

Science, Politics and Public Policy

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However one looks at it modern science must stand as one of pinnacles of human achievement. The fruits of scientific inquiry and practice are so ubiquitous to us that it is impossible - or at the least as close to impossible as to make little difference - for anyone in the modern world to conceive of any form of day to day reasoning which does not rely to some degree on the methods of science and scientific knowledge. Science and scientific methods provide us with tools which enable us to evaluate the world in which we live, both the 'natural' world and also our own societies. In many ways science offers the ultimate source of legitimacy in modern society, not many would offer up a policy or proposal without supporting it with some sort of scientific data or justification - even if the data or justification is more science-like than science¹.

In recent years there has been a noticeable increase in public debate about what can be called 'bad science', the use of science-like language and presentation to promote theories and practices with no scientific basis, biased and sensationalist science reporting in the media and the misuse of science in formulating public debate and policy. These topics have been discussed in numerous books over the last number of years such as the former *Times* science editor Mark Henderson's *The Geek Manifesto*², and the *Guardian's* Bad Science columnist Ben Goldacre's *Bad Science*³ and *Bad Pharma*⁴. These books and others like them are very welcome in highlighting many episodes where science or scientific methods have been misrepresented or misused by in-

dividuals, governments and companies however they are often quite 'woolly' when it comes to the interactions between science and politics or political decision making.

This is probably not surprising in that the main goal of much of the recent writing on this topic has been around the promotion of a scientific and evidence based approach to evaluating everything from medical treatments to government policy. The critique of how exactly science is misused is generally excellent and the reasons why are often grounded in very real material conditions such as conflicts of interest or ideological grounds. Likewise many of the prescriptions on how to better use scientific methods to evaluate policies - while unlikely to produce revolutionary outcomes - seem very sensible. Where the analysis seems lacking is in how it deals with political ideology. The treatments vary from statements like the suggestion by Henderson that 'precisely what politicians think is less important than how they think⁵' - a statement that should worry anyone with a political outlook - to the superficially similar but much more subtle outlook of those like Goldacre who argue for the use of scientific methodology in evaluating policy outcomes, -does the policy actually achieve it's stated aim(s)? - while making clear that a similar methodology cannot answer the question of whether the underlying ideology behind the policy is valid⁶.

In this article I want to argue that Marxism offers an excellent framework to examine issues relating to the interactions of science and ideology in society. I intend to briefly examine what exactly science is, the scien-

¹One need only look at the statements of the Catholic right in the 2015 Marriage Equality Referendum or in the current debate around abortion rights. Despite claiming a strong Catholic ethos most of these groups do not - at least in public discourse - resort to a religious claim to justify their arguments. Instead they attempt to quote scientific studies - often disingenuously.

²Mark Henderson, *The Geek Manifesto*, 2012, Transworld Publishers, London

³Ben Goldacre *Bad Science* 2008, Fourth Estate, London

⁴Ben Goldacre *Bad Pharma*, 2012, Fourth Estate, London

⁵Henderson p.7

⁶See for example a talk given by Goldacre where he answers the question of how evidence from randomised controlled trials deals with a policy driven by political ideology. 'Dr Ben Goldacre on randomised controlled trials for public policy' TEDxDHFastStream 22 June 2012 Royal College of Paediatrics & Child Health, London. Available at: <https://www.youtube.com/watch?v=RzRs7cPrrfE> (Question at 23mins)

tific roots of Marxism, why Marxists should care about science and scientific argument, how Marxists should approach some key scientific debates and make a case for the better use of scientific analysis both in criticizing existing political policy and, as importantly, in advancing our alternatives.

Science - What exactly are we talking about?

Although most of us would feel we have an intuitive understanding of what we mean by science, attempting to define 'science' is not a straightforward problem. Thankfully for the purposes of this article a strict definition is not a necessity, indeed given the ultimate desire to investigate the role of science and its interaction with ideology a rigid definition may in fact be more of a hindrance than a help. I will confine my remarks about what science is to a few comments about what, in a broad sense, science is and by extension, perhaps as importantly, what science is not.

In a broad sense science refers to branches of study seeking to understand or explain phenomena of the material world. Science generally refers not only to the knowledge gained from such study but also to the methods used to gain this knowledge - the scientific method, the processes of systematic observation, measurement or collection of data and the use of experiment in the formulation, verification, falsification and modification of hypotheses and theories. This picture of science - while broadly correct - can if taken too literally give a false impression of the workings of science. Science is not always the cold, abstract and dispassionate activity which may be suggested by the basic description outlined above and there has been much written by philosophers of science as well as scientists themselves on how science and the scientific method is influenced by society.

Bertrand Russell observed this influence in discussing the roll of a scientific education:

The kernel of the scientific out-

look is a thing so simple, so obvious, so seemingly trivial, that the mention of it may almost excite derision. The kernel of the scientific outlook is the refusal to regard our own desires, tastes, and interests as affording a key to the understanding of the world. Stated thus baldly, this may seem no more than a trite truism. But to remember it consistently in matters arousing our passionate partisanship is by no means easy, especially where the available evidence is uncertain and inconclusive⁷.

In this passage Russell highlights the tension between the aim of science towards a dispassionate analysis and the difficulty of actually achieving such dispassionate analysis given our own preexisting ideas and cultural preferences and biases. Others such as Karl Popper have also noted the unavoidable cultural components of the scientific method:

The belief that science proceeds from observation to theory is still so widely and so firmly held that my denial of it is often met with incredulity. I have even been suspected of being insincere - of denying what nobody in his senses would doubt. But in fact the belief that we can start with pure observation alone, without anything in the nature of a theory is absurd Observation is always selective. It needs a chosen object, a definite task, an interest, a point of view, a problem. And its description presupposes a descriptive language, with property words; it presupposes similarity and classification, which in their turn presuppose interests, points of view, and problems.⁸

⁷Bertrand Russell 'The Place of Science in a Liberal Education' in *Mysticism and Logic and Other Essays*. George Allen & Unwin Ltd. London. 1963

⁸Karl Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge*

This phenomenon is also acknowledged by many scientists themselves. The physicist Richard Feynman is often quoted as saying 'The first principle is that you must not fool yourself, and you are the easiest person to fool.' The evolutionary biologist Stephen Jay Gould has written extensively on these subjects and his book *The Mismeasure of Man* - which includes a masterful critique of the mistakes, biases and ideological influences in a wide range of supposedly scientific justifications for racism - offers a concise and insightful commentary on how exactly science functions within society

Science, since people must do it, is a socially embedded activity. It progresses by hunch, vision, and intuition. Much of its change through time does not record a closer approach to absolute truth, but the alteration of cultural contexts that influence it so strongly. Facts are not pure and unsullied bits of information; culture also influences what we see and how we see it. Theories, moreover, are not inexorable inductions from facts. The most creative theories are often imaginative visions imposed upon facts; the source of imagination is also strongly cultural⁹

Gould also notes that not all scientists agree with these assertions but argues that they are well backed up by the evidence of the history of scientific development.

This argument, although still anathema to many practicing scientists, would, I think, be accepted by nearly every historian of science.¹⁰

Indeed the history of science is clearly not simply a gradual accumulation of knowledge leading to ever greater knowledge but

an often erratic process where ideas and theories compete to explain various phenomena all influenced by prevailing ideologies and cultural assumptions. It is characterised by often quite abrupt 'paradigm' shifts where one theory is superseded by a new one which although explaining the same phenomena does so in a radically different way - such as Einstein's theory of relativity superseding the Newtonian theory of gravitation.

While the examples above deal with what are sometimes termed 'hard sciences' - physics, chemistry, biology etc. - they apply in much the same way to so called 'soft sciences' such as sociology and the social sciences in general. Indeed if the view of science given above is not how many - including some scientists - think when they consider science it closely resembles the basic critique many of the same people might make of the social sciences. I would contend the essential difference between these so called 'hard' and 'soft' sciences is essentially a combination of the inherent difficulties in acquiring hard and easily interpreted evidence and data from human society and the subsequent increased possibility of ideological and other biases to enter into the process. I could also go further and suggest that in these cases where the available evidence is far from clear and requires significant interpretation that ideology and cultural influences are a necessary component to a meaningful interpretation, the less clear and more contradictory the evidence the more assumptions must be made and the greater the 'creativity' required in making sense of the evidence¹¹. Where such research stops being science and can better be described as ideology is of course a difficult - if not intractable - problem I won't begin to address except to give what I feel is a good general starting point, namely the principle that good scientific inquiry in these areas should fully acknowledge the biases of the researchers and be clear, in as much as is possible, where their ideology comes into

⁹Stephen Jay Gould *The Mismeasure of Man*, revised edition, New York : W.W. Norton 1996 p.53

¹⁰*ibid.*

¹¹The same can of course be said about the 'hard' sciences when evidence is lacking. For a brief account of the role of ideology in regard to one of Engels ventures into scientific debate in relation to human evolution see Dave O'Farrell 'The Politics of Evolution' *Irish Marxist Review* 4 <http://www.irishmarxistreview.net/index.php/imr/article/view/42/45>

the research not just in terms of the analysis but in the problems and questions posed in the research.

The Scientific Roots of Marxism

Marx and Engels both shared a deep interest in science. Indeed Marx expressed the view that science ‘underlies all knowledge’¹². In setting out their theories of socialism Marx and Engels did not simply borrow superficially from science and the scientific method, they set out their theory in great detail using all the current knowledge and evidence available to them from a number of fields of not just science but also philosophy and history. Starting from their observations of the world around them and working within the framework of their materialist critique of Hegel’s dialectical philosophy and influenced by the history of human society they synthesised a systematic world-view which aimed to explain not just the society in which they lived but the whole development of human society and crucially to extrapolate about the future possibilities for society. Marxism offers us not just a critique of capitalism or an argument for socialism, it provides a rich framework of philosophy, in dialectical materialism, and history, in historical materialism, which enable us to understand not just society as it exists today but also how our society came into being, how and why it operates the way it does, how it can develop in the future and - crucially - how we can shape that future.

In formulating their theories Marx and Engels displayed much of what is valuable in scientific methodology. Their methods avoided many of the pitfalls which often accompany the application of science. They were keen to not simply apply a superficial explanation or extrapolate from a specific example to construct an overall explanation. Marx’s methodology in *Capital* serves as an example of this. In setting out the functioning of a capitalist economy Marx does not simply describe the day to day operations of capitalism, he doggedly sets out to un-

derstand capitalism not simply as it appears but to tease out the essence of its inner workings - being highly critical of those ‘vulgar’ economists who concentrate merely on the outward appearance of things.

It should not astonish us, then, that vulgar economy feels particularly at home in the estranged outward appearances of economic relations in which these *prima facie* absurd and perfect contradictions appear and that these relations seem the more self-evident the more their internal relationships are concealed from it, although they are understandable to the popular mind. But all science would be superfluous if the outward appearance and the essence of things directly coincided.¹³

Marx and Engels were similarly critical of those who simply took a static view of the world and extrapolated from it or reflected their analysis backwards in time. Their general philosophical framework of dialectical materialism views the world and human society as being in a constant state of motion with these states coming into and out of existence and displaying internal contradictory tendencies or behaviours. Simply describing even the essence of the underlying functioning of capitalism was not sufficient for Marx and he sought to elucidate the fundamental factors of human society which could form the basis from which these essential functions developed - in doing so Marx, along with Engels, had to develop not just a scientific framework for analysing capitalism but the whole of human history. The importance placed by them on this scientific basis of explanation, with general principles applicable to any human society is apparent in Engel’s speech at Marx’s grave.

Just as Darwin discovered the law of development of organic nature, so Marx discovered the law of development of human

¹²Quoted in the preface to F. Engels *Dialectics of Nature* Progress Publishers Moscow 1972 p.6

¹³Marx *Capital* Vol. III Chapter 48 <https://www.marxists.org/archive/marx/works/1894-c3/ch48.htm>

history: the simple fact, hitherto concealed by an overgrowth of ideology, that mankind must first of all eat, drink, have shelter and clothing, before it can pursue politics, science, art, religion, etc.; that therefore the production of the immediate material means, and consequently the degree of economic development attained by a given people or during a given epoch, form the foundation upon which the state institutions, the legal conceptions, art, and even the ideas on religion, of the people concerned have been evolved, and in the light of which they must, therefore, be explained, instead of vice versa, as had hitherto been the case.

But that is not all. Marx also discovered the special law of motion governing the present-day capitalist mode of production, and the bourgeois society that this mode of production has created.¹⁴

That this scientific, materialist dialectic is at the centre of Marx's revolutionary outlook and criticism of capitalism is then made apparent. The arguments he advances for socialism are not based on a purely moral argument against the 'evils' of capitalism but are grounded in a scientific analysis of the nature of human society and its development. According to Marx the dialectic

In its rational form ... is a scandal and abomination to bourgeoisdom and its doctrinaire professors, because it includes in its comprehension and affirmative recognition of the existing state of things, at the same time also, the recognition of the negation of that state, of its inevitable breaking up; because it

regards every historically developed social form as in fluid movement, and therefore takes into account its transient nature not less than its momentary existence; because it lets nothing impose upon it, and is in its essence critical and revolutionary.¹⁵

Broadly speaking it can be said that a scientific world-view is an essential component to a Marxist understanding of the world.

Why Marxists should be concerned with scientific debate

The previous section has shown the importance Marx and Engels placed on a scientific framework for understanding the world in their development of Marxism and such an understanding is just as important for Marxists today. I would argue a basic understanding of science and how scientific evidence is formed is necessary not only to grasp scientific aspects of debate but to help to reveal ideology and bias masquerading as scientific argument.

In general science has penetrated so much of our daily lives that it has almost become the 'language' of modern political debate. No matter what the policy it is more than likely presented in a science-like manner. Invariably some form of evidence will be advanced and it will be asserted that either it was the result of some policy or it justifies the implementation of some policy. Here a knowledge of science and its attendant methods can be very useful in arguing for a political perspective. Not only can a knowledge of science help us to spot blatant spin but also the basic - or occasionally quite convoluted - errors made in assessing evidence as a justification - retrospective or preemptive - for a particular course of action.

This is not intended to be an argument for the supremacy of scientific argument over ideological debate, indeed going down this

¹⁴Frederick Engels 'Speech at the Grave of Karl Marx' Highgate Cemetery, London. March 17, 1883 <https://www.marxists.org/archive/marx/works/1883/death/burial.htm>

¹⁵*ibid.*

route where ideological goals or motivations are sidelined almost always ends in a cul de sac. There is no 'neutral' space free from ideology and if socialists are not advancing an ideological argument for changing society then we are stuck arguing within the framework of the dominant neoliberal capitalist ideology.

A rather depressing example of this route can be found in *The God Species*, a book by the well known environmentalist Mark Lynas. The book is ostensibly a scientific analysis of the dangers of climate change and an outline of some of the possible solutions. While the vast majority of the science in the book is quite correct (and very well referenced) and some of the criticisms of the environmental movement are justified in his engagement with the science of climate change Lynas, formerly quite a radical environmentalist, seems to have abandoned any trace of a desire to change the economic system which drives climate change. Any sort of change in how society is run is ignored in favour of technical solutions that fit comfortably within the capitalist framework, such as carbon trading schemes. These are ultimately justified by asserting that

Markets are human instruments, and can be targeted to achieve any environmental objective if cleverly designed with that end in mind¹⁶

without any acknowledgment that such schemes have totally failed to halt rising CO2 emissions while making massive profits for many of those trading.

In reality the scientific element to political debate is generally less important than the ideological element but the ability to evaluate and use the evidence in a scientific manner can be crucial to making a coherent argument - it is little use outlining your political views and then backing them up with

bad science! I now want to examine two areas of debate where I think the arguments that need to be advanced are primarily scientific or political. Space constraints preclude any detailed analysis but I hope these examples can serve to clarify the roles of scientific and ideological arguments.

Biological determinism

In brief biological determinism can be described as the view that '...all human behaviour - hence all human society - is governed by a chain of determinants that runs from the gene to the individual to the sum of the behaviors of all individuals... that human nature is fixed by our genes'¹⁷ It is a world view advanced most famously by Richard Dawkins in his book *The Selfish Gene* and ultimately seeks to offer a scientific justification for the way society, with all its inequality and injustice, is structured.

This world view has been challenged both scientifically and politically and both challenges are necessary although given the 'scientific' nature of the arguments advanced the scientific criticisms are of great importance. In *Not In Our Genes*, Richard Lewontin, Steven Rose and Leon Kamin offer an instructive guide to making such an argument. Pointing out that they disagree strongly with the political conclusions of biological determinism and 'believe it is possible to create a better society than the one we live in at present'¹⁸ they continue with scientific arguments that 'to show that the world is not to be understood as biological determinism would have it be, and that, as a way of explaining the world, biological determinism is fundamentally flawed'¹⁹

In advancing their arguments they are also critical of those on the left who advocated equally fallacious - even if more ideologically palatable to those on the left who want to change society - theories of cultural determinism which sought to 'see human na-

¹⁶Mark Lynas, *The God Species: How the planet can survive the age of humans*, 2011, Fourth Estate, London. p.155

¹⁷R.C. Lewontin, Steven Rose, Leon J. Kamin *Not in our genes: Biology, Ideology, and human nature* 1984, Pantheon Books, New York. p.6

¹⁸*ibid.* p.9

¹⁹*ibid.* p.9

²⁰*ibid.* p.10

ture as almost infinitely plastic, to deny biology and acknowledge only social construction'²⁰ The point that this misuse of science was so contrary to 'actual lived experience' that it often served to reinforce the view of biological determinism as simply 'common sense' is an important one.

GM Crops

Genetically modified crops are often strongly opposed by the left. There are many good political reasons for this but few scientific ones. Despite the often repeated claims of the danger to human health there have been no recorded instances of any ill health effects attributable to GM foods - despite the fact that many people in North America have been eating large quantities of GM foods for the better part of two decades. There are certainly health implications related to diet (and lifestyle) in North America but these are shared across the 'developed' world and the blame must lie squarely at the feet of the capitalist system which produces and aggressively markets so much food with poor nutritional value.

The evidence on environmental impact of these crops is much more mixed and difficult to make a clear judgment on. Many properties of GM crops, such as increased yields and reduced requirements for artificial fertilisers and pesticides, could potentially be environmentally beneficial but other properties, such as resistance to glyphosate weed-killers like Roundup or tendencies towards monoculture, may have negative environmental effects. These potential problems are however also shared with non GM crops in capitalist agricultural production.²¹

The political reasons for opposing GM are many but can possibly be summed up in one word - Monsanto. The despicable behaviour of large corporations when it comes to GM crops includes aggressive patenting of 'their' crops and taking legal action against anyone found growing their crop even if it is only a case of unintentional cross pollination of the field with a patented GM crop.

In many instances large companies such as Monsanto have managed to turn farmers into near vassals who appear to exist only to make profits for the company.

If the potentials of GM crops are to be in any real sense used for the benefit of humanity then a political fight to take on the power of multinational corporations is a necessity. Part of this fight may involve opposition to GM crops but as socialists we should be clear the opposition is directed at the companies and how they use the technology - not the technology, or indeed the concept, itself.

Science and public policy

Having looked at the role of science in some political debates it is worth considering the role of science in formulating public policy.

Firstly it should be restated that science cannot a priori determine if a policy is 'good' or 'bad' - this is an ideological question. What science is very good at is determining if a policy actually achieves its stated goals and this is something that socialists should be very interested in.

How often have you heard a statement from a Government Minister about how some new policy was going to improve something or resolve some crisis? Now how often have you heard them revisit the policy and decide if it actually achieved what they claimed it would? It is fair to say that the evaluation of evidence for much public policy is rather poor and idea of carefully considering the available evidence before proposing a policy is often ignored due to a 'something must be done, this is something, therefore it must be done' approach on foot of criticism from opposition groups, the media, or the public.

Globally there has been an increase in the use of randomised controlled trials (RCTs) in areas of public policy²². In the UK some very simple trials have been performed and the previous governments Behavioural Insights Team, with others, in-

²¹For an excellent overview of agriculture under capitalism see Martin Empson 'Food, agriculture and climate change' *International Socialism Journal* 152 October 2016

²²This blog post from Ben Goldacre's Bad Science site lists a sample from 2011. <http://www.badscience.net/2011/05/we-should-so-blatantly-do-more-randomised-trials-on-policy/>

cluding Ben Goldacre, have published a document on how government departments can use trials to assess new policies and interventions²³.

While the trials in this report are unlikely to make any major differences to most people's lives many of the procedures involved would be of great benefit to socialists in critiquing government policy.

While there is now a commitment from government to 'equality proof' budget measures the information on how budget measures will affect people often amount to little more than spin. Forcing governments to not only state what they want to achieve but also how exactly they will measure the success of their policies ahead of time would be a valuable tool for the left. Knowing how

a given policy will be evaluated in advance significantly reduces the government's room for spin and obfuscation.

Conclusion

Scientific knowledge and a scientific framework are vital for evaluating data on society. When combined with a Marxist framework and an understanding of the ideological biases prevalent in society, a good grasp of science can help to make a powerful critique of our society. Marxists owe it to the great project of transforming our society to make every attempt to understand and apply these techniques in any campaign we are involved in, anything less would be an abandonment of the scientific socialism of Marx and Engels.

²³Laura Haynes, Owain Service, Ben Goldacre, David Torgerson *Test, Learn, Adapt: Developing Public Policy with Randomised Control Trials* UK Cabinet Office 2012