Eadweard Muybridge: Fragments of a Tesseract

It is the artist who is truthful and it is photography which lies,
for in reality time does not stop.
—Auguste Rodin, 1911

Here is an irksome paradox of public consciousness: to be accorded the status of a legend is to be whittled down to a microscopic point, a nonentity at the intersection of a random handful of idiosyncrasies, tidbits of gossip, shreds of advertising copy.

To the nonspecialist, René Descartes was the philosopher of a single motto (just three little words . . . and in Latin, no less). He didn't like to get out of bed in the morning (rhymes with Belacqua, Oblomov, Beckett). His taste in eggs was, to put it mildly, revolting. That Descartes presides over a truly exquisite adventure of the mind, the marriage of geometry with algebra, is mere impedimenta for scholars to attend to.

Beatrix Potter, a savante of mycology whose theories of symbiosis have recently found vindication, is known to some of us, at least, as the authoress of *Peter Rabbit*, illustrated; ignorant of her circumstances, we miss the satire in the little books.

The Reverend C. L. Dodgson, a crucial figure in the development of mathematical logic, inventor of a device for recording dreams, photographic portraitist of Victorian celebrities and young girls, is survived in public memory by his literary persona, Lewis Carroll.

And of the extraordinary man who chose to call himself Eadweard Muybridge, we learn in school only that he was hired as a technician, by a California nabob, to settle a colossal wager over whether a galloping horse, at any instant in its stride, has all four feet off the ground.

The story is almost certainly a fabrication: Leland Stanford was keen enough on horseflesh and took a vast interest in the "scientific training" of trotters, but he was neither essentially frivolous nor a gambler. Nor could the single incident explain the ensuing decade of personal friendship between Stanford and Muybridge, during which Stanford gave his full support to projects having precious little to do with horses, opening to the photographer the engineering facilities of the Central Pacific Railroad and even providing legal defense when Muybridge stood trial for his life.

Eadweard Muybridge was forty-two years old when the association began, with the first "inconclusive" photographs of the champion trotter Occident, so

we can hardly assume that he sprang, fully armed, from the brow of his personal Maecenas. How, then, are we to account for his extending the commission into a lifework? The eleven folio volumes of *Animal Locomotion*, comprising many hundreds of photographic sequences, show men, women, children, domestic and wild animals, and birds—and even amputees and persons suffering from nervous disorders—engaged in hundreds of different activities: they constitute a unique monument that is clearly the work of a man obsessed. And his zoopraxiscope, a machine for resynthesizing the illusion of motion from the analytic images provided by his batteries of sequential still cameras, established Muybridge as the inventor of the photographic cinema.

Four generations of artists, of the most diverse persuasions, have acknowledged the fascination of his work, and it is obvious that many have learned from it, if only at second or third hand: that alone justifies our curiosity about the genesis of his sensibility.[1]

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Enter Edward James Muggeridge, on April 9, 1830. He is supposed to have received a good education. Local tradition held Kingston on Thames to have been an ancient seat of Saxon royalty. In 1850, the Coronation Stone (I'm told that half the towns in England boast one) was set up in the Market Square, upon a hexagonal plinth engraved with the names of the kings crowned there. Two of the six were Eadweard the Elder (900 A.D.) and Eadweard the Martyr (975 A.D.). Muggeridge, an East Anglian version of Mod-Rydd, an Old Norse name with magical associations, was less pliable. But a *muy* had once been a dry measure of grain; the elder Muggeridge, who died when the boy was thirteen, had been a corn chandler. Exit then, at about the age of twenty, Eadweard Muybridge, young Romantic, already considered an eccentric. (Thousands of miles away, and twenty-five years later, a man who had been his intimate friend was to tell a jury, in support of a plea of insanity: "I have known Muybridge to sit up all night reading, generally some classical work.")

His destination was California, a simply fabulous land, like Szechuan or the West of England, where gold, shipping, and the whalefish had kept some men rich enough long enough to make them hungry for culture. He set up shop as a genial bookseller in San Francisco, got to know the bohemian crowd, and prospered by outfitting the local gentry with entire libraries.

In 1860 he returned to England, convalescent from a serious stagecoach accident, for a visit that lasted nearly seven years; while he was there he learned the cumbersome, delicate craft of the collodion wet plate, and discovered his vocation as a photographer. When he returned to California it was to work under

the pseudonym "Helios," affecting the broad-brimmed hat and velvet cape of continental poets and painters and calling himself a "photographic artist."

During the next five years he systematically photographed the Far West, producing some two thousand images in several series catalogued by Bradley & Rulofson, a photographic gallery that distributed his work: these series included views of San Francisco, lighthouses of the Pacific Coast, Vancouver Island, Alaska (as director of photographic surveys for the United States government), Farallone Island, railroads, Geyser Springs, Woodward's Gardens, Yosemite, Mariposa Grove. "Helios' Flying Studio" offered not only albums of contact prints made from very large plates but also innumerable slides for the stereopticon that had already become indispensable in every American household.

In fact, it does not seem that Muybridge ever quite stopped making conventional still photographs with the large view camera; material in the Kingston Library includes images made in places as diverse as Alberta, Louisiana and Georgia, Maine, Chicago (at the World's Columbian Exhibition of 1893, where he operated his Zoopraxographical Hall among the sideshows on the Midway), and the beaches at Atlantic City (New York holiday crowds romping in the surf, dressed as if for an Arctic blizzard); many were made long after he had completed and published his work in Philadelphia, in the midst of repeated American and European tours with his zoopraxiscope, lecturing on "The Science of Animal Locomotion in its Relation to Design in Art."

Sometime in 1870 or 1871 Muybridge married Flora Shallcross Stone, a woman much younger than himself, who had been (gasps from the jury) divorced. The work at Leland Stanford's Palo Alto farm began in the spring of 1872; the earliest instantaneous photographs of horses, exposed with a high-speed shutter Muybridge built from a cigar box, have been lost, along with those made the following year under improved conditions. The work was at first only sporadically pursued, with crude equipment. Muybridge pronounced himself dissatisfied with the results, which nonetheless attracted a good deal of attention as curiosities and augmented his considerable international reputation. In 1873 he photographed the progress of the Modoc Indian War, making images of considerable intimacy on both sides of the conflict, apparently acting as a free agent, much as Roger Fenton had done in the Crimea. When he returned home, Flora Muybridge presented him with a baby boy that she had conceived in his absence by one Harry Larkyns, ne'er-do-well. On October 17, 1874, Muybridge traveled by boat and wagon to Calistoga, where Larkyns was staying, and killed his wife's lover with a single pistol shot. After a sensational

trial, the jury found the homicide justifiable. During four months of imprisonment, Muybridge's hair and beard had turned entirely white.

He left immediately for a yearlong photographic expedition in Central America. While he was gone, Flora sued him for divorce on the grounds of extreme cruelty (in support of which she deposed only that Muybridge had looked through their bedroom window, seen her sleeping, and then left; the case was dismissed, and we are left to imagine the ferocity of the man's stare). Shortly thereafter, she died. Returning to California, Muybridge issued an immense portfolio of photographs from Panama, Guatemala, and Mexico, including a study of the cultivation of coffee.

1877 brought his last major work in still photography proper: an immense 360-degree panorama of San Francisco, in thirteen panels, taken from the roof of the Mark Hopkins house on Nob Hill. He had already resumed his studies of locomotion, at Palo Alto, and this time it was in absolute earnest. He was forty-seven years old.

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Had Muybridge left us none of his celebrated sequences, his place as an innovative master in the history of photographic art would nevertheless be assured. The huge body of work from his years of greatest creative expansion, the decade 1867–77, sustains from the very outset, with almost voluptuous intensity, a markedly personal vision. Among early photographers of the American West, there is scarcely anyone (with the possible exception of Timothy O'Sullivan) to put alongside him: he is the Grand Progenitor of a West Coast school of view-camera photography that has included Edward Weston, Imogen Cunningham, Wynn Bullock, and others in our own time. He was, moreover, an indefatigable stereoscopist; his stereo images, committing him by definition to the most thoroughgoing photographic illusionism this side of full color, function as a curious palimpsest to the mature sequences, from which very many of the illusionist strategies available to photography have been rigorously evacuated.

In his advertising cards for Pacific Rolling Mills and for Bradley & Rulofson (neither are isolated instances) he seems to anticipate much later developments elsewhere in the visual arts. "Studies" of trees and clouds (the latter emphatically including the sun) predate by fifty and eighty years, respectively, the tree photographs of Atget and Alfred Stieglitz's late work, the Equivalents.

If any other photographer in the nineteenth century foreshadows the twentieth as massively, that man must be Oscar Gustav Rejlander (1813–1875); and it is curious that Muybridge's method for making the serial photographs was a practical elaboration of a theoretical scheme published by Rejlander.[2]

One wonders whether Muybridge ever met the man who began with *The Two Ways of Life* and ended as Charles Darwin's illustrator, making *The Artist's Dream* along the way.

But what interests me most in all this work of Muybridge's first career is something that seems to anticipate, almost subliminally, the sequences of *Animal Locomotion* . . . a preoccupation that is restless, never quite consistently present, seldom sharply focused: I refer to Muybridge's apparent absorption in problems that have to do with what we call *time*.

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Philosophical questions about the nature of time, originating in the ascendancy of Newtonian mechanics, variously energized and vexed much of nineteenth-century thought. Einstein's relativistic mechanics eventually established that time is simply a function of the observer's frame of reference; twentieth-century cinema discovered, quite early on, that temporality is precisely as plastic as the filmic substance itself. It is remarkable that cinema depends from a philosophical fiction that we have from the paradoxes of Zeno, and that informs the infinitesimal calculus of Newton: namely, that it is possible to view the indivisible flow of time as if it were composed of an infinite succession of discrete and perfectly static instants.

But, during the long interval that concerns us, the question brought forth a profusion of views, each of which met its scientific apology and its specific implementation in art. The heathen opinion had been that time was some sort of personifiable substance, *Chronos*, a corrosive universal solvent into which all things were dumped at the moment of their creation and then slowly sank, suffering gradual attrition. From some such simile, speculations proliferated. Time was duration, or was rate of change, or it was the sum of all conceivable rates. It was seen, always, as linear and isotropic. Time, it was said, passed . . . which looks, nowadays, like an excessively euphemistic way of saying that we pass.

Art historians invented a variation, "influence," in which the fluid metaphor becomes a hydraulic system for transmitting energy: the frog Virgil, jumping into the old pond, makes waves whose widening rings eventually joggle the cork Tennyson. The flow is still seen as unidirectional. T. S. Eliot's crucial insight, that the temporal system of a tradition permits, and even requires, movement of energy in all directions, could not have taken place within the metaphoric continuum of "classical" temporality.

The underlying assumption was that time "exists," just as fictions like ether and phlogiston were once supposed to exist, on a basis of parity with the paper on which these words are printed. Whereas a conjectural summary of our

own view might read: *Time* is our name for an irreducible condition of our perception of phenomena; therefore, statements that would separate the notion of time from some object of direct perception are meaningless.

Much of the early history of still photography may be looked upon as the struggle of the art to purge itself of temporality. The normative still photograph, the snapshot, purports to be an ideal, infinitely thin, wholly static cross section through a four-dimensional solid, or tesseract, of unimaginable intricacy. W. H. Fox Talbot, inventor of photography and also a mathematician who was certainly acquainted with the incremental model of time, writes of his longing to "capture . . . creatures of a single instant": the creatures in question are landscape images projected on the ground glass of his camera obscura. He would escape time and fix his instantaneous pictures, immutable and incorruptible, outside the influence of entropy, the destroyer. But it was not long before still photographers began toying with the temporal: the first known narrative sequence (illustrating the Lord's Prayer) dates to 1841, and that opened the field to the likes of *Little Red Riding Hood* (high seriousness in four panels, by Henry Peach Robinson, originator of new sins). That even the single image, in epitomizing an entire narrative, may thereby imply a temporality was knowledge learned from the still photograph, of which the Surrealists were to make much.

The work of Étienne-Jules Marey, a scientist who switched from graphic to photographic notations of animal movement under Muybridge's direct tutelage, summarizes the point of disjunction between the still photograph and cinema; his studies consist of serial exposures made on a single plate. The photograph could no longer contain the contradictory pressures to affirm time and to deny it. It split sharply into an illusionistic cinema of incessant motion and a static photographic art that remained frozen solid for decades. So complete and immediate was the separation that by 1917 the photographer Alvin Langdon Coburn (an ex-painter, who is rumored to have collaborated on a Vorticist film, long since lost, with Ezra Pound) could speculate in print—and in ignorance—on the "interesting patterns" that might be produced if one were but to do what Marey had in fact done, mountainously, thirty-odd years before.

On first inspection, Muybridge's early work seems to affirm the antitemporality of the still photograph as he had inherited it. He may have meant to do so; an imperfection of his material ran counter to such intentions. The collodion plate was slow, exposures long, the image of anything moving blurred. Yet Muybridge, in some of his earliest landscape work, seems positively to seek, of all things, waterfalls, long exposures of which produce images of a strange, ghostly substance that is in fact the *tesseract* of water: what is to be seen is not water itself but the virtual volume it occupies during the whole time-interval

of the exposure. It is certain that Muybridge was not the first photographer to make such pictures; my point is that he seems to have been the first to accept the "error" and then, systematically, to cherish it.

In the photographs concerned with Point Bonita Lighthouse there is a kind of randomization, or reshuffling, of the sequence of approach to the lighthouse, seen from several different viewpoints in space, which destroys the linearity of an implied molecule of narrative time, reducing the experience to a jagged simultaneity that was to be more fully explored in film montage fifty years later.

Generically allied to this series is the tactic adopted in an advertising photograph made for Bradley & Rulofson (and their center-ring attraction, Muybridge himself). The resemblance to later collage and accumulation pieces long familiar to us is striking (the year is 1873), but it is, I think, superficial. Because the elements of the image are themselves illusionistic fragments of photographs, of varying implied depth, the space is propelled backward and forward on an inchmeal basis as we contemplate the contents of the frame; only the edges of the individual elements and the graphic lines of type, which make us conscious of seeing marks on a surface, tend to compress the image into the shallow inferential space proper to Cubism. But the arrangement of photographs within the image is deliberate, and what we do infer is the sequence in which the pieces of this still life were laid down: in compounding a paradoxical illusionist space, Muybridge has also generated a "shallow" inferential temporality.

Muybridge continued this same investigation in at least one other work: the title page for the Central American album issued in 1875, the largest number of images from which remain breathlessly immobile. But in one subset, of a hunting party in Panama (the photographs are in Kingston), Muybridge transgresses against one of the great commandments of view-camera photography, permitting what was at that time the most violent smearing and blurring of moving figures (again, he acknowledged the images and assumed responsibility for them by allowing them to be publicly distributed); the jungle background against which they are seen is rendered with canonical sharpness.

Finally, in the great San Francisco panorama of 1877 he condenses an entire rotation of the seeing eye around the horizon (an action that must take place in time) into a simultaneity that is at once completely plausible and perfectly impossible; it is as if a work of sculpture were to be seen turned inside out, by some prodigy of topology.

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Muybridge returned, then, to Palo Alto and his sequences. The new attempts were immediately successful, and the work continued, for nearly two decades, in a delirium of inexorable logic and with little modification, synthesis following analysis; the results, at least in excerpt, are known to everyone who associates anything at all with the name of Eadweard Muybridge.

Having once consciously fastened upon time as his grand subject, Muybridge quickly emptied his images as nearly as he could of everything else. His animals, athletes, and subverted painters' models are nameless and mostly naked, performing their banalities, purged of drama if not of occasional horseplay, before a uniform grid of Cartesian coordinates—a kind of universal "frame of reference," ostensibly intended as an aid in reconciling the successive images with chronometry—that also destroys all sense of scale (the figures could be pagan constellations in the sky) and utterly obliterates the tactile particularity that is one of the photograph's paramount traits, thereby annihilating any possible feeling of place. About all that is left, in each case, is an archetypal fragment of living action, potentially subject to the incessant reiteration that is one of the most familiar and intolerable features of our dreams.

Beyond that, there is a little that Muybridge, looking from close up, could not have seen. I am always aware, looking at the sequences, that the bodies of Muybridge's actors are somehow strangely unlike our own, as if slightly obsolescent: the men seem to be heavy-duty models; and all but the stoutest women are round-hipped, with small high breasts that remind me of Cranach's *Judgment of Paris*. Their postures, gestures, gaits are not quite ours either, and seem to mean something a little different.[3] The children, birds, dogs haven't changed much. The horse is notable chiefly for appearing with what at first seems uncalled-for frequency—until one recalls that there was once a time (geologically remote in feeling from our own) when the horse represented very much more than the rather mannered recreation we know today.

And it was over Muybridge's photographs of the horse, of all things, that a great storm of controversy broke in his own time. Painters, it seems, were absorbed in rendering, with perfect verisimilitude . . . the horse! Emotions ran high, and so forth, and so on. I have neither space nor inclination to pursue the argument here. Paul Valéry, in the midst of a discussion of Degas, gets to the heart of what was serious in the matter; I reproduce his discussion as definitive:

> Muybridge's photographs laid bare all the mistakes that sculptors and painters had made in their renderings of the various postures of the horse.

> They showed how inventive the eye is, or rather how much the sight elaborates on the data it gives us as the positive and impersonal result of observation. Between the state of vision as mere *patches of color* and as *things* or *objects*, a whole series of mysterious operations takes place, reducing to order as best it can the incoherence of raw perceptions, resolving contradictions, bringing to bear judgments formed since early infancy, imposing continuity, connection, and the systems of change which we group under the labels of *space*, *time*, *matter*, and *movement*. This was why the horse was imagined to move in the way the eye seemed to see it; and it might be that, if these old-style representations were examined with sufficient subtlety, the *law* of unconscious falsification might be discovered by which it seemed possible to picture the positions of a bird in flight, or a horse galloping, as if they could be studied at leisure; but these interpolated pauses are imaginary. Only *probable* positions could be assigned to movement so rapid, and it might be worthwhile to try to define, by means of documentary comparisons, this kind of *creative* seeing by which the understanding filled the gaps in sense perception.[4]

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A question remains to haunt, and I will offer a bare intuition of my own by way of attempted answer.

Quite simply, what occasioned Muybridge's obsession? What need drove him beyond a reasonable limit of dozens or even hundreds of sequences to make them by thousands? For the "demonstration," if such a thing was intended, must have been quite adequate by the time he left California. Instead, with Thomas Eakins's help, he went to Pennsylvania and pursued it into encyclopedic enormity.

I will simply invert Rodin's remark (he was, in fact, speaking of Muybridge's work) to read thus: "It is the photograph which is truthful, and the artist who lies, for in reality time *does* stop." Time seems, sometimes, to stop, to be suspended in tableaux disjunct from change and flux. Most human beings experience, at one time or another, moments of intense passion during which perception seems vividly arrested: erotic rapture, or the extremes of rage and terror come to mind. Eadweard Muybridge may be certified as having experienced at least one such moment of extraordinary passion. I refer, of course, to the act of committing murder. I submit that that brief and banal action, outside time, was the theme upon which he was forced to devise variations in such numbers that he finally exhausted, for himself, its significance. To bring back to equilibrium the energy generated in that instant required the work of half a lifetime. So that we might add, in our imagination, just one more sequence to Muybridge's multitude, and call it: *Man raising a pistol and firing*.

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When the work was done, Muybridge retired to Kingston on Thames. Withdrawing from all contention, he serenely took up the British national pastime of gardening. The old man imported sago palms and a ginkgo tree from California and planted them in his backyard. I am told that they still thrive. When he died, in 1904, he was constructing a little pond, in the shape of the Great Lakes of North America.

I am tempted to call it a perfect life.

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The steps a man takes, from the day of his birth to the day of his death, trace an inconceivable figure in time. The Divine Intelligence perceives that figure at once, as man's intelligence perceives a triangle. That figure, perhaps, has its determined function in the economy of the universe.

—Jorge Luis Borges, "The Mirror of the Enigmas"

Notes

1. In its original publication in *Artforum*, in 1973, the essay contained at this point brief remarks on a then-recent exhibition at Stanford University of Muybridge's work. Those paragraphs, excised in 1983 for the revised version of the essay in *Circles of Confusion*, are as follow (B.J.):

> And now, finally, we are given, if not answers, then at least rich substance for contemplation. Anita Mozley, curator of photography at the Stanford University Museum of Art, who has spent nearly twenty years in the pursuit and study of Muybridge's work, prepared the exhibition *Eadweard Muybridge: The Stanford Years, 1872–1882,* together with its accompanying catalogue.
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> The catalogue is one of the most thorough (and seductive) I have ever seen. If the sheer quantity and energy of work done are astonishing, the magnitude of the aesthetic terrain Muybridge had staked out, decades before commencing his magnum opus in Philadelphia, is more so; page after page tempts hyperbole. Mozley has contributed an introduction and extensive notes on the photographs, and there is also an extended biographical essay by Robert Bartlett Haas; a brief monograph by Françoise Forster-Hahn details the commerce among Muybridge, the painter Meissonier, and the physiologist Marey. An attempt has been made to approximate the tonality of the original prints (nineteenth-century photographs are properly spoken of as monochrome, within a range of sumptuous reds, browns, sepias; they were almost never black and white). And the book is otherwise chock full of scholarly apparatus, patent diagrams, technical and historical documents.
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> The exhibition proper nevertheless includes some surprises. To begin with, it is precisely the right size, neither inundating nor settling for mere titillation. A number of the protocinematic devices (phenakistiscope, zoetrope, praxinoscope . . . "Philosophical Toys," they were called) that were kept in the Stanford home, presumably for the edification of Leland, Jr., are there. All are in good working order and may be played with by the spectator, along with a

precise working replica of the zoopraxiscope that became part of Muybridge's bequest to the Public Library at Kingston on Thames, where he was born and died; this latter machine, an elegant hand-cranked projector, demonstrates forcefully how tenuous the illusion of the earliest cinema must have been: the ghost of an illusion, so to speak, demanding much of [what Valéry called] the "kind of *creative* seeing by which the understanding filled the gaps in sense perception."

Finally, I must remark on the insight that arranged for essential images, otherwise unavailable, to be reprinted from the original negatives and permitted copy prints to be shown wherever an album might not be dismembered for exhibition: these re-executions are, in every case, immaculate. A photographic print is not, after all, a unique object but only a member of a potentially infinite class of "related" interpretations of a negative.

2. *British Journal Photographic Almanac* (London, 1872–1874): 115.
3. It seems quite appropriate that Ray Birdwhistell should be pursuing his studies of kinesics at the same university where, ninety years before, Muybridge had stared the vocabulary of body language into such voluminous existence, whether or not he understood anything of its syntax.
4. Paul Valéry, *Degas, Manet, Morisot,* trans. David Paul, Bollingen Series XLV, vol. 12, *The Collected Works of Paul Valéry* (Princeton, N.J.: Princeton University Press, 1960), p. 41.

Artforum 11, no. 7 (March 1973): 43–52. Reprinted in *Circles of Confusion* (Rochester, N.Y.: Visual Studies Workshop Press, 1983), pp. 69–80.