

JD Bernal: In the Nexus of Science, Politics and Philosophy

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During this pandemic, as scientists have become the new media celebrities, it is obvious that they play a vital role, but do not all do it in the same way. Our epidemiologists, virologists, immunologists and public health doctors are constantly filling the airwaves. Some stick close to the facts, outlining the current statistics and repeating the current public health advice, while others range more widely opening into psychology, sociology and political economy.

In Ireland, Anthony Holohan, chief medical officer, has kept his focus tight and will not be drawn easily into wider terrain, while Luke O'Neill has leveraged his prominence as an immunologist into media gigs as lead singer of his band the Metabollix. In the USA, Anthony Fauci has been a lightning rod as political storms raged around the scientific effort.

Everywhere in the world, the science-politics nexus has been a high stakes game played out on many levels in many ways. Both scientists and politicians have been called to stretch themselves in the direction of the other. Many have not been up to this task, while others rose to it superbly.

Of the many scientists and doctors coming to my attention during this period, I have been impressed by those heading the World Health Organization response to the pandemic, Tedros Adhanom Ghebreyesus and Michael Ryan, because of breadth of vision they bring to bear on it, astutely moving from the details of viral replication and vaccine effectivity to the global forces shaping inequality in health outcomes.

Throughout its whole history, science has been intermeshed with politics in myriad ways, whether scientists fully comprehended it or not.

In Britain in the 1930s, there was a flourishing movement of scientists who did comprehend it, exploring it as both intellectuals and activists. One of them, JBS Haldane declared "even if the professors leave politics alone, politics won't leave the professors alone."

A giant presence in this milieu was John Desmond Bernal. Bernal was born in Ireland in 1901, but he came a long way from Tipperary. He was based in Britain during his professional life, while striding the world as a scientist of international renown. He was nevertheless crucially shaped by his Irish roots, growing keenly aware of the gulf in standards of living between English landlords and Irish laborers and becoming sharply critical of class and colonial exploitation. He was staunchly republican and he supported the Easter rising in 1916, which he witnessed as a teenager.

After graduating from Cambridge University, he became Professor of Physics at Birkbeck College of University of London and a Fellow of the Royal Society. His intellectual interests ranged widely, doing pioneering work in x-ray crystallography as well as socio-historical studies of science, which he called the "science of science".

He was by all accounts a dazzling thinker and talker. His contemporaries called him "Sage", as he was considered to be uncommonly wise. He was a Marxist in philosophy and a communist in politics. He led a complicated life, sitting on hundreds of committees and playing a leading role in many scientific and political organizations. At the experimental level, he tended to generate seminal ideas, while leaving the details to others, mentoring a number of ground-breaking scientists,

including women, such as Dorothy Hodgkin and Rosalind Franklin. He also led a somewhat unconventional domestic life of a notoriously non-monogamous nature.

Although Bernal reached the heights of the academic establishment, he engaged in radical critique of its cherished assumptions and structures of power. Bernal was at the centre of a radical science movement that thrived in the 1930s.

A seminal event in this movement was the 1931 International Congress of the History of Science and Technology in the Science Museum in London. At this congress, contrasting world views were in collision. A large Soviet delegation had unexpectedly arrived and created a great stir in the British media. It was led by none other than Bolshevik leader Nikolai Bukharin. The paper delivered by physicist Boris Hessen on the socio-economic roots of Newton's *Principia* made the strongest impact, being a "trumpet blast" heralding an ideological analysis of science thought to be beyond ideology.

To the majority of scientists present, the Soviet viewpoint was seen as either a curiosity or an outrage. To a minority, those in whom it crystallised something that had already been stirring, it had a profound impact. It was an experience that gave the impetus to the development of a distinctive school of Marxist thought along with a wider movement for social responsibility in science.

Bernal was struck by the unity, the philosophical integrality, and social purpose of the Soviet delegation in contrast to the approach of British colleagues with their indisciplined array of ill-assorted individual philosophies and remoteness from any social considerations.

There was a discernable shift to the left among scientists, some of them also figures of international renown, such as JBS Haldane and Joseph Needham, who were enthusiastically pursuing a Marxist approach to the history and philosophy of science and highlighting the multi-faceted social relationships of science. The ideological and socio-political assumptions of past and present science were being ruthlessly laid bare. Around them emerged a vigorous movement for the defence of science against all forces threatening it and for social responsibility in science. The movement took many organizational forms, such as the Cambridge Scientists Anti-War group and the Association of Scientific Workers trade union.

There was also a polemical backlash from the right, finding its manifesto in John Baker's "Counterblast to Bernalism" and its organisational form in the Society for Freedom in Science, defending "pure science" and resisting any form of social control of science. Even the hostile reaction to the radical science movement testified to the power of its impact.

Bernal saw science as a social activity, integrally tied to the whole spectrum of other social activities, economic, political, cultural and philosophical. Bernal's book *The Social Function of Science* published in 1939 immediately became a classic in this field. Based on a detailed analysis of the contrast between science under capitalism and socialism, in particular the difference between British science and Soviet science, Bernal's dominant theme was that the frustration of science was an inescapable feature of the capitalist mode of production and that science could achieve its full potential only under a new socialist order.

The cause of science was, for Bernal, inextricably intertwined with the cause of socialism. He saw science as holding the key to the future and the forces of socialism alone as gathering to turn it.

For him, the scientific method encompassed the whole of life. Science was the starting point for Marxist philosophy, which was an extension of scientific method, extending it to a realm of greater

scope and significance, giving a comprehensive and ordered account of the whole range of phenomena, from nebulae to human society. There was no sharp distinction between the natural sciences and the social sciences for Bernal, seeing the scientific analysis of society as continuous with the scientific analysis of nature.

His vision of the sort of future that science could make possible was in total contrast to that of Aldous Huxley's *Brave New World*. An early work, *The World the Flesh and the Devil* (1929) set out a futuristic sketch of further evolution, showing how scientific rationality could overcome obstacles in the physical, physiological, and psychological domains. Full automation, nuclear energy, and cybernetics could bring a fuller realisation of human potential.

His knowledge of history was both detailed and sweeping, placing every particular within an epochal grand narrative. This was most fully expressed in his four-volume *Science in History* published in 1954.

Bernal's philosophy of science was in the tradition of Engels. The important thing about Engels's concept of nature was that he saw it as a whole and as a process. In Bernal's opinion, if Engels's philosophy of science had been more widely known in the scientific world, theories underlying relativity, quantum physics, biochemistry and genetics might have been discovered sooner and would be free from the idealistic confusions under which they were suffering.

For Bernal, dialectical materialism was the most powerful intellectual current of the time. It provided the basis not only for a revolutionary social movement, but also for the enhancement of science. It was a philosophy derived from science that brought order and perspective to science and illuminated the onward path of science. It was no substitute for science. The hard empirical work still had to be done. It was not a dogma imposed on the findings of science from without, but a method of co-ordinating the experimental results of science and of pointing the way to new experiments, a method that had been developed in and through the development of science itself. Its role was to clarify and to unify the different branches of science in relation to one another and to other human activities and to suggest directions of thought that were likely to yield further results in the future.

It was a science of the sciences. It was a means of overcoming overspecialisation and of achieving the unity of science. It placed science within the context of the whole of human and cosmic evolution. Bernal saw the unity of science as grounded in the unity of the universe itself. He affirmed the unity of the universe, not in a hollowly reductionist way, but in a way that recognised the intricacy and complexity of matter that had evolved in such a way that new qualities emerged at higher levels of organisation.

He was extremely critical of alternative philosophies of science, both of positivism and of many forms of anti-positivism. He was unsympathetic to tendencies to equate science with positivism, but even more so of tendencies that were so preoccupied with the critique of positivism as to undermine science. He thought of irrationalist and intuitionist currents as the backwaters and dead ends of human knowledge. He objected most to scientists who were bringing irrationality into the structure of science itself and making what science did not know, rather than what it did know, the basis for affirmations about the nature of the universe. These trends have multiplied since his time, especially with the postmodernist approaches to science studies.

The Marxist approach to science was seen by Bernal as still being in the process of being formulated. He saw what was started by Marx and Engels as being further developed in the Soviet Union in a lively and sometimes violent process. He was, on the whole, extraordinarily impressed by Soviet science and philosophy of science, at times more so than the situation warranted. When he had first

visited the Soviet Union in 1931, he was struck by the overriding sense of purpose there and found the country "grim but great." As time went on, he discovered things that must have disturbed him deeply, particularly things relating to the fate of scientific colleagues. He interceded with the Soviet ambassador in London in relation to the arrests of the physicists, but in public he did not criticise the Soviet Union. He knew of the clash between Vavilov and Lysenko, but did not seem to realize the gravity of what was taking place in this sphere, describing it as a difference in emphasis between hereditary and environmental factors without articulating how these intellectual debates had become caught up in a complicated and deadly struggle for power. Bernal himself was firmly committed to the science of genetics and was conducting experiments aimed at discerning the molecular structure of the gene.

He brought science to bear in war and then turned his energies to peace. During the war, he was a scientific adviser to allied operations, serving in Mountbatten's "department of wild talents". In the post-war period, he was active in the world peace movement.

The pressures of the cold war in general and the Lysenko controversy in particular led to a decline in the popularity and prestige of the radical science movement. Bernal went on the offensive against cold war ideology and was in the world peace movement, but equivocated on Lysenkoism.

Bernal suffered a series of disabling strokes before he died in London in 1971. Among his offspring is his son Martin Bernal, famous for the *Black Athena* controversy. He dedicated that book to his father "who taught me that things fit together, interestingly".

The many honors that came his way in life continued after death. There have been many citations and encyclopedia entries, several biographies, and a Bernal Institute at the University of Limerick. While it is good to see a Marxist so regarded by the academic world, it has sometimes involved an erasure or minimalization of his Marxism. The biography of Bernal on the website of the Bernal Institute at UL, confines any mention of his politics to world peace and makes no reference to anything so embarrassing as communism. It identifies his legacy as the development of crystallography as a central tool across the sciences.

A much-reviewed biography of Bernal by Andrew Brown, a well-researched and valuable work, is admiring of his science, intrigued by his sex life and condescending about his philosophy and politics. The reviewer in *Nature* took it further "Bernal became committed to Marxism. How a man with such a marvelous analytical mind could come to terms with dialectical materialism is still a subject of discussion — it seems to have been an act of faith, a substitute for Catholicism."

Bernal came to Marxism seriously and intelligently. He found in its philosophical framework a structure in which he could live, think, create, pursue science, act politically and develop further. It opened him radically to the world, rather than closing him down or constricting him, as critics imply. Science, philosophy and politics were all tightly bound together in his highly integrated mind. He took issue with those who believed that science could get along quite well without philosophy or politics and refused to see the unexamined philosophical and political assumptions masked by this stance.

In 1939, when a government minister was questioned about Bernal's role in advising the government in its war effort, he replied "Even if he is as red as the flames of hell, I want him." Today it is not despite the fact that he was "as red as the flames of hell" but because of it that we should still look to him today.

More important than the academic honors bestowed on him before and after his death is the need for today's left to integrate science into its perspective and practice in continuity with his vision.

His enduring legacy is his insistence that science was inextricably tied to philosophy and to politics, which did not undermine, but affirmed, the rationality and liberatory power of science.

Science today is better funded and more integrated into the structures of capitalism than in Bernal's time, but its priorities and potential are even more skewed by that relationship. The commercialization of science, as part of the overall commodification of knowledge, with the endorsement and inducement of the state, has produced scientists obsessed with patents, promotions, prizes and pay, increasingly distant from philosophical reflection or social commitment. The alliance of science and capital has patented genes and prioritized development of designer drugs for the syndromes of the rich over cures for the diseases of the poor.

Until recently, vaccine research was an area of significant underfunding and underdevelopment. Under pandemic pressure, there has been massive investment and activity in this area with dramatic results, highlighting all of the positive possibilities of science as well as the parasitic nature of capitalism. Despite the research receiving massive public funding, big pharma have acquired the patents and refuse to release them to enable production in parts of the world being left aside as the wealthier parts of the world scramble for the most and best of everything in vaccines and treatments as in all else.

Only the left, proceeding along paths forged by scientist-activists such as Bernal, can see clearly the relation of science to capitalism and why addressing this is more important than ever.