

Motherboard
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Rachel Adams
Noon
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(1) OPERATIONAL LOGIC

In 1941 Grace Hopper (1906–1992) relinquished her tenured mathematics professorship at Vassar College to sign up to the war effort. By 1944 she had graduated first in her Naval class and was awarded the rank of Lieutenant. She was assigned to a computer project, now commandeered by the Navy, led by Howard Aiken at Harvard University.¹

¹ Hopper continued for decades to work as both a naval officer and a pioneering computer programmer. She was one of the oldest active service personnel in the Navy when she retired (for the second time), at the rank of Rear Admiral.

(2) Until 1945, the term ‘computer’ was ‘a job description for a person who performed mathematical operations for large-scale projects.’² In a February 1945 US defence report, George Stibitz signalled a shift in the terminology’s definition, a transposition from human to machine: ‘By “computer” we shall mean a machine capable of carrying out automatically a succession of operations of this kind and of storing the necessary intermediate results ... Human agents will be referred to as “operators” to distinguish them from “computers” (machines).’³

(3) ‘FIRST ACTUAL CASE OF BUG BEING FOUND’

On 9 September 1947, Hopper and her team working on the Mark II computer ‘helped to popularize the terms bug and debugging. The Mark II version of the Harvard computer was in a building without window screens. One night the machine conked out, and the crew began looking for the problem. They found a moth [...] that had gotten smashed in one of the electromechanical relays. It was retrieved and pasted into the logbook with Scotch tape. “Panel F (moth) in relay,” the entry noted. “First actual case of bug being found.” From then on, they referred to ferreting out glitches as “debugging the machine.”’⁴ This account

² ‘About Mark I’, accessed 01/09/18: <http://sites.harvard.edu/~chsi/markone/about.html>

³ George Stibitz, ‘Report for the National Defense Research Committee on Relay Computers (February 1945)’, quoted in ‘About Mark I’, accessed 01/09/18: <http://sites.harvard.edu/~chsi/markone/about.html>

⁴ Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses and Geeks Created the Digital Revolution*, New York, 2014,

in itself edges towards the mythical: the term 'bug' had been used since the nineteenth century in relation to engineering glitches; Thomas Edison used it in an 1878 letter to mean 'technical error.'

(4) This incident, however, lodged firmly in the collective imagination. The remains of the moth in question have been preserved, first in the group's logbook at Harvard, and subsequently with the document's transfer to the Smithsonian's National Museum of American History in Washington, D.C. Its tiny form, trapped against ever-yellowing adhesive tape, appears now as if preserved in a sliver of amber.

(5) Rachel Adams started using moths in her work because of Grace Hopper, drawn to the bodily potency of the moth 'computer bug' anecdote. While it has assumed the character of an origin story for this now common terminology, the events merely literalised a figure of speech already in use. As the logbook records, this particular moth actualised the metaphor to enact a physical, concrete disruption ('first actual'). The moth inside the Mark II computer stopping it from working, but here – in this room – this quasi-apocryphal tale is reinvented. What is synthesised in this new account of bug and machine, comprised not of words but instead a collection of objects made and assembled for one

space? Rachel Adams has envisaged this exhibition space as a total environment, comprised of three fundamentals: craft (and those processes and materials associated with it, such as fabric, dyes and macramé); industrial technology; and finally nature. How these three elements interact with each other is the subject of this space, and its history.

(6) In 1947 Grace Hopper witnessed the assimilation of nature and technology that produced an unexpected rearrangement of power relations, summarised by Adams with the phrase: 'Nature is the saboteur.' Nature holds the power; it has its own strategies of action and counter-action. Let us remember that, as Bruno Latour once said, 'An object that is merely technological is a utopia...'⁵ Correspondingly, an object that is brought to the condition of nature, while remaining a material and technical hybrid, offers a glimpse of production that is equally hand- and machine-made, both and neither, evading binary constructs.

(7) TECHNOLOGY'S GENDER
Commander Howard Aiken, director of the Mark I and Mark II computer projects at Harvard, many years later would describe Lt. Hopper as a 'good man.' The highest compliment he could give Grace Hopper was to erase her gender, or rather, to reallocate it.

excerpt accessed 01/09/18: <https://news.harvard.edu/gazette/story/2014/12/grace-hopper-computing-pioneer/>

5 Bruno Latour, *Aramis or the Love of Technology*, Cambridge, Mass., and London, 1996, p.viii.

(8) DEGREE OF DISORDER

Is this installation environment a closed system, and therefore one which invites entropy? Entropy is the tendency of all closed systems to become inert, having lost the ability to uphold a particular state. The computer in this room is both an ordered, rigid and geometrically coherent structure, and a mess of cables, an entanglement that resists order and lurches toward decay. It is both a technological entity and its apparent opposite, a rich, plush furnishing – something luxuriant and tactile, offering us macramé, the craft of knot tying, one other form of connective circuitry. (And a leisure pursuit shared by sailors and housewives alike.) It demands to be touched, to relate to the body, while also resisting the human realm. The computer is a machine, but we cannot know what it really does; what function it performs. It is – in effect – subject to what Robert Smithson would call, embracing the vocabulary of entropy, ‘monumental inaction.’⁶ The messy, fibre-based innards reassert its handmadeness as if challenging the assumption that computers must be sleek, cool and elevated beyond the human touch, while still engineered to tap into the human desire for acquisition (of soon-to-be consumer products) on the basest bodily level.

6 Robert Smithson, ‘Entropy and the New Monuments,’ in *Artforum* (June 1966), reprinted in *Robert Smithson: The Collected Writings*, ed. Jack Flam, Berkeley, Los Angeles and London, 1996, p.12.

(9) THE MOTH BREAKS THE SYSTEM

In this room, the moths’ wings appear like a Rorschach test. Randomly generated digital splatter is produced using Photoshop, then the pattern is flipped, traced and cut into vinyl stickers. Resembling both the cabbage moth and the pepper moth this new species is born in code. Memorably, industrialisation in northern Europe caused the pepper moth to invert its features, from white with black smudges to become black with white smudges, so that it could blend in with newly sooty trees. The adaptation of this reversal speaks to the technology-like ‘updates’ of nature: the evolutionary impulse to survive under new conditions by upgrading your hardware, be that IBM computer cabinetry or the pattern of a moth’s wings.

(10) INSERT ONE: ‘RAVENOUS INVADERS’

The 1974 film *Phase IV*, directed by graphic designer Saul Bass in his only feature, unfolds a scenario in which nature – ants, specifically – controls, disrupts and co-opts humanity and technology in equal measure. Turning the tables on our assumed hierarchies, the tiny insects (terrifying en masse) assume a dominant position in the Arizona desert’s ecosystem. The film shows us the ants’ newfound ability to communicate with each other, across species. There is a corresponding ‘biological imbalance’ – the ants’ predators are dying out. What remains, in this place, of the unbuilt and abandoned ‘Paradise

City' housing development, is just a parched grid. It is the apocalyptic American Dream, charred and desolate like a nuclear test site. The film's score is atonal, abstract and suggestive of computer beeps, with squeaking, high-pitched sounds for the ants' collective workforce.

Anthills assume the proportions of monolithic towers – like oversized CPUs, controlled not by a circuit board but by the hive mind and its queen: a literal motherboard. The film's camerawork consistently elides the ants and the humans; their bodies are given an equivalency. The ants are described by one of the film's human protagonists as 'individual cells, tiny functioning parts' – like the components of a technology they are here to study. The ants are framed technologically as much as the computers are, and they take over the scientists' field lab with apparent ease: chewing through a cable to disconnect their essential air conditioning system, upon which both man and their machines rely.

With this act of sabotage, the insects occupy machinic territory. Of the two scientists, James starts to 'decipher the ant language' from the sounds recorded, attempting to communicate with them, while Ernest believes that he can 'educate this power'; an almost colonial attitude of assured domination over the ants. In reality, it is the humans who are the bugs in the ants' social and environmental machine; it is humanity that needs to be 'debugged'. The film ends with the

humans becoming host bodies for the ant colony, James uttering the words: 'We were being changed and made part of their world. We didn't know for what purpose. But we knew we would be told.'⁷

(11) Rachel Adam's single-room installation fails to confirm what purpose it serves. Its components allude to productive systems of business and farming, but without clear articulation of an ultimate objective. From the lamps to the desk to the low structural field harbouring cabbages, it presents a concept of labour lacking confirmation or fixity. Some elements appear recognisably office-based, while others gesture towards industry outdoors. This room's machine hub is a green-on-green tie dye fabric, panelled in reference to IBM's design shift of the mid-sixties, when computers stopped looking like domestic appliances and began to take design cues from Cadillacs, which is to say, the ultimate object of consumer desire. In 1964 IBM launched their System/360 model, a room-sized computer mainframe available commercially in five standard colours.⁸

(12) The welcome desk of this space is a custom-built construction of Formica on plywood. It has a precise,

7 James R. Lesko (Michael Murphy), in *Phase IV*, directed by Saul Bass, Los Angeles: Paramount Pictures, 1974.

8 See IBM's history of the System/360, accessed 09/09/18: <http://www-03.ibm.com/ibm/history/ibm100/us/en/icons/system360/impacts/>

factory-built finish. If its labour isn't visible, is it still quantifiable as such? The desk is home to a series of holes drilled by CNC – computer numerical control – that appear like a punch-hole or ticker-tape pattern, suggestive of clocking in and clocking out, a visual manifestation of our physical labours as marshalled by working time. It's also a reminder of the electro-mechanical punch tape operations of the Mark I computer. This trail is an absence that stands in for the hours worked, the labour given up or rendered whole, a transfer of time, energy and matter from individual to a collective, corporate or otherwise variously productive end point. Looking around the room we might also read these incongruous holes as evidence of caterpillar consumption. The holes indicate a lack, a loss that is also indicative of sustenance achieved by the insect on its way to becoming a cabbage moth. All that energy has to go somewhere.

(13) HEAT DEATH

'The Heat Death of the Universe' is a short story by Pamela Zoline, first published in 1967 and widely considered to be one of the most innovative (and genre-defying) contributions to the sci-fi genre at this time. It locates the disorienting effects of system breakdown in the family home, and in the personhood of one Californian housewife, Sarah Boyle.⁹ As Esther Leslie notes,

9 Pamela Zoline, 'The Heat Death of the Universe' first published in *New Worlds*, No. 173, July 1973. Reprinted in *Busy About the Tree of Life and Other*

Zoline's text 'visioned the entropic decay present in the seemingly perfect world of convenience consumer products and chemically based substitutes.'¹⁰ Sarah Boyle's worries about sugar in particular seem startlingly prescient. Long before our uncertain obsession over what is safe and healthy to feed children today, Sarah Boyle's concerns about her children's day-glo packaged breakfast cereal have a visceral, pulsing power. The artificiality of foodstuffs is an abiding theme – the extremity of their processing which leads to an unnatural state of consumption and absorption; a union of nature and artifice.

(14) In the words of Mary E. Papke, Zoline's short story 'marries science to fiction, all for the purpose of detailing one day in the life of Sarah Boyle and her mental disintegration. It effects this marriage through the inclusion of scientific explanations but also in its presentation of all information through a series of axioms, hypotheses, definitions, narrative fragments and summaries that instantiate the scientific principles inserted into the story.'¹¹

Stories, London, 1988, pp.50–65.

10 Esther Leslie, *Synthetic Worlds: Nature, Art and the Chemical Industry*, London, 2005, p.236.

11 Mary E. Papke, 'A Space of Her Own: Pamela Zoline's "The Heat Death of the Universe"', in *Daughters of the Earth: Feminist Science Fiction in the Twentieth Century*, ed. Justine Larbalestier, Middletown, Conn., 2006, pp.144–159,

The story is recorded in short, numbered paragraphs to reinforce 'the "experiment" of our observing Sarah Boyle,' creating an effect similar to the ants' detached, experimental treatment of the humans in *Phase IV*.¹²

(15) FORCED GROWING

The plants need watering in Sarah Boyle's house. A hydroponic field in this space ensures the automated growth of crops without soil; the efficient delivery of water above ground, via mechanical delivery system. Again we witness a transformation of states within a closed system. If this white plastic floor-based structure is based on a hydroponic growing field, it adopts its feedback loop mechanisms while diverging significantly from the real. These cabbages are made rather than grown. This is a system that is not functional: the hydroponic field alludes to forced crop growth, but without the elements required for such a function. It's an operational feint; a gesture towards a field of production that remains unfulfilled, unprocessed and uninitiated. The cabbages hang on as if for dear life. It is not at all clear whether this gridded system is indeed their life support, or that which inflicts their decay and death. Is the system sustaining the cabbages or are the cabbages sustaining the system?

(16) These various elements within

accessed 01/09/18: <https://justinelarbal-estier.com/books/daughters-of-earth/excerpts/papke/>

the installation together instigate a conversation: in cybernetics, the term 'conversational' 'refers to a feedback loop between a command and its activator.'¹³

(17) THE GARDEN

Outside this gallery space there are two dark green cabbage lamps. Sarah Doyle's suburban California is summed up by two 'natural' colours ('cunt pink and avocado green') but amongst this ecological harmony is a seeping toxic presence, 'fume-y ammoniac despair,' from which the home offers no refuge. Cabbage moths are an utter blight: their caterpillars eat brassicas especially, as their name suggests. As with Sarah Boyle's home so too in this space there is growth and blight, renewal and destruction. The hole punches on the cabbage leaves and on the desk also appear on the leaves of the green lightshades, and are indicative of this blight – they trace the pattern of crop consumption and devastation, marking the ability of something tiny to wreak havoc on vast swathes of farming land.

(18) HEAT FORMATION

László Maholy-Nagy and Naum Gabo began working with heat-formed plastic in the 1920s and early 1930s, attracted to these newly available materials and their potential for transformation. Moholy even heated and warped sheets of Plexiglas in his kitchen oven, in a beautiful blend of domesticity and cutting-edge artistic practice. The new acrylic options in the

1960s caused this earlier technique to slip into obsolescence. What does this old technology of heat-formation allow the object to do? As well as contorting or curving a flat surface to oscillate between two- and three-dimensions, it also retains a sensation of malleability; an awareness of its change of state, from solid to near-liquid, from firmness and resistance to a state of pliability – a potential for slippage between different states, between different categories and cartographies. It is a permissible form.

(19) LOOSE HEADS

These cabbage leaves were scanned and then screen printed onto laser-cut acrylic, finally heat-formed to various three-dimensional shapes.¹⁴ The Savoy cabbage, *Brassica oleracea* L. var. *sabauda*, is a medieval variety with a loose 'head' originating in Western Europe, probably Germany, which gained its name in the sixteenth century from an association with the Italian Savoy province in France.

14 For an account of the historical use of cabbages as stand-ins for human heads, see Rachel Adams and Nicolas Helm-Grovas, 'Theses on Restaurants (A Discontinuous Perambulation on Time, the Guillotine, Gastronomy and the French Revolution),' accessed 02/09/18: http://www.jerwoodvisualarts.org/writing-and-media/theses-on-restaurants-a-discontinuous-perambulation-on-time-the-guillotine-gastronomy-and-the-french-revolution/#_ednref15

(20) A 1967 essay by E. P. Thompson examines how technology reshaped the working day in the late eighteenth century, away from an agrarian community model and towards the industrial capitalist system. He charts technology's impact on our bodily rhythms, focusing on the imposition of clock time. As Thompson remarks: 'Those who are employed experience a distinction between their employer's time and their "own" time [...] Time is now currency: it is not passed but spent.'¹⁵ His concern is 'simultaneously with time-sense in its technological conditioning, and with time-measurement as a means of labour exploitation.'¹⁶

(21) Our contemporary attitudes towards work's definition and our labour's boundaries have become more diffuse, less concrete, more confused. Many of us lack the ability to determine our working hours or agree those hours contractually. The blur between work and leisure time, in this freelance, gig economy labour market, has become an absolute. If we have lost the solid, irrefutable certainty (with an exploitative tinge) of the punch in, punch out clock-based mentality, then what have we gained in return? If we choose to stream TV shows instead of working, that is our choice, in a sense, but we suffer in some way – one less task complete,

15 E. P. Thompson, 'Time, Work-Discipline and Industrial Capitalism,' in *Past and Present*, No. 38 (December 1967), p.61.

16 *Ibid.*, p.80.

one less shift clocked. If there is no real end (and no real beginning) to work, if we work without temporal and spatial restriction, how do we measure anything? Our output, our productivity, our improvements? Or do we resist the capitalist logic of this continuous cycle of self-assessment and self-negation, and choose instead to stop marking time, to return to a pre-industrial, task-based delineation of the working day? We still have deadlines to meet, meetings to attend, and many other markers of our labour's delineation. Britain's productivity is statistically considered to be one of the lowest in Europe, so perhaps this warm embrace of inefficiency is merely inevitable. How much disorder can we allow into the system, before it can no longer constitute itself as a system? Is it perpetually noon here, just shy of lunch, the day stretching ahead of us?

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Rachel Adams (b. Newcastle upon Tyne, 1985) lives and work in Glasgow. Adams recently completed an MFA at the Ruskin School of Art, University of Oxford. Recent exhibitions include, *Right Twice a Day*, Jerwood Visual Arts Project Space, London (2018); *Insight 20*, Yoshimi Arts, Osaka, Japan (2018); *Mostra*, British School at Rome, Rome, Italy (2016); *How to Live in a Flat*, The Tetley, Leeds (2014); *Long Reach*, domobaal, London (2014); *Mood is Made/Temperature is Taken*, Glasgow Sculpture Studios, Glasgow (2014).

This exhibition has been produced in partnership with Bloc Projects, Sheffield. Rachel Adams will present *Lowlight*, a solo exhibition at Bloc Projects from the 5th - 22nd October 2018