpferische Konfession*” of 1920, Klee had used the metaphor of the tree as a “symbol” of the artist and the artistic process: The [artist’s] “orientation in terms of temperament and life” corresponds to the tree’s “root system,” which carries water and minerals to the organism.²⁹ “Juices flow to the

²⁷ Paul Klee, *Bildnerische Gestaltungslehre, Principielle Ordnung* BG I 2/2–5; www.kleegestaltungslehre.zpk.org (my translation).

²⁸ *Ibid.*, BG I 2/6; www.kleegestaltungslehre.zpk.org (my translation).

²⁹ Klee, “*Schöpferische Konfession*,” 1920, 121 (my translation).

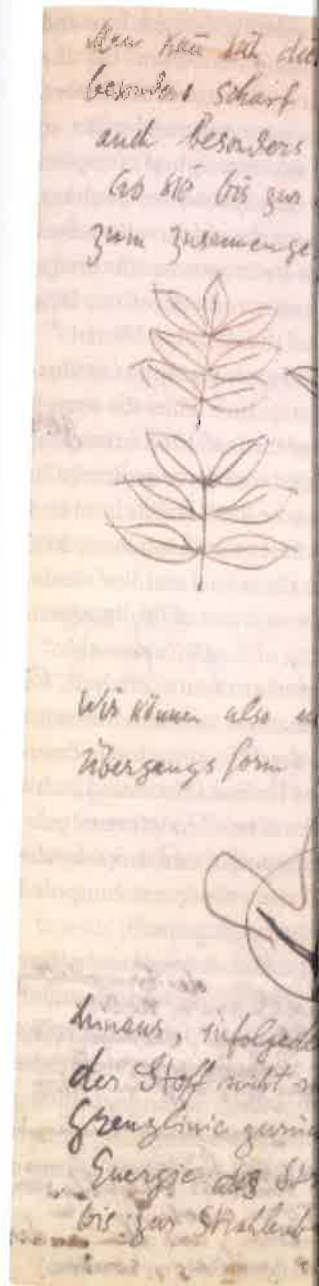


Figure 7: Paul Klee, Teaching

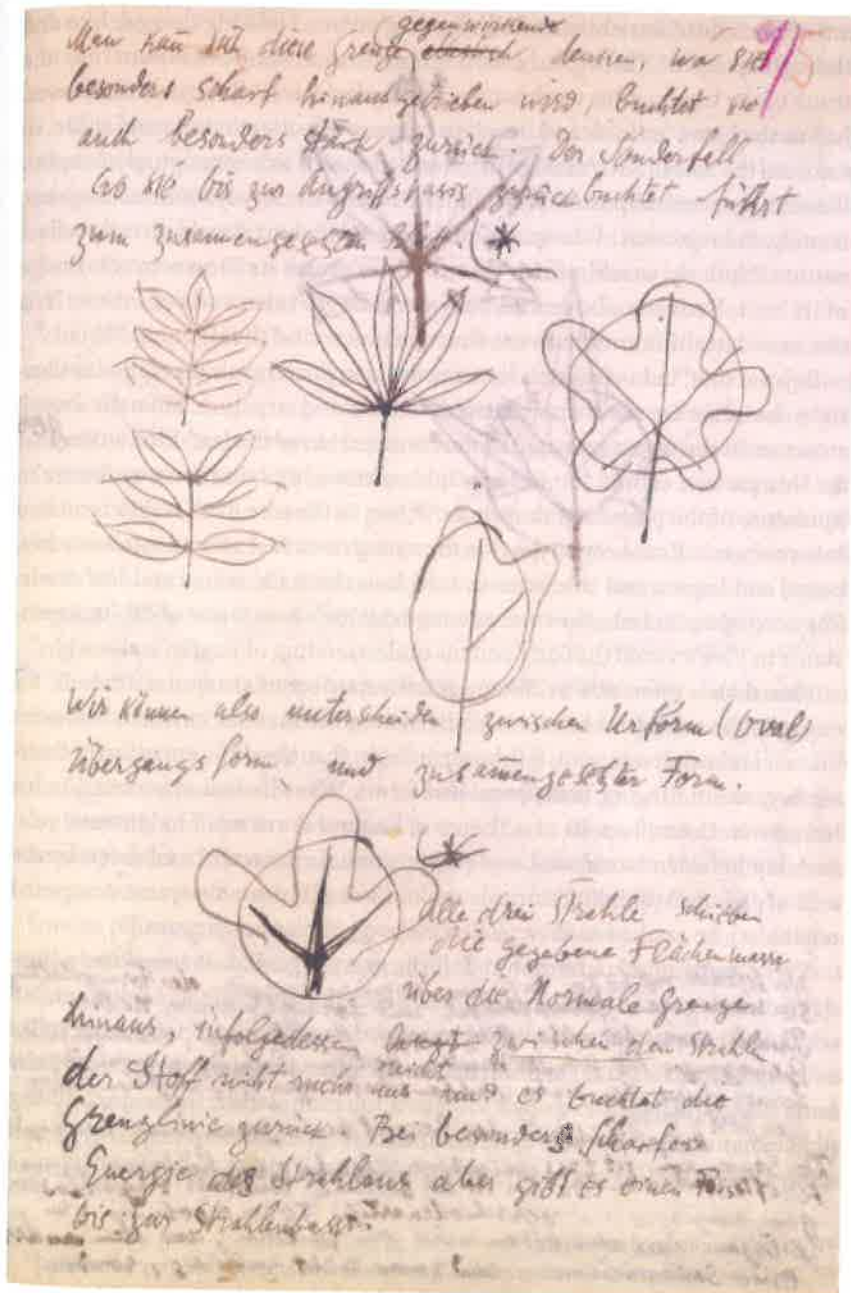


Figure 7: Paul Klee, Teaching notes at pictorial creation (leaf structure),
 lecture of 29.10.1923

artist" from this "branching and subdividing order . . . passing through him and through his eyes." The artist himself amounts to a "simple medium" like the trunk of the tree, and his work is comparable to the tree's branches and leaves. Just as the latter "unfolds and develops in every direction in time and space, so too does the work." Klee's image of a tree had served as a conceptual metaphor illustrating a central postulate of modern art and the newly founded Bauhaus, namely, the rejection of the traditional demand that art should directly reflect nature. "Nobody would affirm that the tree grows its crown in the image of its root. Between above and below can be no mirrored reflection. It is obvious that different elements must produce vital divergences."³⁰

Beyond that, in his Bauhaus lectures the tree turns into a metaphor to illustrate the inductive nature of principles of form and structure. Thus the overall structure of the tree is reflected in the construction of the leaf. Klee writes that "in this pattern can be found ideas and relationships that form an image in miniature of the pattern of the whole."³¹ Just as the tree itself is differentiated into roots, trunk, and canopy, so too the canopy is differentiated into branches, twigs, and leaves, and the latter in turn into the stalk, veins, and leaf tissue. The correspondence between macro- and microcosmos is one of the basic constants in Klee's visual thinking and his understanding of the natural world.

Klee makes reference to the quantitative aspect of structural analysis, for example the relations of numerical division in the manner in which leaf veins branch and subdivide, and, following on from this, the differentiation of intersecting, alternating, or centripetal leaf forms. What he had introduced in his lectures on Contributions to a Theory of Pictorial Form as a fundamental relationship between "structural and compositional character," embraced by the terms "dividual" (building stones) and "individual" (the consequent composed organism), he applied in *Principielle Ordnung*, to plant organisms.³²

Every "individual" or "structured" form, every organism, is based upon "fundamental elements, which in the material sense are extremely important, but which in the spiritual sense are of very minor significance," for instance, like cells and atoms as the smallest structural units. Klee points out that those basic elements have developed to have a function within the wider building plan of nature: thus, for example, the conducting structures of capillary vessels allow liquids to pass up and down the plant. Klee also fruitfully made use of

³⁰ Klee, "Über die moderne Kunst," 13.

³¹ Paul Klee, *Bildnerische Gestaltungslehre, Principielle Ordnung* BG I 2/2; (my translation).

³² Klee, *Beiträge zur bildnerischen Formlehre*, 55; see also: www.kleegestaltungslehre.zpk.org. (my translation).

the principle of dividual and important forms of expression visualize the growth and deve

Klee most systematically *Gestaltung* (planimetric constripts on "planimetric const processes of growth and deve field of geometry. Thus the not in nature) is also central to d "charged point." Like the formi preped as the product of a dyna work there are numerous exametrical forms are shown as b In his chapter entitled "*Progres* natural forms as the result of he presents a palm leaf as a " basis of a circle divided into tr ing and differentiation of the le "regressions" (Fig. 8).

For all the importance to his examination, his works dealing individual creative freedom. Bot made several hundred works o ing majority of them are free vi actually turn into "botanical act the garden as their stage. These famous painting *Botanical Thea* ers a broad spectrum both techn a brush, the imaginary plant bei dark background. In his *Botanica* full of actors created from an in and incorporates them into an er and plant life also fascinated th the uniqueness of Klee's fantast

³³ Ibid.

³⁴ Paul Klee, *Bildnerische Gestaltungslehre*. (my translation).

the principle of individual and individual in his artistic work as one of the most important forms of expression of natural structures and forms, in particular to visualize the growth and development of plants.

Klee most systematically pursued this in his seminars on *Planimetrische Gestaltung* (planimetric construction) at the Dessau Bauhaus. In his manuscripts on "planimetric construction," Klee systematized his analysis of the processes of growth and development of plants and transferred them to the field of geometry. Thus the notion of "causal" driving forces (analogous to seeds in nature) is also central to deriving geometrical "elementary forms" from a "charged point." Like the forms of leaves, flowers, or fruit, the latter were interpreted as the product of a dynamic process of development.³³ In Klee's artistic work there are numerous examples where the emergence of elementary geometrical forms are shown as being at one with processes of growth in nature. In his chapter entitled "*Progressionen*" (Progressions),³⁴ Klee is concerned with natural forms as the result of geometrical "progressions": thus, for example, he presents a palm leaf as a "progression" and "regression" of angles on the basis of a circle divided into twenty-four sections or the progressive branching and differentiation of the leaf organs as vertically and diagonally directed "regressions" (Fig. 8).

For all the importance to his artistic work of Klee's theoretical and analytical examination, his works dealing with the natural world exhibit a high degree of individual creative freedom. Both while teaching at the Bauhaus and later, Klee made several hundred works on the subject of plant growth: the overwhelming majority of them are free visual inventions. In Klee's fantastic flora, plants actually turn into "botanical actors," with physiognomies and feelings and with the garden as their stage. These elements are combined, for example, in Klee's famous painting *Botanical Theatre* (*Botanisches Theater*), 1934, 219, which covers a broad spectrum both technically and in terms of content: "painted" with a brush, the imaginary plant beings seem to emerge from a transparent and yet dark background. In his *Botanical Theatre*, Klee assembles a veritable museum full of actors created from an inexhaustible reservoir of visual images and ideas and incorporates them into an enigmatic scenography. Klee's imaginary nature and plant life also fascinated the Surrealists. They were the first to recognize the uniqueness of Klee's fantastic cosmology of nature. In an article entitled

³³ Ibid.

³⁴ Paul Klee, *Bildnerische Gestaltungslehre, Progressionen*, BG II.19/1-96. See: www.kleegestaltungslehre.zpk.org.

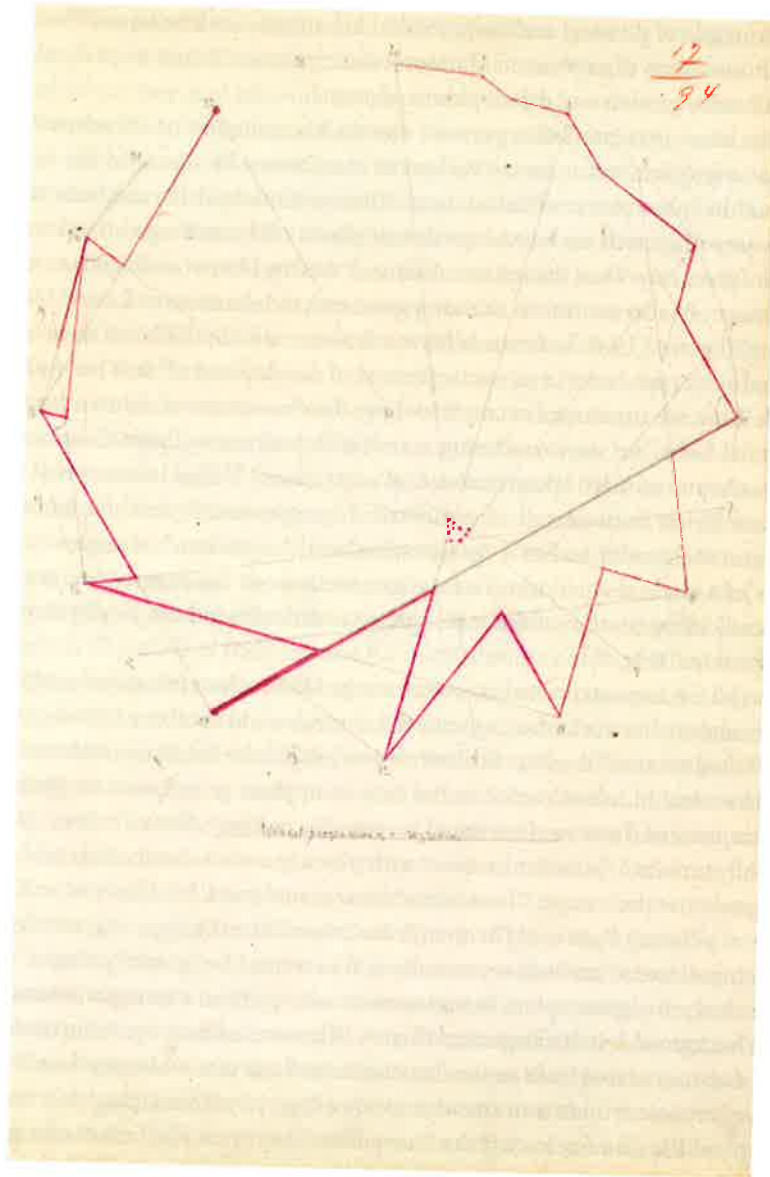


Figure 8: Paul Klee
 Pictorial Creation: II.19 Progressions
 Bildnerische Gestaltungslehre: II.19 Progressionen
 Pencil and colored pencil on paper, 33 × 21 cm
 Zentrum Paul Klee, Bern

"Le dernier été," wh
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³⁵⁾ Louis Aragon: "Le dernie

³⁶⁾ René Crevel, "Merci, Pat

"Le dernier été," which appeared in the literary magazine *Littérature* in November 1922—the earliest text to be published on the artist in France—Louis Aragon compared Klee with a mysterious plant, a "witch's tooth" that was sprouting leaves in Weimar (not in the Bauhaus): "C'est à Weimar que fleurit une plante qui ressemble à la dent de sorcière. On ne sait pas encore que la jeunesse va préférer Paul Klee à ses devanciers."³⁵ The Surrealist metaphor of the "witch's tooth" has associations of the perverse and the forbidden, of black magic, and is typical of how Klee was perceived by the Surrealists. His art is like a strange plant that has grown out of the depths of the subconscious. Six years later, this vegetable metaphor was still being used. In his eulogy "Merci, Paul Klee," René Crevel compares Klee's pictures with mysterious "dream plants" (*plantes de songe*) and sees in Klee the true forerunner of the Surrealist approach to natural history: "Avant même la merveilleuse histoire naturelle de Max Ernst, grâce à vous [Paul Klee], déjà, une flore et une faune surréalistes nous vengeaient des gazelles aux yeux trop bien peints, des hortensias hydrocéphales et autres littératures de nos jardins caducs."³⁶

What is fascinating about Klee's imaginary plant life is that, regardless of all its playfulness, it can only function as art because the fantasy of the faculty of imagination is based on a thorough investigation of the structure and the morphology of plant life not only in terms of an analysis of its parts and organs but as an insight into the laws of process-like growth in nature.

³⁵ Louis Aragon: "Le dernier été," *Littérature*, no. 6 (1 November 1922): 20.

³⁶ René Crevel, "Merci, Paul Klee," *Le Centaure*, 3. ann. (December 1928), 50f.