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Abstract
Critical reflections on Salvatore Engel-Di Mauro's Ecology, Soils, and the Left

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Fertile thinking?

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Introduction

Salvatore Engel-Di Mauro has authored a really interesting and distinctive monograph that cuts a rarely trodden path through the thickets of knowledge. I mean that both with specific reference to research on soils and more general relevance to research into human-environment relations. It's rare indeed to encounter a bibliography that mixes a book like *The conquest of bread* by Dick Walker (2004) with a book like *Environmental chemistry of soils* by Murray McBride (1994). But Salvatore's monograph is more than a novel synthesis of Marxist political economy and soil science. It also exemplifies an approach to creating and using knowledge seemingly very different from that usually touted, variously, under the labels 'cross', 'multi', inter' and 'transdisciplinary' inquiry. In the context of professional Geography, Salvatore's book comes at an interesting time. It resonates, in a very general sense, with Stuart Lane's (2014) manifesto for what he calls 'sociohydrology', with the 'cultural climatology' advocated by several Auckland University geographers (Tadaki, Salmond & LeHeron, 2014) , and with the charter for 'ethnogeomorphology' presented by Deirdre Wilcock, Gary Brierley and Richie Howitt (2013). More widely, all three interventions – like Salvatore's book – intersect with recent calls for a 'critical physical geography' (the subject of this issue of *PiPG*).

I have titled this review 'Fertile thinking?' and readers will understand why presently. But first let me spell-out what I take Salvatore's core theses to be. Because this all-too-brief summary over-simplifies things the usual apologies apply.

A socialised soil science and an earthly social science

As Salvatore asserts early in his book "The intertwining of social and biophysical study remains rare" (p. 10). He goes on not only to evidence this claim in the book's five explanatory-diagnostic chapters. He also explains why the disjuncture matters. Soil scientists, he shows, have persistently bracketed a set of political economic and cultural issues that condition how soils are categorised, analysed and utilised by a range of social actors. They have done so in the name of value freedom while ignoring the political complicity of their research with an increasingly capitalist definition of why soils matter. For Salvatore these scientists are victims of the long-standing belief that their endeavours are relatively autonomous from the 'extra-scientific' realms of government, commerce and civil society. Theirs' is *status quo* research and thereby, to quote Alvin Gouldner's memorable phrase, "objectively partisan" (1970: 91).

However, Salvatore is even-handed. Though he argues for a Left soil science, he is not afraid to criticise his erstwhile allies on the Left of contemporary social science. Despite the 're-naturalisation' of Marxist theory and critical social science more generally since the early 90s, Salvatore identifies two problems. First, there's a general lack of attention to the things soil scientists and other geoscientists are good at revealing – namely, the material specificities of a differentiated yet connected biophysical environment. These specificities both bear but exceed a human imprint. Second, there is a general tendency to favour like-minded interlocutors rather than engaging other epistemic communities.

As a result there are losers on both sides, so Salvatore argues. On the one hand, Leftist non-scientists concerned about environmental change and its social dimensions remain ignorant of important biophysical issues that would profoundly impact progressive politics if and when addressed. Here he charges some Leftists with over-estimating the power of social revolution to birth a new ecological

order, an anti-capitalist idealism. On the other, soil scientists are not forced to confront the insights of critical social scientists about the role their research plays in capitalist political ecology. So we have equally impoverished bodies of knowledge, one currently ineffectual because largely scholastic and university-bound, the other effective in policy and practice but bound intimately to our capitalist way of life.

We can think of this in terms of what STS scholar Steve Fuller (2003: 172) likes to call "negative responsibility". This is where an individual or group must take responsibility for their *failure to act* when they could and arguably *should* do so. So what is to be done? The book's closing chapter advocates an 'eco-social' approach. This navigates the antinomies of naturalism and constructionism. It relativizes soil science to the ensemble of values, norms and social relations that together define what aspects of soil should matter in different times and places. It is 'symmetrical' both epistemologically and ontologically. It makes soils a question of both social formation and biophysical process. Normatively, since values, norms and relations vary then what soil science can tell us should also vary according to the human projects it is enrolled in. We might call this relational and overtly political approach 'socio-pedology'.

Four plus-points

So much for what the book says. Let me now reflect on Salvatore's claims and aims. First, I would absolutely endorse his critique of science separatism. Science, in all its contemporary forms, both internalises and affects its social integument. Therefore separation is a myth and it is not enough to talk about ELSA either – that it, so-called 'ethical, legal and social aspects'. But science is not reducible to the social. Sheila Jasanoff usefully captured this in her concept of 'co-production' wherein "the ways we know and represent the world are inseparable from the ways in which we choose to live in it" (2004: 2). Second, it is great to read a contemporary book about science

whose author is equipped to offer an internal critique. I would compare this with too many STS studies of science in action that refrain from *evaluating* (as opposed to simply recounting) the practices they detail. Science and technology ought to be judged by analysts as a matter of course – so much the better if the judgements are based on an understanding of both the 'context of discovery' (or invention) and 'the context of justification'.

Third, I think Salvatore is right that many – most? – Left-leaning social scientists who profess environmental concern are content to criticise or defer to science, depending, all the while remaining quite ignorant of biophysical processes and forms. On page131 he quotes David Schwartzman's (2009) salutary observation that "Socialist political economy cannot theorise a socio-ecological transition by itself. The natural, physical and information sciences … must be fully engaged. These sciences will inform the technologies of renewable energy etc. whose infrastructure will replace the present unsustainable mode". Compare this with the 1930s when, in both North America and Europe, a number of leading scientists were overtly Leftist. They included the likes of J.D. Bernal, Lancelot Hogben, Hyman Levy, Joseph Needham, and J. B. S. Haldane. Today's leading Left scientists are seemingly few in number and ageing – for example, think of Steven Rose or Levins and Lewontin.

Fourth, I especially like Salvatore's implied critique of the ontological holism and monism that underpins many calls for greater collaboration across the social sciences-natural sciences divide. This holism, to be parochial for a second, has animated numerous calls for physical and human geographers to unite. There was recent one in the journal *Area* authored by a group at the National University of Singapore (Ziegler *et al*., 2013 – see also Brander, 2013). Tacitly, they imagine the world to be a 3D jigsaw of 'coupled' human-environment interactions. Their vision of intra-disciplinarity is, in my view, additive,

narrow and superficial (cf. Castree, 2015). It assumes that is one world out there awaiting more comprehensive analysis than we have heretofore achieved.

Seeding intellectual change: how to persuade soil scientists that 'politics' is not a dirty word?

These four positive points having been made let me be constructively critical. Here my title 'Fertile thinking' begins to make sense. Salvatore's book is intended to both diagnose existing problems and inspire new intellectual habits. So how far might it seed change among those whose practices it criticises – particularly soil scientists?

First, I just made reference to the 1930s. Today, we have an awful lot of what we call 'concerned scientists' – James Hansen is a leading example. But few scientists openly acknowledge that science is a means whereby certain value judgements and certain interests get instantiated in technologies and 'evidence-based policies'. This matters for Salvatore's argument in very practical ways. Consider the heated 2011 debate in the pages of *Nature* and *Science* about invasive species. As Paul Robbins and Sarah Moore (2013) phrase it, the antagonists suffered 'ecological anxiety disorder'. That is, they fretted about tying invasion biology too closely to normative judgements about the human impact on Earth. Ironically, as Robbins and Moore point out, the 'is and the ought' were harnessed *anyway*. Analogous to this, I wonder how receptive soil scientists will be to what might seem like a project to politicise their science.

Second, related to this, I suspect soil scientists – like other environmental scientists – need suitable conceptual terms of engagement with critical social scientists. Salvatore's eco-social approach rather lacks the conceptual granularity necessary for many soil scientists to meet someone like him half way. Compare this with Bruno Latour's elaborate attempt in his book *Politics of nature* (2004) to write a new constitution for knowledge and practice. But Latour's

arguments are far too abstract. What is needed, it seems to me, is a lexicon that facilitates reflexive exchange in the borderlands where the environmental sciences confront the 'people disciplines' like human geography.

Here is an example. The American philosopher Dan Hicks (2015) has just published a really interesting analysis of the conflicting evidence used by those for and against genetically modified (GM) crops. It appears in the journal *Studies in History and Philosophy of Biological and Biomedical Sciences*. He shows how no one body of scientific evidence can ever settle the issue. In so doing he triangulates evidence with reference to ontology, epistemology and values. With great clarity he shows that debates over what scientific evidence tells us about GM crops reflect rival conceptions of what exists, of what counts as knowledge and of what kind of world we should live in. These conceptions are neither 'right' nor 'wrong' but reflect debatable and amendable decisions. While profoundly relevant to these debates and conceptions, Hicks shows that agricultural science cannot adjudicate metaphysical, epistemic and axial differences between social actors. Airing and trying to resolve these differences is, of course, the stuff of politics. Hicks demonstrates that science is neither *reducible to* political questions nor in any way *separate from* them.

Third and finally, I'm not sure Salvatore's foregrounding of Marxism will have much traction among more than a few soil scientists. The scale and scope of contemporary science is utterly unprecedented. I agree with him that much of it – far too much of it – is harnessed directly and indirectly to facilitate capital accumulation (especially through agronomy and forest science). But my sense is that practising scientists are more likely to be receptive to his 'eco-social' approach if it is linked to arguments for a revitalised *democracy* rather than for a socialist future. This has been Latour's tack, of course, so too Sheila Jasanoff's, Roger Pielke's, Andy Stirling's, Philip

Kitcher's and Steve Fuller's, among others. In different ways these authors accent scientists' responsibility and accountability not so much to the things they discover or invent as to the diverse constituencies their practices affect when translated into things like IQ tests, flood risk assessments, microwave ovens or a chemically synthesised genome. This sensibility, it seems to me, animates Mark Tadaki and others' (2014) recent manifesto for a physical geography more deeply aware of its political economic, cultural and institutional preconditions and effects.

What they miss, and what Salvatore rightly accents, is that such awareness will only come through meaningful engagements with social scientists willing to both share and to learn. Such engagement, in the form of a NERC-ESRC project, is what lies behind fluvial geomorphologist Stuart Lane's (2014) recent charter for 'socio-hydrology'. Such engagement underpins Wilcock and co-authors' (2013) idea that the means and ends of geomorphological research be referenced to indigenous cosmologies in Australia and New Zealand as to the mathematicised systems and complexity thinking emanating from Europe and North America over the decades. These are examples of a wide and deep intra-disciplinarity that should be cultivated in geography, and engendered in all areas of human-environment research. Given that so-called 'human dimensions' are being belatedly recognised by many environmental scientists as absolutely central to environmental change, I am cautiously optimistic that a new compact with 'the people disciplines' is in the offing. The last thing we need is scientific business as usual, as the Holocene gives way to something new and potentially far less hospitable to humankind.

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