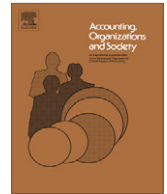




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Contents lists available at ScienceDirect

Accounting, Organizations and Society

journal homepage: www.elsevier.com/locate/aos

The office: The weakness of numbers and the production of non-authority

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A B S T R A C T

It often seems to be taken for granted that numbers produce effects and that practices of accounting enhance authority. This also goes for accounting and the environment. This paper shares this belief and argues that practices of accounting have been a crucial technology for taking nature or 'the environment' into account in the post-war era. Nevertheless, the 'constitutive turn' in the studies of accounting should not tempt us to leave unexplored the limitation of accounting practices and the *inabilities* to govern by numbers. With a point of departure in a pollution control agency, the paper explores the making of a non-authoritative office. It points to the emergence of what is labelled 'accounting intimacy' rather than the exertion of government at a distance. The paper also points to the ways in which the agency, rather than building a separate and distinct authority, came to reproduce the actor subjected to being governed, i.e., the polluting factory, within its own office. The author argues that this can be related to the investment in a shared 'technical interest' and the belief that the right (emission) number in itself would be sufficient to move the factory. The paper then explores the conditions for which numbers nevertheless came to have effects. The argument is that this should be seen as inextricably linked to the emergence of an 'interesting object', i.e., 'the environment' and an environmental interest, within the office. Thus, we need to pay attention to the formation of interests, and as accounting scholars turn to 'the environment', the latter should not be taken for granted.

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Introduction

Originally, the word *bureaucracy* meant government by bureaus. Gradually, however, bureaucracy came to signify men who concentrated power in their offices (Robson, 1952). Studies of bureaucracy or public administration often underscore this aspect of power, as well as its enabling of authority. This is not surprising. A variety of authors have elaborated on the significance of the bureaucratic office: Distance from the client, it is argued, has been reproduced through the displacement of bureaucratic work into the modern office, a separate physical space (Becker & Clark, 2001, pp. 2–12; Weber, 1978, p. 219). According to Max Weber (1978, p. 975), a key component in the process of bureaucratization is 'dehumanization': the elimination of irrational and emotional elements, elements which

escape calculation. Hence, the work of Weber implied a concern with the ways in which the ordering of public administration enabled distance, rationality, objectivity and authority – and a calculative machinery.

Over many years, accounting scholarship has contributed to interlinking public administration and authority in particular ways. First, systems of accounting – or, more generally speaking, numbers – have been shown to be of key importance to current forms of government. More specifically, accounting practices play a part in enhancing public administration by enabling and extending control and authority over an internal as well as an external environment.

This way of reasoning has gained strength and partly follows from 'the constitutive turn' of the new accounting history. As summed up by Napier (2006, p. 12), a major recognition within the accounting research community in recent years is that accounting is not just reflective but constitutive: Accounting practices not only reflect their

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environment, they also help shape it. As Hopwood (1987, p. 213) had already pointed out: 'A regime of economic visibility and calculation has positively enabled the creation and operation of an organization which facilitates the exercising of particular social conceptions of power'. However, it is not only the exertion of power that is enabled through such new regimes of visibility; so are the objects or object domains that become the target for intervention. Hence, numbers and practices of accounting produce social reality in a profound sense.

This paper takes for its point of departure an appreciation of the constitutive turn in its own right as well as its intellectual foundations. This is for several reasons. One is the constitutive turn's focus on the materialities of government; another is its concern with exploring the practices of government, and hence its interest in studying the ways in which public administration, and its objects and object domains, emerge and function. Public administration, then, becomes a question not so much of institutional structure as of how it is carried out in practice.

Nevertheless, something significant seems to have largely escaped our attention. This concerns the *limitations* of accounting practices and the exercise of power by numbers. When taking a point of departure in the productive or constitutive paradigm, there seems to be a tendency to take for granted the existence of a centre from which to govern and exert power, and moreover the *will to power* on behalf of the centre or public administration. But these technologies of government have their limitations. So what are they? And what if the relation between accounting and public administration is not only about exercising power, but also about *disabling* authority, and hence about the production of non-authority?

It is not by chance that these questions and concerns of mine have sprung from what we might call yet another turn in the history of accounting studies, namely accounting and the environment. As noted in a recent special section in *Accounting, Organizations and Society*, accounting has started to be implicated in the consideration of environmental issues, and it is probable that this development will continue in the years to come (Hopwood, 2009). The relationship between accounting and the environment is, of course, nothing new. One might even argue that 'the pollution issue' is inextricably linked to practices of accounting in the first place – not the accounting of financial entities, but the accounting of physical entities. What are 'emissions' if not the quantification of pollutants? Numbers are, and have been through the whole post-war era, important to environmental issues. In other words, accounting has been a crucial technology for taking nature into account (Asdal, 2004, 2008a). More than any other area of public administration, the pollution issue has been framed through numbers and calculating practices. The extent to which these calculating practices have raised questions for economics or engineering, the market or public administration, or a combination of these has varied (Asdal, 1998).

This paper examines accounting practices and the environment before 'the market turn' of the 1990s. By exploring a particular case in the history of accounting and the environment, the emergence of and the practices of a calculative regime in relation to the pollution issue in

post-war Norway, I seek to explore the questions outlined above.¹ The more general question I then address is how governing by numbers can fail to work for the environment, and produce *non*-authority rather than an authoritative office. At the same time, I seek to understand the conditions under which numbers nevertheless come to have effects. Although I would certainly not reject the possibility of generalizability (Napier, 2006), the purpose of this paper is not to suggest any clear-cut universal answers or to list key conditions that must be in place for numbers to work in public administration. Rather, the purpose is, through a detailed study of a single historical case, an archive study, to open up a space where the above issues can be explored in greater detail than they often are in the scholarly discussion. The space that I seek to open up is a relational space. Let me say a few words about this before proceeding.

As Miller points out, calculating selves and calculative spaces do not emerge in a smooth and linear process: 'As they come into contact with the specifics of concrete practices, they often operate in ways that are discrepant with their original designs' (Miller, 1994, p. 258). 'Resistances occur', he adds, but without elaborating on what form these resistances might take. Likewise, the general literature on accounting bypasses the issue of resistance (Asdal, 2007) (with some exceptions, of course; see, for example, the piece by Zelizer (1992), on resistance to quantification, or 'pricing', in the first place). Taking as my point of departure Miller's further assertion of the importance of examining particular accounting 'events' at particular moments in specific national contexts (Miller, 1994; see also Burchell, Clubb, Hopwood, Hughes, & Nahapiet, 1980; and Barry, Osborne, & Rose, 1996), the overall argument of my paper is that calculating practices ought to be examined through the relations in which they take part. This is a key condition for grasping the effects and consequences of accounting and calculative technologies. In relation to the environment, I argue, this is no less true before as well as after the market turn (for the latter see Braun, 2009; Callon, 2009; Engels, 2009; Lohmann, 2009; MacKenzie, 2009; and Cook, 2009).

To account for accounting and the environment in public administration without touching on 'the factory' is virtually impossible. Therefore the following section of this paper begins with 'the factory'. Then I will explore a set of meeting points – the relations, so to speak – between the factory and the office of public administration that was established to handle pollution from industry.² To analyse

¹ The paper elaborates on a comprehensive study by the author of the emergence and practices of the Norwegian Pollution Control agency and the politics of pollution in the post-war era, thus a geographical area as well as a historical period which, according to Napier (2006, p. 4), lies outside the usual range of historical accounting studies. Archive materials referred to in this paper are from the National Archival Services of Norway, the Ministry of Industry, box 129, 0272, 0261, and the archive of the Norwegian Pollution Control Authority, box 22/65-30/65, 10/66-17/66, 60/69, 410/69.

² The name of this new office of public administration was the Smoke Damage Board (Røykskaderådet), and later, from 1974, the Norwegian Pollution Control Authority (Statens Forurensningstilsyn). The name 'Smoke Damage Board' is an interesting feature of the pollution issue of the 1950s and 1960s, albeit a bit confusing in this context. As for the Pollution Control Authority, the question of 'authority' is what I seek to explore and investigate empirically, thus for the purpose of this paper I mostly use the terms 'office' or 'agency'.

and critically discuss this, I have adopted the following strategy: While delving into a set of selected events in this relationship, I will discuss in greater detail the problems and questions outlined in the introduction to this paper. To do this I will make use of selected literature in the field of the new accounting history in its constitutive turn.

The factory as an experiment: license to pollute

Drawing on resources from the history and social studies of science (e.g., Lynch, 1985; Schaffer, 1994), Miller and O'Leary (1994) have elaborated on attempts to transform the workplace in accordance with particular political projects. Their article, 'The factory as a laboratory' (1994), points out ways in which such attempts have been related to the transformation of the nature of economic citizenship and a remaking of the industrial base of a nation. The factory that was put to work right after World War II, on the western coast of Norway, deep within one of the long fjord arms at the bottom of a valley surrounded by steep mountains, is certainly no exception to this history. The factory was established not only to secure an industrial base for the new post-war economy but also to map new land in more symbolic ways. The factory in Årdal would be an experiment, it was proclaimed in Parliament: a social experiment which would take part in the mapping of foreign land; an experiment in realising the new socialist, or at least social democratic, workplace. The state-owned factory was to be a flagship, an emblem for the new post-war era and the social democratic government.

However, the factory, an aluminium smelter, was to conquer new land in a far more literal sense as well. During the war aluminium had proved itself extremely useful. Since the first metal aircraft had been built in 1915, aluminium had been of immense significance to the aircraft industry. Now, in the emerging post-war era, aluminium was put forward as the closest to perfect of all metals, with a wonderful set of features (Reimers, 1947, Sogner, 2003). As it was later to be formulated by the industry, aluminium was 'the world's most versatile metal'. And not only was aluminium extremely usable. The parallel innovations by the Frenchman Paul Heroult and the American Charles M. Hall in the late 19th century had enabled (together with huge amounts of cheap energy) an aluminium industry in the first place: In order to extract aluminium from bauxite, they invented a process of electrolysis through which aluminium oxide was made available by being dissolved in melted cryolite, a mineral (now artificially produced) which contains fluorine.

While the aluminium produced was exported to the world market, the tons of fluorine emitted in the form of smoke from the factory stayed behind in the surrounding area. The result was a huge controversy and the near extinction of the animal husbandry nearby as the animals became sick with fluorosis – fluorine poisoning.

The controversy had other lasting effects for the environment as well. As a direct result, a new government office was set up to handle such issues of industrial pollution – or 'smoke damages', as they were called at the time. The regulatory regime of this new office for pol-

lution control was based upon a system of concessions or 'licences' assigned to the individual factory: No licence, no right to pollute; thus, in practice, no new factory, or expansion of the factory.

Accounting for emissions emerged as a crucial knowledge and surveillance practice within this regulatory regime. What was to be accounted for, then, was not the production itself, but the side effects, or what was (literally) made *external* to the production: namely, its emissions. Hence, 'externalities', so pivotal to thinking about the environment in economic theory, were materialised through a system of accounting.

The key professionals in this respect, however, were not economists and economic theory, but engineers and engineering. Starting with efforts from the engineering community affiliated with the Norwegian Technical University College (NTH) to develop accounting techniques for pollutants, and in so doing to also attempt to create a market for technical solutions to pollution problems stemming from industry, a calculative space of emissions came to be produced in the form of a, literally, abstract space (Lefebvre 1991 [1974]): The really crucial thing to measure was not any longer only the content of pollutants *in* nature-objects, but rather the amount of pollutants emitted *from* the factory.

Thus, an abstract space was established in between, so to speak, the factory walls and the nature-objects in which the pollutants were having possibly damaging effects. The technologies of accounting were directed towards the factory, and the pollution problem was established as an issue for industry and engineering. To borrow a well-known sociological phrase, an 'imagined community' (Anderson, 1983), grounded in technical expertise, was established between industry, research and public administration, i.e., the pollution control authority. The making of this abstract space of emissions served to produce trust among those who were made to be the relevant actors. But it was also crucial to the possibility of acting upon the factory.

To sum up very briefly: There was trust (Porter, 1995) in the performativity of numbers: In establishing knowledge (about emission numbers and the technical possibilities of cleansing emissions), the idea was that action would follow. But how did this abstract space perform in practice? And what was the relation between trust and the enactment of authority, i.e., between the relevant emission numbers and the capacity to act upon the factory, and hence to actually reduce emissions?

Surveying and surrounding the factory: 'the single number series'

The press release that the pollution control agency made public between Christmas and New Year's Eve 1970, and the events that it referred to, may stand as an eminent example of the ways in which numbers rule (Miller, 1994; Porter, 1994, 1995; Rose, 1999), or are made to rule, the world. The narrative of the press release was structured around not the single number (Miller, 1994), but rather what we could call 'the single number series'. By the use of this single number series, a historical

narrative was enabled, and hence change over time (Napier, 2006). Starting in 1964, the press release stated, the emissions of fluorine from the Årdal aluminium factory had been estimated to be around 84 k/h. However, with the help of new cleansing equipment, emissions had been reduced to 57 k/h. The pollution control authority had declared, however, that these emissions were far too large if one aimed to avoid further damage. With this background, the reader is told, the factory had come up with new plans to limit the emissions to 50 k/h before the start of the coming year. This had been accepted by the pollution control authority, which had nevertheless stated that by the beginning of the next decade, 1 January 1980, the emissions would have to be brought down further, to 40 k/h. This further demand from the pollution control authority 'had now been accepted by the factory'.

Hence, this 'single number series' acted as a precondition, a technical device or a *dispositif* (Foucault & M, 1977; Muniesa, Millo, & Callon, 2007), so to speak, not so much to the calculating practice itself as to a larger narrative of intervention and agency – and consequently to the will and the ability to govern the factory and to combat pollution by controlling emissions.

In the above respect this little piece of history linking accounting, the environment and public administration may be said to simply underscore what has already been pointed out in the accounting literature. First, this applies to the general point that governing by numbers has become a dominant managerial rationale (Miller, 1994; but see also Napier, 2006; Porter, 1995; Rose, 1999). Calculative technologies of accounting are intrinsic to the activity of management (Miller, 1994). Thus, second, this applies to the point that numbers enable rule over entities and individuals that are distant from the centre of management. It is in relation to this point that actor-network theory has proved useful to studies of accounting. The ways in which practices of accounting seek to act upon the action of others have been related, for instance, to the notion of 'action at a distance' as well as, more implicitly, to notions like the 'immutable mobile'. Drawing on a combination of Latour (e.g., 1987, 1990) and Law (e.g., 1986), Miller and others have pointed out the importance of mobile traces that are both stable enough to be transported back and forth without distortion or decay, and also combinable so that they can be accumulated and calculated (Miller, 1994, p. 243; see also Rose & Miller, 1992). This enables, it is argued, a centre to be formed that can act upon distant objects, persons and processes. And as Miller (1994, p. 243) adds: 'Whether it is a question of dominating a particular society or economy, or the earth or sky, the mode of operation is similar: domination involves the exercise of a form of mastery made possible by those at a centre having a particular type of information about events and persons distant from them'.

It is precisely such a calculative space and such quantified information on matter emitted into the open air that served as a precondition to the mastery displayed by public administration. But how exactly is such mastery to be achieved? And even if these knowledge gathering and intervention technologies enabled a centre, and thus an authoritative office, to be formed, how is this form of authority developed (or not) in practice?

The question of agency and subjectivity can be said to be a crucial aspect of the constitutive turn in the history of accounting and in studies of accounting practices (see, e.g., Miller, 1994; Rose, 1999; Rose & Miller, 1992). Drawing on Foucault and his interest in exploring the indirect means of government and exercise of power, Miller (1994, p. 241) links Foucault's concern with selfhood and subjectivity to practices of accounting in two ways: 'It refers to the possibility of being subject to regulation or control by someone else; and yet it also emphasizes how practices of the self operate by mechanisms that tether one's own identity to oneself by self-knowledge and self-regulation'. Thus what we are talking about is a form of power which presupposes the freedom to act – in one way or another. As underscored by Foucault, government is not so much a question of acting *on* as it is a relation (Foucault, 2004; but see also Burchell, 1996).

This relational and indirect approach is of immediate relevance to the field of accounting and the environment: By way of numbers – emissions quantified – public administration are enabled to intervene in relation to the individual factory in a procedure that takes as its point of departure the factory's individual agency and freedom to act. In theory, this means that no demands need to be made for specific technologies or cleansing equipment; government can be exercised indirectly by requiring that certain ends be achieved in relation to a specified timeline. In principle, the factory can be set free to choose its own procedure in order to achieve the given ends: a way of governing through self-government.

Another – indeed, another French – route to the issue of agency that has been taken up in the accounting literature is also relevant. Again, this has to do with actor-network theory: 'Rather than focusing on attempts to impose a particular form of conduct by force, Latour and Callon analyze such mechanisms as the formation of alliances, the gaining of legitimacy, attempts to convince another that their problems or goals are intrinsically linked or their interests consonant', Miller (1994, p. 244) writes. He goes on to point to the notion of 'interessement', which has been developed to describe and analyse such forming of assemblages. Governing in these ways may imply that one is able to structure and define the field of action of 'the other' (Miller, 1994, p. 241). Accordingly, practices of accounting can, in principle, be a way of extending and enhancing public administration by securing access to the intimate space – that of emission statistics – of the individual factory.

'In this work I speak only of those weaknesses that want to increase their strength', Latour (1988, p. 167) once stated, in line with the above notion of 'interessement'. But what if there is no interest, no will, that wants to increase its strength in the first place? Strangely enough, the agency and authority on behalf of the assumed centre from which action is to be enacted seems to be largely taken for granted in the accounting literature.

Too much trust in numbers: no disincentives to pollute

This is something we need to elaborate on, I argue. The press release referred to earlier demonstrates the ways in

which the single number series was part of the strategy of defining the actions available to the factory. But to what extent did the practices of accounting enable authority and action – at a distance?

In order to explore this in greater detail, let us move one step back in the above story. A closer look at earlier events and the negotiations leading up to the press release reveals that there is more to this story.

The background to the ‘licence to pollute’, culminating in the above press release, was that the factory management in Årdal wanted to increase the smelter’s production capacity. However, the actual work on expanding the capacity had already started when the application was made to the pollution control agency. Moreover, what the company communicated to the pollution control agency was not so much a *request* for a licence to pollute but rather the fact that, as the company management put it, they ‘wanted to clarify the cleansing capacity on parts of the technical machinery one wanted to install’.

This serves to illustrate the problem the pollution control agency was facing: Rather than being approached as an authoritative office with the capacity of acting *on* industry, it was seen as an office for technical assistance (Asdal, 2008b). This was in line, one could argue, with the imagined community of which both industry and public administration were part: a community built upon the shared technical interest in ‘emission issues’. This was the shared community through which the pollution control agency came to build its identity. However, ‘interest’ is not necessarily the right word to apply here. The problem was rather that the issue of interest was not questioned. For its part, the aluminium company stated explicitly that it was an acknowledged fact that farming in the vicinity of the factory was no longer possible – and that this would be the case for the foreseeable future. To assume that technological development would be able to avoid further damage was an error. Later, the company emphasised how, due to investments already made, the smelter had now, together with its ‘cousin’ in another fjord arm on Norway’s west coast, become the largest in Europe. Thus, the size and the significance of the aluminium industry was pointed out. Reducing emissions, however, was not any part of the future plan. On the contrary, the planned expansion of the factory would lead to increased emissions, back to the level of 10 years before, i.e., 70 k/h.

Even if the trust in numbers ruled, both in the sense that the pollution control agency trusted the company’s numbers and in the sense that numbers alone could do the job, the agency did nevertheless, in this case, make its own estimates, concluding that the emissions would be higher – indeed, far higher than the company’s own estimates. The agency’s response signalled an effort to exert authority: to actually bind the possible actions of the other, the factory in question. The agency put forward the quite radical demand that the emissions had to be reduced, indeed brought down to 20 k/h.

In response, the aluminium company resisted the suggested cuts: Unrealistic demands to reduce air pollution could only be realised by making radical cuts in production as well as in the workforce, it was argued. And, it was

added, such drastic efforts would be out of proportion to the damaging effects of the emissions.

Face-to-face negotiations were pursued at the pollution control agency’s office. But it seems as if at this point the authority had already yielded: 40 k/h now seemed to be what they hoped to achieve from the company. But the company was not interested. Hence, the agency put forward another option: Could the company manage 57 k/h, i.e., that the emissions should not exceed the present level? The company accepted. Fifty-seven kilos were, after all, close to three times more than the 20 k that had initially been put forward (Byrkjeland, 1997).

Building accounting intimacy

In the first round, what the pollution control agency *did* decide on, rather than straightforward emission cuts, was the establishment of a fine-grained system of accounting in order to measure in more detail the ongoing flow of emissions. Within specified time limits the company was to inform the pollution control agency about all the factory’s emission outlets, as well as to estimate the type, size and concentration of emittants and the type and estimated effects of the cleansing efforts. Twice a year the company was to report the results of their ‘self-accounting’. The pollution control agency, for its part, was to be guaranteed access to the factory, at whatever time and for whatever reason it was needed to ensure that the accounting practices went by the book and were pursued in the correct way. Hence, the pollution control agency seemed to go by ‘the book of governmentality’ as described by Foucault (2004) and elaborated on by the accounting literature: Public administration sought to act upon the actions of the individual factory, which in turn was prescribed an accounting system of self-regulation. However, towards which ends was this done, and at what distance?

The interesting thing to note is that the aim of keeping the emissions under the critical limit of 57 k/h was to be secured, not by action at a distance, but by nitty-gritty accounting. Ironically, the accounting system was in practice established as a substitute for a more radical way of governing. Thus again, and even when opting for somewhat stricter demands than the factory was initially willing to accept, the pollution control agency did not position itself as a distinct authority.

Thus, in this instance, practices of accounting did not produce a centre enhanced by an abstract space enabling action at a distance. On the contrary, the statistics of pollution contributed to situating the pollution control authority within the factory. And likewise the other way around: Rather than exerting power over distant objects, the factory replicated itself, so to speak, *within* public administration. Rather than producing authority on behalf of public administration, a neat system of accounting came to *replace* action and authority at a distance, securing close to non-action, and non-authority. Consequently, rather than enhancing the pollution control agency, and thus public administration, accounting came to enhance the factory. The agency, by way of accounting, became glued, so to speak, to the factory: Instead of action at a distance

came what we could call *intimate* action – or ‘accounting intimacy’.

Thus, one of the results of accounting in relation to the environment was the opposite from what the general literature on accounting after the constitutive turn would lead one to expect. Rather than serving as a governing tool to demand action from a distance and in an indirect way, accounting technologies were used to produce a detailed control of the emission flow. Ironically, this was done in order to achieve an end that was relatively arbitrary and far more liberal than the pollution control agency initially called for. The single emission number, or the single number series, did not develop into a powerful tool for agency and regulatory ends. Thus, accounting through self-regulation became a substitute for, not a tool to achieve, technological change for environmental ends.

However, according to the scientific expertise working on behalf of the pollution control agency, 57 s was far too high. The scientist’s demand had been for a limit of 40 k, which would have required a radically different and expensive cleansing system. For this reason, their demand was not supported by the pollution control agency: Achieving this end would have been too costly for the factory. On the other hand, the pollution control agency was not really satisfied. The company had been talked into accepting 57 k of fluorine per hour, but would not 50 k be the better maximum emission number when the new and expanded factory was ready? To make a straightforward demand, however, proved too difficult for the agency: ‘A further reduction down to 50 k will lead to such gross financial losses that the agency has found it correct to leave the final decision to the king’ (i.e., the government, and the Ministry of Industry under which the agency operated). This illustrates again the way in which the agency enacted non-authority: The authority was, quite literally, handed over to the ministry.

In under a year the agency had moved from putting forward a demand to reduce emissions to 20 k/h, to a point where it was not able to decide upon a demand that allowed for more than twice that amount, namely 50 k/h. This was no exception to the rule. In practice, the pollution control agency most often issued the licence asked for: The factory had its licence – that is, its allowance – to pollute (White Paper no. 57, 1971–1972). Of the 115 applications for concessions made to the pollution control agency’s office, not one had been rejected (White Paper no. 56, 1970–1971).

Thus, the pollution control agency did not gather power in its offices. Rather, it enacted what I have termed *non-authority*. So how did this come about and how is it to be explained? The accounting literature has pointed out how ‘the neutrality and social authority accorded to the single figure is one that is set above the fray, apart from disputed and political interests, and endowed with a legitimacy that seems difficult to contest or dispute’ (Miller, 1994, p. 246). In the above case of accounting and the environment, this proved correct to an astonishing extent. The numbers themselves were subject to relatively little dispute. However, the ‘facticity’ did not in itself produce much of a regulatory effect. The efforts to produce a self-regulating factory came, in practice, to produce a form of account-

ing intimacy which enhanced the *factory* rather than the new pollution control agency. Accounting came to *replace* action at a distance.

Competing systems of accounting: abstract and relational spaces revisited

What I will suggest is that in analyzing why this happened, there is much to gain from attending to the two key notions I have already introduced: the ‘abstract space’ and the ‘relational space’ through which accounting for the environment was to take place. In the accounting literature one is often left with the impression that accounting and, more generally, numbers replace social relations. As Porter (1995) argues, calculations and persons depart from one another. Consequently, the abstract spaces and the accounting practices in ‘themselves’, so to speak, have been the key interest. This is despite an explicit interest in extending the scope of study: Not only the abstract spaces are important, it has been argued (Miller 1994); the ways in which physical spaces are established is just as significant.

Nevertheless, in practice, this has been left somewhat unexplored. But it is precisely this issue that we must attend to if we are to grasp the ways in which the pollution control agency enacted itself as a non-authoritative office. As noted earlier in this paper, the quantified emissions emerged as a separate and abstract space outside the factory walls, and were thus cut off from the nature-ground or the nature-objects on which these emissions were having damaging effects. Thus, the single number was produced by being cut off from the ground.

Nevertheless, the abstract space of ‘the emissions quantified’ was not simply abstract – without relation to physical or social space. On the contrary, the abstract space enacted a quite particular social and physical space as well. Together, industry, researchers at the technical university, and the pollution control agency formed what I have called an imagined community on the basis of a shared competence and the implicit assumption of a shared interest: that of establishing practices of accounting which, in the next round, would serve as a condition for intervention to bring emissions down and hence to solve the pollution problem. Hence, the pollution problem was enacted as an ‘emission issue’ inextricably linked to engineering, and thus to technical competence about industry.

This was the shared community through which the pollution control agency came to build its identity. And that, I argue, is part of the explanation of why the emission numbers, although undisputed, did not have much effect beyond documenting a situation: There was no centre with a distinct and separate identity to which the numbers could return in order to really *act* on the distant other, hence effects did not follow the numbers.

To be clear: The point of employing the term ‘imagined community’ is not to suggest that this community was not real or did not really exist. Rather, the problem, one could argue, lies in its very existence: The pollution control authority seemed to assume that this technical and factual approach would be enough. So the agency was taken by

surprise when this community did not, in practice, really hold together or ‘deliver’. The situation which emerged *after* the pollution control authority had, quite literally, handed its authority over to the Ministry of Industry may serve as an illustrating example.

Although they had not arrived at an agreement on the final pollution licence, together the company and the agency had agreed that in the meantime, until the new and expanded factory was ready, the fluorine emissions were at no point to exceed 57 k/h. Or so the pollution control agency assumed. It turned out, however, that the company saw it differently: As the agency had not come up with a licence, but had rather handed the final decision over to the Ministry, the company no longer felt any loyalty to the informal – or, as we could call it, the gentleman’s – agreement about keeping within the limit of 57 k/h. Moreover, they simply refused to relate to the agency, except in the presence of the Ministry of Industry. Thus, a situation which had occurred so often before repeated itself: The company proved heavily present within the pollution control agency, but the pollution control agency was peripheral to the company.

While bearing this in mind, it is time we move onto the significance of the relational space through which the emissions quantified were caught and were to act. Because, whereas the pollution control authority did not have a distinct and separate identity, the factory and the industry had their own story. That was a story of export income from the aluminium industry, of work for an interested workforce and a continuous prosperous social democratic future: the conquering of new land. This story had its own system of accounting, and was an integral part of the national accounting system for economic management as it appeared in the middle of the 20th century. As has been shown by accounting scholars, this system was made possible not simply by the installation of new sets of concepts for thinking about the economy, but also by the construction of a vast statistical apparatus through which this domain, ‘the economy’, could be inscribed, visualized, calculated and compared (Rose, 1999, p. 33; Désrosières, 1998). That was a system of national accounting which made it possible to measure, and compare, the performances of national economies, year by year and country by country; hence, it was one of the crucial preconditions for post-war growth-driven economies (Lie & Roll-Hansen, 2001).

It was in line with this system of accounting that the aluminium company came to present its story on the consequences of reducing emissions to the Ministry of Industry: It was a story about the tons of reduced production, the extent of reduced profits, and the ensuing loss of export income. And it was in relation to this domain that the emission numbers were to work.

Moreover, this was a domain in relation to which ‘emissions’ had been made external in the first round. No wonder, then, that the pollution control agency had trouble enhancing its authority: The agency had no ground, no distinct identity, from which to build its own authority in the encounter with the above story and system of accounting. By placing all its trust in numbers and an imagined community of facticity and technical expertise, the pollution

control authority was left alone – or, more precisely, it was caught within the factory.

Thus, if there is a lesson to be taken from the story of this paper, it is that ‘interest’ and the will to enhance authority and to rule over distant others cannot be taken for granted. Moreover, and as I have sought to demonstrate; the enactment of *non*-authority is a specific form of practice. It takes work to produce a non-authoritative office; thus processes of producing interest and authority are an area that the accounting literature needs to explore in greater detail if we are to understand the work numbers do, or do not do.

And if there is *one* thing that we can draw from the politics and the practices of accounting in relation to the environment and the issue of sustainability, that is the extent to which politics and accounting practices are not questions of *one* will or of *one* desire, but rather of encounters and confrontations between competing projects and desires. What we need to take into account then, I argue, is precisely this relational space: the meetings and confrontations between wills and between competing systems and practices of accounting.

So the question that remains is how such interests can be formed; what can they be made from? More specifically, what should concern us in this context of accounting and the environment are the ways in which numbers get linked to an external nature-ground – what we have come to label ‘the environment’.

Establishing an opposing ground

Perhaps the reader is already objecting to my story: It is not correct, she might argue, that the agency was not trying to exercise influence – and hence authority – over the internal practices of the factory. The press release discussed above was an attempt of that sort, wasn’t it? It is to this question that I now return. Because the sceptical reader is right, of course. As the 1970s began, the agency was trying to convince, to interest or enrol (Callon, 1986; Callon & Law, 1982), the factory regarding how to proceed and perform its production activities. Emissions had to be brought down, insisted the agency, and reduced emissions were indeed decided upon. We could already see this in the negotiations leading up to the issuing of the press release; however, it is primarily evident in the formulations put forward by the group of experts appointed by the agency. The experts had argued that the emission of 40 k of fluorine per hour was the limit ‘from a biological standpoint’. Even if the agency *in practice* did not endorse such claims, at the time or in the years to come, there was indeed something interesting going on here. This has to do with the building up of an interest within the agency. ‘Nature’ – as an object worthy of protection from the activities of the factory – had emerged and was made relevant within the agency.

Thus, the agency or the authority performed should not be seen as the result of practices of accounting, or of the single number series. Rather, this must be understood in relation to the emergence of a more distinct identity. The formation of this identity however, is inextricably linked

to nature-objects *outside* the factory walls but nevertheless not caught in the abstract space of emission numbers: In addition to the long-established fact that animal husbandry had become to a large degree impossible in the vicinity of the aluminium factories, the agency had become concerned about the damage being done to the nearby forest. It was noted that even if the company compensated the farmers for damages, this concerned only the individual and strictly economic losses. It did not consider 'society's more general interest in preserving landscape and the natural environment', it was claimed. Hence, a more *general*, indeed national, nature-interest was formulated within the office. Strong words were spoken, pointing to a quite remarkable landscape that deserved protection: The virgin forest of the area, with pine trees that were more than 600 years old, was now severely damaged, on the threshold of extinction, it was argued. Moreover, another 'nature tragedy' was occurring, as wild animals also became sick with fluorosis.

Never before had such an external environment surrounding the factory been described and made relevant within the agency. Hence, an environmental interest – an identity grounded in a new nature-object – was about to be established: An external nature and a nature-interest came to be opposed and contrasted with the factory and the societal interests with which it was already linked. Thus an 'interesting object', i.e., 'nature' or 'the environment' and an environmental interest, emerged together.

This did not imply that the situation was reversed, that 'industry' was replaced with 'nature'. What happened was rather that nature emerged as an object against which the factory could be contrasted and weighed. '[H]uge nature-values in great danger' was the terminology used and developed within the agency as its relations with the factory became heated. These were strong words coming from the customarily careful and non-authoritative office.

This was to be reinforced in the years to come, to the extent that what we could see was the emergence of another land: No longer was it only the production site of the aluminium company, inextricably linked to the prospect of conquering more, indeed new, land – the land of the future. It was also becoming a precarious or vulnerable land, a site in which the factory did not fit into the landscape as neatly as it had before. As it was noted within the pollution control agency in the mid-1970s, 'The aluminium company is placed in the possibly least environmentally friendly way'.

This new, vulnerable nature-site was to become a source of power for the pollution control office, a source of power that the numbers alone had never been able to provide. Alone, the single number and even the single number series that provided an overall narrative were rather 'slim'. However, in the new nature-ground, the interests pursued by the factory finally had a counterpart. Was it possible to unite these sites? And if so, how? Thus, 'nature' became the site from which to negotiate, as well as the reason.

I have argued that interests and wills, the desire to act upon the will of others, cannot be taken for granted. Thus, what we need to pay attention to is the *formation* of interests, ways in which an interest may come about in the first

place. 'Nature', I have shown, was to be formed as a ground on which to build such an interest, hence it was a precondition for an authoritative office. Only from such a ground could a pollution control authority, helped by practices of accounting, enhance its authority and seek to produce action at a distance – from the factory. To grasp this I have suggested a profound relational approach to the study of accounting – an approach that is crucial if we are to understand the now emerging field of accounting and the environment.

Thus, what I have shown is that in this emerging field of accounting and the environment, the latter should not be taken for granted. On the contrary, what I have pointed out is how the calculative space of pollutants has come to be produced in the form of an *abstract* space, cut off from the nature-objects on which the pollutants were assumed to have polluting, i.e., damaging, effects. This has served as a crucial condition of possibility to act upon the factory. However, a condition of possibility is not enough. The question, then, is not only one of how 'emissions' are made integral to the factory, but also one of how a nature-ground is being formed and hence re-related to the single number series: the emissions quantified.

As Callon (2009) has pointed out, the emerging carbon markets are ongoing experiments. Thus they are hot issues in the form of scientific experiments. Rather than study these experiments directly, I have addressed the relationship of accounting and the environment before the current market turn. Nevertheless, this market turn may be read as yet another twist in an ongoing story on trust in numbers: a belief that numbers will finally start to work 'automatically', by themselves, so to speak. If there is a lesson to be gleaned from this story, it is that even if the pollution issue is inextricably linked to the politics and engineering of numbers, numbers do very little on their own. Even a price in the market cannot make up for the fact that there are technicalities, politics, and indeed negotiations involved, not only in establishing the number in the first place, but also in enabling calculating techniques and practices of accounting that will take the environment into account.

I would like to conclude this paper by agreeing with Miller on a crucial point. As he has pointed out in a general remark, and as this paper has demonstrated in more detail, individuals (or, in this case, factories) do not respond 'automatically' to accounting practices and certainly do not embrace them willingly. 'But even when they are stubbornly opposed, over time the new visibilities and calculable spaces that are constructed tend to become the foci of decision and debate', Miller writes (1994, p. 254). The question of accounting and the environment is no exception to this. The pollution issue was to a large extent framed as a question of numbers – of reducing emissions down to the right number. Moreover, as I have shown in this paper, the question of agency and authority in relation to the pollution issue was, from the side of the pollution control agency, helped by what I have called the 'single number series'. Not only was the explicit will to govern by these numbers important here. The composition of the single number series enabled a powerful narrative of agency and authority: Early in this paper I referred to the narrative of the press

release, in which the emission numbers had been reduced from 87 k an hour in the 1960s, and were to be reduced to 40 k in the not-too-distant future. However, in an internal memorandum it was noted how difficult it had been to establish the correct emission number. Back in 1964 the number brought to the table by the factory had been 42 k/h. Hence, if we were to take *these* numbers into our account, all that the pollution control authority was able to achieve was to return to the situation half a decade *earlier*. In this respect the single number, every single number, does indeed count for the extent to which an office can narrate itself as the embodiment of agency and authority.

References

- Anderson, B. (1983). *Imagined communities: Reflection on the origin and spread of nationalism*. London: Verso.
- Asdal, K. (2007). Re-inventing politics of the state: science and the politics of contestation. In K. Asdal, I. Moser, & B. Brenna (Eds.), *Technoscience. The politics of Interventions*. Oslo: Unipub.
- Barry, A., Osborne, T., & Rose, N. (Eds.). (1996). *Foucault and political reason: Liberalism, neo-liberalism and rationalities of government*. London and New York: Routledge.
- Asdal, K. (1998). Knappe ressurser? Økonomenes grep om miljøfeltet. [Scarce resources? Economists and the environment]. Oslo: Scandinavian University Press.
- Asdal, K. (2004). Politikens teknologier: Produksjoner av regjerlig natur [The technologies of politics: Producing governable nature]. Oslo: Unipub.
- Asdal, K. (2008a). Enacting things through numbers: Taking nature into account. *Geoforum*, 39, 123–132.
- Asdal, K. (2008b). On politics and the little tools of democracy: A down-to-earth approach. *Distinktion: Scandinavian Journal of Social Theory*, 16, 5–25.
- Becker, P., & Clark, W. (2001). Introduction. In P. Becker & W. Clark (Eds.), *Little tools of knowledge: Historical essays on academic and bureaucratic practices*. Ann Arbor: University of Michigan Press.
- Braun, M. (2009). The evolution of emission trading in the European Union: The role of policy networks, knowledge and policy entrepreneurs. *Accounting, Organizations and Society*, 34, 469–487.
- Burchell, G. (1996). Liberal government and techniques of the self. In A. Barry, T. Osborne, & N. Rose (Eds.), *Foucault and political reason: Liberalism, neo-liberalism and rationalities of government*. London and New York: Routledge.
- Burchell, S., Clubb, C., Hopwood, A., Hughes, J., & Nahapiet, J. (1980). The roles of accounting in organizations and society. *Accounting, Organizations and Society*, 5, 5–28.
- Byrkjeland, M. (1997). Kampen mot fluoren [The fight against fluorine]. In R. P. Amdam, D. Gjestland, & A. Hompland (Eds.), *Årdal: Verket og bygda 1947–1997* [Årdal: The factory and the local community]. Oslo: Samlaget.
- Callon, M. (1986). Some elements of a sociology of translation: Domestication of the scallops of St. Brieuc Bay. In J. Law (Ed.), *Power, action and belief: A new sociology of knowledge?* London: Routledge and Kegan Paul.
- Callon, M. (2009). Civilizing markets: Carbon trading between in vitro and in vivo experiments. *Accounting, Organizations and Society*, 34, 534–548.
- Callon, M., & Law, J. (1982). On interests and their transformation. *Social Studies of Science*, 12, 615–625.
- Cook, A. (2009). Emission rights: From costless activity to market operations. *Accounting, Organizations and Society*, 34, 456–468.
- Désrosières, A. (1998). *The politics of large numbers: A history of statistical reasoning*. Cambridge, MA: Harvard University Press.
- Engels, A. (2009). The European emissions trading scheme: An exploratory study of how companies learn to account for carbon. *Accounting, Organizations and Society*, 34, 488–498.
- Foucault, M. (1977). The confession of the flesh. In C. Gordin (Ed.), *Power/knowledge: Selected interviews & other writings, 1972–1977*. New York: Pantheon Books.
- Foucault, M. (2004). *Sécurité, territoire, population. Cours au Collège de France, 1977–1978*. Paris: Gallimard. Seuil.
- Hopwood, A. G. (1987). The archaeology of accounting systems. *Accounting, Organizations and Society*, 12, 207–234.
- Hopwood, A. G. (2009). Accounting and the environment. *Accounting, Organizations and Society*, 34, 433–439.
- Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.
- Latour, B. (1988). *The pasteurization of France*. Cambridge: Harvard University Press.
- Latour, B. (1990). Drawing things together. In M. Lynch & S. Woolgar (Eds.), *Representation in scientific practice*. Cambridge, MA: MIT Press.
- Law, J. (1986). On the methods of long-distance control: Vessels, navigation and the Portuguese route to India. In J. Law (Ed.), *Power, action and belief. A new sociology of knowledge?* London: Routledge and Kegan Paul.
- Lie, E., & Roll-Hansen, H. (2001). *Faktisk. talt Statistikkens historie i Norge* [The history of statistics in Norway]. Oslo: Scandinavian University Press.
- Lohmann, L. (2009). Toward a different debate in environmental accounting: The case of carbon and cost-benefit. *Accounting, Organizations and Society*, 34, 499–534.
- Lynch, M. (1985). *Art and artifact in laboratory science: A study of shop work and shop talk in a research laboratory*. London: Routledge & Kegan Paul.
- MacKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society*, 34, 440–455.
- Miller, P. (1994). Accounting and objectivity: The invention of calculating selves and calculable spaces. In A. Megill (Ed.), *Rethinking objectivity*. Durham, NC: Duke University Press.
- Miller, P., & O'Leary, T. (1994). The factory as a laboratory. In M. Power (Ed.), *Accounting and science*. Cambridge: Cambridge University Press.
- Muniesa, F., Millo, Y., & Callon, M. (2007). An introduction to market devices. In M. Callon, Y. Millo, & F. Muniesa (Eds.), *Market devices*. Malden, MA: Blackwell.
- Napier, C. (2006). Accounts of change: 30 years of historical accounting research. *Accounting, Organizations and Society*, 31, 445–507.
- Porter, T. (1994). Making things quantitative. In M. Power (Ed.), *Accounting and science*. Cambridge: Cambridge University Press.
- Porter, T. (1995). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton, NJ: Princeton University Press.
- Robson, W. A. (1952). Review of reader in bureaucracy by Merton, R. K., Gray, A. P., Hockey, P., & Selvin, H. C. *The British Journal of Sociology* 3, 274–275.
- Rose, N. (1999). *Powers of freedom. Reframing political thought*. Cambridge: Cambridge University Press.
- Rose, N., & Miller, P. (1992). Political power beyond the state: Problematics of government. *The British Journal of Sociology*, 43, 173–205.
- Reimers, J. H. (1947). *Aluminium*. Oslo: Johan Grundt Tanum.
- Schaffer, S. (1994). Babbage's intelligence: Calculating engines and the factory system. *Critical Inquiry*, 21, 203–227.
- Sogner, K. (2003). Skaperkraft: Elkem gjennom 100 år, 1904–2004. [Productive Power. Elkem through 100 years] Oslo: Messel Forlag.
- Weber, W. (1978). In G. Roth & C. Wittich (Eds.), *Economy and society*. Berkeley, Los Angeles & London: University of California Press.
- White Paper no. 56 (1970–1971). Report on the Smoke Damage Board [Om Røykskaderådets virksomhet], Oslo.
- White Paper no. 57 (1971–1972). Report on the Smoke Damage Board [Om Røykskaderådets virksomhet], Oslo.
- Zelizer, V. E. (1992). Human values and the market: The case of life insurance and death in 19th-century America. In R. Swedberg & M. Granovetter (Eds.), *The sociology of economic life*. Boulder, CO: Westview Press.