What are the utilities, values, dangers and proclivities in the use of the analytical terms “maintenance and repair”? In this article I focus on activities within sociotechnical systems that are sustained by relatively few technologies, but a great deal of social or emotional work. I do so to explore two analytical uses of maintenance and repair, and then to point out some of the dangers in each. Approaching “very social” activities as maintenance helps to reveal these term’s analytical proclivities in ways that approaching the “very technical” aspects of a system may not. I will not settle the question here; rather, I begin to lay out a few of the benefits and consequences I have encountered in approaching such activities as matters maintenance and repair.

Cases: retention and stewarding

I draw from two of my ongoing investigations of scientific organizations: Long-Term Ecological Research (LTER) and the Multicenter AIDS Cohort Study (MACS). These two organizations do many things, most notably, and by their own definition of mission, they engage in the scientific investigations of ecology and HIV disease, respectively. In both LTER and the MACS, for over thirty years scientists, technicians and staff have sustained sites for the collection for data and specimens, sought to ensure that these materials are collected in ways that make them comparable, and they have worked to preserve data and specimens in ways that ensure that others can use them years or decades later. In my writings I have often approached sustaining these collections as a matter of maintenance and repair.
Is this maintenance of the social?

… or this?

Imaged by Jake Fagan

In the case of LTER the sites of collection are places: 26 ecological “biomes” across the globe where scientists return on a regular basis to measure temperatures, salinities, or phosphorous levels and to collect water, air, flora or fauna which are then preserved as data or specimens. In the case of the MACS, the sites of collection are thousands of gay and bisexual men in four American cities: twice a year these men visit clinics to fill out behavioral questionnaires and donate dozens of bodily materials such as blood, hair and semen that are then stored in archives as data or placed in cold storage as specimens.

Within LTER and the MACS there are distinct forms of maintenance for each of these activities, and there are scientists and staff tasked with those responsibilities.

It is easy to speak of the activities of instrument calibration or data preservation as a matter of maintenance: laboratory technicians calibrate instruments and confirm the successful preservation of specimens; information managers work to clean data and transition them across generations of information architectures (e.g., from paper, to disk, to cloud). Calibration and data management fit tidily within the rubrics of maintenance and repair, and my research has sought to redescribe them as sociotechnical activities, highlighting their seminal role in the operations of the LTER and MACS, bringing forth often invisible, undervalued or underfunded activities and actors, or demonstrating the epistemic and ontological consequences of these seemingly mundane activities.

The more “social” work of sustaining the sites of collection fits less tidily, even jarringly, when considered as a matter of maintenance and repair: I will describe this as an analytic “rub” or “friction” below. Both LTER and the MACS have cultivated relationships with their sites of data and specimen collection in order to continue creating longitudinal archives. The word for this activity in biomedicine is “retention.” Retention means keeping subjects involved in a medical study, rather than lost to “attrition.” In a longitudinal study like the MACS, this means encouraging surviving men to come back to clinics biannually for a new round of questionnaires and blood drawings, ideally for the indefinite term of the study. Some of the men in the study have done so for over thirty years, filling in the same questionnaire over sixty times! There are many things that the MACS scientists, doctors and staff have done to retain their cohort, e.g., they throw parties to thank the men for their volunteered contributions; they move their clinics to locations more convenient for participants; they provide cutting edge expert advice about HIV disease, and a great deal more. Ecologists don’t have as tidily defined a name for sustaining relations to their sites of collection, but they often call it ‘stewarding.’ For example, they foster relationships with the landowners or public agencies that control access to their various ecological sites of investigation. These “social activities” are not the prototypical things that come to mind when thinking about maintenance and
repair\(^1\), and yet they share many of the qualities we associate with those terms.

**Rub, friction and repeat**

There are both advantages and disadvantages to using analytic words or metaphors that “rub” against the grain of the object of study. In the field of Science and Technology Studies (STS) scholars have for many years adopted terms such as *construction* or *production* to describe the trajectories of knowledge creation in the sciences. Speaking of the production or construction of scientific knowledge rubs against the received understanding of scientific facts as “findings” or “discoveries”. Those terms make facts seem as though they were always there, awaiting their encounter with science but otherwise untouched by human hands. STS scholars have employed such analytic rubs to unsettle naïve realist formulations of scientific knowledge: the terms production and construction serve to draw attention to the practical work of assembling facts from scientific enterprises (such as experiments, or data analysis), or the processional nature of their generation. But no analytic term serves all cases. For instance, STS scholar Annemarie Mol has eschewed the metaphors of *construction* or *production* in her studies of agriculture\(^2\). Since production is already a word everyone uses for the food industry, it does not generate “friction” with received ideas about agriculture, and thus evokes no analytic insights: i.e, few are surprised (though they may be upset) to hear that agriculture today operates using similar principles to other supply chains. In short, a frictionless analysis fails to generate inspiration, one that rubs evokes insight, but taken too far it may chafe the very objects of study. Similarly, Susan Leigh Star in her studies of invisible workers, grouped and contrasted nurses, librarians and prostitutes\(^3\), a provocative contrast revealing common feminist themes about undervalued, stigmatized or marginalized work in all three groups.

Certainly less provocative but hopefully evocative, by putting on equal footing the managing of data, calibration of instrumentation and retention and stewarding of people and natural sites, I hope to reveal their common features. The analysis becomes symmetrical, treating human, natural and technological resources as equally a matter of maintenance and repair.

I find that thinking about the activities of retention and stewarding as maintenance encourages me to attend to the *instrumental* interests of these scientists to preserve their subjects or natural ecologies for the collection of data and samples: they retain and steward so that they may strengthen their findings and renew the value of their research. Drawing on the technically oriented terms maintenance and repair also sensitizes me to the routinized, systematized or institutionalized nature of these organizational activities: in the MACS there are people who have been *employed* to engage with subjects, forming personal connections and collectively navigating their hesitations to return to the clinic once again. Similarly, LTER stewards its sites to sustain investigative diversity and global generalizability, also serving to secure additional dollars at their next funding renewal. Lastly, viewed as part of a broader sociotechnical system, retention and stewarding the sites of collection reveals analogous relationships to their other activities: just as data archives and instruments are maintained, so too are relations with participants and biomes, and these are all part of the stated missions of these sociotechnical organizations.

**Populating maintenance and repair with affect & care**

There is something useful in conceptualizing retention and stewarding as maintenance and repair, a productive analytic friction: perhaps an unsettling revelation about the logic of scientific organizations. But there is also something jarring about calling these activities maintenance. Analytical rubs and frictions can also chafe.

A received understanding of maintenance and repair considers them as routine or mechanical. There is something cold about speaking of keeping people and natural sites involved in research; you may have felt it in my description of the cases above? In response, scholars of maintenance and repair have sought to repopulate those terms with the emotion, attachment, care and the other personal investments they have encountered in
their fieldwork[4]. In my own cases, there is no doubt that the activities of retention and stewarding are simultaneously interested and caring. For example, throwing parties for long-term participants is not only instrumental for retention, it is often heartfelt; a genuine “thank you.” Moving a clinic’s geographical location so that the men need travel less to reach their biannual visits is a strategic form of “repair,” but also the outcome of staff who have genuinely listened and sought to accommodate the challenges and difficulties of participants. Ecologists are often not just investigators of ecology, for some it is also a great love; ecological science has orthogonal overlaps with environmentalism. Treating these as ‘cold and mechanical’ maintenance can easily lead to rendering invisible the emotional ties in the work of stewarding (somewhat dangerous) and retention (outright dangerous), and so I find efforts to broaden the meaning of repair to include affect and care to be meaningful conceptual contributions.

However, just as the use of a narrow definition of maintenance and repair offers both a valuable analytic “friction” and the danger of obfuscating its affective qualities, so too do the efforts to redefine maintenance and repair add a “rub” while also presenting analytic dangers. I have space to note only one danger here: the positive valences of maintenance and repair can be magnified by including the discourse of care or emotion, in some cases making critical or political points difficult to argue:

There are scientists outside the MACS and LTER who feel that these organizations should not exist at all. Members of the ecological sciences have accused LTER, with its relatively vast and secure budget, to be an “entitlement” for its members. They claim that members of LTER are able to operate within a sphere of research that affords them relative protection from the constant competition for funding awards that other ecologists face. In a related argument, a vocal minority of AIDS researchers have argued that the MACS is outdated, relying on an ‘interval cohort’ model that is more expensive and slower to respond to changing science that newer models such as ‘clinical cohorts.’ No one doubts that the HIV positive subjects in the MACS have benefited from access to the newest diagnostic techniques and ongoing medical advice; but critical scientists note that the larger mission of investigating, treating or curing HIV disease could be better served by discontinuing the MACS and funneling its resources into modern biomedical machineries.

In both cases, approaching these organizations as a matter of maintenance and repair has offered me little to answer these arguably larger or consequential questions: should there be an LTER or MACS at all? Does LTER diminish the competitive meritocracy valued by scientists? Is the MACS consuming medical resources that should be focused on developing a cure or vaccine? Here I find the the answers from maintenance and repair seem loaded e.g., drawing attention to the crucial and often undervalued role of maintenance and repair or the intertwined care, affect and human ties, already seems to presuppose these organizations are worth maintaining. I find that the concepts of ‘maintenance and repair’ as we have them now, do little to help answer questions such as ‘what should be sustained or renewed?’ rather than being better left to degrade, fall apart or be actively discontinued. Care, maintenance and repair are investments in time money and effort, and as with all investments they must be placed judiciously. More than this, maintenance and repair are finite resources, they cannot be distributed equally to all things that may need them, positing a second question ‘at whose expense?’

It is just these kinds of question that Michelle Murphy has recently raised with a concern for the implicit positive valence of the term ‘care’: “If care is non-innocent, if care is entangled, what work does the politics of care do for critical technoscience studies?”[5]. She points, firstly, to a long and winding history of internal tensions in feminist theory between advocating for ‘care’ but also embracing the ‘unsettling’ role of criticism. The positive leanings of care, and associated notions such as easy, comfort, or inclusion can operate counter to the critical tradition’s valuation of unease, discomfort, and the marginal perspective. Secondly, she points to the already existing irregular global distribution of forms of care which serve to reproduce the comfort and well-being of some and not others – in other words, Murphy argues that care is already unevenly allocated according to the classical social cleavages of nation, race, class and gender, etc. For Murphy, care is always deeply tied to the reproduction of
wealth, comfort, and ease. Approached as such, finding, valuing or encouraging care is not an end in itself or a social good, rather care is itself ‘entangled’ with power.

Similarly, maintenance and repair – whether drawing attention to them, valuing them, or conceptually repopulating them with human work, care, practice or history – cannot be an end in and of itself if it means failing to ask the questions: repair and maintenance of what, serving whose interests, and at the expense of what people? Such broad questions about the distribution or structure of maintenance and repair need not immediately appeal to the classic categories of race, class or gender, but as with the case of LTER, speaks to the micropolitics of funding amongst scientists (e.g., is sustaining LTER an ‘entitlement’ for its members?), or in the MACS to decisions about institutional priorities (e.g., could there be a better use of resources than sustaining the MACS?). Care, maintenance and repair in Murphy’s formulation evoke distributational questions about finite resources: to continue, revive, or restore in one place also means not dedicating those energies somewhere else. Without this consideration, these concepts may fall into the trap of reproducing the social order as is under the guise of well-meaning rubrics such as care, maintenance and repair.

So what am I really getting at here? I have sought to begin to explore the affordances and limitations of these terms, the analytical valences or tendentiousnesses of ‘maintenance and repair’ by using cases of activities of sustaining human ties, or ties with nature. The uses of the terms maintenance and repair that I have described above are drawn from two distinct strategies for their analytical use in a study. Maintenance and repair in the first half of the paper served to draw attention to the instrumental and routinized qualities of retention and stewarding, revealing a symmetrical treatment of people and things within an organization. This analysis largely relied on a received understanding of maintenance and repair that I have described above are drawn from two distinct strategies for their analytical use. Maintenance and repair in the second use sought to redefine their meaning, by revealing forms of care beyond the instrumental formulation associated with a narrow technical view of maintenance and repair. In practice, these emotional and caring ties are present in the work of biomedicine and ecology. But I have highlighted a concern that by adding affect and care to the discourse, there may be a danger of magnifying the already positive valences of maintenance and repair, arguably making critical analysis more challenging. The leanings of those analytical terms may define the role of social analyst to “find and remind” of the humans, practice, work, and emotions in their midst, but it may also always demand additional (uphill) steps to recount the broader, structural or distributional dangers associated with the tendentiously sunny words, maintenance and repair.

REFERENCES

[1] Of course, there are a great number of technical things and practices that go into the activities of stewarding and retention, e.g., databases listing the names, addresses or locations of those people and places. But usually the object of maintenance is a technical thing, in this case, what is maintained are relations to people, and, well … nature.


