**Bilder animierter Bewegung/Images of Animate Movement**
Sigrid Leyssen, Pirkko Rathgeber (Hg.)

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Wilhelm Fink

Schutzumschlag: Matt Mullican, Untitled (Progression of the Arts), 2011 (Detail). Die Abbildung mit freundlicher Genehmigung des Künstlers. Courtesy Mai 36 Galerie, Zürich, Foto: © Helga Aichmaier, Basel. Die Zeichnung entstand anlässlich seines Vortrags »How to Prove that Stick Figures Live Lives: A Lecture in Three Parts«, während der Tagung »Bilder animierter Bewegung. Darstellungen von Leben / Images of Animate Movement. Representations of Life«, eikones NFS Bildkritik, Universität Basel, 27. Mai 2011.

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# Living Abstractions. Images of Animate Movement in Art and Science: An Introduction

Sigrid Leyssen and Pirkko Rathgeber

At the origin of this book lies a paradox: the paradox that we can see life in very schematic or abstract images. In a drawing of just a few lines, we can immediately recognize a human figure walking. A moving quadrangle can be seen as a crawling caterpillar. And some well-placed moving points are directly joined together in the form of a dancing couple. Very little actually needs to be provided to enable such a rich and meaningful impression in the viewer, yet the perception of a living being in movement can be very compelling. This paradox of seeing life in movement where only a few static streaks or only some elemental moving dots are given has a long and persistent history of fascinating spectators and thinkers. How can it be explained that we can see a living creature moving in such very schematic representations of movement? How can we understand that some simple dots or lines can suddenly gain such specific and strong significance? Why at a given moment does an entire figure appear to be moving, evoking an impression of animate movement?

With the concept of *animate movement* we refer to a movement that belongs to a living being. Because of its specific character, such a movement ›reveals‹ the presence of an animate creature. Such ›living‹ movements are often experienced as self-moving, autonomous,


**1 Matt Mullican, Untitled (Pricking his Finger (Feeling Pain)), 1982.**

goal-oriented or intentional. This specific phenomenon is investigated in different disciplines under different headings, such as biological movement, auto-locomotion, animacy, animation, liveliness, vitality, enlivenment or *Lebendigkeit*. This specific movement, as it is performed or perceived, has been described and understood in many different ways, by means of respective field-specific methods, terminologies and ways of observing. With this concept of *animate movement* we also want to emphasize that in the perception of the external movements of a living creature, an inner animate movement is expressed as well. An *animus* is sensed in this particular kind of movement, a spirited or ensouled creature which has a certain character, with emotions and intentions, all of which seem to be discernible in some way and to some degree via external movements.

This can best be illustrated by showing some striking images of animate movement. Take for example the drawing of a stick figure by the American artist Matt Mullican [Fig. 1]. The stick figure pricks his finger and, as we can read in the by-line, it *is* feeling pain. While watching, we learn about the figure's ›bodily experience‹. The image immediately triggers our own somatic sensations and these then enter into an exchange with the ›feelings‹ of the line figure. The drawing is part of a stick figure series, in which the artist addresses the idea of ›entering an image‹. The question ›Where is life?‹ proves to be a driving force in the exploration of the emotions, feelings and moods a spectator experiences when he or she is confronted with the figures expressing these physiological and psychological conditions. At the same time, the vivid expression conveyed by these charcoal lines, roughly sketched out on the paper, conjures up long traditions of debate about the interplay between motion and emotion, between visible and invisible complexions and, more generally, between production and perception processes of images.

Something similar can be observed in the moving images of just a few animated points in *Punktefilm (Dot Film)*, Carsten Höller's animation from 1998, in which one immediately sees a dancing couple

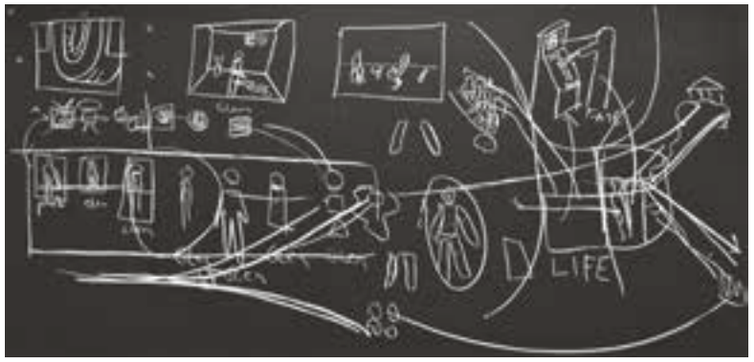
**2 Screenshots, from: Carsten Höller, Punktefilm (Dot Film), 1998.**

[Fig. 2]. The animation of Höller goes back to the systematic research on the perception of biological movement of the human body by the Swedish experimental psychologist Gunnar Johansson. It shows a film of a couple dancing a Swedish folk dance equipped according to the Moving-Light-Display Method. Johansson, following up on the technique of the physiologist Étienne-Jules Marey, was applying small lights to the joints and head of the dancers and filming them in front of a dark background so that only the moving lights were seen. Höller selected this original point-light display film by Johansson, manipulated it and created a loop animation. Here, the artist switched off one dot after another until just one is left moving, after which he switches the dots back on. In this way, one can explore when the viewer stops seeing the dancing figures and perceives only the remaining dots, and what information is minimally needed for the dancers to reappear. Höller's experimental set-up further demonstrates that in freeze-frames and even in strongly decelerated films, the points of light are no longer recognized as a moving person.

A third example presents a simple moving geometric shape that is perceived as a living being in movement. In Figure 3, a black thick paper disc with a red form painted on it is shown. When rotated and observed through a narrow horizontal slit in an apparatus so that only a small section of the disc is visible, the image of an expanding and contracting quadrangle is seen, moving forward just like a caterpillar. With these kinds of moving images the experimental psychologist Albert Michotte investigated the problem of *living movements* from the late 1930s onwards . He sought to reveal the specific phenomenal character that human and animal movements possess as compared to the mechanical movements of inanimate objects. This crawling movement was strongly perceived as an activity for which a living object was the source.

It is striking that abstract and schematic images have so often been used to explore the perception, depiction and functioning of animate movement. Elaborating a uniform concept of abstraction is not one of the aims of this book. Instead, we are interested in exploring the different types of images and image practices which have been developed to capture animate movement and which in different ways can be understood as abstract. This approach offers a way to better understand the reasons why such reduced and abstracted forms are so often used, what different tasks they enable, and what they teach us about our perception and about the phenomenon of animate movement.

3 Disc for creeping caterpillar effect, laboratory Albert Michotte, between 1939 and 1965.




**4 Matt Mullican, Untitled (Progression of the Arts), 2011.**

This leads us to look more closely at the image that figures on the cover of this book. It displays Mullican's model for understanding and ordering the world. In his work, the artist aims at developing the ›Universal‹ and the ›Individual‹, the ›General‹ and the ›Concrete‹ equally and to amalgamate their constellations into images that are directly present. In his lecture *How to Prove that Stick Figures Live Lives: A Lecture in Three Parts*, on the occasion of the conference which preceded this volume, the artist laid out his subjectively organized world on the blackboard in our conference room. Here he drew from his encyclopaedic *Charts* and *Cosmology*, making use of his *Signs*, which are recurrent elements in his oeuvre, as a way to visualize his ideas [book cover, Fig. 4]. This sketch on the blackboard depicts the breakdown of one object from its objective material givenness into its purely subjective representation. Our reflexive faculty of abstraction of daily objects and contents is here represented. For Mullican, a rudimentary view on the way we appropriate reality consists of five themes of perception and cognition, to which he assigns colours and characters. An important component of the blackboard drawing is the stick figure, a fictitious character named *Glen*. By means of *Glen*, Mullican explores the mutual exchange of subjective approximation of the image and of abstract representation. The idea of the stick figure is a *model presence* that for Mullican provides a tool for investigating the possibility of dealing with the stick figure's sensations, allowing us to feel what it feels, or become the figure in the drawing. It is a vision of life that comes alive in the image.

In the blackboard drawing, Mullican presents a very particular version of the animation of a figure, setting out to demonstrate that the stick figure has its own life by mobilizing the proper bodies and sensitivities of the observers and inducing identification with the figure. In the space between observing the drawn figure, reading the descriptive by-line, and becoming aware of the somatic, imaginative, and memory responses that are evoked, the stick figure is set in motion – *Glen* gains his life. This is only one specific way of ›animating‹ a figure, and many different ways are explored in this book. A more general process that seems to play a role in seeing a figure as animate involves different levels of projection, empathy and *Einfühlung*. In certain cases of a positive *Einfühlung*, we become immersed in the image in an almost magical way.

Not all impressions of animate movement demand such an investment on the part of the viewer, however, or involve a magical identification. The psychologist Michotte, for instance, argued that the perception of something as animate is not the result of a projection or *Einfühlung* by the spectator, but is a perceptual phenomenon, objective and measurable, in which very precise perceptual boundaries determine whether a certain movement will appear as animate or not. The impression of animate movement here is dependent on specific parameters of the moving object. We can see here two opposite approaches: the process responsible for the perception of animate movement is identified by some as a projection, whereas others see it as a mode of perception determined by measurable quantities. These views do not need to contradict each other and often a mixture of these explanatory principles has to be invoked, or they can even work to reinforce each other. However, both perceptual mechanisms depend to a large degree upon the special properties of the object.

For many centuries, artists and scientists have searched for ways to construct a figure with qualities that enable the perception of living movement, or that make projection possible or easy. Many different techniques have been developed to present the movement of living beings vividly in an image. Here the very basic structures

of the stick figure skeleton, its curves or bending, as well as the energy resulting from the relation of its composing lines help to unfold the movement of the figure, and are important in their animating effect. It takes specific knowledge in anatomy and physiology to differentiate the simple structure of the stick figure with more details such as bones, muscles and flesh so that it becomes, anatomically speaking, more concrete. It then can act as a basis upon which to build for creating very specific and convincing character movements in animation film. For example, carnivores show much more body undulation during galloping, whereas the shape of the vertebral column in a galloping horse remains virtually unchanged. There is, however, another type of ›skeleton‹, the ›kinetic skeleton‹ of an event, the specific constellation of movement patterns that can be accorded an important role in the creation of animate movement images. A caterpillar's movements can be clearly presented by a dilatation-contraction movement and a locomotion movement in a certain well-defined combination. Furthermore, important contributions to the specific *animate* character of images exist because of a manipulation in the space in-between the images, typical for film and animation, where moving figures are created and dissolved. In stretching the movement of the images, or in partially revealing the different sorts of interventions and their effects that can happen in and around such an interval, a specific kind of productive moment as movement can be perceived.

This collective volume focuses on figures that seem animate, whose movement is seen as the movement of a living being. There are, however, other ways to study images related to animate movement. Exploring them allows us to further specify both the concepts of ›animate‹ and of ›movement‹ in ›animate movement‹. For example, images created by an animate being can be found to have some typical characteristics that can be clearly recognized as such. Sometimes it is said that an artist puts his soul into his work. It turns out that we can distinguish whether an image is created by an animate being or by means of some mechanical process. It seems that a living being animates his drawings, and in some way transmits the nature of his aliveness to the image. How can the artist's animate presence be visible in certain characteristics of the traces resulting from the act of drawing? What is special about the lines drawn?

Another perspective on animate movement begins not with images, but with animals and human beings, and investigates how they move. Here one starts from the careful observation of the movements of an animal and scientists study these movements by means of visualization techniques. Here, we have come full circle: we are back to representations of animate beings in motion, used in this case, to analyse the movement of animals. In research in animal physiology, for instance, simulations are used in order to visualize and check the outcome of neuro-mechanical models of animal movement. Here the movement of the animal is ›reanimated‹ again, produced from the neuro-mechanical model, in order to compare these constructed movements to the actual locomotion of the real animal. One can then ask how much these simulations actually *look* animate. In another example, coming from cell-biology, animation can be taken in a most literal sense of ›giving life‹ to the moving figure. In the new technique of live-cell imaging, the human body is made to produce a visual probe along with its own proteins, the living movement of which can then be observed and recorded.

Here, the question ›What is *animate* in animate movement?‹ becomes acute. Indeed, what does ›*life*‹ mean in these different cases? We are part of a multi-layered cognitive world, with many different meanings of ›the living‹ and with different paradigms for understanding life. Our aim in gathering together the contributions in this book is to clarify that paradigmatic examples of the living can range from cells and amoebas to walking humans. Furthermore, for some scientists, life stands in a clear binary opposition to non-life (one cannot be half-alive), but other conceptions of life allow for a range of gradations as well as ambiguous in-between forms. This multiplicity of ideas and examples of life means that different images, with sometimes very different characteristics, can still be experienced as animate movement. One might ask whether it is possible to find some universally valid principles linked to the perception of animate movement – this question evokes a variety of answers, some of which are treated here.

Another intention of this collective volume is to bring together perspectives from a diversity of disciplines. Areas of study that are represented include archaeology, animation, the arts, art history, biology, choreography, history of science, visual studies, philosophy and perceptual psychology. Scholars from these different disciplines shared their approaches to the phenomenon of seeing animate movement in abstract representations in order to study the phenomenon anew. Each of them brings to the fore concrete examples of images of animate movement, contributing to the discussion from the vantage

point of their respective terminologies, techniques, and disciplinary attitudes. One recurrent methodological tool identified is the differentiation of the movements in question. Different kinds of movement are distinguished, on a technical or phenomenal level, and the movement within movement is explored. Furthermore, the common opposition between the static and the moving image is questioned from different angles. Here, it becomes clear in what ways the static can have a productive role in creating the impression of movement, and that static images can have a particularly strong movement potential.

The contributions to this book study the construction, the perception, and the real world effects of images of animate movement. In a first set of chapters, different techniques of constructing images of animate movement take centre stage. The focus is on techniques, tools and apparatuses for creating images of a certain degree of abstraction that nonetheless – or because of the abstraction – manage vividly to present a living figure in motion. In a second series of chapters, the effect of these images on our perception is studied. How is it possible that we see *life* in such abstract representations? Then, thirdly, the contributors explore the impact of these images in society, in the sciences, and in politics. The epistemic impact of images of animate movement is likewise investigated: their concrete use in experimentation aids in the investigation of movement and life, as well as the impact the images have on our conceptions of movement and of life. Finally, after this wealth of examples and theories, it becomes important to focus on the different types of images, and to closely compare them so that we can learn more about the ways in which these different images deal with animate movement. This is, of course, a leitmotiv throughout the book. The abstract and schematized representations discussed in the book are presented in many different media, going from drawings, animation film, point-light displays, paintings, live-cell imaging, choreographic notations, and blackboard sketches to antique vase paintings. It is interesting to see what forms or types of images are chosen to represent which kinds of movement, and whether some forms are more fitting to represent certain types of movement than others. Bringing together all these images in their presentation of animate movement is sure to set in motion multifaceted problems and questions.

A first series of chapters focuses on questions of how to construct an image of animate movement. The article of art historian Pirkko Rathgeber dedicates a study to the dream of artists to capture living movements in the image. She shows how the construction of temporally fleeting movements is related to a system of geometric schematization of the figure. A study of the so-called stick figure is used to elucidate this paradox of the combination of the abstract representation of the figure and the liveliness (*Lebendigkeit*) of the movement in the image. Artists have used these geometrical figures, at least since the proportion and motion theories of the Renaissance, in teaching manuals and pattern books. This schematized figure was in its construction and application easy to understand and to learn. Centuries later, at the intersection of drawing and the new medium of animation film, this same stick figure obtained an important task as a tool for the construction and perception of movement, helping to make cartoon characters in films move.

In his article, the animation consultant Stuart S. Sumida, who also teaches comparative animal and human anatomy, discusses the construction of animation characters in current day animation films. He shows how movements in animation film remain powerfully anchored in anatomical reality. His practical experience, gained while working in between anatomical studies and large animation film studios, allows him clearly to formulate a number of *biological rules* which are of great utility for animators. It is by following these rules that animation characters can be made to move in a more convincing way. What an animal eats, its age or its sex determines its body shape and body stiffness, and this affects its locomotion mechanics. Animators have to take into account all these factors in order to understand the way an animal moves. These rules also allow them to create ›naturally‹ moving hybrid creatures, such as dragons. They are an indispensable guide as well in selecting those distinguishing features for presenting a character at a great distance in a very schematic yet clearly recognisable way.

Paul Ward, who lectures in the fields of animation, documentary film and television, focuses in his contribution on how to create something magical with the help of different manipulations in the animation process. He explores the intricate relation between the construction processes in animation, and the way in which partly revealing these has been a constitutive part of magically bringing figures to life. Ward places animation film here in a long tradition of prestidigitation and the revelation of tricks, which has always been part of it. He studies in particular George Dunning's *Damon the Mower* (1972) and Mark Simon Hewis's *The Life Size Zoetrope* (2007) and their deliberate revelations of construction procedures.

With the first example he shows the animation process of progressively building up the illusion of movement from individual sketches, yet without removing the marks that are part of the drawing process. In the second example, the animation is constructed from the technical adaptation of events filmed in live action. Ward shows how the work that was done to achieve the animation is made into an essential part of the film, as well as how this allows the artist to create images that are teeming with life, thanks to an interplay between magic and mechanics that holds our fascination.

Robin Curtis, teaching in the field of theory and practice of audio-visual media, explores cases in which moving images of living beings do *not* look animate or only barely so. She studies examples of moving images that hover between the representational and the abstract; for example, images of human beings in which only minimal indications of subjectivity are retained. Here, the distinction between animate or inanimate movements becomes ambiguous. Curtis focuses on the movement of the moving image itself and its capacity to either conjure life or rather bring out this ambiguity. She relates this capacity to the specific in-between in moving images, and discusses the different ways in which working with that in-between allows the reanimation of motion. In order to explore these gradations of life, Curtis argues we must take into account the effect of a negative *Einfühlung* (Theodor Lipps). By studying these boundary cases and gradations, and by showing that even if the moving image may look vital its fundamental stasis is always present within the movement, her contribution points to some of the complexities of what it means to see animate movement.

The discussion of *Einfühlung* highlights a second leading motive of this collection: the question of how to explain the perception of animate movement. The chapters in this second section discuss some of the explanatory frameworks available. Sigrid Leyssen, philosopher and historian of science, studies a series of experiments from the history of perceptual psychology where the impression of living movement became an object of experimental study as a purely perceptual phenomenon. The psychologist Albert Michotte, in the late 1930s, designed an experimental method and an apparatus in order to demonstrate how the perception of mechanical causality depends on very narrowly defined stimulus conditions. In these investigations he used abstract moving figures, and these serendipitously led him to study why we perceive and describe certain movements as mechanical and others as living. He showed how, phenomenally, *living movements* show a very characteristic kinetic structure and he discusses what could be called their kinetic blueprint or their *kinetic skeleton*. In his analysis of the perception of *animal locomotion*, Michotte explores the different phenomenal movements – going from *microkinesis* to various macroscopic movements – that determine the perceptual impression of living movement.

The psychologist and researcher of vision and behavioural sciences Nikolaus F. Troje discusses current research on the perception of biological motion. He refers to the Swedish psychologist Gunnar Johansson, and to how he studied *biological motion* by means of point-light displays. Johansson, and many researchers after him, studied this incredible ability of the human visual system to organize a few moving light dots into the compelling percept of a person in motion. Troje explains biological motion perception as a hierarchical, hypothesis-driven process, in which one needs to take into account not only current sensory information, but also expectations based on previously learned knowledge about the world, in order to make sense of often ambiguous stimuli. If one takes a still frame of one of these point-light display movies, the 15 individual dots appear meaningless and their arrangement arbitrary: there clearly is not enough information given to recognize a living being. When the points are set into motion, however, suddenly one sees a person vividly performing a certain type of action. Troje shows how in this perception of biological motion, a number of biases are at work which are based on expectations and previous experience. These determine whether, for example, we see a figure rather as coming towards us or as moving away from us, in cases where the dots could be ›read‹ both ways.

From the different kinds of movement that can be seen in an image, Helena De Preester and Manos Tsakiris study the movement in the act of drawing, traces of which can be seen in the lines of an image. De Preester, a philosopher in the field of phenomenology and cognitive science, and Tsakiris, working in psychology and cognitive neurosciences, set up a collaborative project to explore such questions empirically. In an experimental study, they compare schematic drawings made by a particular drawing robot developed by artists, and hand-made copies of these drawings. They show how subjects indeed recognize the difference between human-made images and those drawn by robots, and they suggest how this is due to the kinematics of the drawn line. De Preester and Tsakiris explain how the kinematics of the line allows recognizing the different motor

schemata behind the lines, as there is more *motor resonance* with those images produced by an agent whose motor schema is more similar to ours. We can indeed wonder how far the resonating of the actor's movements in the traces contribute to our seeing movement in them, to our seeing these static traces becoming ›living lines‹.

A third group of articles explores the concrete uses and impact of images of animate movement. Two articles present detailed studies of particular images of animate movement, showing how their impact on society and politics should be understood from the particular movement they carry. Maria Luisa Catoni, teaching in ancient art history and archaeology, focuses on the ancient Greek *schemata* as bodily attitudes, studying images of dance and group sports on drinking cups and amphoras in fourth-century B. C. E. Athens. The correct execution of such schemata in the mimetic arts was attributed a high ethical and political import. This was mainly because human beings were understood as having a natural tendency to imitate involuntarily the *schemata* they were exposed to and to assimilate the characters and values that those *schemata* embodied into their souls. Catoni explores the functioning of the *schemata* in more depth, thereby touching upon the foundations of our current understandings of the relation between static and moving images, and their intervals. She shows how *schemata* were static yet mobile in that they could carry specific implicit movements in a synecdochic way. Such a movement could be reactivated again, thanks to the viewer who had to know exactly which bodily knowledge to contribute to the static form. Catoni demonstrates how *schemata* were understood as able to migrate between different representational forms.

Thomas Lamarre teaches East Asian studies and communication studies. In his analysis of the experience of *movement-as-life* and *movement-in-movement* in cartoons, Lamarre offers a diversified view on movement in animation film. Building on the animation theories of Imamura Taihei and Sergei Eisenstein, he shows how *character animation* or *localized movement* has received much attention in animation praxis and theory, yet *non-localized movement* or the movement obtained through compositing has often been ignored. Lamarre exposes his analysis of these different kinds of movements in their concrete technicality in order to reveal the political dimensions and powers linked to presenting certain movements in animation film. He demonstrates, for example, how non-localized movement has been used strategically for making the life of national species appear natural and imperishable.



Animal physiologists Ansgar Büschges, Silvia Daun-Gruhn, Matthias Gruhn and Joachim Schmidt study the movements of a real animal, the stick insect. They discuss the images of its movements that play different roles in their experimental praxis. In their research, they investigate the different neural networks that are involved in order for the animal to take a series of goal-directed steps. In this article, Büschges et al. discuss the different visualization methods they use in the investigation of the neural control of locomotion, one of which is a neuro-mechanical simulation of a stepping leg. These simulations create a visualized output of the differential equations in the form of moving legs and a moving body. This is a powerful tool, they write, not only for layman, but also for the physiologist, in that it allows a quick qualitative judgement of the explanatory power of the model: it permits a visual comparison of the animate movements that are the outcome of the neuro-mechanical model with the behaviour of the living animal. Following this enquiry into the locomotion of the stick insect, the next contribution focuses in on the microlevel even more to look at the movements of cell life.

The life sciences historian Hannah Landecker studies how in certain moving images we see life in a particularly literal sense. She discusses the technique of live-cell imaging, which has rapidly become a crucial technique for the scientific visualization of living things, visualizing the movement *in vivo* of vital molecules. Here we can observe life in the form of developing proteins. Reviewing different moving image techniques used in the biological sciences for over a century, going from microcinematography to live-cell imaging, Landecker develops a clear analysis of the role of visual technologies in how we think and conceive of life. She points to the fact that such animated images produce a »gripping truth« that allows the scientists themselves to actually see their theories of life ›live‹, and that this helps them to believe they are actually working on life. Landecker explores how our perception of life has changed in the recent transition from genomic to postgenomic sciences, to a large degree thanks to the new live-cell imaging techniques.

A fourth guiding theme in many of this book's contributions, which is investigated in detail in the next two chapters, is the comparison of different types of images and their way of constructing animate movement.

In her article, Daniela Hahn, working in theatre studies, displays a set of different movement images by the painter and

choreographer Oskar Schlemmer. In his theatrical laboratory at the Bauhaus in Dessau in the 1920s, Schlemmer performed experiments on movement, studying the movement of walking as one of the most fundamental actions on the stage. Hahn analyses how he develops a tripartite typology of walking, taking into account the different bodily tensions and characters of different walking acts. She shows how Schlemmer constructs different types of images, each performing an abstraction to the elementary in different ways: a floor plan diagram, a score, and also how the performed movements were themselves considered as images (types) of movement. These images allowed Schlemmer to explore the ways in which walking movements – understood as figures – wandered between the plane of the image and the three-dimensional theatre space. Schlemmer's theatrical movement experiments deal with a walking that is self-conscious.

Matthias Haldemann, in his article, stages a narrative in which the line itself becomes self-conscious and »learns to walk«. Haldemann is director of the Kunsthaus Zug, and works on the history and theory of the line, especially in the work of Kandinsky. Discussing selected examples from the history of the line, ranging from the *figura serpentinata* over the arabesque to abstraction in modern art, Haldemann traces how the line can be seen as gradually gaining more and more independence, gaining movement, gaining life.

## Figures

**1** Matt Mullican, Untitled (Pricking his Finger (Feeling Pain)), 1982, Black Charcoal on Paper, © Matt Mullican, Courtesy Daniel Blau, Munich/London.

**2** Screenshots, from: Carsten Höller, Punktefilm (Dot Film), 1998, Betacam SP + VHS, s/w, 1 min 30 sec, Loop, 3 + 1 AP. Reproduced with kind permission of the artist.

**3** Disc for the creeping caterpillar effect (only a small section of this rotating disc was seen in the narrow opening of the apparatus), red paper pasted on black paper, Archive of the Laboratory of Experimental Psychology, Katholieke Universiteit Leuven, Photo: © Sigrid Leyssen, Leuven.

**4** Matt Mullican, Untitled (Progression of the Arts), 2011, Black Board Drawing, Courtesy Mai 36 Galerie, Zürich, Photo: © Helga Aichmaier, Basel. Reproduced with kind permission of the artist.

**p. 27** Matt Mullican, Untitled (Running), 1974 (detail), Black Charcoal on Paper, Courtesy Mai 36 Galerie, Zürich, see also this volume, p. 58.