

Photography's Past Futures

The Past Future of Futurist Movement Photography

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As a rule, a new thing is at best an irritation in the place where it first appears—it can only be approached in the mode of the past future.

—Hans-Jörg Rheinberger¹

I.

Around 1900, cinematography became a tool for addressing the future. In Germany's first film-trade journal, *Der Kinematograph*, which promoted the political and social values of the newly invented cinematograph, the chief editor, Ludwig Brauner, presciently hinted at the full legibility of recorded images by the year 2000: "Let us imagine the possibility that the cinematograph today did not boast an age of a little over ten years, but rather one of a hundred years, and that motion pictures of the so-called good old days were handed down to us. What a vivid picture these unretouched, truthful documents would offer us of a past era!"² Brauner imagined himself being a future observer in a hundred years' time who could extract a whole cultural history out of a single film-strip that outclasses every written and depicted medium in detail: "Let us take only a street scene. . . . It would show us not only clothing and shoes, but also the way of walking, the salutations, the social forms, the types of movement on the street, the traffic on the street, in short, everything that we currently have to first imagine on the basis of surviving paintings, engravings, and descriptions."³ Brauner's thought experiment not only was directed from a past present toward an unknown future but also anticipated a twisted time structure in which observations of the future might be confronted with artifacts from the past. This past was, at the same time, the present of 1908.

This confrontation of two "presents"—one from the past and the other from the future—within a single artifact is encapsulated in the term *past future*, which the historian Reinhart Koselleck coined in his thoughts on the temporalization of historic time. According to Koselleck, the experience of rapid change and the development of "progress" as a key concept since the end of the eighteenth century established a widening chasm between the "space of experience" and the "horizon of expectation."⁴ The prophetic modes of expectation found in former times, which based their predictions on experiences of the past, were slowly transformed into the concept of an open future that traversed former experiences. This development reorganized the relationship between

past and future. The future—following Koselleck’s argument—becomes a potential “horizon of expectation” that veers away from the realm of experiences. Koselleck’s historiographical solution for capturing this historic change in the concept of historic time was to focus on the expectations, wishes, and unfulfilled prophecies of particular segments of the past, rather than try to reconstruct them as not-yet-optimized stages that gradually approach the present.

As Brauner’s statement suggests, the focus on the future expectations of a historic constellation is particularly relevant for the invention of new media technologies in the nineteenth century. Photography, telegraphy, the telephone, and cinematography—to mention just a few—were historicized in real time and perceived in the mode of future expectations.⁵ Early photographs, for example, were of interest not only because of what they actually depicted but also because of what the technically produced images would explore in future times. The French physicist François Arago envisaged, in his famous speech on 3 July 1839 in front of the *Chambre des Députés* in Paris, the manner in which the newly invented image technology would revolutionize various disciplines such as archaeology, astronomy, and the arts.⁶ In the rhetoric of a flourishing future, the temporality of the actual artifacts of the early daguerreotypes and their future application falls apart. Like the countless patents of new technologies in the nineteenth century, it points to a technology’s fulfillment in the future.⁷ As Bernhard Siegert writes about the time structure of patents, “This discourse can be nothing other than prophetic in its core, because only in a futurist vision can the arrival of something that is not yet present, seem to be an event of the past—a past that is yet to be found in the future.”⁸ This aporia poses a problem for the historian. How can he or she go back to a historic moment, when the phenomenon in question is not yet fully distinct and shaped in its definition, without including later results that merely seem to fulfill former speculations? How does one describe a constellation that reverses linear time and ideas of a “before” and “after,” while confronting the present of the past with the present of the future in the *futurum exactum* at the same time?

In this article, I would like to address these questions by focusing on an intentional anachronism within movement photography. Profound things have been said about the imaginative horizon of sequence photography and chronophotography in the second half of the nineteenth century, when various disciplines such as astronomy, physiology, physics, and psychology worked simultaneously on the projected and moving image, which would later be called film.⁹ What interests me here is that the representation of movement by way of photography seemed not to lose its imaginative potential at the moment the cinematograph appeared. Even the Lumière brothers did not fulfill all of the expectations of the future with their short films in 1895. In other words, it does not hold true for the development of movement photography after 1900 that its imaginative potential was at its highest level at the very moment the new medium of the cinematograph emerged, as Friedrich Kittler argues.¹⁰ Rather, the “horizon of expectation” that Koselleck analyzes for the modern era shifts from the realm of optimization

of technologies (from still photography to film) to a paradigm of recurrence, recombination, and reconceptualization. By reassessing the so-called failures, or incapacities, of the chronophotographic practices of the 1880s, futurist experiments on movement photography in the 1910s try to open up unexpected horizons of the future, which question the linear teleology of technological optimization typically found in histories of photography. In the following article, I exemplify this temporal structure of recurrence in the history of photography in relation to the experiments of Italian futurists Anton Giulio and Arturo Bragaglia between the years of 1911 and 1913.

II.

The widening chasm between the “space of experience” and the “horizon of expectation” that Koselleck has analyzed in the modern era, which resulted in a focus on the expectations of the future as evidence through historic constellation, is illustrative of the entire futurist agenda from 1909 onward. Surprisingly, the strong rhetoric of the futurists’ manifestos, which conjured up the new technological era in the form of machines, airplanes, and locomotives that sped through the metropolis, does not actually correlate with their artistic production. In 1916, a coauthored manifesto on “The Futurist Cinema” positioned the film as a new model of creative imagination in opposition to traditional media, even though most futurist production continued to be realized in painting and sculpture: “The Futurist cinema will sharpen, develop the sensibility, will quicken the creative imagination. . . . The Futurist cinema will thus cooperate in the general renewal, taking the place of the literary review (always pedantic) and the drama (always predictable), and killing the book (always tedious and oppressive).”¹¹ This confident statement was despite the fact that the futurists were convinced that the actual artistic possibilities of cinema still rested in the future: “Therefore all the immense *artistic* possibilities of the cinema still rest entirely in the future.”¹² In fact, only a few filmic projects were actually realized within futurism. Marinetti’s plan for a film called *Velocità*, for example, was intended to implement the futurist visions of megacities in future times—sequences of crowds on the street, electric lighting, or the speed of factory work.¹³ However, the screenplay never was filmed. One of the few futurists who actually worked with new media (but it was photography and not film), Anton Giulio Bragaglia (1890–1960) felt called to “carry out a revolution . . . in photography” even if at that current moment most of the “results are still imperfect and not persuasive.”¹⁴ Similar to Ludwig Brauner’s assertion, he argued that photographs should unfold their full potential in the future: “The inner logic of movement within photography will show us the whole movement of life in future times.”¹⁵ But unlike the imagined future observer, who could extract information about the past out of a sharp and—from a technical point of view—perfectly produced filmstrip, Anton Giulio and his younger brother Arturo Bragaglia (1893–1962) imagined their renewal of the field of photography through the transformation of the older medium of chronophotography, most popular in the 1880s: “We despise the precise, mechanical, glacial reproduction of reality, and take the utmost care to avoid it. For us this is a harmful and negative element,

whereas for cinematography and chronophotography it is the very essence. They in turn overlook the trajectory, which for us is the essential value.”¹⁶

Between the years of 1908 and 1910, the Bragaglia brothers worked in one of the major film studios in Rome, Cines, and coproduced 134 short films, 36 documentaries, and 57 cartoons, which means that they had the most up-to-date technical and institutional knowledge of the cinematic medium at their disposal in order to capture, or index, “the inner logic of movement” within technical media. But it was not the latest technology that would fulfill their goal of inventing a new form of expression for the future; instead, it was movement photography (and all its failures from the previous century), which they incorporated into futurist aesthetics. In doing so, the actual antagonist of their photographic experiments became the cold, analytical mechanic of the cinematograph: “Cinematography does not trace the shape of movement, it subdivides it, without rules, with mechanical arbitrariness, disintegrating and shattering it without any kind of aesthetic concern for rhythm. It is not within its coldly mechanical power to satisfy such concerns [as the inner logic of movement, KMH].”¹⁷

From 1911 until 1913, the Bragaglia brothers experimented with the device of the camera to depict movement within instant photography.¹⁸ The neologism *fotodinamismo*, which alludes to the “Dynamism of Free Verses” by Filippo Tommaso Marinetti, points to the idea that the technically produced image should be overcome in its conventional sense.¹⁹ This conventional use of photography—according to Bragaglia’s sixty-page manifesto, *Fotodinamismo futurista* from 1913—is instantaneous photography and chronophotography: “We will overcome the static qualities of the camera and the instant by using the traces of light that represent movement and life.”²⁰ In different gestures—the lighting of a cigarette (*The Smoker*), a slap in the face (*A Slap in the Face*), or the turn of a head (*Polyphysiognomic Portrait*)—movement is captured by sacrificing the sharp outlines of objects and bodies.

In July 1911, the wife of Anton Giulio Bragaglia, Giuseppa Pelonzi, found a postcard in her mailbox (fig. 1). The handwritten message, “Many. Niny. Frosinone Station at 8:45. Tuesday,” determined the location and time of its posting at the railway station in Frosinone near Rome without any further information. The exact written data—“8 Lug 11,” “Frosinone Stazione,” and “Roma”—emphasized that this postcard was merely meant to be a means of conveying a precise point in time and space. The front side, however, shows the attempt to overcome this precision (fig. 2). The image of the Bragaglias’ first photodynamic work, *The Bow* (1911), fixes the photographic trace of a movement in a duration—the upper part of a body bending forward. The movement of the body is not divided into different positions within the space, but rather is captured in a synthesis of impressions of the entire movement. According to the technical preconditions of the camera, the temporal and spatial indefiniteness of the body produces a blurred effect of bodily outlines. The polyphysiognomic portrait of Umberto Boccioni, one of the leading futurist painters and theorists, depicts this visual diffusion of his head in motion (fig. 3). The movement of the head is transformed into the layering of different details—the ear,



Fig. 1. Anton Giulio Bragaglia (Italian, 1890–1960) and Arturo Bragaglia (Italian, 1893–1962). *The Bow*, 1913, verso of postcard, 17.5 × 23 cm (6⁷/₈ × 9¹/₁₆ in.). Rome, Centro Studi Bragaglia

Fig. 2. Anton Giulio Bragaglia (Italian, 1890–1960) and Arturo Bragaglia (Italian, 1893–1962). *The Bow*, 1913, photodynamism (recto of postcard), 17.5 × 23 cm (6⁷/₈ × 9¹/₁₆ in.). Modena, Galleria civica di Modena (597). Courtesy Galleria civica di Modena. © VG Bild-Kunst, Bonn 2014. © 2014 Artists Rights Society (ARS), New York / SIAE, Rome



Fig. 3. Anton Giulio Bragaglia (Italian, 1890–1960) and Arturo Bragaglia (Italian, 1893–1962). *Polyphysiognomic Portrait of Umberto Boccioni*, 1913, 12.3 × 17 cm (4⁷/₈ × 6³/₄ in.). Milan, Calmarini Collection. © VG Bild-Kunst, Bonn 2014. © 2014 Artists Rights Society (ARS), New York / SIAE, Rome

the nose, the eyes are recombined as fractured body parts. The Bragaglias used three lamps to flood the subject in movement with bright light in order to isolate the trajectory of the body. Within the resulting blurred surface, the depiction oscillates between fixation and dissolution; the time structure is thereby captured in the in-between of before and after. The film theorist Mary Ann Doane refers to this blurring effect in her reflection on the emergence of cinematic time; she writes, “the trajectory traced by Bragaglia’s photographs effectively lengthens the duration of the present—the instant—to make it accessible to representation, even if it is a representation characterized by a certain illegibility. It sacrifices the object.”²¹ However, rather than sacrificing the object completely, the Bragaglias’ photodynamic experiments aim to transform former paradigms for the successful depiction of precise time segments, as the scientific chronophotographic imagery of the 1880s suggested.

In the framework of the visual experiments of the French physiologist Etienne-Jules Marey, this undated photograph of a horse in movement would have been classified as a failure (fig. 4). The aim of Marey’s photographs was the precise, scientific analysis of moving bodies, using the camera to illustrate his assumption that all bodily movements follow mechanical laws of nature. Marey perceived the human body as a living machine that follows the same laws as inanimate nature. From the 1880s onward, after experimenting with various photographic methods, Marey installed a laboratory in the Bois de Boulogne and used his invention, the photographic revolver, to capture

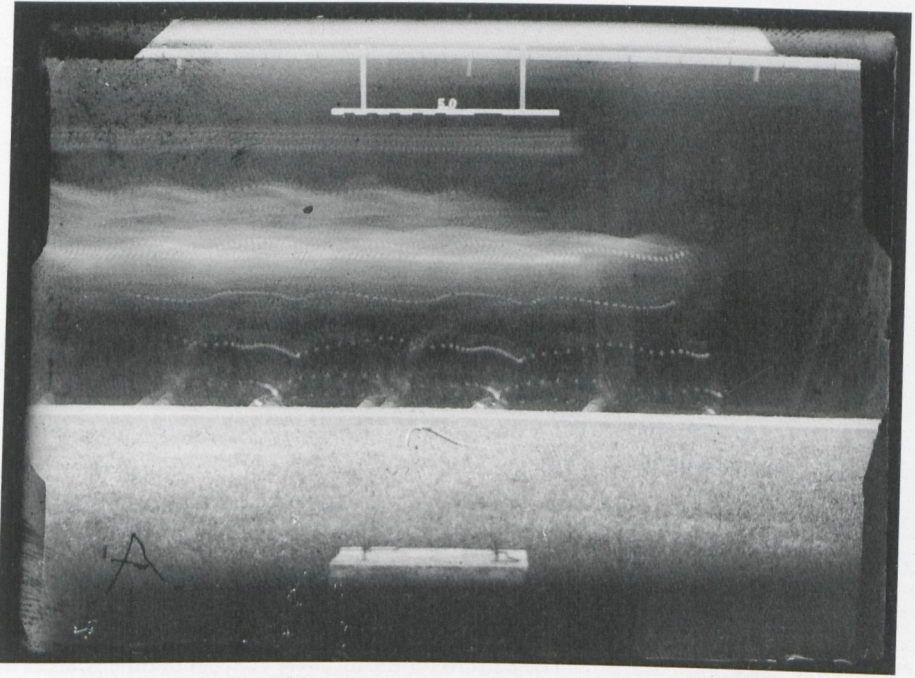


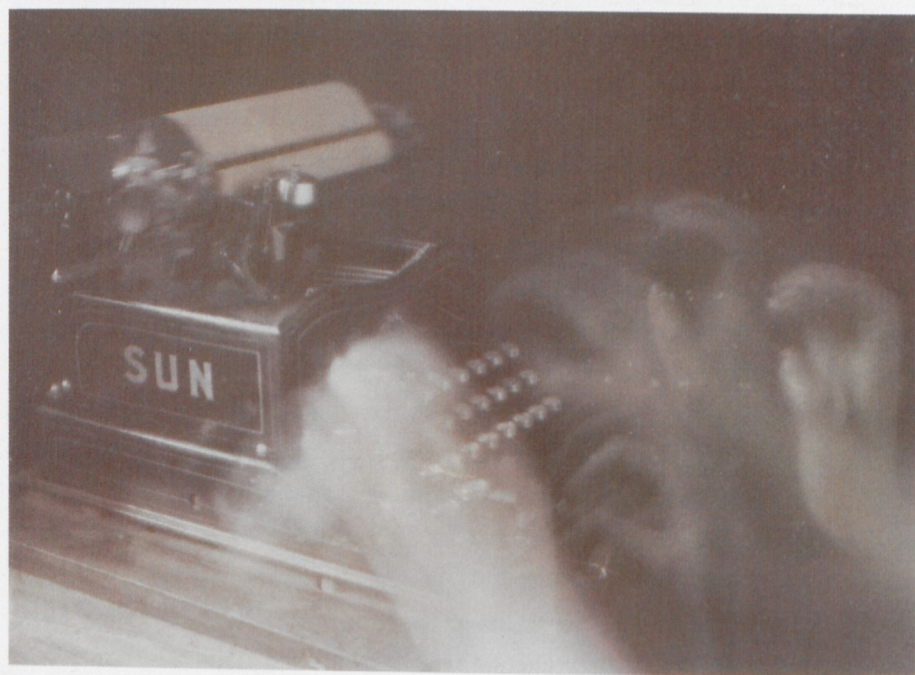
Fig. 4. Etienne-Jules Marey (French, 1830–1904). *Mounted Horse Walking: Partial Geometric Chronophotography*, 1886, gelatin silver negative on glass, support: 6,5 × 9 cm (2½ × 3½ in.). Paris, Collège de France (3 PV 1210)

several instants on a single photographic plate. Marey's work was driven by the ascribed mechanical objectivity of the camera device, which the historians of science Lorraine Daston and Peter Galison have recently analyzed as part of a system of scientific objectivity emerging in the nineteenth century.²² According to Daston and Galison, Marey expected that the camera would "eliminate all suspect mediations between nature and its representation."²³ The precision of the photographic image would overcome all subjective intervention as well as the fatigue of the human scientist. As we can clearly see in the chronophotography of the horse, this expectation of Marey within the scientific framing failed a number of times. The distinct outlines of the horse are blurred, the overlapping representations melt into one another, and the exact position of the horse in time and space cannot be defined clearly. The Bragaglias' photodynamic experiments incorporate this out-of-focus effect (which were previously identified as failures) within their vision of the futurist aesthetics of movement. In the pictorial logic of black-and-white imagery, the parallelism of bodily movement and the picture's surface, and the rigid experimental system, the photodynamic images refer to their scientific predecessors, but within that framework they break up the analytical division of movement by introducing long exposure times to represent their future ideals of an inner concept of movement. As they write, the photodynamic image should represent the "inner, sensorial, cerebral, and psychic emotions that we feel when an action leaves its superb, unbroken trace."²⁴ This new idea of representing movement is set against the analytical time segments of the

cinematograph and chronophotography; Bragaglia suggests a metaphorical picture of a imaginative clock to illustrate this difference: “To put it crudely, chronophotography could be compared with a clock on the face of which only the quarter-hours are marked, cinematography to one on which the minutes too are indicated, and photodynamism to a third on which are marked not only the seconds, but also the *intermovemental* fractions existing in the passages between seconds. This becomes an almost infinitesimal calculation of movement.”²⁵

The blurred image becomes the index for a new, inner logic of movement that would be achieved by transforming Marey’s analytical system of experimentation. In his theoretical framework, Bragaglia sets the cold and mechanical division of lively movements against the notion of intuition: “The intermovemental fractions of a second can only be captured by intuition.”²⁶ Around 1900, the concepts of analysis and intuition, introduced by the French philosopher Henri Bergson, were discussed excessively in French and Italian philosophical circles and were noted in the artistic manifestos of the avant-garde. Bergson connected intuition with the sensation of time, and differentiated a physical, conventional clock time (*temps*) from the concept of an inner time of individual perception (*durée*).²⁷ The pattern for the intuitive concept of time is, according to Bergson, the perception of movement. Bragaglia transfers Bergson’s division of analytical and intuitive time to the field of scientific and artistic production by way of

Fig. 5. Anton Giulio Bragaglia (Italian, 1890–1960). *The Typist*, 1913, gelatin silver print, 12.8 × 17.8 cm (5¹/₁₆ × 7 in.). New York Metropolitan Museum of Art, Gilman Collection, Gift of The Howard Gilman Foundation, 2005. Credit: bpk / The Metropolitan Museum of Art / Anton Giulio Bragaglia. © VG Bild-Kunst, Bonn 2014. © 2014 Artists Rights Society (ARS), New York / SIAE, Rome



movement photography. The “infinitesimal calculation of movement” should be represented by the trajectory of light in the photodynamic experiments that would revolutionize photography and the arts. To extract the inner movement of the light trajectory, the Bragaglias did not use the newest medium of film, which would have been congruent with their aims of being truly contemporary, but they transform the scientific capturing of movement into a picture of the *durée*. The futurist project, which was intended to represent the whole movement of life for future times, is therefore a reevaluation of past modes of representing movement and their concomitant paradigms of analysis and precision. Writing in the 1920s and 1930s, the cultural theorist Walter Benjamin described the new reproducible media like photography and film mainly as an effect that retroactively changes how we think about former media and artifacts.²⁸ The retroactive impact of photodynamism on chronophotography thus elevates former technological failures, reclaiming its experimental status as an innovation that points to the future even if standardized photographic techniques were in most instances established by the end of the nineteenth century.

The German media philosopher Friedrich Kittler used the photodynamic postcard of a typewriter shown here in his book *Grammophon, Film, Typewriter* (1986) in order to illustrate his concept of technical evolution, where he proclaims a connection between the automatic and discrete units of a machine gun and the celluloid of film (fig. 5).²⁹ However, the image of Bragaglia’s typewriter undercuts Kittler’s argument, which is based on a purely technical understanding of reproducible media. The blurred image is not simply an illustration of the technical improvement of photography; it exemplifies how the futurist expectations for photography’s future tried to reverse the teleological notion of its history by retroactively ennobling former failures.³⁰

III.

From a historiographic perspective, the focus on the expectations related to movement photography around 1913 means a shift away from a teleology of technological optimization to the description of recursive structures of historical constellations. In the history of photography, there has been a strong focus on a kind of narration that describes the development of nonfunctional techniques by way of their optimization and standardization toward the end of the nineteenth century: from early examples of long exposure times to snapshot photography, from heavy camera obscuras to mobile, handheld cameras, from blurred to sharp images.³¹ The rhetoric of the futurist manifestos supports movement photography’s open future and conceptualizes the old/new image techniques as tools of potential knowledge through the reassessment of how failure and success have come to be defined, thereby reversing the linearization of technical optimization.

The historian of science Hans-Jörg Rheinberger coined the dual terms of *epistemic things* and *technical things* (epistemische und technische Dinge) in order to describe the relationship between provisional assemblages of techniques, inscriptions, and representations, on the one hand, and standardized techniques on the other. Epistemic things

such as systems of experimentation, according to Rheinberger, are characterized by their undefined status: “epistemic things are vague things without definite boundaries in a state of process, which has not yet come to its end.”³² Technical things, by contrast, are fixed in definition and standardized in their application. Epistemic things are bound to a system of experimentation, which not only is focused on the product but also implements a process, whose final results cannot be foreseen in the beginning. Epistemic things are thus part of nonclassified knowledge, “machines that produce the future.”³³ Even though the Bragaglia brothers could have easily produced sharp images or projected film images, they go back to an earlier phase to reclaim photography’s experimental status that promises future results. Using Rheinberger’s terminology, they foil the teleological linearity of the history of photography from the epistemic thing to the technical thing, from the realm of experiment, expectation, and vague ideas to optimized techniques that merely fulfill previous speculations about the future of the medium.

The means by which photodynamism claims the flourishing potential of future innovations by referring to former image technologies can be understood as a recursive structure: As Markus Krajewski writes, “recursion means a recourse to familiar knowledge that serves as a starting point for the production of something new.”³⁴ On the basis of movement photography’s failures, the Bragaglias try to reorganize the relation of technology, image, and meaning in order to claim that the prospective aspect of photography, therefore, works through the problem of past, present, and future in relation to technical media. For Rheinberger, this kind of recursive structure is a *signum* for our general understanding of historical time—in line with the French philosopher Jacques Derrida—which always has to deal with the paradoxical coexistence of belated and antecedent knowledge:

What does a historian deal with? Does he look back at a past, which on the other hand is the result of a past that lies even further back, hence back to the very beginnings? Or does he look back on a past that proves to be the result of a *differance*, which has always been postponed or shifted, accessible from the dimension of the past future? [...] These conditions [that is, the production of something new—KMH], seem, as does the new itself, only accessible via a kind of recurrence that requires the existence of a product in order to make the circumstances surrounding its fabrication graspable.³⁵

In this manner, historical artifacts situated within a past future perspective manage to escape two potential traps: the linearization of historical movements and the search for origins. However, its problem is a “knotting of time” (*Verknotung der Zeit*) of past and future. The use of the rhetoric of an unknown future in order to describe photodynamic images is paradoxically based on their own status as experiments and their ability to produce imprecise knowledge. The aim of Anton Giulio and Arturo Bragaglia is to present a machine in an epistemic phase that produces open futures, which at the same time leads to a knotted temporal structure of past and present image technologies.

As Rheinberger points out, in the epistemic phase not only is the representational status vague, but, perhaps even more importantly, it becomes the point of reference: "The most tricky problem of the epistemic thing is its reference. We cannot yet point to the thing. If there *is* something like a reference in this epistemic phase, then it is always ascribed but remains uncertain, *must* remain uncertain."³⁶ It is exactly this quality of vague reference that opens up a whole horizon of possible meaning, and as such, the relation between the image and what it represents remains unclear. The vague reference of the trajectory of light that sacrifices the mimetic exactness of representation, which would enable us to point to a certain object, is the culminating point of a wide range of ideas about how the Bragaglias' photodynamic photographs could represent the flow of life: "Only within the single image can the intimate drama of the objects of our world be represented, the scream, the pause, the resounding laughter. Life in its purest form is represented by the light trajectory."³⁷ In the futurist manifesto of 1913, the vague reference of the photodynamic images is transformed into a wide range of linguistic metaphors. In his essay "Naming Photography," the art historian Geoffrey Batchen describes how the early phase of photography generated "a mass of metaphor" because the qualities of the new medium still seemed to be vague.³⁸ In reference to photodynamism, I would like to argue not only that this is the case for the early phase of the medium but also that it is dependent on the treatment of photography as either an epistemic or a technical thing, as a tool for generating unknown knowledge or precise data of the world. Therefore, the suggestion by the historian of science Jimena Canales that we should focus on the "desired machines" in the history of photography and cinematography could hold true not only for the second half of the nineteenth century but also for a whole structure of thinking about what "the future" means in relation to technical media: "Attention to desire permits us to explore the complex relation between discourse and things, dreams and reality, without having to focus on one or the other. The difference between what 'is' (the technical), what 'ought' (the ethical), and what 'could' be (the fantastical) led scientific research into new, unexpected directions."³⁹

In recent discussions on the potential of photography and film to organize different levels of time against the background of a theory of history, it has been argued that only the medium of film inhabits a prospective quality.⁴⁰ This prospective quality of the projected moving image not only relates the pastness/thenness of a past to the presentness of a now of projection time. It opens up an "open future" that is analyzed as being distinct from the "completed future" of photography. As the film theorist Simon Rothöhler writes: "In contrast to photography, which as a storage medium refers to a completed and in this sense inaccessible past, just like film does, the younger medium of time gives the indexical, fixed images the illusion of an open future through the means of projection."⁴¹ Along these lines, the medium of film could serve as a historiographic model for measuring the openness of past future horizons.⁴² Rather than wedding this connection of media characteristics and a model of historiography to an ontological argument (the presentness of filmic projection *always* opens up prospective qualities),



Fig. 6. Maarten Vanvolsem (Belgian, 1974-). *Contraction of Movement 3*, 2007, lambda print, 20 x 20 cm (7⁷/₈ x 7⁷/₈ in.). Courtesy Maarten Vanvolsem

the thinking of new and unexpected future perspectives could be dependent on the treatment of media as either epistemic or technical things in any historic phase. For instance, in more recent examples of movement photography, the artist Maarten Vanvolsem experiments with the sports timing equipment of the “photo finish” technique in order to lengthen the duration of movement registration, which still seems to offer a “[new] opportunity to show the experience of time” (fig. 6).⁴³ Just as the Bragaglias transformed the system of Marey’s images of scientific precision, Vanvolsem appropriates a technique that originates from the measurement of sports movements in order to generate movement images of long durations. These new techniques are based on the rearrangement and reevaluation of former technologies and implement the recursive layering of temporal structures that still promise the openness of future horizons.

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1. Hans-Jörg Rheinberger, *Experimentalsysteme und epistemische Dinge: Eine Geschichte der Proteinsynthese im Reagenzglas* (Frankfurt am Main: Suhrkamp, 2006), 222. All translations are mine unless otherwise noted.

2. Ludwig Brauner, “Kinematographische Archive,” *Der Kinematograph* 97 (4 November 1908): 1–2; translation by Alex H. Bush. See Tony Kaes, Michael Cowan, and Nicholas Baer, eds., *The Promise of Cinema: German Film Theory, 1907–1933* (forthcoming).

3. Brauner, “Kinematographische Archive,” 1.

4. Koselleck introduces the differentiation of experience and expectation in his article “Erfahrungsraum und Erwartungshorizont—zwei historische Kategorien,” in Ulrich Engelhardt et al., eds., *Soziale Bewegung und politische Verfassung. Beiträge zur Geschichte der modernen Welt* (Stuttgart: Klett Verlag, 1976), 13–33. For Koselleck’s whole argument, see Reinhart Koselleck, *Vergangene Zukunft. Zur Semantik geschichtlicher Zeiten* (Frankfurt am Main: Suhrkamp, 1979). For the English translation, see Reinhart Koselleck, *Futures Past: On the Semantics of Historical Time*, trans. Keith Tribe (Cambridge, Mass.: MIT Press, 1985).

5. The term *constellation* refers to the nonlinear conception of history that Walter Benjamin executes in his *Passagen-Werk*. See Walter Benjamin, *Gesammelte Schriften*, ed. Rolf Tiedemann and Hermann Schweppenhäuser (Frankfurt am Main: Suhrkamp, 1972–99), vol. 5. For the fabrication of historic time in reference to technical media, see Bernhard Siegert, “Von der Unmöglichkeit, Mediengeschichte zu schreiben,” in Ana Ofak and Philipp von Hilgers, eds., *Rekursionen. Von Faltungen des Wissens* (Munich: Fink, 2010), 149–66.

6. See François Arago, *Rapport de M. Arago sur le Daguerrotyp, Lu à la séance de la Chambre des Députés le 3 juillet 1839* (Paris: Bachelier, 1839).

7. In this context the archive plays a crucial role as a container not only for storing promising techniques from the past but also for preserving the “past futures” of technology. For a theorization of the archive, see Jacques Derrida, *Mal d’archive. Une impression freudienne* (Paris: Editions Galilée, 1995). For recent discussions on the temporalities of the archive in relation to technology, see Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, The Archive* (Cambridge, Mass.: Harvard University Press, 2002), and Knut Ebeling, *Wilde Archäologien 1: Theorien der materiellen Kultur von Kant bis Kittler* (Berlin: Kadmos, 2012), 730–39.

8. Siegert, “Von der Unmöglichkeit, Mediengeschichte zu schreiben,” 151.

9. For the historiographic emphasis on expectations and desires in the precinematic phase, see Jimena Canales, “Desired Machines: Cinema and the World in Its Own Images,” *Science in Context* 24 (2011): 329–59, and Jimena Canales, *A Tenth of a Second: A History* (Chicago: University of Chicago Press, 2009).

10. Friedrich Kittler, *Optische Medien* (Berlin: Merve, 2002). For a similar argument in the history of photography, see Geoffrey Batchen, “The Naming of Photography: A Mass of Metaphor,” *History of Photography* 17 (1993): 22–32.

11. F. T. Marinetti, Bruno Corra, Emilio Settimelli, Arnaldo Ginna, Giacomo Balla, and Remo Chiti, “The Futurist Cinema 1916,” in Umbro Apollonio, ed., *Futurist Manifestos* (New York: Viking Press, 1973), 207.

12. Marinetti et al., “The Futurist Cinema 1916,” 208.

13. See Giovanni Lista, "Futuristischer Film und Futuristische Fotografie," in Norbert Nobis, ed., *Der Lärm der Strasse. Italienischer Futurismus 1909–1918* (Milan: Edizioni Gabriele Mazzotta, 2001), 303.

14. I quote Anton Giulio Bragaglia's manifesto *Fotodinamismo futurista* from the original manuscript that I found in the Malandrini Collection in Florence with the abbreviation FF 1913. For a reprint of the whole manifesto, see Anton Giulio Bragaglia, *Fotodinamismo futurista*, ed. Antonella Vigliani Bragaglia (Roma: Nalato Editore, 1970).

15. FF 1913, n.p.

16. FF 1913, n.p.

17. FF 1913, n.p.

18. For general information on the work of Anton Giulio Bragaglia and photodynamism, see Doane, *The Emergence of Cinematic Time*, 84–88; Giovanni Lista, *Futurism and Photography* (London: Merrel, 2001); and Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830–1904)* (Chicago: Chicago University Press, 1992), 296–318.

19. See Lista, *Futurism and Photography*, 21.

20. FF 1913, n.p.

21. Doane, *Emergence of Cinematic Time*, 88.

22. Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone, 2007).

23. Lorraine Daston and Peter Galison, "Das Bild der Objektivität," in Peter Geimer, ed., *Ordnungen der Sichtbarkeit. Fotografie in Wissenschaft, Kunst und Technologie* (Frankfurt am Main: Suhrkamp, 2001), 30.

24. FF 1913, n.p.

25. FF 1913, n.p.

26. FF 1913, n.p.

27. Henri Bergson, *Essai sur les données immédiates de la conscience* (Paris: Alcan, 1889).

28. Walter Benjamin, *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit. Drei Studien zur Kunstsoziologie* (Frankfurt am Main: Suhrkamp, 1966), 11.

29. Friedrich Kittler, *Grammophon, Film, Typewriter* (Berlin: Brinkmann & Bose, 1986), 283.

30. For a reading of Kittler's evolution of technology in reference to hardware and imaginative processes, see Stefan Andriopoulos, "Psychic Television," *Critical Inquiry* 31 (2005): 623.

31. For a critique of a teleological history of photography, see Peter Geimer, *Bilder aus Versehen. Eine Geschichte fotografischer Erscheinungen* (Hamburg: Philo Fine Arts, 2010). For a similar emphasis on nonteleological ways of understanding historical and technological change in the realm of media archaeology, see Thomas Elsaesser, "The New Film History as Media Archaeology," *Cinemas* 14, nos. 2–3 (2005): 75–117; and Erkki Huhtamo and Jussi Parikka, eds., *Media Archaeology: Approaches, Applications, and Implications* (Berkeley: University of California Press, 2011).

32. Hans-Jörg Rheinberger, "Epistemische Dinge-Technische Dinge," accessed October 10, 2013, <http://vimeo.com/2351486>. For the whole theoretical framework, see Hans-Jörg Rheinberger, *Experiment, Differenz, Schrift. Zur Geschichte epistemischer Dinge* (Marburg an der Lahn: Basiliken-Presse, 1992); Hans-Jörg Rheinberger, *Experimentalsysteme und epistemische Dinge. Eine Geschichte der Proteinsynthese im Reagenzglas* (Frankfurt am Main: Suhrkamp, 2006); and Hans-Jörg Rheinberger, *Historische Epistemologie zur Einführung* (Hamburg: Junius, 2007).

33. Rheinberger, "Epistemische Dinge."

34. Markus Krajewski, "Die Rose. Vorstufe zu einer kleinen Geschichte der Rekursion" (unpublished typescript, 1997), 9, <http://www.verzetteln.de/Rose.pdf>.

35. Rheinberger, *Experimentalsysteme und epistemische Dinge*, 222.

36. Rheinberger, "Epistemische Dinge."

37. FF 1913, n.p.

38. Batchen, "The Naming of Photography," 22–32.
39. Canales, "Desired Machines," 329.
40. "Cinema, the projected moving image, demands that we participate in the movement we perceive. Analysis of perceiving motion can only offer some insights into the way the moving image exceeds our contemplation of a static image. Motion always has a projective aspect, a progressive movement in a direction, and therefore invokes possibility and a future. Of course, we can project these states into a static image, but with an actually moving image we are swept along with the motion itself." Tom Gunning, "Moving Away from the Index: Cinema and the Impression of Reality," *differences: A Journal of Feminist Cultural Studies* 18 (2007): 42.
41. Simon Rothöhler, *Amateure der Weltgeschichte. Historiographische Praktiken der Gegenwart* (Zürich and Berlin: diaphanes, 2011), 82.
42. See Lucian Hölscher, *Neue Annalistik. Umrisse einer Theorie der Geschichte* (Göttingen: Wallstein, 2003), 52.
43. Pieter T'Jonck and Maarten Vanvolsem, *Move in Time* (Bruges, Belgium: Concertgebouw Brugge, 2007), 24.