Anarchism and Science

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Abstract

Though it is still largely regarded as a wholly political tendency, anarchism has long enjoyed a close relationship with the sciences. As figures such as Kropotkin have argued, it is the only ideology not bound to arbitrary stipulations about the proper functioning and organisation of societies. In particular, anarchists have stressed how the ethical principles of state capitalist societies are not in any way a reflection of human nature or the findings of psychology, but are rather imposed from above. Departing from modern liberalism and conservatism, anarchism is perhaps the only political ideology which proposes that morality is a mind-internal procedure. More specifically, how the brain is responsible for aspects of human nature such as morality and how the brain sciences might even be able to inform discussions of political ideology are major topics of current neuroscientific research. This contribution will consequently discuss developments in the sciences and their implications for domains ranging outside naturalistic investigation and will consider to what extent our current understanding of the brain can inform accounts of political action. It will be argued that it can be shown very evidently that aspects of political critique can, and should, be grounded in a naturalistic basis.

Though it is still largely regarded as a wholly political tendency, anarchism has long enjoyed a close relationship with the sciences. In his seminal essay 'Modern Science and Anarchism', Peter Kropotkin wrote at the beginning of the twentieth century that 'Anarchism is a world-concept based upon a mechanical explanation of all phenomena, embracing the whole of Nature—that is, including in it the life of human societies and their economic, political, and moral problems. Its method of investigation is that of the exact natural sciences, by which every scientific conclusion must be verified'.[1] Anarchism, Kropotkin claimed, is the only ideology not bound to arbitrary stipulations about the proper functioning and organisation of societies. In particular, he placed stress on how the ethical principles of state capitalist societies are not in any way a reflection of human nature, but are rather imposed from above:

> When, for instance, we are told that Law (written large) "is the objectification of Truth;" or that "the principles underlying the development of Law are the same as those underlying the development of the human spirit;" or that "Law and Morality are identical and differ only formally;" we feel as little respect for these assertions as does Mephistopheles in Goethe's "Faust."[2]

As Kropotkin predicted, the psychological and behavioural sciences have since made considerable advances in exploring the structure and origin of our moral faculties.[3] Departing from

[1] P. Kropotkin, *Modern Science and Anarchism* (Philadelphia: The Social Science Club of Philadelphia, 1903), available at: https://theanarchistlibrary.org/library/petr-kropotkin-modern-science-and-anarchism (accessed 19 December 2017).

[2] Ibid.

[3] J. Mikhail, 'Universal moral grammar: theory, evidence, and the future', *Trends in Cognitive Sciences*, 11 (2007), 143–152; C. S. Sripada, 'Nativism and moral psychology: three models of the innate structure that shapes the contents of moral norms', in W. Sinnott-Armstrong (Ed), *Moral Psychology, Volume 1, The Evolution of Morality: Adaptations and Innateness* (Cambridge, MA: MIT Press, 2008), 319–343.

modern liberalism and conservatism, anarchism is perhaps the only political ideology which proposes that morality is a mind-internal procedure and not aligned purely with an externally defined set of principles. More specifically, how the brain is responsible for aspects of human nature such as morality and how the brain sciences might even be able to inform discussions of political ideology are major topics of current neuroscientific research. As such, it is worth reflecting on particular developments in the sciences and their implications for domains ranging outside naturalistic investigation and to consider to what extent our current understanding of the brain can inform accounts of political action. It will be argued here that by now it can be shown very evidently that aspects of political critique can, and should, be grounded in a naturalistic basis; a conclusion which immediately departs from a number of figures (Lacan, Barthes, Althusser, Derrida, Foucault, Kristeva, Butler, Meillassoux) who typically keep to discourse analysis, but reinforces the intuitions of Kropotkin and other anarchist thinkers reviewed here.

Foundations

Many anarchists have long argued that we should cast suspicion on those who revere what Bertrand Russell called the 'intellectual rubbish' which often results from the anti-scientific concepts emerging from certain corners of the humanities, in particular, literary studies.[4] This is often done in the name of radicalism, leftist politics, and even revolution. When discussing state capitalists and state socialists, Kropotkin writes in *Modern Science and Anarchism*:

> Perhaps we are wrong and they are right. But in order to ascertain who is right, it will not do either to quote this and that authority, to refer to Hegel's trilogy, or to argue by the "dialectic method." This question can be settled only by taking up the study of economic relations as facts of natural science.[5]

Bringing this mindset into more modern times, in 1965, during the escalation of the war in Vietnam, the anarchist Noam Chomsky was invited to a conference which brought together the opinions of social scientists and representatives of 'various theological, philosophical, and humanist traditions' in order to 'find solutions that are more consistent with fundamental human values than current American policy in Vietnam has turned out to be'. He responded to the invitation:

> The only debatable issue, it seems to me, is whether it is more ridiculous to turn to experts in social theory for general well-confirmed propositions, or to the specialists in the great religions and philosophical systems for insights into fundamental human values …. If there is a body of theory, well tested and well verified, that applies to the conduct of foreign affairs or the resolution of domestic or international conflict, its existence has been kept a well-guarded secret.[6]

[4] B. Russell, 'An outline of intellectual rubbish', in Robert E. Egner and Lester E. Dennon (Eds), *The Basic Writings of Bertrand Russell, 1903–1959* (London: Routledge, 1999), 45–71.

[5] Kropotkin, *Modern Science and Anarchism*.

[6] J. Bricmont and J. Franck, 'Chomsky, France, reason, power', in J. Bricmont and J. Franck (Eds), *Chomsky Notebook* (New York: Columbia University Press, 2010), 55.

The scientific impulse of anarchists has been channelled through a range of pursuits, not necessarily purely naturalistic in tone. For instance, 'dream literature' throughout English history has proven to be a viable medium through which authors have engaged in dialogues with classical texts and developed a robust understanding of empirical inquiry. In Chaucer's terminology, these 'olde bokys' (*old books*) can often be detected as an influence and a guide, yielding a 'new science' (or understanding) for the audience of medieval poets to interpret their place in the natural world and the hierarchical social structures imposed on them by church and state. In Chaucer's *The House of Fame*, the narrator is guided by an eagle around a glass temple decorated with images of classical heroes. His guide soon begins to expound on the Aristotelian physics behind falling bodies, with Chaucer (unlike Petrarch and the Italian humanists) being one of the few medieval poets open to the 'new science' of the Merton natural philosophers.[7] The work on matter, mechanics, and dynamics by Bradwardine (present in the *Nun's Priest's Tale*), Heytesbury, Strode (to whom Chaucer dedicated *Troilus and Criseyde*) figures in the background as the eagle explores through logical reasoning the physics of sound, pledging 'A preve by experience' (*to prove through experience*).[8]

Chaucer's oeuvre typically frames this 'experience' in opposition to 'authority', a dichotomy which, in *Fame* (with its lack of chapels, monasteries, and paradises), supports a secular appreciation of naturalistic inquiry over the 'auctorite' (*authority*) of instinct and purely imaginative literature. Though Chaucer restricts the eagle's exposition in order not to distort the poem's artistic merits, one would not be mistaken in describing this as a form of popular science and one which employs the findings of scientists to undermine the claims of concentrations of domestic power, a core motivation of classical anarchist thought.

There are a number of other ways in which the scientific perspective aligns very closely with the goals and motivations of anarchists. Though his suspicious gaze was cast primarily on eloquence, Francis Bacon's remarks could easily be seen as a valuable lesson for contemporary cultural, literary, and critical studies: '[M]en began to hunt more after words than matter; and more after … tropes and figures, than after the weight of matter … [and] soundness of argument'. Unlike Bacon, postmodernists and many contemporary Marxists and neo-Marxists typically reject the rationalist tradition of the Enlightenment, promote a cognitive and cultural relativism which views science as merely a 'narration' or social construction, and engage in theoretical speculations disconnected from any empirical test. The anarchist and political scientist Michael Albert notes in this respect: 'There is nothing truthful, wise, humane, or strategic about confusing hostility to injustice and oppression, which is leftist, with hostility to science and rationality, which is nonsense'.[9]

This general theme—of finding ways to align scientific pursuits with some apparently non-scientific domain, like anarchism—has been pursued in recent years by philosopher Galen Strawson, who opens an essay on metaphysics with the following Russellian statement:

> Philosophy is one of the great sciences of reality. It has the same goal as natural science. Both seek to give true accounts, or the best accounts possible, of how things are in reality … Philosophy, unlike natural science, usually works at finding good ways

[7] P. Boitani, 'Chaucer's labyrinth: fourteenth-century literature and language', *The Chaucer Review*, 17:3 (1983), 198–220 (202).

[8] L. Benson (Ed), *The Riverside Chaucer*, 3rd edn. (Oxford: Oxford University Press), 358.

[9] M. Albert, 'Science, post modernism and the left', *Z Magazine*, 9:7/8 (July/August 1996), 64–69 (69).

> of characterizing how things are without engaging in much empirical or a posteriori investigation of the world … Many striking and unobvious facts about the nature of reality can be established a priori, facts about the structure of self-consciousness, for example, or the possibility of free will, or the nature of intentional action, or the viability of the view that there is a fundamental metaphysical distinction between objects and their properties.[10]

Yet politics and the sciences can also be aligned in less principled, theoretical ways, and in more pragmatic, bureaucratic ways as part of political power plays. Jean-Jacques Rousseau, for instance, was aware of the deceitful role certain elements of academia play in defending illegitimate authority: 'Need raised up Thrones; the Sciences and Arts have made them strong'. They 'spread garlands of flowers over the iron chains', which limit the public's understanding and 'throttle in them the sentiment of that original freedom for which they seemed born, make them love their slavery, and fashion them into what is called civilized Peoples'.[11] The Christian anarchist Leo Tolstoy (1930) often remarked on the successful men who were indoctrinated with the mythos of capitalism:

> I know that most men—not only those considered clever, but even those who are very clever and capable of understanding most difficult scientific, mathematical, or philosophic problems—can seldom discern even the simplest and most obvious truth if it be such as obliges them to admit the falsity of conclusions they have formed, perhaps with much difficulty—conclusions of which they are proud, which they have taught to others, and on which they have built their lives.[12]

Rousseau's 'garlands of flowers' could be cast aside through the spreading of scientific and humanistic knowledge, countering artificial political narratives, national and religious mythologies, and so forth. Reversing the Marxist claim that culture is economically determined, and instead arguing that economic systems are culturally determined, the anarchist Rudolf Rocker believed that capitalism would be transcended not through abolishing the rich Western cultural heritage, but through redistributing it freely. He claimed that '[w]hat the human spirit has created in science, art and literature, in every branch of philosophic thought and aesthetic feeling is and must remain the common cultural possession of our own and of all the coming generations. This is the starting-point, this is the bridge to all further social development'.[13] Relatedly, Watkins is in an important minority in stressing that, '[h]istorically, the culture of the left, from Marx to Trotsky, Lukács to Sartre, focused overwhelmingly on literature, with far less to say about the visual arts, let alone painting'; although exploring this particular topic takes us considerably beyond the scope of this chapter.[14]

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[10] G. Strawson, 'Introduction', *Real Materialism and Other Essays* (Oxford: Oxford University Press, 2008), 1–18 (1).

[11] J.-J. Rousseau, *The Discourses and Other Early Political Writings*, V. Gourevitch (Ed) (Cambridge: Cambridge University Press, 1997/1750), 6.

[12] L. Tolstoy, *What Is Art and Essays on Art*, Aylmer Maude (trans) (Oxford: Oxford University Press, 1930), 128.

[13] J. Rose, *The Intellectual Life of the British Working Classes*, 2nd edn. (New Haven, CT: Yale University Press, 2010), 56.

[14] S. Watkins, 'Presentism? A Reply to T. J. Clark', *New Left Review*, 74 (2012), 77–102 (78).

Science Education

The anarchist Oscar Wilde, though not concerned in the slightest with natural philosophy or metaphysics, wrote a perceptive essay on Chuang Tzu, drawing upon his ideas to ultimately conclude: 'All modes of government are wrong. They are unscientific, because they seek to alter the natural environment of man; they are immoral because, by interfering with the individual, they produce the most aggressive forms of egotism; they are ignorant, because they try to spread education; they are self-destructive, because they engender anarchy'.[15] Again, the use of science to ridicule state capitalism is used to some effect; and, in Kropotkin, we find a stress on the malign delimitation of scientific research at the hands of finance and funding-based structures: 'As long as men of science depend upon the rich and the governments, so long will they of necessity remain subject to influence from this quarter'. Moreover, the structure of scientific fields of inquiry are often much more democratic than the political sphere. There are no leaders of physics or neuroscience; it is a collaborative process, with such collaborations typically being voluntary. The chemist Linus Pauling gave the following suggestion, reminiscent of the enormous significance Kropotkin, Aldous Huxley, and other anarchists placed on science:

> Science is the search for truth—it is not a game in which one tries to beat his opponent, to do harm to others. We need to have the spirit of science in international affairs, to make the conduct of international affairs the effort to find the right solution, not the effort by each nation to get the better of other nations, to do harm to them when it is possible.[16]

Kropotkin's brother, Alexander, had written to him years before he came to prominence about the influence of Darwin's *The Descent of Man*. 'Those nice children', he wrote of the tsarist government, 'simply don't comprehend that it is more dangerous than a hundred A. Kropotkins'.[17] The dissident potential and democratising effects of science have not gone unnoticed: The Copernican world view subverted the authority of the Church just as much as Jesus's teachings undermined the aggression of the Roman Empire. Nonetheless, in large part thanks to the arbitrary ranking of disciplines across much of the world, science can often provide a dangerously neutral moral ground for some. The Brazilian philosopher of education Paulo Freire wrote in *The Politics of Education* of how many people, both students and teachers, 'might try to hide in what [they] regard as the neutrality of scientific pursuits, indifferent to how [their] findings are used, even uninterested in considering for whom or for what interests [they] are working'. They 'might treat [the] society under study as though [they] are not participants in it. In [their] celebrated impartiality, [they might] approach this world as if [they] were wearing "gloves and masks" in order not to contaminate or be contaminated by it'.[18]

A walk along the corridors of any modern science department seems to confirm the general basis of this suspicion, but it also does not follow that the *findings* of these departments are wholly depoliticised—indeed, they are of potentially outstanding interest for political critique and social

[15] O. Wilde, 'A Chinese sage', *Speaker*, 8 February 1890.

[16] L. C. Pauling, *No More War!* (New York: Dodd, Mead & Company, 1983/1958), 237.

[17] A. Butterworth, *The World That Never Was: A True Story of Dreamers, Schemers, Anarchists and Secret Agents* (London: Vintage, 2011), 91.

[18] P. Freire, *The Politics of Education: Culture, Power, and Liberation*, Donaldo Macedo (trans) (New York: Praeger, 1984), 103.

activism. Rejecting Arendt's conclusion in her essay 'The Conquest of Space and the Stature of Man', which claimed that scientists should not even enter political debates because their professional loyalties are to non-political theory construction, it is possible to sketch out a number of potentially fruitful ways that the sciences—in particular, the burgeoning neurosciences—can inform, and even direct, policy formation.[19] What neuroscience can provide is a set of principles grounded in biology and psychophysics to explain a range of politically relevant behaviours, rooted in evolutionary development and able to be realised in societies ranging from the anarchistic to the fascistic. The question of how well they can function differs based on the society and its compatibility with the predispositions revealed to us through the brain sciences.

Philosophy of Science and Technology

Discussions of science and anarchism cannot be complete without recognising the role of technology as a crucial mediating influence. Wilhelm von Humboldt believed that the promotion of human creativity should act as a path towards self-perfection, but by forcing a labourer to perform a certain task not out of his own choice or preference, he moves closer to an automaton: 'The true end of Man, or that which is prescribed by the eternal and immutable dictates of reason, and not suggested by vague and transient desires, is the highest and most harmonious development of his powers to a complete and consistent whole'.[20] The technology used in factories and offices is morally neutral—it could be used to drive workers into Marx and Humboldt's feared robotic state, or it could be used to negate the need for demeaning labour. For instance, the Luddites, often regarded as harbouring a deep hatred of all technology, in fact condemned only that technology which was 'hurtful to Commonality'. And the poet and radical Percy Bysshe Shelley, though a student and advocate of natural science, nevertheless recognised the alienating effects of technological advance: 'We want the creative faculty to imagine that which we know … The cultivation of those sciences which have enlarged the limits of the empire of man over the external world, has, for want of the poetical faculty, proportionally circumscribed those of the internal world'.[21]

The anarchist Herbert Read, like the Marxists, believed that humanity could technologically manipulate nature and its workings for its own needs. But he qualified that 'Marxism is based on economics; anarchism on biology'.[22] In a letter to James Guillaume, Kropotkin stressed that '*Kapital* is a marvellous revolutionary pamphlet but its scientific significance is nil'.[23] He also 'distrusted Marx's claim to have discovered in the nebulous world of economics a science of human society'; a doctrine informed largely by academic exercise.[24] Anarchists have almost uniformly adopted a more rigorous conception of science than the loose one employed by Marxist thinkers; witness the Marxist Richard Seymour's dilettante forays into brain plasticity in order to politi-

[19] H. Arendt, 'The Conquest of Space and the Stature of Man', *Between Past and Future* (New York: Penguin, 1977), 265–280.

[20] W. V. Humboldt, *The Limits of State Action* (Indianapolis: Liberty Fund, 1993).

[21] P. B. Shelley, 'A Defence of Poetry', *The Selected Poetry & Prose of Shelley* (London: Wordsworth Poetry Library), 655.

[22] H. Read, *Existentialism, Marxism and Anarchism* (1949), in Marshall S. Shatz (Ed), *The Essential Works of Anarchism* (New York: Quadrangle Books, 1972), 534.

[23] Butterworth, 133.

[24] Ibid., 68.

cise controversial, and far from settled, neurobiological debates, where an interest in the brain is invoked only insofar as it will reinforce some pre-existing ideology.[25] Anarchists are highly suspicious of intellectualism (not to be confused with anti-science), rhetoric, and the social science 'theory' best embodied by the French academy; or 'the attempt to impose order on reality by means of rational consciousness, and encompass it within abstract theory', which 'robs life of its infinite variety and individuality', as Shatz puts it.[26] This mentality can be found most forcefully in the works of Chomsky, Albert, and in Kropotkin's *Modern Science and Anarchism*:

> The book of nature, the book of organic life, and that of human development, can already be read without resorting to the power of a creator, a mystical "vital force," an immortal soul, Hegel's trilogy, or the endowment of abstract symbols with real life. Mechanical phenomena, in their ever-increasing complexity, suffice for the explanation of nature and the whole of organic and social life.

Elsewhere in his essay, Kropotkin elaborates on his philosophy of science by adding that '[t]he social sciences are still very far removed from the time when they shall be as exact as are physics and chemistry', and so it would be 'unreasonable' to expect the social sciences to 'foretell social events with any approach to certainty'. He concludes that '[n]ot out of the universities, therefore, does Anarchism come'. Rather, it comes from an aspect of human neurobiology which we could summarise as that which seeks *peaceful collaboration with others and creative self-determination within oneself*; a tendency which cannot currently be grounded in any particular physical framework, although the beginnings of neuroscientific inquiry into this domain can be illuminating in this respect, as reviewed below.

Drawing an explicit alignment between the development of anarchist thought and contemporary technology, Kropotkin concluded that '[b]y means of the … popular creative power and constructive activity, based upon modern science and technics, Anarchism tries now as well to develop institutions which would ensure a free evolution of society'. Continuing this conversation, physicists David Bohm and F. David Peat, exhibiting the fundamentally anarchistic nature of science, write that '[c]learly what is called for is a kind of free play within the individual and society so that the mind does not become rigidly committed to a limited set of assumptions, or caught up in confusion and false play. Out of this free play could emerge the true creative potential of a society'.[27]

What Friedrich Nietzsche called the 'Last Man' in *Thus Spoke Zarathustra*, described below so perceptively by the anarchist Chris Hedges, seems to fit well with the philosophy and attitude of the intellectual and celebrity classes which distance themselves from these goals and, like Freire's dreaded 'neutral' and self-satisfied scientist, give no further thought to the matter of human progress:

> Nietzsche foresaw the deadening effects of the bourgeois lust for comfort and personal satisfaction. Science and technology might, instead, bring about a race of *Dauermenschen*, of Last Men. The Last Man would ignore and disdain all that went

[25] R. Seymour, 'This is your brain on neuroscience', Patreon (17 October 2017): www.patreon.com/posts/this-is-your-on-14901486.

[26] Shatz, xxi.

[27] D. Bohm and F. D. Peat, *Science, Order, and Creativity*, 2nd edn. (London: Routledge, 2000), 111.

> before him. The Last Man would wallow in his arrogance, ignorance and personal contentment. He would be satisfied with everything he has done. He would seek to become nothing more. He would be stagnant, incapable of growth, part of an easily manipulated crowd. The Last Man would confuse cynicism with knowledge.[28]

Kropotkin also understood that '[f]rom all times, two currents of thought and action have been in conflict in the midst of human societies'. On the one hand lies the 'mutual aid' tendencies, exemplified through tribal customs, musical ceremonies, village communities and all institutions 'developed and worked out, not by legislation, but by the creative spirit of the masses'. On the other hand lies the authoritarian spirit, adopted by the 'magi, shamans, wizards, rain-makers, oracles, and priests' and also the legal bodies and the 'chiefs of military bands'. 'It is evident', concludes Kropotkin, 'that anarchy represents the first of these two currents … We can therefore say that from all times there have been anarchists and statists'.[29] This is something Hermann Göring confessed at Nuremburg:

> Naturally the common people don't want war: Neither in Russia, nor in England, nor for that matter in Germany. That is understood. But, after all, it is the leaders of the country who determine the policy and it is always a simple matter to drag the people along, whether it is a democracy, or a fascist dictatorship, or a parliament, or a communist dictatorship. Voice or no voice, the people can always be brought to the bidding of the leaders. That is easy. All you have to do is tell them they are being attacked, and denounce the peacemakers for lack of patriotism and exposing the country to danger. It works the same in any country.[30]

If Chekov was right when he wrote that 'man will only become better when you make him see what he is like', then the sciences—in particular the psychological and behavioural sciences—should be regarded as having great potential political significance, handing effective tools to either, in Kropotkin's terms, the anarchists or statists.[31] Socialists, anarchists, and political activists of all stripes have for centuries been able to construct perceptive and illuminating accounts of political dynamics, and behavioural or neurophysiological data is certainly not required to coherently reject any number of social policies, which can be done quite independently of laboratory experiments. But the brain sciences can nevertheless be used—as they have not been so far—to add significant weight to certain political critiques. In fact, it isn't so much the causal relations between cortical and socioeconomic structures which pose the central problem, but rather the silent, unacknowledged existence of these connections.

This perspective does not come without its risks. As in every area of naturalistic inquiry, an appropriate level of analysis must be sought. It makes little sense, for instance, to ask what implications the recent discovery that nerve cells cover their high energy demand with lactate has for parliamentary democracy. The findings of neuroscience need to be politicised in the appropriate way, and one of the ways they have been exploited is through so-called 'neuropolitics', ultimately a form of neuromarketing. The current field of neuropolitics itself is far from worthy of the name;

[28] C. Hedges, *I Don't Believe in Atheists* (London: Continuum, 2008), 84.
[29] Kropotkin quoted in G. Woodcock, *Anarchism* (Harmondsworth: Penguin, 1962), 35.
[30] G. M. Gilbert, *Nuremberg Diary* (New York: Signet, 1947), 278–279.
[31] S. S. Koteliansky and L. Woolf, *The Notebooks of Anton Tchekhov* (London: The Hogarth Press, 1967), 15.

no genuine neuroscientific theory of political organisation currently exists. Neuropolitical arguments often proceed as follows: X group of people show Y type of activity in region Z of their brains during the presentation of images of their preferred electoral candidate. Region Z is associated with personal pleasure and reward. Therefore, this select group of voters are biologically determined to select candidates for purely selfish reasons. Therefore, voters act on their own interests. Therefore, the human race is ruthless, cunning, and selfish. In truth, the arguments are scandalously baseless and illogical, designed to self-fulfil the researcher's own biases, and simply amount to 'If X, therefore Y, so why not Z?'

In most popular neuro-inspired frameworks, 'not only is there not much neuroscience to be found, but neither is there much of the host discipline to be found either', as De Vos points out.[32] What constitutes current neuropolitics is lacking both in its grasp of biology and its approach to political critique. While philosophers of physics and philosophers of mathematics need to be closely familiar with their respective fields in order to enter into professional discussions, it is particularly odd that philosophers of neuroscience can confidently pontificate without any demonstrable grasp of neurobiology. At the same time, we should not conclude from this that neuroscientific studies of, for instance, schizophrenia and autism cannot deliver an explanatory account of what some scholars call 'organicity' (a peculiar term to use, as if these sorts of disorders can have their origin in anything but biology).[33] Most of the neuroscientific data heralded by Western governments has been of the variety which supports the capitalistic image of 'flexibility', with the brain being shown to have a number of self-managing, risk-organising, and adaptive functions. But these findings are fairly general and ideologically uninstructive, and the extensive collection of studies which support alternative political outlooks is rarely consulted.

The remainder of this chapter will provide a tentative step towards establishing empirically sound and theoretically plausible relations between brain function and behaviour of the kind informative to anarchist politics. Although the number of neuroscientific studies of politically relevant cognition and behaviour is currently slim, and the field is certainly in its infancy, enough has already been established to at least allow for new questions and perspectives to emerge. Instead of being grounded purely in the humanities, the study of anarchism would benefit greatly if it made greater contact with the sciences.

Neurobiology

At the close of the nineteenth century, after the socialist and anarchist movements had been fractured through violence and intimidation, Kropotkin wrote in a speech (for a lecture he was subsequently prevented from delivering) something which seems in a way perhaps more appropriate to the present era than to his:

> When a physiologist speaks now of the life of a plant or of an animal, he sees rather an agglomeration, a colony of millions of separate individuals than a personality one and indivisible. He speaks of a federation of digestive, sensual, nervous organs, all very intimately connected with one another, each feeling the consequence of the

[32] J. De Vos, 'The death and the resurrection of (psy)critique: the case of neuroeducation', *Foundations of Science*, 21:1 (2016), 129–145.

[33] See, for instance, E. Murphy and A. Benítez-Burraco, 'Language deficits in schizophrenia and autism as related oscillatory connectomopathies: an evolutionary account', *Neuroscience & Biobehavioral Reviews*, 83 (2017), 742–764.

> well-being or indisposition of each, but each living its own life. Each organ, each part of an organ in its turn is composed of independent cellules which associate to struggle against conditions unfavorable to their existence. The individual is quite a world of federations, a whole universe in himself.

The neurologist William Grey Walter also saw the advantages of collectivist models of both political and naturalistic phenomena, writing in a remarkable paper in 1963:

> In comparing social with cerebral organisations one important feature of the brain should be kept in mind; we find no boss in the brain, no oligarchic ganglion or glandular Big Brother. Within our heads our very lives depend on equality of opportunity, on specialisation with versatility, on free communication and just restraint, a freedom without interference. Here too local minorities can and do control their own means of production and expression in free and equal intercourse with their neighbours. If we must identify biological and political systems our own brains would seem to illustrate the capacity and limitations of an anarcho-syndicalist community.[34]

In more recent times, neuroscience has been used to defend, and not reject, corporate capitalism, as when much of the press inform us that we are 'hard-wired' for jealousy, competition, selfishness, and other neoliberal proclivities, simply because these features have some form of biological basis. What has not been understood by both the neuro-informed critics and defenders of neoliberalism is that there is no longer a coherent conception of *matter* in the post-Newtonian world, and so it cannot be justifiably claimed that the bounds of the physical are unable to adequately capture free choice action, altruism, and participatory economy-building (the so-called 'mind-body problem' cannot even be formulated, lacking any conception of body/matter, as Chomsky and Strawson note[35]); nor can it therefore be claimed that these egalitarian concepts are mere illusions and social constructions.

In addition to these purely naturalistic concerns, the fact that we increasingly experience ourselves as neuro-subjects leads to a situation in which, as Ortega has argued, it is 'impossible to differentiate the brain as a scientific object and the brain as an object of extra-scientific study'.[36] It is somewhat misleading to say with Rose and Abi-Rached that via the rise of neuroscience '[m]ental processes—cognition, emotion, volition—could be explained in entirely material ways'.[37] What is placed under the MRI or MEG scanner is not the human mind or the unpleasant 'external world', but rather a particular psychological theory, which can be supported or rejected on the basis of subsequent data analysis.

It should be stressed, then, that it is not so much the case that the general signifier 'neuro' is now emerging as the ultimate unit of explanation, but rather that the neurosciences are shedding new light on the underlying mechanisms responsible for current conceptions of morality,

[34] W. G. Walter, 'The development and significance of cybernetics', *Anarchy*, 25 (1963), 75–89, 89.

[35] N. Chomsky, *New Horizons in the Study of Language and Mind* (Cambridge, MA: MIT Press); Strawson, *Real Materialism and Other Essays*.

[36] F. Ortega, 'Toward a genealogy of neuroascesis', in F. Ortega and F. Vidal (Eds), *Neurocultures: Glimpses into an Expanding Universe* (New York: Peter Lang), 27–44 (28).

[37] N. Rose and J. M. Abi-Rached, 'Governing through the brain: neuropolitics, neuroscience and subjectivity', *Cambridge Anthropology*, 32:1 (2014), 3–23 (9).

education, and emotions. The common claim that the neural level is the ultimate explanatory source is peculiar and misguided: science progresses in whatever manner it can using the most powerful explanatory tools available, and we can easily imagine the development of a lower-level physico-chemical framework replacing 'neuro' at some point in the near future. The claim that neuroscience is the final point of explanation appears remarkably similar to Fukuyama's infamous claim that post-Soviet neoliberalism represents the final point of political and economic development, or the 'end of history'.[38] When approaching the issue of neuropolitics, it is consequently vital that attention be placed largely on empirical findings which can potentially tell us something new about humans as political animals.

Neuroscience has shed much-needed light on the decision-making capacities and in-group/out-group relations of humans and has informed policy debates concerning the proper treatment of PTSD; even devices like cochlear implants reflect a slow, general shift towards neuroscientifically based self-governance.[39] The unwillingness to act on a moral urge, a habitual cultural activity which dominates the neoliberal world, has been shown not to implicate the major emotional regions of the brain, as opposed to the action of fulfilling a moral impulse, suggesting that a level of self-denial and internal suppression (and not just awareness of one's inaction) accompanies moral failure.[40] The encultured brain consequently restricts emotional regulation—often with disastrous effects on mental health.

Similar innateness arguments can be made about our sense of fairness. Neuroimaging studies have revealed that fair monetary offers yield higher ratings of happiness and increased activity in various reward regions of the brain (such as the ventral striatum and the orbital and medial prefrontal cortex) relative to unfair offers.[41] Fair treatment has more generally been shown to strongly implicate reward centres irrespective of whether or not the subject is the recipient of the fair monetary amount (even rodents appear to prefer cooperation to working alone for identical rewards). The motivation to cooperate, produced by these reward centres, is modulated by a cognitive control network in the lateral prefrontal cortex (interpreting extrinsic cooperative incentives) and a system of social cognition processing trust/threat signals in the temporoparietal junction and medial prefrontal cortex. Irrespective of the actual motive (categorical imperative, empathy, mores, self-interest), altruistic decisions are uniformly associated with reward system activation.

Experiments involving the punishment of those who act unfairly also implicate these cortical networks, suggesting that a sense of justice is deeply rooted in neurobiology and is not purely some kind of socially manufactured power tool, while unreciprocated cooperation leads to substantially reduced activity in the ventromedial prefrontal cortex. The empirical evidence that concepts of fairness and cooperation are generated in identical brain regions to monetary gain suggests that these independent factors (gauged in different ways by governments, corporations, economists and workers) may in fact require the same level of consideration when constructing political spaces and organisations.

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[38] F. Fukuyama, *The End of History and the Last Man* (New York: The Free Press, 1992).

[39] L. Mauldin, 'Precarious plasticity: neuropolitics, cochlear implants, and the redefinition of deafness', *Science, Technology, & Human Values*, 39:1 (2014), 130–153.

[40] C. H. Declerck, C. Boone and G. Emonds, 'When do people cooperate? The neuroeconomics of prosocial decision making', *Brain and Cognition*, 81 (2013), 95–117.

[41] G. Tabibnia and M. D. Lieberman, 'Fairness and cooperation are rewarding', *Annals of the New York Academy of Sciences*, 1118 (2007), 90–101.

It is also worth noting that many neuroscientific concepts, like plasticity, arguably originate in the humanities, and since countless brain studies rely so heavily on notions already well-developed in humanistic terms, the neurosciences should seek (as they are not currently doing) to critique and transform the concepts they often inadvertently import from other disciplines. For instance, an emerging consensus about the neurobiological basis of selfhood has the potential to undermine, amongst other things, the partially and very dubiously attributed legal personhood of corporations, a topic anarchists have long discussed.

A number of Marxist and anarchist critics of neoliberalism have noted how state capitalism demeans reward through hyper-consumerist cycles, converting pleasure into a series of micro-transactions. Decety et al. have developed a neurobiological account of cooperation and competition which does not so much lend support to these critiques as it opens up new avenues for the evaluation of social and personal rewards.[42] Their basic conclusion from a range of imaging studies is that cooperation is highly socially rewarding and associated with activation in the medial orbitofrontal cortex, part of the familiar reward centres. As Kropotkin already noted, cooperation is the defining feature of human tribal life—ethological research even shows that non-human primates such as capuchin monkeys respond negatively to the distribution of unequal rewards.[43] All of this suggests that the neurological basis for a strong cooperation-reward network exists (with the main avenue to cooperation being through the lateral frontal cortex generating cognitive control and monitoring the presence/absence of extrinsic cooperative incentives) and that inhibiting its self-reproducing and self-sustaining computations is not simply a minor obstacle to self-development but stands in direct conflict with the brain's function.

Given the brain's highly sophisticated empathetic and egalitarian tendencies, the dominant neoliberal culture documented and critiqued by anarchist scholars seems to have overruled and suppressed the reflexive neurobiological drives of cooperation and solidarity. To take one of numerous examples: Although modern scientific progress in the form of social media arguably strives towards cooperation and collectivism, it also promotes a peculiarly ruthless and vicious form of competition, ironically fulfilling the neoliberal model of online networking. A particular sector of the Left (what the anarchist and anthropologist David Graeber has called 'the Loser Left') are obsessed with winning online arguments purely because they could never feasibly win anything else.[44] These activists purposefully secure themselves into political circumstances that guarantee that their only victories will be on Twitter and Facebook, not in the world of social justice movements. Social media is typically centred on narcissism and taps into the reward centres of the brain much more often than it does the more critical, empathetic centres. Because social media is today used to construct our external internet selves/avatars, any criticism levelled at political opinions expressed online inadvertently turns into an attack on our very identities. And so instead of fostering cooperation, social media ultimately turns debates about political movements and activist tactics into a cavalcade of intensely self-oriented identity crises. It is along similar lines that we can ask whether the great naturalists pursued truth and empirical evidence not out

[42] J. Decety, P. L. Jackson, J. A. Sommerville, T. Chaminade and A. N. Meltzoff, 'The neural bases of cooperation and competition: an fMRI investigation', *NeuroImage*, 23:2 (2004), 744–751.

[43] S. F. Brosnan, C. Freeman and F. B. M. De Waal, 'Partner's behavior, not reward distribution, determines success in an unequal cooperative task in capuchin monkeys', *American Journal of Primatology*, 68 (2006), 713–724.

[44] D. Graeber, 'Foreword', in M. Knapp, A. Flach and E. Ayboga, *Revolution in Rojava: Democratic Autonomy and Women's Liberation in Syrian Kurdistan* (London: Pluto Press, 2016), xiii.

of some scientific spirit or sense of wonder, but out of what the anarchist John Cowper Powys called 'an aristocratic desire to stamp their own theories upon the plastic clay of the universe'.[45]

The picture becomes more complicated when we acknowledge that in certain populations, typically termed Machiavellian individuals, Bereczkei et al. have found evidence for dedicated neural operations in particular social dilemmas which aid the exploitation of others.[46] Unlike 'low-Mach(iavellian)' individuals, high-Machs appear to have cognitive heuristics allowing them to predict future rewards in risky social situations. During financial negotiations with a partner, high-Machs relative to low-Machs not only come out with a higher reward but also display stronger activation in a number of regions responsible for monitoring cognitive conflicts and abstract reasoning, including reasoning about social situations, such as the bilateral middle frontal gyrus. This region is also implicated in executive control and the anticipation of beneficial decisions, and it is likely that Bereczkei's results reflect the opportunistic and exploitative nature of high-Machs.

These and other fMRI studies could potentially inform workplace management operations in that they very clearly reveal that high-Machs (who, as Joel Bakan notes, typically dominate managerial and senior positions) prosper when given greater decision power and fewer constraints than others.[47] Given that many business managers and executives have personalities which have been shown to border on the psychopathic, the need that these studies reveal for redistributive decision-making power and greater constraints on the use of company resources and finances seems fairly strong. Larry Young, summarising recent work, relatedly points to the deleterious effects of organisational hierarchies on the brain: 'Social subordination and social instability have been associated with an increased incidence of mental illness in humans'.[48] Along with the therapeutic benefits of this research, Young notes that 'it also calls on us to evaluate how we construct social hierarchies—whether in the workplace or school—and their impacts on human well-being'. Political activism is suitably becoming fuelled less by hierarchy and more by varieties of swarming. People teem in crowds, created and organised through networks, and few top-down procedures are required (or desired). As the above studies indicate, it is by now virtually undeniable that morality, cooperation, and empathy arise not from the passing down of religious and philosophical principles, but instead emerge in a bottom-up fashion from brain structure and function—leading to what Ferguson has called 'the deep biology of politics'.[49]

Certain other studies are highly relevant to this deep biology. For instance, Romeo et al. used MRI scans to reveal that the brains of children from lower socioeconomic backgrounds have less developed language regions than children from wealthier backgrounds (specifically, children from higher socioeconomic backgrounds exhibited greater cortical thickness in bilateral perisylvian and supramarginal regions), due to the range and variety of linguistic stimuli they are exposed to.[50] This was the first study to show a possible causal relation between wealth and

[45] J. C. Powys, *Weymouth Sands* (New York: Overlook Press, 1999/1934), 78.

[46] T. Bereczkei, A. Deak, P. Papp, G. Perlaki and G. Orsi, 'Neural correlates of Machiavellian strategies in a social dilemma task', *Brain and Cognition*, 82 (2013), 108–116.

[47] J. Bakan, *The Corporation: The Pathological Pursuit of Profit and Power* (London: Constable, 2005).

[48] Society for Neuroscience, Press release: New links between social status, brain activity, *Science Daily* (2013): www.sciencedaily.com/releases/2013/11/131113092546.htm.

[49] K. Ferguson, 'The deep biology of politics: a reminder', *Political Research Quarterly*, 67:2 (2014), 457–461.

[50] R. R. Romeo, J. A. Christodoulou, K. K. Halverson, J. Murtagh, A. B. Cyr, C. Schimmel, P. Chang, P. E. Hook and J. D. E. Gabrieli, 'Socioeconomic status and reading disability: neuroanatomy and plasticity in response to intervention', *Cerebral Cortex* (2017): https://doi.org/10.1093/cercor/bhx131.

neural composition, and, if attention was paid to this from outside academia, this may well have considerable impact on the shaping of educational and welfare policies.

Recent years have seen a move towards biologically grounded perspectives of cognition; keeping to high-level, abstract discussions of 'memory', 'theory and mind' and 'semantics' will not suffice, and so neither will concepts like 'reciprocal altruism' and 'competition'. We are left in a situation which is almost necessitated by the facts that: (1) A purely reductionist neuro-based approach is inadequate in dealing with complex social phenomena; (2) A purely cultural approach leads to a similar pitfall to the one found in shallow ultra-social perspectives, with no room for a causal relation between biological and political structures. Instead, it seems that a highly multidisciplinary perspective is required, leading to an extensive level of hybridity being filtered into scientific concepts of politics, cooperation, and morality. An example of this type of thinking can be found in Jara-Ettinger et al., a study which draws a strong connection between the development of a child's linguistic competence (specifically, counting skills) and their moral faculty of fairness.[51] Many other language-cognition and language-morality linking hypotheses have been drawn up over the past decade, and it is possible to think of many other potential avenues.

Neuroscientific technology has also recently been used to examine the mental processes of anarchists and political moderates. Anarchism is a particularly compelling ideology to study due to its proponents bearing fairly dissimilar ethnic prejudices and personal values amongst themselves, unlike the relative uniformity of moderates and communists, according to a study by Van Heil (though this is something of an over-generalisation).[52] In an event-related potential experiment by Dhont et al., anarchists exhibited stronger late positive potentials (LPP, an electrophysiological signature of change evaluation, occurring 400–900 ms post-stimulus) in response to a range of political words, ostensibly because their political attitudes are more emotionally charged than those of moderates.[53]

Political labels are a far cry from natural kinds, however, and it is questionable to what extent neuropolitical studies of 'left-wing' or 'right-wing' tendencies can be of any use. Zamboni et al. took similar considerations of complexity into account when conducting an fMRI study which went beyond the simple (and psychologically inflexible) left/right-wing spectrum, exploring the neural correlates of three independent political dimensions.[54] Their results suggested that individualism is substantially generated in the medial prefrontal cortex and the temporoparietal junction, conservatism in dorsolateral prefrontal cortex, and radicalism in the ventral striatum and posterior cingulate. A finer-grained political perspective in experimental designs, bypassing familiar ideologically loaded terms, will likely produce a more satisfactory understanding at the neural level, with 'conservative' and 'radical' being able to be unpacked much further.

In conclusion, one of the most potentially meaningful forms of rebellion a genuine neuropolitics can lead to is an objection to current humanistic orthodoxy, which approaches political

[51] J. Jara-Ettinger, E. Gibson, C. Kidd and S. Piantadosi, 'Native Amazonian children forego egalitarianism in merit-based tasks when they learn to count', *Developmental Science*, 19:6 (2016), 1104–1110.

[52] A. Van Hiel, 'A psycho-political profile of party activists and left-wing and right-wing extremists', *European Journal of Political Research*, 51:2 (2012), 166–203.

[53] K. Dhont, A. Van Hiel, S. Pattyn, E. Onraet and E. Severens, 'A step into the anarchist's mind: examining political attitudes and ideology through event-related brain potentials', *Social, Cognitive and Affective Neuroscience*, 7:3 (2012), 296–303. For the nature of ERPs, see E. Murphy, 'The brain dynamics of linguistic computation', *Frontiers in Psychology*, 6 (2015), 1515.

[54] G. Zamboni, M. Gozzi, F. Krueger, J.-R. Duhamel, A. Sirigu and J. Grafman, 'Individualism, conservatism, and radicalism as criteria for processing political beliefs: a parametric fMRI study', *Social Neuroscience*, 4:5 (2009), 367–383.

critique as if brain structure, function, development, and evolution play no part in the determination of socioeconomic hierarchies and relations. Questions of power, exploitation, and domination clearly play a vital role, but grounding a number of political concepts in a neurobiological base may also force us to conclude that several higher-order constructs are—as Auden said of love and matter—'much odder than we thought'.[55]

[55] W. H. Auden, 'Heavy Date', October 1939.

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