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Affective practices, care and bioscience: a study of two laboratories

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Abstract

Scientific knowledge-making is not just a matter of experiments, modelling and fieldwork. It also involves affective, embodied and material practices (Wetherell, 2012) which can be understood together as 'matters of care' (Puig de la Bellacasa, 2011). In this paper we explore how affect spans and connects material, subjective and organizational practices, focusing in particular on the patterns of care we encountered in an observational study of two bioscience laboratories. We explore the preferred emotional subjectivities of each lab and their relation to material practice. We go on to consider flows and clots in the circulation of affect and their relation to care through an exploration of belonging and humour in the labs. We show how being a successful scientist or group of researchers involves a careful choreography of affect in relation to materials, colleagues and others to produce scientific results, subjects and workplaces. We end by considering how thinking with care troubles dominant constructions of scientific practice, successful scientific selves and collectives.

Keywords: affect, care, science, laboratory

Introduction

Recently we have seen an 'affective turn' in social studies of science, comprising a renewed focus on embodiment, care and affective interactions in relation to the intellectual projects, fieldwork, models and discovery work of science (Lorimer, 2008; Myers, 2008; Pickersgill, 2012; Puig de la Bellacasa, 2011; Fitzgerald, 2013; Friese, 2013; Latimer and Miele, 2013). Attending to the embodied ways in which scientists enliven molecular models (Myers, 2008), count migrating birds (Lorimer, 2008), or constitute intellectual projects (Fitzgerald, 2013) reveals the routine affective practices on which scientific knowledge-making depends.

In a more overtly political move, Puig de la Bellacasa (2011, 2012) extends our understanding of the kinds of ethico-political caring labours through which scientific thinking and knowing are practised (Puig de la Bellacasa, 2012; Latimer and Puig de la Bellacasa, 2013). This turns our attention to silences and

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exclusions with respect to 'proper' academic scholarship on scientific practice and ethics. Together with an older feminist tradition of analysing care and love in science work (Star, 2007; Rose, 1994; Keller, 1984), and more recent analysis of 'logics of care' in health (Mol, 2008) and laboratory care as 'a site of politics' (Friese, 2013), a focus on care invites us to 'thicken' (Puig de la Bellacasa, 2012) our analysis of the affective practices through which science is accomplished.

Taking up this challenge, we analyse intersecting practices of care and flows of affect in the everyday work of two bioscience laboratories. Building on the rich heritage of lab studies in STS (Woolgar, 1982; Latour, 1983; Latour and Woolgar, 1986; Knorr Cetina, 1981, 1999; Tousignant, 2013), in particular ethnographic analyses of invisible labour (Star and Strauss, 1999) and performativity (Lorenz-Meyer, 2012; see also Felt, 2009), we bring three novel lenses to the study of affect and care in the laboratory. First we scale up: exploring the intricate making of knowledge and material objects together with the wider territory of personal relationships, scientific careers and laboratory collectives via affective flows and care practices. Second, we scale back from the open-ended ethical quandaries posed by technoscience in 'the wild' (eg the SUV – Puig de la Bellacasa, 2011) to the intransigent things, colleagues and careers of everyday scientific work. Third, we attend to mundane affects as they figure in making facts and careers, including silences and awkwardness, as well as humour and joy, exploring their intersections in practice (Lorenz-Meyer, 2012; Müller and Kenney, 2013).

Here we draw on Wetherell's (2012) pragmatic approach to the study of affective practice, considering how bodies and subjectivities are organized, evaluated and negotiated through affective practices in specific sites of scientific work. This includes an examination of how and by whom affective practices are performed in the context of research workplaces and the precarity of early-stage science careers.

Our analysis proceeds by re-examining our observation fieldnotes and interview transcripts and identifying moments where care for, of or by, others (or its lack) came to the fore in our two lab studies. We focus on how bodies, feelings, personal qualities, dilemmas, troubles and celebrations textured everyday scientific work in the two different settings. We re-stage key encounters with the two groups in terms of the emotional subjectivities and affective practices through which we came to understand their dynamics (Wetherell, 2012; see also Blackman, 2008). We treat subjectivity as relational: a product of specific inter-personal, affective and material settings of the laboratories. We think of affective practices in terms of both individual feelings and emotions and shared affective patterns or currents. Reviewing the narratives, performances, embodiments, materialities and relationships in our data allows us to focus on contradictory and unsettling encounters to reconstruct these affects and emotions. Reflecting on the materiality, temporalities and flexibilities of affect we explore moments and patterns of inclusion and exclusion as instances where care or a lack of care seemed to consolidate or 'stick' (Wetherell, 2012; Ahmed,

2004), forming relatively coherent (if temporary) settlements which configured workers in the lab and its future.

Finding affective practices in the laboratory

Our analysis is based on a small-scale, ethnographically oriented study of institutional dynamics of knowledge work in two bioscience laboratories in a British university, conducted in 2007–8. We chose these labs because they were different in scale, focus and longevity, and because the two lab leaders' established interests in questions of ethics were important in helping us to negotiate access. The labs were typical of contemporary academic bioscience in that they were populated by postgraduate students, technicians and postdoctoral researchers working on short-term or 'open' contracts which are project-related and are by their nature relatively insecure as compared to the more established academic workforce (see Felt, 2009; Vermeulen, 2010). The first lab, headed by a professor we refer to here as Celia, was relatively new and large in comparison to the second lab we studied, headed by a professor we refer to here as James. Celia's team increased in size to around 24 members during our observation period. The lab was home to one of the leading groups in a growing sub-field of genetics and plant development, and had extensive international networks through which staff and materials were exchanged and developed. Celia was also an important figure in national science policy communities, promoting women in science and public understanding of biology. The second lab, headed by James, had been in existence for 30 or more years. It had 8–10 members and was a well-regarded centre for research in embryology, with links to healthcare and veterinary practice. James was a highly respected figure in his field who had played an important role in developing regulation of embryo research. During our observation James was nearing retirement and the lab was in a fairly quiet phase, with fewer researchers and declining external grant funding.

The intensive phase of the observation, conducted by the second author, lasted approximately nine months. Our presence in the two lab sites was episodic and we worked on a model of ethnographically inspired 'co-presence' (Beaulieu, 2010) rather than the intensive ethnography of continuous access. This involved visits to both laboratories for one or two days per week. The researcher observed the everyday activities of the lab members including their work at the bench, in writing-up spaces, in teaching sessions and outreach activities. Sometimes the work included participant observation, involving routine tasks at the bench and contributions to outreach presentations or seminars with undergraduates on issues such as 'public understanding of science'. The researcher attended laboratory meetings, department seminars, administrative meetings, and a specialist conference held at the university during the observation period. We conducted a small number of formal interviews ($n = 6$) with members of the laboratories, where we explored peoples' reflections on career and life in the laboratory and in British academic biology.

This generated fieldnotes and interview accounts relating to practices (routines, experimental work, social relationships), narratives (origin stories, narratives about good scientists and science) and ethos in the two labs. In what follows, we explore how each group performed and articulated an ideal of the successful scientific subject – and negotiated feelings of failure and loss when they were unable to live up to them. We also look at how belonging and not belonging were negotiated through bad feelings and humour. We are 'in the data' in the sense that we shared and were part of the affective practices we document here, so we try to remain alert to the partial nature of our analysis, including how we contributed to the articulation of interpersonal styles, material practices as well as bad feelings and silences. However, we are also by now 'removed' from the data in that we are writing some years after the observation period and our initial analysis of the labs' epistemic practices in relation to gendered patterns of work and career (Garforth and Kerr, 2010; Kerr and Lorenz-Meyer, 2009; Garforth, 2012; Garforth and Cervinkova, 2009).[1] This distance gives us a new perspective on how things, people and practices mattered in these labs.

Emotional subjectivities

To understand how scientists belonged we consider the preferred subjectivities of the two labs, and the affects or emotions through which they were practised. We trace these subjectivities through our notes and transcripts, looking for the kinds of behaviours, competencies and ambitions that were celebrated and valued in the labs, and their links to ideas about 'good science' therein. We explore these subjectivities in relation to what Puig de la Bellacasa calls the 'layers of caring labour' (2012: 97) through which members of the lab were 'subjectified or constituted as they engage(d) in practice, taking up and inflecting already available positions' (Wetherell, 2012: 125). We consider the emotional subjectivity of the lab leaders and how this set the tone of the laboratory as well as some emotional subjectivities that we found in the shadows of these winning styles, analysing their role in relation to care in/for the laboratory collective, particularly how they seemed to 'stick' to members and practices on the margins of the laboratory.

Celia's lab: growing and getting stuck

Our experience of fieldwork in Celia's lab and its record in interviews and fieldnotes were marked by a strong sense of Celia's values and preferences for how and why science and scientists should progress. This was evident in the narratives and practices through which laboratory members expressed care for each other, their epistemic programmes and experimental objects, and science *per se*. From the outset Celia was very engaged with our project – she saw it as part of her commitment to caring for the next generation of scientists in her field. Celia also emphasized the importance of investing in

young scientists, and we observed her spending a lot of time in developing their careers in practice. The best ways to support and advance scientific careers was a frequent topic of discussion in our interviews and observations with Celia as well as in her interactions with the members of her laboratory. Celia was modest and unassuming about her own considerable success, stressing instead the importance of well-planned and methodical working practices. At the same time, she emphasized the humanity or normalcy of science and scientists, and the pleasures of working with nature which she felt attracted many scientists to her field.

Caring for careers and nature also came together in accounts of the importance of individually focused, detailed and intensive work with one's 'own' plants and seeds that circulated around Celia's lab. In caring for careers Celia told us how she took active measures to ensure that projects 'did not bump up against each other' (interview with Celia), enabling original results to be produced by individual scientists. We also observed her regular discussions with team members not just about their projects and experimental results, but about their satisfaction in their work and their career plans. This was valued as a defining feature of working in the laboratory by many of its members: as one postdoctoral researcher commented, 'the work with her is very one-to-one'. Another noted, 'she'll help you work out what you like, what you're good at, and then give you chances to develop it'. Celia described her approach as a matter of gradually turning off the 'feed' of ideas to produce this autonomous sensibility. Members of the lab shared this expectation that researchers would gain intellectual independence then move on to work elsewhere. Commitments to autonomy and excellence were visibly performed and publicly reinforced at the weekly group meetings we attended. These meetings frequently involved normative sequences of well-wishing and celebrating career successes in response to the announcement of arrivals into and departures from the lab. It was also articulated in frequent reflections on successful colleagues who had recently left the lab, usually postdoctoral researchers whose work had been recognized and who had gained a secure position elsewhere. Caring in this way for career and autonomy formed what Wetherell (2012) calls the articulation of 'dominant or winning styles' (2012: 121) in this laboratory. This style was strongly associated with Celia's personal preferences and orchestrated by her in significant ways. But it was also reproduced by other members of the laboratory.

We nevertheless also found that this winning or dominant style was troubled, often in more private conversations, where tensions around responsibilities for care and ownership of materials and ideas were expressed, as in the following quote:

> I'm the only person working directly on my question in the lab. I feel quite possessive about it. . . . I was working with Anton quite closely and then he went off to Germany and he said that there were things that he could take from here . . . and I was really anti that because that's mine . . . (Postdoctoral interview, Celia's lab)

Tensions also arose as researchers negotiated their sense of individual ownership of materials in and beyond the lab in relation to collective responsibilities, specifically the practices of tending generations of stock and the infrastructure required to support the group's work as a whole.

This was suggestive of a shadow subjectivity that was strongly related to practices of working closely with and feelings of care for plants and the broader material infrastructure of the laboratory – indexing the seeds, organizing the equipment, maintaining the archive – and with staying, rather than moving on. It was mainly articulated by and associated with a small number of older, female researchers who had been in the lab for some time. The emotional subjectivity it seemed to manifest had a shadowy quality because these researchers expressed considerable ambivalence and unease about being associated with this caring, local labour, a loss of career momentum and lack of status in their private accounts of worry and frustration about lack of recognition and uncertain futures. For example, one postdoc explained that after 12 years in Celia's lab she considered herself content and productive at the bench and more than competent in her research. But she expressed a worry that Celia was 'not happy' with what she called her lack of ambition. This is suggestive of a subjectivity that was less visible, more troubling and manifest in tension with the dominant subjectivity of mobile individualism. This shadow emotional subjectivity was, however, central to the lab's coherence insofar as the supporting, caring and infrastructural practices associated with it enabled more visibly productive individual experimental work to flourish. It was associated with the kinds of invisible labours of caring work identified by Star and Strauss (1999), but these labours were more marginalized than invisible, forming part of the more mundane 'politics' of care through which the laboratory was constituted (Friese, 2013).

James's lab: caring and not fitting in

We also identified patterns of winning and shadow emotional subjectivities in our notes and transcripts from James's laboratory. Here, however, they involved very different styles, values, affective and caring practices. As in Celia's lab, the preferred subjectivity in this lab drew from and echoed James's stories about his career in embryo research, in his case stressing care and conscientiousness in working with materials, patients and publics. James too was a great supporter of our project because it formed part of his commitment to social and ethical engagement with his profession and his sensitive research field. This resonated with James's open collegiality and a strong ethos of sharing and conviviality in this laboratory. Here the group as a whole were involved in 'bringing up' the next generation of scientists. Many sociologists of science have noted the importance of senior-junior relationships in bioscience labs for passing on embodied skills and experimental techniques (notably Knorr Cetina, 1999). But our notes are replete with examples of personal mentoring and career support being distributed across this group, rather than being

performed primarily by the lab leader, as in Celia's group:[2] from helping with equipment failures or failing experiments to reviewing upcoming conference presentations, discussing what to wear to a job interview, and advising on how to manage short-term contracts. These routines were quickly extended to include the researcher as group members looked for points of shared experience (as early career researchers for example). They performed belonging and commitment to the laboratory and produced interpersonal connections between ourselves and James's team that were harder to establish in Celia's group.

Modest pride in the relative stability of the lab was another notable feature of its ethos and values. The public narratives of Celia's lab celebrated new arrivals and researchers moving on to new jobs. In James's lab colleagues celebrated the fact that members stayed or returned there because it was a good, 'caring' place to work. For example, Mark was a senior, who had done his PhD with James and returned to the lab after a short period at another institution. Celebration of his 'coming back' was a frequently rehearsed normative sequence enacting the lab as a good and caring space where dedicated scientists could flourish. This was often contrasted to other kinds of laboratories, where ambition and income might be higher but where good relationships, trust and methodical work were in shorter supply.

A second person who seemed to embody the commitment to staying and the caring ethos of the laboratory was Rachel, a senior technician who had worked with James for over ten years. She performed belonging to and caring about the laboratory through a range of activities which went well beyond what we would typically think of as a technician role. This included management of sensitive research materials, routine experimental work, dealing with staff contracts, health and safety, project governance and more. Rachel also performed a therapeutic role, managing the social relationships and emotions of the group. She shared Mark's worries and encouraged him to be optimistic about future funding opportunities. She was important in creating a culture of friendly collegiality, sharing the hen's eggs from her rural garden around the office and organizing social events. Rachel also discreetly shared her concerns about the members of the laboratory with James, and they shared a hope that Mark, who both had nurtured since his PhD, would become the next lab leader.

Together these practices, values and commitments formed a repertoire of care which manifest in a preferred subjectivity of caring commitment to this lab, in contrast to the autonomous and mobile career individualism which was the winning style in Celia's lab. However, this strong emphasis on the lab's caring subjectivity was also entangled with feelings of ambivalence and uncertainty sometimes expressed in the informal chat of the laboratory or in more private moments with the researcher. For Mark this involved expressions of anxiety or uncertainty about the next grant or career move, often discussed with Rachel, who offered reassurance and support. Rachel's uncertainty was a more private affair, which we encountered in quieter moments in the lab, in the form of her expressions of frustration over her contractual insecurity, or 'becoming too expensive' to be employed on future grants. These concerns tended to be

fleetingly expressed in one-to-one interviews or off the record chats. Others in the lab had an even more strained relationship with the preferred subjectivity of caring collegiality. One female postdoctoral researcher had come to work on a new project and experienced what she considered a lack of interest in her work and career in contrast to the support given to Mark. Another senior postdoc had stayed in the lab to support James's editorship of a journal and was frequently absent from core experimental activities. She sometimes expressed feeling let down by the group as she contemplated the limited opportunities available for the last few years of her career. We suggest these affective practices formed part of a shadow subjectivity of 'not fitting in' which attached visibly to these older women and was partially inhabited by Mark and Rachel.

In both labs, then, care was a key component of the flows and patterns of relationships and emotions that constituted epistemic selves and communities. Tensions around 'obligations of care' (Latimer and Puig de la Bellacasa, 2013) came to the fore in the articulation of shadow subjectivities. Here, expressions of frustration, worry, even loneliness were associated with concerns around the replication of laboratory materials and infrastructure. They seemed to relate to the prospect of individual careers being 'wasted', or sacrificed for the productivity of the laboratory as a whole. Although the two contrasting emotional subjectivities tended to be primarily inhabited by some individuals and not others, we found that these were not exclusive associations. Emotional subjectivities flickered in and out of view in our notes and transcripts, appearing to circulate around the lab, sometimes sticking individuals together in a collective, sometimes sticking to particular individuals. In the two labs, then, very different preferred emotional subjectivities had arisen as locally specific ways of 'figuring situations' (Wetherell, 2012: 143): collectively worked through emotions, identities and practices to make sense of how things were. But they were imperfect and unresolved, shot through with shadows, dilemmas and contradictions.

Material practices

In this section we look at how affective practices and emotional subjectivities were constituted through and in relation to material practices in the laboratories. This introduces another strand to our analysis, foregrounding the entanglement of objects and subjects in making up the laboratories via the practices of care therein. Working with materials is one of the most characteristic routines of laboratories, and therefore forms an important set of practices which underpin their future prospects. Experimental and preparation work involves embodied, painstaking but often repetitive and mundane care practices (Garforth and Kerr, 2010). In our study, we often observed this practical work while talking to individuals (usually in Celia's lab) or taking part in collective reflections (usually in James's lab) on what being in the laboratory or being a good scientist meant. Focusing on these simultaneous moments of care for the

objects and subjects of science, we explore below how cultivating seeds, plants and embryos both expressed and troubled the winning styles of the labs.

Plant life: Celia's lab

We begin by noting the centrality of the material in Celia's laboratory to her career and standing in her field. The plant on which she worked was in many ways her invention – she had constructed it as a primary experimental site, recruited others to it, and organized her research around its development. The plant was a crucial conduit through which the field was developed as a legitimate site of international scientific inquiry (Ankeny and Leonelli, 2011). Despite this, the plant itself was cast as a modest, unattractive object – a weed – a casting that echoed the modest elements of the preferred subjectivity in this lab and their wider articulation of the field as self-consciously low key and not 'showy'. The preferred subjectivity in this lab was articulated via particular relations of cultivation and ownership of plant materials. Successful researchers painstakingly developed new hybrids, generating new findings and performing a sense of pride and ownership in their creations. But this usually meant leaving Celia's lab behind and claiming the seeds of the new hybrids as a personal possession, which would be currency for their scientific career beyond the lab, rather than part of the group's resources.

But the seed work was nonetheless a collective affair, particularly the work of maintaining and archiving stocks. In Celia's lab some share of it was allocated to almost all the group members. This was done through printed rotas and publicly displayed task lists, created by Celia herself with her senior technician,[3] that we noted were often framed in humorous or ironic terms:

> Marie explained that Celia is keen to distribute shared responsibility for 'looking after' (maintaining, cleaning, tidying, stocking) different work areas in the lab … Some of them have 'jokey' titles … people are 'filter hood monitors' etc [. . .] there's an almost anticipatory worry in this that people will feel bossed like kids. (Fieldnote, 8 September 2003)

The routine care work of labelling, filing and archiving seeds was associated with the shadow subjectivity we outlined earlier (see also Garforth and Kerr, 2010), as was care of growing plant material. This shadow subjectivity tended to be articulated in the quiet glass houses, away from the main laboratory, as the researchers tended their plants. Here, caring for plants and seeds were occasions for expressions of quiet satisfaction and pleasure in working with materials and keeping things organized, alongside expressions of worries about lack of productivity, and fears of careers being wasted. The 'petty doings of things' (Puig de la Bellacasa, 2012) intersected with private reflections and worries about being a contented and a successful scientist.

Being careful: James's lab

By contrast, in James's lab caring about materials was frequently done in groups and publicly articulated as valuable and worthwhile. Embryos were handled as precious entities, particularly human embryos, partly because they were difficult to source and cultivate, but also because they were deserving of respect as living, albeit liminal, entities. Being caring went to the heart of the group's experimental programme, which emphasized the need to compare embryo development in other species (pig, cow) before intervening in human embryos. The group were exploring 'quiet' metabolism. This was the idea that steady metabolic activity was indicative of good embryo development. Minimal intervention was key to the lab's work and ethos, complementing its preferred subjectivity of collective caring.

This intersection of material, affective and subjective practices was especially evident in the work of Rachel, who took a leading role in caring for human embryos and for the lab as a whole. Rachel personally collected the embryos from a nearby hospital in her car, returning to work on them in a special room. These practices were partly a result of stringent national ethical regulations that made this area of research accountable to a quasi-governmental organization and the wider public. But they also performed a sense of responsibility to the donors and to infertile couples – a duty which was articulated by most members of the group as a core rationale for their work (see also Pickersgill, 2012).

We also identified an association between the shadow subjectivity of 'not fitting in' and the material, affective practices of James's lab in relation to work on mouse embryos. Mouse work stood out as an anomaly in this lab. Only one researcher was involved in this experimental programme. It involved the troubled practice of vivisection and was framed by the group as an emotionally as well as ethically demanding practice. Friese has noted that in many settings black humour plays an important role in managing vivisection (Friese, 2013). But in James's lab it was marked by silence and avoidance. The researchers did not discuss the mouse work among themselves in collective settings. Although we were often invited to see the mouse work, time and again it didn't happen – schedules changed, the mice weren't ready, the mouse researcher wasn't available. The group took care *not* to expose us to work which we might think callous or uncaring. At the same time, this performed the mouse researcher as not quite fitting into the lab – acting outside its primary focus on caring for the embryos and working alone to deal with the difficulties of her experimental work.

Here we have argued that the material practices in each lab were aligned with the emotional subjects therein. Material and affective practices of care for objects and subjects were woven together in the everyday work of the labs. Seeds and embryos took on a certain affective valence in the production of results, careers and societal value and were associated with privileged repertoires of cultivation and ownership (in the case of plants) and care (in the case

of animal, specifically human materials). At the same time we also found too much or too little care for materials could be associated with feelings of not fitting in or getting stuck and thus reinforce and reproduce with the 'shadow' subjectivities in the labs. Thus we see how materials and subjectivities were co-produced through practices of care or, in Puig de la Bellacasa's words, 'productive doings that support liveable relationalities' (Puig de la Bellacasa, 2012: 93).

Belonging and not belonging

So far we have sketched the dominant and shadow subjectivities of the two labs, and considered how they related to material practices. Now we explore the patterns of care and affective practice through which each lab constituted and reconstituted itself as a collective. We focus on instances where affective practices and routines of care seemed to help the group to stick together, manage shared tensions, and envisage a collective future. We also consider situations where affective practices and routines of care left individuals sticking out as different, feeling neglected or stuck on the margins. This involves us in reflecting carefully on the affective position of the researcher as rendered in our notes, honing in on accounts of ambivalence, discomfort and doubt about her 'belonging' in the labs and on shared occasions of joy and camaraderie.

We begin by looking at two troubling, awkward moments for the researcher when members of the lab were managing difficult feelings about being marginalized. Secondly, we look at a contrasting case which involved what we suggest is a form or 'affective repair' or stitching together a way of belonging in the lab. Thirdly, we explore how humour expressed camaraderie and belonging in the context of tensions relating to precarious individual and collective futures, questions of personal value and productivity, and dealing with material waste.

Sticky situations

We turn first to a difficult encounter with one member of James's lab – Jayne – which illustrates some of the awkward episodes of our fieldwork in this otherwise happy and friendly lab. Jayne, a relatively junior and new technician, had just learned that she would not be re-employed after her current short-term contract ended. Jayne was less involved than other members of the group in our study and in the collective work of the lab. She spent a lot of time working alone with mechanical kit in the large dry lab and less time in the small 'wet' lab and preparation areas where most of James's team gathered to work on experimental materials. One morning the researcher found her angry and tearful about not being kept on. She explained how she felt about what had happened, as this fieldnote recounts:

> Jayne speculates that James has asked – told – the others not to mention it. What bothers her is that she knows that "they – Rachel and Mark – know" about this,

> but that no-one's said anything … she experiences this as an awful tension and silence where she's trying to work out what to do and it's as if it's not happening … (Fieldnotes, 13 March 2007)

Jayne spoke of her experience of silence and isolation, rather than being cared for by the collective. Staging this in terms of affective practices of care and emotional subjectivity, this was an instance where a shadow subjectivity of not fitting with affective, material and experimental practices and the laboratory future seemed to have stuck to Jayne and she felt there was little scope for its revision in a culture of silence and a sense of the absence of care. Jayne's feelings of hurt and anger also produced a reworking of our own grasp of the lab's relationships. The fieldnotes on this incident express acute feelings of discomfort as the researcher worked through what now seemed like limits and absences in what we had previously understood as the group's warm, inclusive repertoires of care and support. They also suggest feelings of shame as the researcher reflects on how little attention she had paid to Jayne before this point and asks whether this echoed Jayne's neglect by colleagues.

Seen through the lens of repertoires of affective practices, silences and bad feelings like these appear like clots in the circulation of affect in the lab. They signalled instances where individuals became marginalized from its routines and practices and for whom the caring repertoires were experienced as having been suspended or withdrawn. They are examples of when the 'emotional dirty work' (McMurray and Ward, 2014) of dealing with a colleague in an anomalous or precarious position was avoided by the team, but also part of the dynamic of care with which scientific experiments and careers are made and unmade through material and affective practices. This was also an instance in which our project and our social scientific selves markedly became part of the affective practices of James's laboratory. Our intervention enabled some kinds of articulations whilst stemming or interfering with others (see also Müller and Kenney, 2013). Our capacity to notice or reveal different shadow subjectivities in particular was contingent on our position vis-à-vis the scientists with whom we engaged, and especially the ways in which the research process and material routines of the labs created spaces and encounters where personal narratives and shadow subjectivities were illuminated.

By way of contrast, we explore how belonging could, in different circumstances, be delicately constructed out of affective dispositions and material resources in order to bring an individual out of the shadows and construct for her a legitimate position in the collective. Marie was an experienced postdoctoral researcher who had been employed in Celia's lab for over ten years on a series of fixed-term contracts. She performed a key role in caring plant work and supporting other researchers, but her funding and her career future was uncertain. She no longer wanted to inhabit the mobile and autonomous subjectivity favoured by the lab, nor did she want or feel able to move on to a more senior and stable academic role. Celia took a strong line on the need for postdoctoral researchers to attain autonomy and move on, a line that was

frequently articulated in the wider bio-science communities. But in Marie's case, personal affection and trust on Celia's part, along with the lab group's recognition of her skills and caring capacities, put her in a different position. Plans were being developed for her to become a 'super postdoc' or lab manager. Funding was to be drawn from across different grants and departmental sources to craft a hybrid role in which Marie would be given a more permanent and legitimated role in taking care of the material, techniques and intellectual programme of the lab. Here affective and material practices which could be occasions for marginalization were rehabilitated – or stuck together – to form a legitimate kind of belonging, under the lab leader's auspices of care.

In both these cases care has what Latimer and Puig de la Bellacasa (2013) call a 'motile' quality; moving across and between ostensibly different spheres of laboratory life: people, facts, things. Care and its absence was both inter-subjective and inter-objective; it articulated and mediated experimental work, scientific selves and the laboratory future.

Funny stuff

Humour is another important but under explored feature of the affective dimensions of scientific practice (Mulkay and Gilbert, 1982, on discourse, is a rare exception). As Holmes and Marra (2002) have noted, humour can articulate collegiality and belonging in the workplace, disrupting the flows of bad feeling in groups, including stopping it from sticking to particular individuals. It can also displace and intensify certain emotions and mark individuals out for exclusion. As Parkhill *et al*. (2011) note, humour allows for the vocalization of uncertainty about the future where it is otherwise difficult to articulate. Humour is also a way of handling affective ambivalence about working with particular materials (Friese, 2013). It is therefore a useful analytical category with which to explore material and affective practices of care in science and the emotional subjectivities through which they are configured.

Humour was an important part of the collective fabric and working practices in James's lab. There was a rich repertoire of teasing, shared references, and funny stories about lab member's technical skills and lack thereof, mainly told against oneself but sometimes about/against former members. Humour also played a role in voicing concerns and uncertainties about the collective future of the lab via gentle mockery about particular individual's ambitions and prospects for success. It could articulate worries about precarity and uncertainty, and offer caring protection against them. This was most notable in the group's shared task of extracting eggs from pig and cow ovaries delivered from a nearby abattoir two or three times a week. The researcher was invited, with somewhat macabre relish, to observe and in one instance participate in the messy, repetitive and smelly work of spiking slippery ovaries to remove unfertilized eggs. Most members of the group took part in this activity, even if they were not going to be using the materials in their experimental work. Preparing these low status materials in a rumbustious fashion was a time for working

together, sharing expressions of disgust at the process alongside jokes about relative strengths and weaknesses. These materials were very much objects to be processed, in stark contrast to the reverential manner in which human embryos were treated. On one occasion the group were teasing a new student doing his undergraduate project in the lab and who Mark had taken under his wing. This involved a good deal of 'blokey banter' about pig's testicles – '"very meaty," according to Mark'. But observations about the student's clumsiness were also linked to narratives about senior researchers' past failures and successes (fieldnote, 20 February 2007). So this work with unvalued, uncared for materials, enabled reflections on researchers' capacity to learn and improve and the projection of a continuity of skills and care for the collective future as well as expressing care for others.

Humour in Celia's lab also articulated efforts and tensions around care-work and centred on the group's specific experimental materials in particular. Here, though, humour seemed rather strained and underplayed. Individuals expressed dry and sharp-witted comments on various events and situations, but collective practices of humour were more distant from sites of experimental practice. The group took part in collective performances of joking affection for 'the weed', and laughingly bemoaned its unimpressive appearance. The weed was symbolized by cartoon images, plant-shaped plastic toys, key rings and fridge magnets. But the dancing plants and cartoon weeds tended to be in spaces that were not owned by anyone: on notice-boards between write-up desks, for example, never in the clean lab where the seeds and plants were grown and tended;[4] longer-standing members of the group rarely engaged in jokiness about plants. We read weed humour in Celia's lab as a routine for an unthreatening kind of communality and individuals with concerns about their status and career prospects were careful to keep their distance from it.

In both labs, humour generated through and with experimental materials performed inclusion and collegiality which, on reflection, seems to be highly congruent with the dominant emotional subjectivities of care therein. Humour articulated during material practices or at a distance from these practices managed ways of caring, belonging and being successful in the lab and in relation to experimental results and careers. Attending to the neglected affective material practices of humour further thickens our analysis of the kinds of care that constitute science (Puig de la Bellacasa, 2012). Humour directs our attention to the ways in which care can both flow and congeal in collective settings, creating belonging but also reinforcing marginalization.

Conclusion

The labs we studied were full of specialist machines and complex, carefully constructed bio-materials. They generated potentially world-changing findings, like the groups in Latour and Woolgar's *Laboratory Life* (1986), and produced highly knowledgeable and skilled individuals, like the labs in Knorr Cetina's *Epistemic Cultures* (1999). But these iconic studies in STS rarely

show the patterns of affect and care for colleagues, careers and futures that, alongside work with materials and knowledge-objects, also constitute laboratories and their work. Nor do they explore how everyday science work is marked by shadows and stoppages as well as successes and flows of affect. Key studies in social studies of science tend to focus on the *successful* production of knowledge claims and scientific subjects. But even in relatively successful laboratories we suggest that affective practices could congeal into temporary but forceful patterns that left some things and people untended, some careers and subjectivities neglected. There were disjunctures and absences in flows of care. And there were shadows and silences around care that were as much part of the conditions of knowledge production as the embodied and intricate practices of material labour that made up the winning styles therein.

Crucially we found that the care (and the absences of care) that mattered in relation to experimental materials and findings was the same kind of care that mattered for careers and collectives. Care was protean with regard to its objects, but it was also situationally specific. There was no single model of affective patterning or successful emotional subjectivities, even across two laboratories that shared many similarities in institutional location, discipline and career trajectory. The winning style of Celia's highly successful lab was very much in tune with the currently dominant model of the good bio-scientist: mobile, self-reliant, unencumbered. But it was accompanied by a range of shadow subjectivities and caring practices that suggest other ways of being good at and good for science as part of the collective endeavours of the lab. James's group was, at the time of our study, less visibly successful but the group as a whole did extensive affective and material-ethical caring work to make their lab a different kind of place to do good science together, and to exchange affective resources for coping with uncertainty. At the same time, it produced marginalization for a few members.

Thinking with care reveals a fluidity and diversity of good scientific selves and collectives that provides a welcome antidote to narrow and externally imposed models of research excellence. It also draws attention to the ways scientists come to be marginalized or remote from particular engagements with objects, equipment, knowledge and collectives. To understand how these processes constitute science requires a shift in the attention of STS and sociology of science beyond the pleasures and frustrations of material and embodied practices to rather more mundane matters of getting along with other scientists and knowledge workers in contemporary research cultures. STS and sociology need to re-engage with the affects which make up particular kinds of scientific selves and collectives, as well as the material practices with which they are entangled. Thickening the analysis of science requires us to care more about what is neglected, discarded and uncared for in the affective practices of knowledge communities, including our own.

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Notes

1 The groups themselves have also moved on and changed so that we feel able to reflect on intimate and sometimes difficult matters involving exclusion as well as inclusion, neglect as well as care, anger and fear as well as satisfaction and happiness, without risking the 'muckraking' and 'gossip' that social science lab studies have been understandably anxious to avoid (Latour and Woolgar, 1986).
2 In fact in James's lab, the group routinely joked about having to look after James (who generally seemed to take this in good part). Similar jokes were never made in Celia's lab.
3 In James's smaller lab such tasks tended to be taken up – or not – in more spontaneous and less formal ways. Everyday maintenance work was treated as everybody's business – but could also be a cause of interpersonal tension, frequently gendered, between those who felt they did more than their fair share and those who were thought irresponsible. We have more than one fieldnote wherein one of the postgrads, Monica, takes Mark to task for failing to empty the wet lab bin, for example. James never got involved in managing these issues.
4 In James's lab, by contrast, the fridges where pig semen or cow ova were stored had laminated calf and piglet cartoons prominently displayed on their doors.

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