THE AFFECTS OF AGENCY: AN ENTANGLED ETHNOGRAPHY OF A LIVING MACHINE

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Abstract
The author discusses an experimental and interdisciplinary art science project based out of SymbioticA and in collaboration with Ionat Zurr and Oron Catts that attempts to construct a “living machine” out of skeletal muscle tissue and the ontological, aesthetic and methodological complexities inherent in such a project.

We are slightly late for the appointment. Quickly entering the ramshackle physiology complex, we pass by the detritus of research long past: sealed, bright yellow trash containers of various sizes with “clinical” signs fragilely clinging to their surfaces; discarded pieces of outmoded measuring equipment strewn about the dim hallways; out of commission refrigerators with “Biohazard” stickers that at one time held fragments of cells and other bio-matter. Situated on the second floor of the building, the room we are looking for is only identified by a spartan “research lab” sign. Upon entering, this space feels messier, more disorganized, somewhat chaotic compared to the clinical feel of the tissue culture labs we have worked in over the past weeks. A spaghetti of electrical cables snaking from racks of gleaming white boxes passes over lab benches, ending in even more twisted coils attached to complex looking machines. These devices occupy much of the real estate of this “laboratory” which appears more like an electronic music studio filled with patch cables entering and exiting outboard gear than a site of physiology experiments.

Suddenly, the director of the lab, Gavin Pinniger, appears, smiles, shakes our hands and quickly gets down to business. Over the next hour, this young assistant professor of skeletal muscle physiology takes us on a whirlwind tour of his research: how muscle fibers work; why they spontaneously twitch given the right nutrients; how we measure a muscle’s force and displacement using these expensive white boxes that transduce and record motion. During our discussion in which Pinniger excitedly describes his work and the apparatuses that make it possible, demonstrating large black metal mechanisms with tweezer-like pinchers and thrusting computer printouts into our face, we are continually struck by how these machines render the palpable, embodied actions of living muscle tissues into inert traces, marks and measurements on paper.

“How is it that the costly apparatus, animals, chemicals and activities of the bench space combine to produce a written document?” wrote Latour and Woolgar in 1979 in their influential ethnography of science, Laboratory Life [1]. Indeed, hearing Gavin’s explanations and seeing his measurement devices continually confirms Latour’s now (in)famous claim that the laboratory consists of a “tribe of readers and writers who spend two-thirds of their time working with large inscription devices. They appear to have developed considerable skills in setting up devices which can pin down elusive figures, traces or inscriptions in their craftwork and in the art of persuasion” [2].

In other words, science transforms the mucilaginous quality of stuff, energetic bursts of electro-magnetism and flows of carbon that make up the lived material world into graphemes, glyphs and graphs. Science becomes a literary practice – none other than writing itself and Derrida’s notorious dictum rears its forty-seven year old head yet again: “Il n’y a pas de hors-texte” [3].

The project at hand that brings us to Gavin’s laboratory is called “Tissue Engineered Muscle Actuators” (TEMA), which my collaborator Ionat Zurr has briefly described in her introduction to this special issue of Leonardo on “Agency in Movement.” This “living machine” of tissue and mechanical actuators, of fleshy and electronic parts forms a kind of microscopic Frankenstein whose behavior is not made perceptible through optical instruments of scientific observation but instead is translated onto the bodies of its gazing onlookers through sensory phenomena like vibration, light and smell felt through the skin, nose, ears. TEMA is thus both a research project exploring how to engineer and measure the actions of artificially grown muscle tissues and a materialized study object that, through the creation of a sensorial artistic experience, let us explore how a hybrid thing can blur ontologically set categories like live/non-live and mechanical/organic.

To build a machine that measures micro-Newton forces and inscribes those forces into time/frequency domain signals is the normal task of instruments in scientific knowledge production. But the machine we are building is aberrant, defying Latour’s inscriptive and consequently epistemological teleology in two ways. First, as historian of science Henning Schmidgen argues, machines in the experimental life sciences are “machines because they combine technological components with parts of human and nonhuman organisms to form essentially precarious, but functioning, arrangements of flows and interruptions that are directed toward the production of semiotic events” [4]. Machines are amalgams, partially semiotic and partially material, creating both epistemic and aesthetic effects.

Yet, our muscle actuation machine goes even further than instruments such as the frog muscle devices of Helmholz or the experimental setups of the Dutch physiologist Franciscus Donders that sought to measure physiological reflexes; setups that, as Schmidgen argues, catalyze the paradigmatic shift of science at the end of the 19th century from one focused on the measurement of space to the measurement of time. The scientific apparatus we build plays a different role, shifting from recording device to machine for transmission, capturing and sending signals in the form of vibrational energy (in the form of light or vibrations) out onto the observers’ bodies. In this way, our mutant bioreactor fits in with historian of sound Douglas Kahn’s attempt to overthrow the Kitterian obsession that modern media begins with recording and hence, inscription [5]. Second, by detouring from writing to felt vibration, and from scientific measurement to aesthetic affect, our device transforms Latour’s epistemic stakes into ontological ones. We can no longer ask what the movement or (in the case of inscription) the text generated by the device means or signifies but following Deleuze, we can ask how it functions and what it does to the world.

But the logos is all powerful. At first, it seems that Gavin’s machines cannot escape the coupled perversiveness of measurement with writing. Still, according to historian of science Davis Baird, Latour’s transformation of the material conditions of the laboratory—and, indeed, scientific practice—into reading and writing is “a travesty.” Instead, instruments themselves, in their material formations and conditions, “bear knowledge” on their subjects, transforming them and, in many cases, bringing them into being [6]. In his work Thing Knowledge, Baird argues that scientific instruments are not all
the same but have “significant epistemological differences” — either acting as models (Watson and Crick’s ball and stick DNA helix), as devices that perform (i.e., they produce material transformations on the world) or as measuring systems — producing performances in order to create representations (e.g., the thermometer). By focusing on instruments that do not represent but rather create phenomenal, material changes on the world, Baird’s argument aligns with Andrew Pickering’s notion of the “performative idiom” of science which departs from the idea that science produces representational forms of knowledge that appear as correspondences or mirrors to reality and, instead, seeks to grapple with other kinds of material agencies.

Matter, writes Pickering, performs in that “its actions can also make a difference” [7]. Pickering articulates such nonhuman performances through the actions of the material world — the natural force of typhoons and rivers, the early bubble chambers of particle physics, the garage-made homeostats and robotic tortoises of British cyberneticians like Ross Ashby or purposeless machines, like Gordon Pask’s “musicolor” instrument which combined sounds and colored lights to generate synesthetic experiences in the viewer/listener. For researchers like Pickering and, more recently, cultural theorists like Karen Barad and others, the concept and handle of performance provides a frame to ask what ontological-material impact scientific and aesthetic practices have on the world. Performance acts as the strategy to sidestep the Seylla and Charybdis of scientific realism on one side (a de-cultured nature) and social constructivism (a de-naturalized, de-technologized culture) on the other.

But if instruments or machines can be said to be performative, a category that has traditionally been reserved for human or animal bodies, what about the living machine of TEMA? Our lowly muscle cells are, after all, far from “natural”: they are hybrid natural-cultural entities whose actions and behaviors are partially owed to their own structure and makeup and, simultaneously, are instantiated by something completely outside — a technical instrumentarium. Agency is diffused and distributed transversally, cutting through and across the material-semiotic elements of the machine.

What then to make of this strange coupling of body and technology, of human beings, technological objects and instruments, recording surfaces and hybrid life forms that haunts the science fiction sounding project of TEMA? How does one critically describe the processes of materializing a project so saturated by techno–scientific practices, instruments and procedures that they wholeheartedly blur and hybridize distinctions between organic and non-organic, living and non? Latour and Woolgar arrived at their claim of science as writing through another type of writing derived from an “empirical moment in the human sciences” — linking up everyday practice at the bench or in the studio with more complex cultural-social formations and formulations. As Stefan Helmreich and Eben Kirksey write, in such an ethnography we can study how the host of organisms’ lives and deaths are “linked to human social worlds” [10]. With its emphasis on “living with” rather than splitting asunder the human and the non-human other, multi-species ethnography aims towards a more inclusive study of species “intra-action” in which different species’ entanglements bring about mutual becoming that go beyond singular essences.

But I want to conclude this too short provocation by returning to our quasi-object muscle tissue that also blurs the lines between bare life (zoé) and, at the same time, bio. Can multi-species ethnography bridge the ontological divide among biological, material, technical and affective forces to describe the impossibly complex thing that is TEMA? This machine is after all also deeply enrolled as a form of life that encompasses the cultural and ethical context of knowledge embodied in the laboratory: its technologies, instruments and discursive practices that legitimate certain forms of knowledge as well as the psychic and perceptual affects generated through and by visitors who will eventually encounter this hybrid thing outside of the lab — beyond the conditions of measurement, inscription and text. Or do we need an even more inclusive entangled ethnography that grapples with the affects pulsing and resonating in and through all sorts of bodies, instruments, settings, apparatus and socio-cultural formations? In this sense, TEMA might serve as a mutant object-process that allows these entanglements to take place.

References and Notes

2. ibid p. 69