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Numbers Performing Nature in Quantitative Valuing

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Introduction

The poster reproduced below appeared in a document, published in 2011 by a left-leaning Australian think-tank, that successfully proposed a new policy for Australia's fisheries: Stocking Up: Securing our marine economy.¹ Policy proposals very similar to those elaborated here were, in fact, announced by the Australian minister for the environment on 15th June, 2012.²

The poster displays a series of numbers, expressions of quantitative values. Clearly, the authors feel that these series of numbers adequately summarize their argument. In this paper, I examine and critique the performance of some of the numbers displayed. To disentangle some of the confusion around numbers, nature, and values expressed in government policy, I characterize some of the epistemo-cultural properties of the use of numbers on the poster. My interest is in the good-faith, informed use of numbers by social scientists. I am not criticizing the policy that the numbers in this poster have been assembled to support. On the contrary, I fully support the policy and applaud the political courage of the environment minister who has committed himself to getting the policy enacted as law.

¹ Eadie & Hoisington(2011)

² <http://www.theage.com.au/opinion/political-news/stormy-waters-for-marine-park-plan-20120614-20d3v.html#ixzz21rZwNQp0> Accessed 28 July, 2012.

Most of the numbers displayed in the poster are backward looking and act as truth claims. These are orthodox ‘modern fact numbers’³: for example, 15 per cent, “the decline in the rate of growth of long-lived corals in the Great Barrier Reef”. Two numbers are different to the others: one is future-focused—42 per cent, ‘the projected increase in the value of production of sustainably managed Australian fisheries in 20 years, if international fish stocks collapse’; and the other is present-focused—A\$25 billion, “the estimated annual production value marine ecosystem services provide to the Australian economy”. Both numbers purport to perform truth claims, but in neither case can the implicit claim to be evidence of a truth be supported.

Why should it be of interest to investigate the quantitative valuing performance of numbers presented as a set to achieve a particular political purpose? I argue that quantitative valuing is a particular form of ordering. As a set, the numbers on the poster promote a particular epistemo-cultural order that expresses a particular form of nature and (incidentally) a particular political agenda. Whereas we usually think of nature as structure within which human cultures emerge, my examination of the performance of the numbers in this poster reveals nature can be regarded as infrastructure.

This rather surprising outcome of investigating the performative aspect of numbers—disclosing nature as a form of ordering, a form of infrastructure—explicates a claim made by Foucault at the start of his investigation into the governmentality under liberalism and neo-liberalism. “Nature is something that runs under, through, and in the exercise of governmentality. It is, if you like, its indispensable hypodermis. It is the other face of something whose visible face, visible for the governors, is their own action. Their action has underside, or rather it has another face, and this other face of governmentality, its specific necessity, is precisely what political economy studies. It is not background but a permanent correlative.”⁴

Relational empiricism: quantitative valuing as ordering, and the epistemo-cultural properties of numbers

The claim that quantitative valuing is a form of ordering, and the claim that numbers purporting to represent values have epistemo-cultural properties are valid as claims about collective life only if we adopt relational empiricism as our analytic framework. Neither claim can be understood using the more orthodox analytic framework of

³ “Numbers have come to epitomize the modern fact... somehow non-interpretive [in valuing] at the same time as they have become the bedrock [order] of systematic knowledge” (Poovey 1998: xii).

⁴ Foucault (2008: 16)

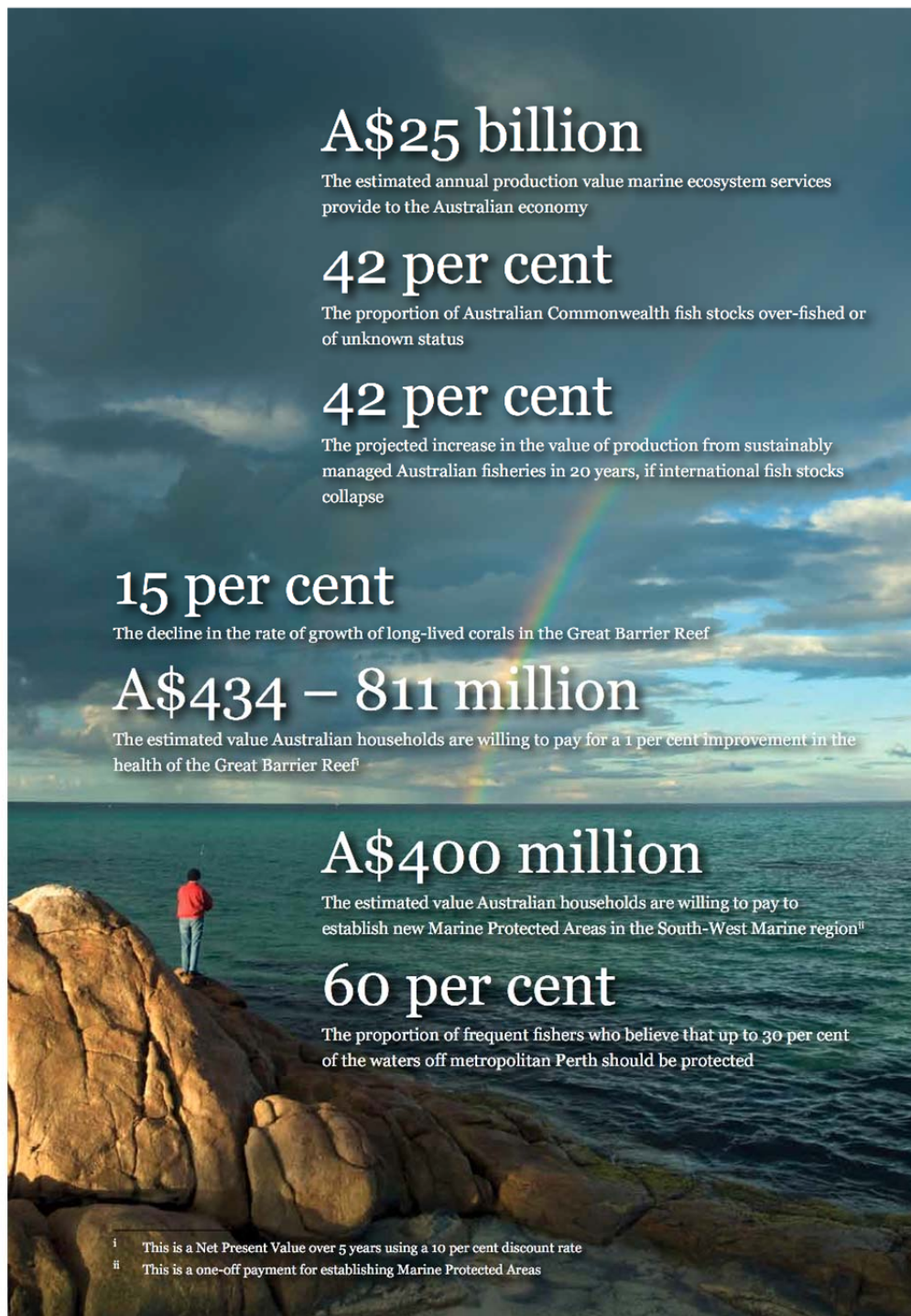


Figure 1. Poster with numbers included in the prologue of Stocking Up: Securing our marine economy⁵

⁵ Eadie & Hoisington(2011)

foundational empiricism.⁶ Relational empiricism is my preferred characterization of a family of analytic framings that began to emerge in science studies and anthropology in the late 1980s, often with arcane names, for example: actor-network theory; sociology of translation; modest witnessing; Melanesian eversion; material semiotics; postcolonial imaginary of emergence; and baroque analysis.⁷

When considering alternative ways to describe African popular economies, I first used the term relational empiricism in 2007.⁸ African economies are often intractable when subjected to the analytic categories of Western economic theories, and are consequently often despaired of in global economic circles as “hopeless”.⁹ Similarly in the 1970s, inconducive to analysis using the categories of Western philosophy, African thought was written off as “primitive”.¹⁰ My response to the inability to explain is to insist that the problem lies not with Africa, but rather with analytical Western academic traditions, in particular, with an ongoing commitment to foundational empiricism.¹¹ Accordingly, I proposed the analytic framing of relational empiricism, characterized by explicit and very different metaphysical commitments. In 2007, settling on ‘relational empiricism’ for the analytic I had more fully elaborated in 2001 as a postcolonial imaginary of emergence, I showed how African economic agents and anthropologists who study those agents, in their various analyses (undertaken for very different purposes) are both mobilizing relational empiricism. Here I re-iterate in terms less tied to the phenomena of African economies, my previous characterization of relational empiricism.

⁶ I style this a non-reductive realistic analytic framing that disavows both a materialist foundationism (Verran 2001: 34) and an idealist correlationism (Meillassoux 2009: 5). I adopt the term from Deleuze. “This form of non-reductive empiricism is analogous to Deleuze’s description of an additive and relational empiricism (Deleuze and Parnet 2002: 57). The ‘relations’ of relational empiricism originate in the workings of happenings that are standardized in some form. I have previously called such repeatable happenings ‘microworlds’ (Verran 2001: 47).

⁷ Actor network theory (ANT) is associated especially with Latour; sociology of translation was the description most commonly used by M. Callon; modest witnessing was coined by D. Haraway; Melanesian eversion was one of the terms M. Strathern used to describe a form of analytic she learned from her Mt. Hagen friends in PNG; material semiotics is the descriptive term adopted by A. Mol and J. Law; a postcolonial imaginary of emergence is adopted by Verran (2001) as a contrast to a foundationist analytic; baroque analysis is a term more recently used by John Law.

⁸ Verran (2007: 180)

⁹ The on-going perception of the exceptionalism of African economies feeds into a general pessimism about their prospects. As Guyer (2004) puts it, “tolerance of noncomprehension works on a threshold principle: so far, no further. By the 1990s, the state of scholarship and the state of the world showed that the popular economies of Africa had passed that threshold. General and specialist media alike started using apocalyptic terms: ‘the hopeless continent’ (cover of *The Economist*, Dec 9–16, 2000).” Such portrayals, of course, invite the rest of the world to intervene and ‘take over’ such economies—as did European empires in the 19th century.

¹⁰ The perception of a continuing inability to satisfactorily explain, in Western terms, how “African thought” is different from that of the West led to a widespread assumption, even among well-meaning commentators, that ‘African thought’ is primitive (see Verran 2001: 11–4).

¹¹ Verran (2001) can be read as a prolonged critique of foundational empiricism.

Relational empiricism is modal analysis of relations between entities that can be understood as participants in some (contingent) collective (with no distinction made between human and non-human actors). What matters in collectives is conservation of the relational order(s) within and through which they have life. Relational empiricism thus acknowledges conservation of order as an enabling premise.¹² Relational empirical analyses adopt whole–parts generalizing where the whole remains only vaguely delineated, but where the constitution of the various emergent parts is amenable to precise articulation.

Those who adopt this approach often overlook one aspect of adopting a relational empiricist analytic: a configuring analyst. The in-text, and perhaps also the fleshy, analyst is necessarily configured as an emergent part of the collective. The position of the detached judging observer, so comfortable for analysts, dissolves (Verran 2001: 151, 158). With respect to the collective, analysis is necessarily an infra-move not a meta-move, but this infra-move can only be achieved by the analyst in the text, so the relational empiricist analyst is a complicated tension of author in the flesh and author in the text. A secondary premise of relational empiricism is that the entities that emerge in the workings of collectives (including analysts) are configured with certain intensive or modal properties which account for the performativities of those entities. What a relational empiricist analyst aims for is felicitous intervention in the order(s) conserved in the work of the collective.

In pursuing a relational empiricist line of analysis with respect to numbers, I am still following an intuition that first arose for me in the early 1980s, when I realized that the scientific numbers I was determined to get Yoruba teachers to bring to life in their classrooms were distinct from the Yoruba numbers that many of the children and teachers were familiar with as they bought and sold in Yoruba markets. I intuited that both Yoruba and scientific numbers were active participants in collective life and that, with potent political consequences, by adopting specific routines, the numbers might be contingently connected and/or separated (2001).

When mobilizing relational empiricism, analysts are committed to realities as emergent, and the foundational empiricist story of numbers as representing values in a world ‘out-there’ gives way to a quite different account of numbers working in the world. The foundational empiricist theory of cardinal numbers as reporting extents to which objects possess qualities or attributes which objects somehow inherently possess, loses its salience.¹³ In relational empiricism, numbers are the formal generalizing

¹² In an analogous way sociology (a foundational empiricist analytic) accepts as its enabling premise that the group is the primary unit of the social.

¹³ In this paper I am concerned only with numbers performing quantitative valuing, so-called cardinal numbers in foundational empiricism. There is also a lot to be said about the

unity/multiplicity relation, and the certainty that imbues their working is elicited in their capacity to interpellate (99–104). Numbers, working as the interpellating relation unity/multiplicity, numbers effect ordering. What sort of order? That depends on performative properties which are embedded in numbers as they come to life in ‘microworlds’ where complicated routine practices ‘clot’ as enumerated entities (159–62).

So what are the epistemo-cultural properties of numbers? In the past 15 years I have proposed several such properties. The first performative property of numbers I learned to see was what I call alternative modes of generalizing: numbers enact both whole–parts and one–many versions of the unity–multiplicity relation. It was by examining the respective workings of these types of numbers, embedded in collectives and their life in contemporary Yoruba language and English language communities, that I could first articulate the differences between these modes. Importantly, these generalizing modes are relational, distinguishable only in relation to each other (235).

Having identified this performative property, a further property of numbers, formerly completely invisible, came into view. Numbers can manifest either as ontologically singular or ontologically multiple, depending on configurations achieved in the different types of socio-technical routines involved in their constitution (92–9). This ontological mode is another intensive epistemo-cultural property of numbers. More recently, I have argued that numbers can also manifest in alternative semiotic modes, as icons, indexes, and symbols (Verran 2010). These particular semiotic modalities carry with them the associated modal properties of temporal extension—being symbolically future focused or indexically past focused, and iconic temporal collapse (Verran 2010, 2012). I propose that these four properties enable the possibility of adducing the performativities of the numbers displayed in “Stocking up: Securing our marine economy” poster.

To adduce is to bring forward to a common point, and that is what I have done here. From a variety of unlikely sources, I have articulated some of the performativities of numbers. By that, I mean some of the possibilities for socio-technical action that numbers might achieve by virtue of their conceptual formation. These performativities render them potent as political and cultural agents. Let me list these performativities and hence possibilities for socio-technical action: the generalizing modalities of numbers; their semiotic mode; the temporalities by which those semiotic modes are themselves modified; and the ontological mode of numbers. In the next section, adumbrating some of their performative

performances of the ordinal numbers of foundational empiricism: that is, what is involved in ranking, scoring, and sorting with numbers in a relational empiricist framing.

properties, I discuss three different sorts of numbers displayed in the Stocking Up: Securing our marine economy poster.

Performances of numbers in the Stocking Up: Securing our marine economy poster

In considering the performative properties of the numbers that the authors of this policy paper clearly feel summarise their argument, I begin, not with the first number they present, but with the number in the middle of the list, at the point where the authors turn to contextualizing their argument. They note that the growth rate of long-lived corals in Australia's Great Barrier Reef has declined by 15 per cent, which they take as an indicator of continuing environmental degradation due to climate change, and which they feel justifies their call for a major rethinking of the fundamentals of Australia's marine environment. I begin with this number because its modal or intensive properties are familiar: it typifies the exemplary modern fact.



Fifteen per cent is a way of expressing the ratio 15/100 which in turn is a simplification of the ratio of two cardinal numbers representing real values. Or at least that is how the authors of the scientific papers reporting the phenomenon understand it. Some specific corals at a particular place on Australia's Barrier reef grew at an average rate of 1.43 cm per year between 1900 and 1970, but only at 1.24 cm per year between 1990 and 2005.¹⁴ Growth slowed by 0.19 cm per year, which might be expressed by the ratio (0.19/1.24) or 15 per cent which, in a foundational empiricist framing, represents the value of the decline in the growth rate of long-lived coral.

Shifting to relational empiricism, I comment on the epistemo-cultural properties of the number. This number is an index; it performs indexically. As an index it exhibits with a past temporal extension: it points at the growth rates of specific pieces of coral growing in a specific place at a specific time in the past.

¹⁴De'ath, Lough & Fabricius (2009).

The number embeds a one–many generalizing mode: it specifies a unit (cm growth per year) and then values through collecting many of those units together. Importantly, because this number performs a truth claim, claiming an absolute precision in valuing, the number is ontologically singular. Embedding strictly standardized material practices, this number implicitly claims that there could no different interpretation. It is an exemplary modern fact.

To discuss the properties of numbers in the way I have in the previous paragraph necessarily involves using rather arcane philosophical terminology that few readers will relate to. What does such a discussion mean in terms of this particular number’s performance? The important aspect of the number, 15 per cent, and four more of the numbers displayed in the poster,¹⁵ is the making of a truth claim about value. In order to do so efficiently and effectively, in common with other such numbers, this 15 per cent has been put together through material, institutional, and literary practices.

The second number from the poster that I interrogate is the sort of number that is currently causing much puzzlement amongst philosophers of science who adopt foundational empiricist framings.¹⁶



42 per cent, or $42/100$ is, like the number I have just considered, arithmetically speaking, a ratio of two cardinal numbers. The denominator A\$2.20 billion per year has been assiduously assembled in one of the vast counting and measuring exercises that go towards constituting Australia’s national accounts. It is the total of value of four classes of Australian fish products.

¹⁵ 42%: the proportion of Australian Commonwealth fish stocks over-fished or of unknown status: A\$434–811 million is the estimated value Australian households are willing to pay for a 1% improvement in the health of the Great Barrier Reef; A\$400 million is the estimated value Australian households are willing to pay to establish new marine protected areas in the South-West Marine Region; 60% is the proportion of frequent fishers who believe that up to 30% of the waters off metropolitan Perth should be protected.

¹⁶ See Figg and Hunter (2010). Such numbers have variously been said to represent objects that are “intentional stipulations” (Callender and Cohen 2006: 78), “fictional objects” like unicorns or Count Dracula (Figg, 2010), “make-believe objects” as in the dinner party injunction “now let this salt shaker represent Madagascar” (Toon 2010), or to “function as parables” (Cartwright 2010).

The numerator has quite different origins. This number emerged not through counting and measuring by specific people in specific places and specific times, but through calculation by a computer. To generate the prediction that the total value of Australia's fish products in 2030 would be A\$3.11 billion per year, a carefully devised computer programme, plied with rich streams of data, only some of which is derived from actual measurements, enfolded the A\$2.20 billion per year number in a complicated set of calculative processes. This would amount to an increase of A\$0.91 billion per year. We can thus render the computed increase as a ratio: 0.91/2.20, which is more felicitously rendered as 42/100, or forty two per cent.

Whereas A\$2.20 billion per year (the denominator), indexing a collection of actual fishery products, an accumulation of the value of all fishery products landed each day in all Australian fishing ports for the year 2010, is a representation, A\$3.11 billion in 2030, and hence A\$0.91 billion per year, is not a representation, and so neither is 42 per cent.

The cardinal numbers A\$2.20 billion and A\$3.11 billion purport to represent the value of the fish products landed by Australian fishers in 2010 and in 2030, respectively. They present as the same sorts of number, and allow the seemingly trustworthy claim that we can expect, in certain circumstances, an increase of forty two per cent in the value. But let us slow down, even the cursory examination I have just made reveals there is a profound difference between these two numbers.

The particular program which generated the denominator of this ratio is called IMPACT (International Model for Policy Analysis of Agricultural Commodities and Trade) developed and maintained in the International Food Policy Research Institute in Washington DC. Among the categories included in the algorithms used to generate this number were the previously mentioned four classes of fish products, differentiated as captured or farmed, and including two categories of animal feedstuffs made from fishery products. Embedded in this numerator number are values very like the denominator number A\$2.20 billion per year.¹⁷

As a cardinal number, the denominator A\$2.20 billion reports the past. It is a representation contrived in an elaborate set of institutional routines which start with actual people, perhaps wearing gumboots, weighing boxes of fish of one sort or another, and writing figures down in columns on a sheet attached to a clipboard, or perhaps in a few places, entering numbers into a computer tablet, that must be protected from splashes and fish scales.

¹⁷ Table A3 on Eadie & Hoisington(2011: 63) reports values attributed to Delgado, International Fish Policy Research Institute. The numbers appear to be extrapolations derived from Delgado, *et al.* (2003).

By contrast, A\$3.11 billion is connected to such material routines only very weakly, and only to the extent that the numbers generated in such routines are incorporated into data sets to be manipulated by computer models. The computers in which A\$3.11 comes to life need no protection from the wetness associated with actual fish and fishers. Similarly the institutional and literary routines in which this number is generated are very different to those that give life to numbers like A\$2.20 billion per year.

What are some of the epistemo-cultural properties of this complicated hybrid number? In working my way towards showing what sort of performance this number gives, I start at the point in its construction where a denominator number like A\$2.20 billion per year, a number which has been derived in careful counting, an abstracting one-many generalizing process, is embedded into processes of computation being carried out in the computer. Owing to that process, the performativity of the number changes. No longer an indexical total (assiduously assembled in the past through actual people quantifying actual stuff), it becomes a whole. In semiotic terms it becomes an icon where category and value are elided, in which there is no distinction to be made between category and value. It now performs as an element in a particular order. In being enfolded into what will become the numerator number in the working of the computer program, the denominator number begins to perform order rather than the quantitative valuing of its previous indexical life.

The processes of the computing undertaken with this newly constituted whole then contribute to processes that are constructing new wholes: icons that articulate the future. By setting these new wholes, calculated as possibilities appearing in twenty years, in proportion with the indexical 2010 total, a purported partial expansion in value of Australian fish stocks can be calculated. After twenty years of oceanic ecological collapse (“an exogenous declining trend of 1% annually” Delgado et al, 2003: 10) this purported partial expansion will, it is said, increase substantially—by A\$0.91 billion per year. This number, too, is an icon where category and value are one and the same, and it has various parts and sub-parts, which could easily be read off from the computer output by an expert. This number collapses the present into a narrowly imagined future, and being the outcome of precisely established and monitored standard practices, the number performs as ontologically singular.

Performing as ontologically singular and rendering the present as various apparently precise futures, such numbers as this icon/index hybridized whole-parts and one-many generalizations, are pervasive in contemporary public life. They increasingly feature in politics and are crucial in generating policy. These numbers now carry relations between economy and state. Indeed in the policy paper I exhibit here, this number of A\$0.91 billion per year (42%) projected

increase in the production value of fish, is crucial to the argument. If anything will persuade politicians and the citizens they represent, it is this number. It justifies taxpayers' money being spent on establishing and running marine parks and protected areas. By justifying permission for one group to fish 'over-there', but not the other, and disallowing them both from 'here', the number even excuses differential control of various classes of economic agents, distinguished as they are by the socio-technical apparatus they mobilize.

This number appears similar to the number I previously considered; it has all the hallmarks of making a truth claim. When we recognize that this number appears, however, to index a future that has not happened and which is unknowable, that implicit truth claim cannot be recognised. It is a prediction, a prophecy, and it has the performative features that go along with that. While we might deplore its dissembling, its seeming to be a truth claim, when recognised as a performative number, it is a valid prediction.

The final number I interrogate is neither a truth claim, nor a prophecy. I suggest that it is best interpreted as a slogan. However, just as the predicting number 42 per cent performatively imitated a truth claim, so I suggest does this sloganeering number A\$25 billion. Yet I will argue that this pretence does not necessarily detract from its validity as a performative number. Perhaps, given the nature of sloganeering performance, it adds to it.



A\$25 billion is a large value, so large that it seems to elude the comprehension of most numerate people. In addition, the claim that this number names the very roughly estimated debt owed by the economy to nature challenges our imaginations in a different way. Perhaps it is not surprising that the authors of the paper in which this number is displayed make a fuss about it. Of the fifty-two pages of argument and evidence in this paper, nine are devoted solely to this number. Six are allocated to describing its conceptual design and three to justifying the value claimed. Of these nine pages more than half are devoted to showing that the value is really much, much bigger than A\$25billion, but the authors have "been conservative" because in the time available it was not possible to quantify all the ecosystems services values provided by Australia's oceans: for example, with

respect to things like rivers and wetlands, it is not possible to determine where oceans begin and end; neither is it possible to determine how to separate Australian ocean ecosystem services from global ocean ecosystem services.¹⁸

As a representation of real value this number is a controversial (Verran 2012: 110–24). The first concern is conceptual and arithmetic. In articulating ecosystem services, the authors claim to have identified a debt that Australia's ocean economy owes to nature—the use-value of Australia's oceans perhaps. They claim that this debt the economy owes to nature can be added to the credit generated in economic production—the exchange value of Australia's ocean. Adding the negative number 25 billion to the positive number 44 billion, oddly, they come up with 69 billion.

The second problem concerns the physical object that the number A\$25 billion per year claims to value. This object is ineluctably vague, spatially indeterminable and existing for eternity. The authors' claim that they had insufficient time to fully quantify the ecosystem services of Australia's oceans is, in fact, made in bad faith. In actuality, the object is not quantifiable because it is not a physical object. It is no more quantifiable than unicorns.

Switching to considering the performance this number makes, we can recognize that it is not a modern fact, although the paper's authors assiduously cultivate the impression that it is, or rather that it could be, and will eventually be. This number is iconic. In it, category and value are one and the same; it expresses an order. Just as a pencil stroke in a geometry exercise book is the materiality of a geometric line, the materiality of the enumerated entity is the nine pages in the report, and just as a geometric line is temporally eternal, so too is this enumerated entity. However, while a geometric line is ontologically singular—there is a thoroughly standard (and rather simple) way to constitute it, there is much controversy over how to conceptualise ecosystems services and over how to value them. This enumerated entity is ontologically multiple; its multiple forms might be connected or separated in contingent ways.¹⁹

As is made clear in this report, this enumerated entity is a whole of many parts and sub-parts. And each of these parts and sub-parts is iconic. As a performed quantitative value, this number fails. Yet despite this, in the paper, the number is flaunted. It takes pride of place in a series of numbers displayed in a poster in a paper produced by a well-respected think-tank. And in other contexts, too, numbers purporting to represent values for ecosystem values get a

¹⁸ Eadie & Hoisington(2011: 14)

¹⁹ In justifying the particular entity they chose to bring to life the authors note: "We used a preference-based approach which assumes that the value of ecosystem services can be estimated by observing how humans interact with, or use the products provided by ecosystems. Within this approach we have accounted only for use values. We have not considered any non-use of existence values".(Foucault 2008: 12)

remarkably good press.²⁰ What to make of this puzzling phenomenon, where a number that is clearly only pretending to perform quantitative valuing is mobilised when making a serious argument?

I suggest that it is useful to think of A\$25 billion as words, to take the appearance of this number at the head of a list of numbers as performing like a shouted slogan.²¹ In being uttered as a slogan, “Australians owe their oceanic nature twenty-five billion dollars!” might aim to convince and/or enlighten. Or more forcefully, as they occupy Bondi Beach, “Twenty-five billion Australian dollars, or more!” someone might shout, adding “When are you going to pay?” As performance—as an act that makes clear that this is the performance of an act that seeks to invoke conventional rights and/or commitments—this number would be felicitous.

Recognizing A\$25 billion per year performatively as a slogan, new questions arise. Is it good or bad to pretend to value an entity precisely, when the entity itself is a fiction? Is it good or bad to proclaim this number as the value of a debt, and to utter that number in order to enlighten, or to get recognition that it has been uttered, and impose obligations on those who acknowledge its utterance? How to define a felicitous utterance here? The criteria for good and bad lie in the aesthetics of the art of politics and are not concerned with facts about the ocean or its fish. This question concerns the conduct of environmental politics as affect.

When we consider the epistemo-cultural properties of the numbers displayed on the poster, it is perhaps this sloganeering number that presents the most interesting performance. While it is garbed in the vestments of disinterestedness that go along with modern fact indexical numbers, it is in actuality performing polemic promoting the highly interested ordering of ‘nature’ as constituted by political liberalism. But that does not invalidate its performance of quantitative valuing. In more or less successfully impersonating modern fact quantitative valuing, this number proves itself effective as a slogan. It also reveals something more general about numbering associated with nature. In performing quantifying valuing, numbers effect an order of political economy that brings into being quantifiable and hence manageable nature.

²⁰ For example The Global Footprint Network, which spends much of its resources calculating ecosystems services values, was recently named as among the world’s top 100 NGOs <http://theglobaljournal.net/top100NGOs/>; In January 2012, the Natural History Museum in London initiated a public debate over the question “Can we put a price on nature?” <http://www.nhm.ac.uk/nature-online/biodiversity/earth-debates/value-of-nature/index.html>

²¹ To use the terms of Austin (1962) the number is a locution; its utterance, or publication in a graphic form such as this poster is perlocutionary act.

Conclusion

In adumbrating some of the epistemo-cultural properties of some found numbers, I have been able to reveal how they perform in Australian environmental policy development understood as a realm of governmentality. The numbers displayed on the poster all perform qualitative valuing as ordering, but several differing moments of that ordering are displayed. Most of the numbers perform as backward-looking truth claims, a thoroughly familiar modern form of epistemo-cultural ordering. These numbers index specific valuation practices in actual past times and places. One number performs as a prediction of a future that will, the authors of the paper argue, be effected by enacting a particular policy in the present. Another performs as a slogan that expresses the present of contemporary Australian environmental governmentality which has in the past fifteen years, radically extended the range of entities that might be bought and sold.

Nature—a very particular nature that humanity can do business with is revealed as an infrastructure of multiple temporal moments, a pervasive order, the “permanent correlative” of Australia’s neo-liberal environmental governmentality.

Bibliography

- Austin, J. L. 1962. *How to do Things with Words: The William James Lectures delivered at Harvard University in 1955*. Ed. J. O. Urmson, Oxford: Clarendon.
- Callender, C. & J. Cohen. 2006. There Is No Special Problem About Scientific Representation. *Theoria* **55**: 7–25.
- Cartwright, N. 2010. Models: Parables v Fables. In *Beyond Mimesis and Convention Representation in Art and Science, Boston Studies in the Philosophy of Science, Vol. 262* (eds) R. Frigg & M. Hunter, 19–32. Springer: Springer Science+Business Media.
- De’ath, G., J. M. Lough & K. Fabricius. 2009. Declining Coral Calcification on the Great Barrier Reef. *Science* **323**: 116–119.
- Delgado C. L., N. Wada, M. W. Rosegrant, S. Siet Meijer & M. Ahmed. 2003. *Outlook for Fish to 2020. Meeting Global Demand*. International Fish Policy Research Institute and World Fish Center Penang, Malaysia.
- Eadie, L. & C. Hoisington. 2011. Stocking Up: Securing our marine economy. <http://cpd.org.au/2011/09/stocking-up/>. Accessed 10 January 2012.
- Frigg, R. 2010. Fiction and Scientific Representation. In *Beyond Mimesis and Convention Representation in Art and Science, Boston Studies in the Philosophy of Science, Vol. 262* (eds) R. Frigg & M. Hunter, 97–138. Springer: Springer Science+Business Media.
- Frigg, R & M. Hunter (eds) 2010. *Beyond Mimesis and Convention Representation in Art and Science, Boston Studies in the Philosophy of Science, Vol. 262*. Springer: Springer Science+Business Media.

- Foucault, M. 2008. *The Birth of Biopolitics. Lectures at the Collège de France 1978–1979* (ed.) M. Senellart. NY: Palgrave Macmillan.
- Guyer, J. 2004. *Marginal Gains: Monetary Transactions in Atlantic Africa*. Chicago: University of Chicago Press.
- Meillassoux, Q. 2009. *After Finitude. An Essay on the Necessity of Contingency*. London: Continuum.
- Poovey, M. 1998. *A History of the Modern fact: Problems in Knowledge in the Sciences of Wealth and Society*, Chicago: Chicago University Press.
- Toon, A. 2010. Models as Make-Believe. In *Beyond Mimesis and Convention Representation in Art and Science, Boston Studies in the Philosophy of Science, Vol. 262* (eds) R. Frigg & M. Hunter, 71–96. Springer: Springer Science+Business Media.
- Verran, H. 2001. *Science and an African Logic*, Chicago: Chicago University Press.
- 2007. The Telling Challenge of Africa's Economies. *African Studies Review*. **50: 2**, 163–82.
- 2010. Number as an inventive frontier in knowing and working Australia's water resources. *Anthropological Theory*. **10: 1–2**, 171–8.
- 2012. The changing lives of measures and values: From centre stage in the fading disciplinary society to pervasive background instrument in the emergent 'control' society. In *The Sociological Review Monographs* (eds) L. Adkins & C. Lury, 60–72. Oxford: Blackwell Publishing.