Captured Motion

Anette Rose

Notation in Motion

Here we have a ring. This ring contains lots of small bobbins, which are actually spool holders. These spool holders rotate around the center of the ring on a meandering track. They wind around each other, so that the threads running together in the middle form plaits… [1]

Hearing these sentences, you see neither ring nor bobbin, just moving blue lines and wandering dots of color – trails of the speaker's gestures. The invisible hands draw machine components in the air and imitate their motion – rotating, meandering, winding around each other: the hands themselves turn into bobbins. Yet not all lines are objectively legible, some accompany the flow of speech, set it to a beat, others arise when one hand comes to rest at a pause. The speaker is an engineer from the Institute of Textile Technology at RWTH Aachen. Anette Rose was able to shoot in the institute's labs as an *artist in residence*. He is describing the functionality of various high-tech machines whose names are as complex as their workings: *Radial Plaiting Machine, Narrow Fabric Needle Loom, and Multiaxial Warp Knitting Machine.* One of this three-channel video's punch lines lays in the fact that, of all procedures, those gesturally described and registered via *motion capturing* here are the ones which practically exclude human intervention: these machines are fully automated.

Anette Rose has been working for some time now with the transformation from manual to mechanized labor, and with the translation from practice to language, from implicit to explicit knowledge, and/or from one form of notation to another. The series Captured Motion forms part of Anette Rose's Encyclopaedia of Manual Operations, for which she has been observing the interplay between eye and hand, hand and machine, and diverse automation processes since 2006. This long-term project is modeled in part after the Diderot/d'Alembert *Encyclopédie,* whose multi-volume section of plates focuses on illustrating manual crafts. Anette Rose's encyclopaedia is comprised of individual modules, each making an excerpt from a production process visible – be it kneading dough in a bakery, imprinting porcelain, or folding light bulb packaging. She films these complex processes with two synchronized cameras and re-synchronizes the two shots in the exhibition space. The spatial arrangement of her multi-channel videos underscores the coordination process between right and left hand, facial expression, and gesticulation, or hand and machine.

Since 2011, one of the focal points of Anette Rose's work has been textile techniques like weaving, knitting, and plaiting. While weaving is among the oldest textile techniques ever, the loom is also both a paradigm of industrialization and, due to its binary logic, a model of the digital. Anette Rose developed the installation Captured Motion in 2016 based on her fieldwork on high-tech techniques of the Textile Technology Institute and the Gestural Research Laboratory at RWTH in Aachen. The title references the different processes of ›capturing‹ motion with media – using video, *motion capturing,* high-speed cameras, diagrams, photography, and artifacts. Captured Motion has been shown in several exhibitions, each time tailored to the space's specific architecture, including at the Haus am Lützowplatz Berlin and the Edith-Russ-Haus for Media

Art in Oldenburg. As part of an exhibition on the dimensions of the gestural shown at the Industry Museum in Chemnitz in cooperation with TU Chemnitz and the Ars Electronica Futurelab/Linz, Module # 25 plaiting, warp knitting, weaving - motion capturing [pp. 6–7, 10] was presented in a specially conceived cube in which Anette Rose makes the aesthetic potential of form-giving processes of gestural research visible.[2]

The three-channel projection feels enigmatic at first: One finds oneself in a darkened room, confronted with lines and detailed explanations of mechanized processes. Rather than focusing on the referential relatioship between gesture and machine, attention is consequently directed at the play of lines which the imagination links to the play of thread described. »A mesh of expressive motions,« as Anette Rose puts it, »forms fleeting sculptures, while machines lay threads, knit, weave, and plait.« One particularity of the three-channel work consists in splitting the *motion capture* recordings in three different views on the speaker: frontal, side, and overhead – which are then projected across the cube's walls and floor. In this case, splitting does not pursue a primarily analytic goal, it sets the abstract play of lines free and projects digitally detected coordinates back into the room. The viewer's mind fills in the three-dimensional gesture, which hovers like an immaterial sculpture in a space spanned by the cube's coordinate axes.

Just like the interview format, the process of splitting and then re-synchronizing in space moves like a red thread through Anette Rose's work. Yet, she puts multi-focal observation to use in highly varied ways. If Module # 15 cleaning, fine grinding, die-cutting, stamping, linking, pulling in, dipping, bundling, pressing, winding, sanding, filmed with two synchronized cameras, is about paralleling hand and eye, the two-channel work Module # 20.1 - 20.2 plaiting - automated [p. 4] contrasts a wide shot with corresponding detail shots. The Chemnitz Module # 25, by contrast, re-synchronizes three different perspective views on the same gesture in space.

The splitting/re-synchronization process suggests the modern division of labor, which aims to simplify and accelerate production processes. However, efficiency is not to be maximized solely through »Taylorism«, but also through optimizing hand motions. To that end, graphic processes were developed against which Anette Rose's work resonates critically. After physiologist Étienne Jules Marey first used reflectors fastened to the body to produce what are known as chronophotographs, Lillian and Frank B. Gilbreth realized the value such recording processes held for the labor-scientific study of motion. Using a stopwatch, light diodes, *grid,* and camera they set about analyzing manual operations [3]. In the interest of achieving the optimal procedure – the »one best way« – the Gilbreths sought to avoid any unnecessary motions. That entailed not only analyzing manual steps, but also setting workplaces up with ergonomics in mind, keeping tools and materials at arm's reach.

The Gilbreths' 1914 chronophotography of a surgeon [p. 11], to name one example, registers the subject's deft motions in stitching a wound. Apart from its intended purpose, this black-and-white recording reminiscent of contemporary ghost photography exhibits a distinctive fascination: a white line quivers through the darkened room, bounces up and down irregularly, and at the beginning and end moves in loops comparable to the pattern of the back-lit curtain. The doctor's body vanishes just as that of the patient. Only the track of the needle is recorded, which recalls the motion like a stitched wound.

The Gilbreths tried to solve the problem of notating spatiotemporal gestures with stereoscopic photography, their specially developed "therblig" notation system, and three-dimensional models. Curves translated into wire did not only make performative procedures visible; they also served a didactic purpose: workers were supposed to mimic the motion lines of the »one best way« with their hands as a way of internalizing them.

Multifaceted as the resonance between Anette Rose's work and early labor science may be, the differences between the two are just as fundamental: Rose experiments with different ways of making operations and production processes visible, but her work is no anthem to efficiency. Aside from trouble-free procedures, she also interested in disruptions, wasted motion, and sensual aspects of mechanized processes. Her minimalist formal language references the aesthetics of classic modernity, which then get quasi flipped over in reverse translation as production plants and laboratories.

In Berlin, Oldenburg, and Kassel, the three-channel work shown in Chemnitz was exhibi-

ted with video recordings of the textile machines referred to in the engineer's descriptions. The video medium does not only make the documentation of complex procedures possible; it also enables them to be rendered at all visible in the first place – be it through slow motion, close-ups, or framing. Module # 19 warp knitting - automated shows a Multiaxial Warp Knitting Machine in various shots. It is hard to tell this machine descends from darning technology anymore. With ghostly regularity, the autonomous apparatus drives flocks of thread over vast expanses of spanned thread. The next shots show the intermeshing that follows via a long row of needles moving up and down rapidly. Structured by horizontal rods and vertical threads, the image almost seems to stand still while a strip of white fabric structured by a single blue thread emerges at the bottom. In the close-up, the video's perspectival depth-of-field vanishes – the textile pattern fills the frame.

While the Multiaxial Wrap Knitting Machine hums along trouble-free and apparently autonomously, the same thing happens in automated ribbon weaving that always happens when working with thread – it frays and tangles up. Module # 21 weaving - automated [p. 9] shows a hand trying to fix a malfunction on the Narrow Fabric Needle Loom. But the machine keeps jamming. Experts can diagnose the fault acoustically, but it takes a human hand to intervene.

The third machine filmed in Aachen, a machine known as a Radial Plaiting Machine, exemplifies Captured Motion's consistent play with ways of notating motion paradigmatically. The two-channel work Module # 20 plaiting - automated [p. 4] consists of two large-format projections: a wide shot of the plaiting machine contrasted with detail shots on the wall opposite. The wide shot filmed with a static camera is remarkable for the connection between standstill and motion previously noted in Module # 19: image and apparatus are static, only small spools rotate within the frame-filling metal ring. Threads emanating from the spools radially are plaited into a tube via robotic pipe. The engineer's introductory description of the dual motion enacted by the spools – around each other and in a circle – becomes visible in details showing the wheel and bobbins in eight shots. Spools circling past each other from two directions appear to be dancing to the machine's rhythmic beat, the sound of which changes with every shot. The plaiting motion morphs into a round dance, mechanic rattling into music. Yellow and red bobbins on their blue substructure evoke associations to Mondrian: a textile boogie whose groove seems to be channeled from living bodies.

A large-format diagram positioned on the ground between the two projections spells out the spool's motion. Printed as on a dance floor, it invites the viewer to physically reproduce the motion. To accomplish that, dancers have to move around each other in sinusoid lines while turning circles in opposing directions. If the engineer's hands turned into bobbins, the bobbins now turn back into bodies.

The two-channel work is augmented by high-speed black-and-white recordings of the spool holder, whose shiny, metallic surfaces slowly rotating into the light recalls László Moholy-Nagy's 1930 »Light-Space Modulator« Yet Module # 23 knitting - high speed [p. 5] foregrounds slow motion even more distinctly. Macroscopic recording at 3000 frames per second stretches time, rendering processes imperceptible with the naked eye visible in detail. Shots utilized for quality control in the lab on a daily basis unfold with nearly hypnotic effect in the context of the installation.

It takes a second to understand that all the notations on display visualize one and the same motion: the floor graphics, the videos, the trails of the engineer's hands – even the piece of white tube resting in a vitrine like the shed skin of a snake has a plaited structure which constitutes the material track left by the play of thread. If you were to dance out the graphic notation, you would be able to reincorporate the spool's pattern of motion. That dance would equal the maypole dance called to mind by an archival photograph [p. 5] in the exhibition – not for nothing does the picture in fact depict the traditional dance of the ropemakers' guild.

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1 Florian Neumann (RWTH Aachen), in: Anette Rose: *Enzyklopädie der Handhabungen (Encyclopaedia of Manual Operations). Module #25 plaiting, warp knitting, weaving–motion capturing*, three-channel video, 2016.

2 Irene Mittelberg uses *motion capturing* in the Natural Media Lab for Gestural Research she built up at RWTH Aachen.

3 See Frank B. Gilbreth: *Motion Study. A Method for Increasing the Efficiency of the Workman*, New York 1921 and Frank B./Lillian M. Gilbreth: *Fatigue Study. The Elimination of Humanity's Greatest Unnecessary Waste. A First Step in Motion Study*, New York 1916.

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