

Marxism, Science and Science Studies: From Marx and Engels to Covid19 and COP26

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Monthly Review
May 2022

The history of Marxism in relation to science is extraordinarily dense and dramatic. Although it is a fascinating and important story, it is an increasingly forgotten one.

From the beginning, Marxism took science extremely seriously, not only for its economic promise in building a socialist society, but for its revelatory power in understanding the world. Marxism has made the strongest claims of any intellectual tradition before or since about the socio-historical character of science, yet always affirmed its cognitive capacity.

Science was seen as inextricably enmeshed with economic systems, technological developments, political movements, philosophical theories, cultural trends, ethical norms, ideological positions, indeed with all that was human. It was also a path of access to the natural world. There were studies, texts, theories, tensions, debates exploring the complexities of how this was so.¹ The objectivist/constructivist dichotomy could never capture its epistemological dynamic. Nor could the internalist/externalist dualism ever do justice to the interacting field of forces harnessed in its historiographical process.

Marx and Engels were acutely attuned to the science of their times and integrated this awareness at the core of their thought process in developing the intellectual tradition and political movement that came to be called Marxism. I would prefer that this complex theoretical and political history not be named after one man, but so it came to be.

There have been controversies about the Marx-Engels relationship, with a tendency to counterpose a humanist Marx to a positivist Engels, especially to dissociate Marx from Engels' posthumous work *Dialectics of Nature*. The dialectics of nature debate resurfaces periodically, including recently, and there is a stronger tendency to vindicate Engels now than when I entered the fray decades ago.² What is at stake is the development of a comprehensive world view embracing both human society and the natural world with a strong emphasis on cutting edge science.

The subsequent generation of Marxists, during the period of the 2nd International, also paid such acute attention to the onward development of science and there were debates among themselves and others about its implications and consequences, especially in response to trends such as positivism, Machism, neo-Kantianism.

After the October revolution, there was an intensification of this activity. Science was a necessity in building a new social order. Scientific theory was thought to be, not only a matter of truth and error, but of life and death. There were many debates, some between those more grounded in the empirical sciences and those who stressed the continuity of Marxism with the history of philosophy.

Intertwined with all the intellectual debates of the day was an intense struggle for power. There was tension between a more cosmopolitan Marxist intelligentsia, who had found their way to Marxism in difficult and dangerous conditions, exposed to an array of intellectual influences, accustomed to mixing with intellectuals of many points of view and arguing the case for Marxism in such milieux. Increasingly they were coming under pressure from those who had come up under the revolution, never been abroad, knew no foreign languages, had little detailed knowledge of either the natural sciences or the history of philosophy, never mixed with exponents of other intellectual traditions. Some were more inclined to cite the authority of classic texts or party decrees than to engage in theoretical debate. They were being fast-tracked in their careers and taking over as professors, directors of institutes and members of editorial boards, occupying positions of authority over intellectuals of international reputation. There was high drama and there was soon to be blood on the floor.

It was the more cosmopolitan intelligentsia that came to London in 1931 for what is perhaps the most memorialized conference ever. The 2nd International History of Science Congress spilled over into the mass media with the arrival of a Soviet delegation led by NI Bukharin and including BM Hessen, NI Vavilov and others renowned in the history of science. They were struggling for their version of Marxism against one set of pressures at home and quite another abroad. They navigated these turbulent waters impressively. Nevertheless, tragedy engulfed them. Bukharin, Hessen and Vavilov perished in the purges.

The paper from this congress that had greatest impact then and since was Boris Hessen's "The Social and Economic Roots of Newton's *Principia*", often cited as a classical manifesto of the externalist position in the historiography of science. Hessen examined the roots of Newton's thought within the social, political and economic forces of his time, seeing Newton as a son of 17th century mercantile capitalism and the class compromise of 1688 in the way he combined mechanistic causation with theological speculation in his pattern of scientific explanation. Within the Soviet Union, Hessen was defending relativity theory and quantum mechanics against a position which argued that the new physics was rooted in bourgeois idealism. Although he emphasised socio-economic roots in London and cognitive credibility in Moscow, most provocatively in both contexts, against conflicting pressures, his position was a consistent one, demonstrating a dialectical synthesis of internal and external factors, of empirical evidence, logical argument and socio-economic context. Hessen was not an externalist.³

Bukharin was a major figure in both the political and philosophical development of Marxism. Although a possible successor to Lenin, he had fallen from the pinnacle of power, he was still a prominent player in many sectors of Soviet life, from the arts and sciences to economic planning. In the pressure to 'bolshevize' every social institution and academic discipline, to shut down debate and to arrive at an correct Marxist line on every question, Bukharin stood up to brash bolshevizers, who were attempting to override the process of scientific discovery, and sided with geneticists, such as Vavilov, against Lysenko. In London, he set out to convey the intellectual vitality of Marxism to a sceptical audience, placing Marxism within the context of all contemporary currents in philosophy. He continued refining his philosophical position throughout the decade. Even in his prison cell, preparing to leave life, he wrote a major tract on philosophy, showing a most impressive grasp of the history of philosophy as well as philosophical problems within science.⁴

The 1931 congress brought forces already in motion into a new level of interaction with each other. At the congress, contrasting world views were in collision. Those most touched by this confrontation were those who stood in between, the left scientists in Britain who shared the vision of the visitors from afar. The ideas of JD Bernal, JBS Haldane and other leading scientists who became Marxists took hold among many of their contemporaries and gave rise to a dynamic radical science movement in the 1930s.⁵

This encounter between British and Soviet Marxists radiated outward and touched many who did not attend the congress. The book *Science at the Crossroads* was translated into many languages and found its way into many parts of the world for decades. It was read by Antonio Gramsci in his prison cell and by Christopher Caudwell, as he raced through every field of human knowledge reconceptualizing all from a Marxist point of view. From this came amazing tracts on biology and physics as well as history, philosophy, psychology, culture and much more, all left unfinished when he struck down in the Spanish civil war.

Caudwell showed how scientific discoveries reflected fresh contact with the natural world through empirical experiment but received their form and pressure from the social relations of the age. He argued that the problems of physics could not be solved within physics alone and looked to the metaphysics of physics as rent by the same dualisms as inflicted every other aspect of bourgeois consciousness. He saw knowledge as advancing at an empirical level, but generating confusion and chaos, as bourgeois culture was unable to assimilate the forces it unleashed and the results it achieved, because of the lack of an integrated world view that would explain all within a unified framework.⁶ Bernal too saw Marxism as providing such an integrated framework. It was a philosophy derived from science that brought order and perspective to science and illuminated the onward path of science. It provided a method of co-ordinating the experimental results of science and unifying the different branches of science in deep socio-historical perspective. He called for a science of science - what later came to be called science studies.⁷

Marxists of this period not only elaborated this position, but also entered into polemics with others holding contrary views. In philosophy of science, arguments against Jeans and Eddington, who were seen as importing irrationalism into science itself, were particularly prominent. It is not hard to know what they would make of the postmodernist anti-science science studies that came later.

After 1945, the influence of Marxism spread ever wider. In Eastern Europe, Marxism became the dominant force in the universities, research institutes, academic journals of new socialist states. It spread to Asia, Latin America, Africa in liberation movements, some of which became parties of power. Marxism was sometimes a matter of deepest conviction, but sometimes not. Being an orthodoxy in a one-party state was not a recipe for healthy development of an intellectual tradition.

Nevertheless, there was serious work done in developing a distinctive approach to science, particularly in exploring the philosophical implications of the natural sciences. This was the case in the academies of Eastern Europe, particularly in the DDR, in the intellectual life of communist parties, in journals such as *Science and Society*, *La Pensée*, *Modern Quarterly* and *Monthly Review*. It was very different from the narrowly methodological approach being pursued in philosophy of science elsewhere. It was work of profound significance that was too little known outside these milieux.

Marxism combined attention to the advancing results of the empirical sciences, development of a philosophical framework capable of integrating expanding knowledge and awareness of the socio-historical context of it all.

The 1960s and 1970s put Marxism on the agenda in a new way in the rest of the world where capitalism held sway. New left ferment pervaded North America and Western Europe especially. This was a time when all that had been assumed was opened to question, when the universities and the streets became contested terrain. Academic disciplines were scrutinized at their very foundations. Philosophy, sociology, literature, science - all knowledge - was seen as tied to power. University campuses and academic conferences were alive with passion and polemic. Journals such as *Radical Philosophy*, *Insurgent Sociologist*, *Science for the People*, *Radical Science Journal*, *Science as Culture* gave expression to this ferment. Many of my generation threw ourselves wholeheartedly into this searching, this striving. We burnt many boats and set ourselves swimming in strange seas. Never in my youth as a little catholic cold warrior did I imagine myself crossing to the other side of the "iron curtain" and becoming a communist. Even when I first moved to the left, I didn't see myself as heading that way.

There was residual anti-communism as well as generational rebellion in the US new left's attitude to the old left. There was also a naiveté about power, obliviousness of economics and suspicion of science. I shared these attitudes at first. I changed when I moved from America to Europe, where the gap between new left and old left was not so wide. My involvement in the political culture of Europe was transforming and I took a new look at the previous generation of the left. Although many were still alive, those who touched me most deeply were dead. Nevertheless they came to life again in my imagination, as I read their texts and grilled their contemporaries about their lives. Bernal and Caudwell especially were my mentors. Perhaps it had something to do with the sensibility of catholics who become communists.

I was interested in Marxism as a comprehensive world view. I was intrigued by the ways in which intellectual movements were rooted in socio-historical forces. I saw the whole history of philosophy that I had been studying in a new way. I saw everything in a new way, a way in which everything was interconnected: philosophy, culture, politics, economics, science. I decided to focus on science within this network of relationships. Researching my book *Marxism and the Philosophy of Science: A Critical History* was an absorbing adventure, especially during my intervals in Eastern Europe. I felt like a detective uncovering an intricate series of intersecting stories. I tried to write a Marxist history of Marxism and science, despite the enormous and opposite pressures on me as I strove to do so, pressures from east and west, from left and right, from old and new left, from commitment and career.

Sometimes, to my surprise, I felt more of an affinity with the previous generation than my own. I could not understand why my contemporaries, especially among British Marxists turned their backs on the earlier generation of British Marxists and went flocking to Althusser or Foucault. *New Left Review* veered between obliviousness and hostility to the previous generation of British Marxists. *Marxism Today* moved ever further from Marxism, no matter how far the term was stretched.

Radical Science Journal did engage with the earlier generation, however critically. Gary Werskey's book *The Visible College* was perhaps the most substantial work mediating between these generations on the question of science. Robert Young's "Science is social relations" was the most explicit and provocative exposition of a new left position on science. Reacting strongly against the view that science itself is neutral and that only the use or abuse of science is ideological, Young and *RSJ* held that science as such is ideological. We never encounter nature unmediated, the argument went, and so what we call nature is socially negotiated and socially constructed, a product of interactions among contending interests. From the premise that modern science, with its characteristic concepts of truth and rationality, and modern capitalism, with its alienating division of labour, arose upon a single edifice, came the conclusion that both would have to be totally dismantled. So, for Young, science = capitalist science; epistemology was a bourgeois pursuit; philosophy of science is a dead end. It was hard to see a way forward for science. It was a far cry from the affirmation of science characterising previous generations of the left.⁸

Meanwhile, some of us carried on in the tradition of older generations of the left, most outstandingly Richard Levins and Richard Lewontin, who brought it to bear on the advancing science of our times, always clear that "the truth is the whole", especially in polemics against trends that got lost in the parts.⁹

Through the 1970s, I found what was going on within the intellectual culture of the left to be much more absorbing than anything at Trinity College Dublin, where I was based at the time. Every summer I went over to the Communist University of London. There were alternative approaches to every academic discipline and the most lively debates imaginable. I veered to the courses on philosophy, history, science, Soviet studies, gender studies, but regretted that I couldn't attend the ones on psychology, anthropology, literature, etc.

Living as if in some parallel universe much of the time, parts of academe proceeded as if the only story in philosophy of science was the one proceeding from the Vienna Circle through Popper, Lakatos, Kuhn. Philosophy of science in philosophy departments rarely took a sideward glance at this other tradition. I found adjusting to the philosophy department of TCD strange every time I returned from Moscow or Berlin or Dubrovnik or even London.

Meanwhile, Soviet delegations were no longer a surprise at international conferences. They were integrated into the organizing structures and gave papers in many sessions. However, how much of a meeting of minds occurred was another matter. The World Congress of Philosophy was to be held in Düsseldorf in August 1978. I spent much of that year in Eastern Europe, mostly in Moscow. The philosophers there were constantly talking about it. In fact, they were preparing for it as if for Warsaw Pact manoeuvres. They kept asking me what Irish and British philosophers were planning. They weren't planning anything in the sense that they meant. They were coming or not coming as individuals and thinking only about their own papers and travel arrangements.

At the congress itself, philosophers from the socialist countries and philosophers from the rest of the world mostly read papers past each other (as most academics at most congresses do). There were, however, several skirmishes and a cold war atmosphere. I felt myself to be in a similar situation to that of British Marxists at the 1931 congress. I moved between both sides in a way that very few did. I found this quite stimulating and entered into all of the polemical possibilities the situation offered.

It was similar at other conferences in those years, for example, the International Congress of Logic, Methodology and Philosophy of Science in Hannover 1979 and the International History of Science Congress in Bucharest 1981. At the latter I was often in the company of British historians of science. I felt that my arguments that Marxism plus science did not necessarily equal Lysenko constantly being undermined by the locus and events of the congress. Elena Ceausescu was presented to a plenary session as a great scientist and many sessions featured Romanians arguing that Romanians were responsible for many discoveries in the history of science and technology attributed to others, including Einstein. There were others who were negotiating these tensions. Joseph Needham, present at the 1931 congress and prominent in the movement of left scientists in the 1930s, was there still mediating between east and west 50 years later.

There were other enclaves where there was sustained cross-fertilization, such as the Boston Colloquium in Philosophy of Science, issuing in many volumes of *Boston Studies in the Philosophy of Science*, edited by Robert Cohen and Marx Wartofsky. The Inter-University Centre in Dubrovnik, was a pioneering and important base for interaction between east and west, between Marxists and non-Marxists. I have happy memories of stimulating encounters in these milieux. The philosophy of science conference in Dubrovnik was preoccupied with the defense of scientific realism against various forms of social constructivism, particularly the Edinburgh School and Paris School. Arguing against positions of Barnes, Bloor and Latour were philosophers from a critical Marxist position such as Marx Wartofsky, Srdan Lelas and Wladislaw Krajewski alongside those from other philosophical traditions such as William Newton-Smith, Rom Harre and Ernan McMullin. The dialogue was free, friendly, funny, purposeful.¹⁰

This was a particularly difficult time for me as a precariously employed intellectual. I often felt angry and bitter, near to despair at times, but I kept working. I lectured in many venues, from ivy league universities to local employment centers, became a talking head on radio and television, diversified into cultural studies. When it came to a secure position, I was always passed over for someone safer, even if less qualified. However, long after I thought it would never happen, I did finally get a tenured academic position in the 1990s.

Marxism may have not have been an asset to me in career advancement, but it developed in me a way to think to get me through the trials and tribulations that it brought upon me. I had intellectual clarity and moral purpose and that was a lot. I had ways to steel and to console myself. I thought: who were the prestigious professors of philosophy when Marx and Engels were writing their classic texts while living difficult exiled marginalized lives, when Caudwell and Guest were bleeding on battlefields with all their brilliance and passion draining into the earth of Spain, when Bukharin was writing in his bleak cell, arguing the case for Marxism to posterity right up to the moment when he was taken out to be shot? So many times I had sung 'through dungeons dark and gallows grim', but I was not imprisoned, I was not executed. I could live with unemployment, semi-employment, marginalization, condescension, injustice. I could endure the loneliness of the long distance Marxist.

In Eastern Europe, within a few years, there was much happening. Everything opened up only to close down again. In 1990. it seemed that the world turned upside down. The USSR, GDR, Czechoslovakia and Yugoslavia disappeared from the map of the world. I often wondered how many of the intellectuals I met in Eastern Europe would be Marxists if there was a regime change. I found out. I had several confrontations in the 1990s with those who had made their careers professing Marxism and then made their careers by denouncing it. Academic life all over the world is full of such people. They do what is necessary to advance themselves and they are rewarded, then and now, but they will never produce anything of real value.

In 1996, I was sent to a university in Slovakia, as part of the European Union's TEMPUS program, which sent western academics into eastern universities to show them how "proper" universities were run, a blatantly colonizing project. I was asked to give a guest lecture on a topic of my choice. I said: Marxism. They were surprised, then disconcerted. Nevertheless, they organized it. The room was packed. Marxism had the frisson of forbidden fruit again. I said that the situation was ridiculous. Marxism was *the* philosophy for decades and then it disappeared from

the curriculum, as if it had never happened. It was orthodoxy one day and apostasy the next. It was not healthy. Marxism, I argued, was a major intellectual tradition in the history of the world and things would never be healthy until it found its place vis a vis all contenders in the overall scheme of things. People came whispering to me in the following days, saying that they agreed.

I have returned over the years to Eastern Europe to see where have all the Marxists gone. I have been most impressed when visiting the vanquished, the Marxist intelligentsia who were still Marxists, especially those involved in philosophy of science, who once occupied the apex of academe and subsequently led quite marginalized lives. However, there has been much dishonesty and denial. It has extended even to the dead. I have been profoundly distressed to read obituaries of those I knew as Marxists where this was never mentioned. When I asked questions about Marxism, it was sometimes as if I were probing sexual liaisons or spy scandals. Nevertheless, while the topic still generates a considerable unease among many, what I have found most striking is the surprise of younger intellectuals at hearing someone make a case for Marxism in this area and their openness to considering it.

Loren Graham of MIT and Harvard, who has spent his whole professional life studying Soviet and post-Soviet science and philosophy of science, has testified to the lasting impact of dialectical materialism on Russian scientists, even after the demise of the Soviet state. Moreover, he observed: "This philosophy of science is actually quite a sensible one and corresponds to the implicit views of many working scientists all over the world."¹¹

So what does Marxism have to offer to science and science studies now? Science and STS seem to be flourishing in the sense that there is a lot happening. There is much funding, many metrics, all sorts of empirical studies. Much of this is interesting and valuable, although a lot of it is bland and bitty. Many studies are short and shallow and driven by market demand and fast-track careerism more than intellectual quest. There is not much in the way of thinking that is simultaneously empirically grounded, philosophically integrated, socio-historically contextualized. This is what Marxism could bring to bear. Instead it goes from one extreme to the other: from the minutiae of molecules to the tao of physics. It is either science stripped of philosophical or historical reflection or it is new age nonsense stepping into the philosophical gap and filling the bookshop shelves. Both are commercially successful. Contradiction sells.

The intensification of the commercialization of science, as part of the general commodification of knowledge, is the strongest force in the field today. A new orthodoxy has taken command, not so much by winning arguments, but by wielding systemic power on a global scale. Philosophy is not thriving in this arena. Nor is theory in any discipline. Universities are being harnessed to operate by market norms and survival of the fittest in commercial competition is outstripping all other forms of validation, particularly truth criteria, theoretical depth and breadth, moral responsibility, political engagement. There are powerful pressures disincentivizing, eroding, marginalizing critical thinking, creative thinking, systemic thinking, especially systemic thinking.

Universities are contested terrain. The atmosphere has changed drastically from what prevailed in the 1960s and 1970s. Then there were large scale contending paradigms in every area facing off with each other with great energy and passion. It has dissipated now. It is disconcerting, because it is not as if anything has been solved. It is that people have learned to live with problems unresolved or unacknowledged or to settle for resolution at a less than fundamental level. The confrontations of world views have given way to low level eclecticism. There is a narrowing of perspective and a retreat from engagement, whether through myopia, ignorance, shallowness, conformity, fear or careerism.

So much of what I read or review in so many areas is so half-baked. Conceptualization is weak and confused. Contextualization is thin and random. Marxism has nurtured in me a demand for conceptualization that is strong and lucid, for contextualization that is thick and systemic. Many social studies of science, including some associated with the strong program, are still too weak in conceptualization and contextualization.

There have been periodic rediscoveries of the socio-historical context of science as if Marxism had never happened - from Kuhn to Edinburgh School to Latour. This is not to deny the significant contribution of the Edinburgh School, offering an impressive output of empirical studies of intriguing episodes in the history of science connecting social structures to cosmologies, relating class interests to positions taken in scientific controversies. They have argued against seeing what is considered to be true and rational in the history of science as unproblematic and as needing no sociological explanation and against seeing social factors as necessarily involving distortions or corruptions of science. They have taken issue with the older view of knowledge as individualist, passive and contemplative in favor of a view of knowledge as social, active and contextual. Knowledge is conceived as a product, not of passively perceiving individuals, but of interacting social groups. Scientific theories are not individually revealed but socially constructed. This much is in common with Marxism.

However, unlike Marxism, they see scientific knowledge as totally contingent, leaving us with no overall patterns, no necessary connections linking knowledge either to the social order or to the natural world, no concept of scientific progress, no criteria of differential assessment. For them, social groups simply choose theories as resources to suit their purposes and there is no way in which such theories can be ranked in terms of their

proximity to reality or their rationality. They constantly shift ground, veering from the most arbitrary voluntarism to the most mechanistic determinism, setting down a hard interest-constitutive model of knowledge and then pleading for disinterested research, arguing against giving science a special status vis-à-vis other forms of culture and against criteria of demarcation and then giving the highest honorific status to science. It is too random, too contradictory and too loose to take us any further towards a deeper insight into the relationship between the cognitive and social aspects of science.¹²

The science wars of the 1990s took up the threads of this tension. I found myself on both sides, yet wholly on neither. I agreed with those who wanted to defend the cognitive capacity of science against epistemological anti-realism, irrationalism, mysticism, conventionalism, especially against anything-goes postmodernism. I also agreed with those who insisted on a strong socio-historical account of science against a reassertion of scientism. A better grounding in what the Marxist tradition has brought to bear on these issues would have illuminated the terrain. I do not believe that the debunking of science in terms of its cognitive capacity is an appropriate activity for the left. It is neither epistemologically sound nor politically progressive. The left should take its stand with science, a critically reconstructed, socially responsible science, but with the possibilities of science.¹³

Science and science studies have tended increasingly to back away from the big ideas that were once in play. They have become too small, too introverted, too obsessed with mini-debates of micro-tendencies with only weak evidence of relevant intellectual history and thin social context.¹⁴

As to philosophy, although it is central to the human condition, many professional philosophers have reduced it to technicist esoterica or obfuscating nonsense. They have alienated many who have come to it seeking meaning, putting any defense of its declining status on dubious grounds. Some texts in philosophy of science seem to me to be equivalent to obsession with a game of chess while the house is burning down around it.

Marxism is still an alternative. It is still superior to anything on the scene. It is a way of seeing the world in terms of a complex pattern of interconnecting processes where others see only disconnected and static particulars. It is a way of revealing how economic structures, political institutions, legal codes, moral norms, cultural trends, scientific theories, philosophical perspectives, even common sense, are all products of a pattern of historical development shaped by a mode of production.

Marxism as a philosophy of science is materialist in the sense of explaining the natural world in terms of natural forces and not supernatural powers. It is dialectical in the sense of being evolutionary, processive, developmental. It is radically contextual and relational in the sense of seeing everything that exists within the web of forces in which it is embedded. It is empiricist without being positivist or reductionist. It is rationalist without being idealist. It is coherent and comprehensive while being empirically grounded.

It needs constantly to be revised in light of the most advanced science, the most up-to-date knowledge, of its time. In philosophy of science this means reflecting substantively on the philosophical implications of the empirical sciences and doing so in a thick socio-historical context. In philosophy generally it means looking to other disciplines and to inter-disciplinary inquiries and participating in debates at the theoretical foundations of growing knowledge. It means scrutinizing contemporary shifts in the very production of knowledge.

Marxism has been a major position in the history of philosophy. It has been a formative force in science studies and other disciplines, and it is a continuing influence. It is not as influential as it deserves to be on the current intellectual landscape, but it is still more influential than many might think. It is there in ways that are not always acknowledged. It is sometimes the philosophy "that dare not speak its name". Moreover, many of its premises have come to be so accepted that it seems no longer necessary or opportune or even known from where they have come.

Marxism lives on, but in circuitous and complex ways, sometimes in strong, brilliant, defiant ways, sometimes in subtle yet influential ways, but sometimes too in weak, confused and debased ways. It is often Marxism lite as an element of intellectual history lite to be raided for random insights for theory lite. Some are quasi-Marxists or post-Marxists. They have become discouraged by defeat or decentered by postmodernism. It was one thing when the wind was at their back, but they have been swept off their feet by crosswinds they could not withstand. There are ebbs and flows and new waves of realization all the time.

The current push for decolonization of knowledge is important. I cheered as Rhodes fell at University of Cape Town in 2015. I cringed every time I passed it on campus prior to that. However, I have watched as a lot of this progressive impulse has become unmoored for failure to see what has been achieved by previous generations as well as a failure to see that the central force colonizing knowledge is capital. I am already seeing a lot of it co-opted into the bland and blind liberal agenda of diversity and inclusion.¹⁵

There is evidence of a revival of interest in Marxism in relation to science now. Over the years since I entered this field, my invitations to speak about it rise and fall. The reasons why I and other Marxists are sought out now have to do with our current planetary emergency, particularly the looming climate catastrophe and the persisting covid-

19 pandemic. Science has become urgent. Premodern or postmodern anti-science is a blind alley. Positivist scientism has some limited potency, but is too narrow, too myopic to grasp the full picture.

I have not seen much of the postmodernist critique of science lately. Because science has become so salient, so immediate, so crucial to our collective fate, I don't think anyone wants to hear that we have no criteria for deciding between contending truth claims or that science is inherently deceptive or oppressive. Yet science under capitalism has never been so problematic. Only systemic analysis can address that and only action flowing from that deal with the issues that raises.

The statistics on carbon emissions or biodiversity loss only get us so far unless we name the system that created the problem, fuels the process onward and blocks possible solutions. There is so much being written about ecological crisis, but it is Marxists, such as John Bellamy Foster, Ian Angus and Andreas Malm, who connect the science to philosophy, sociology and political economy, who bring the whole picture into clear focus and point the way beyond it.¹⁶

It is the same with the current pandemic. The statistics on covid cases, hospitalizations, deaths, vaccinations and mitigation measures only get us so far unless we see what conditions have created this pandemic and persist to create future and fiercer pandemics. It is Marxists, such as Mike Davis and Rob Wallace, who predicted that such a pandemic was coming and showed when it came how it was bound up with the circuitry of capital. Whatever may have happened in the Wu Han lab or the Wu Han market, the real source is in deforestation, destruction of habitats, wildlife trafficking, the whole industrialized system of food production and the global circuitry of capital. Marxists and others have highlighted the downgrading of public health systems and the negative effect on patents and the stranglehold of big pharma in obstructing just distribution of vaccines and therapeutic medicines.¹⁷

We need a more open, co-operative, international science to deal with these problems. There have been moves in this direction in response to current crises, but the obstructions are still formidable.

Marxists have been to the fore in doing the systemic thinking demanded by these crisis, not only in clarifying the causes, but pointing to the solutions, solutions difficult to achieve, because the imperatives generated by ecological and epidemiological crises go contrary to the very logic of capitalism. I think this is being realized by more and more people, the sort of people who gathered outside the barriers of COP26 or those who couldn't travel but followed news reports with dismay.

So where are we now? It is a paradox: never has there been such a totalizing systematizing force as contemporary global capitalism and yet never has there been such inhibition of synthesizing systemic thinking. The centralizing market decenters the psyche. It organizes production and consumption, but disorganizes community. Nevertheless, there is a seeking of truth, a striving for justice, that the system can neither satisfy nor suppress. In this I place my hope in a revival of the kind of totalizing thinking and collective acting that Marxism has nurtured through the decades.

So, in conclusion, the history of Marxism and its relation to science is tied inextricably to the history of everything else. It has been so far a riveting drama, full of revelation, catharsis, tragedy and farce. I am ready for the next act. It is still the unsurpassed philosophy of our time.

¹ The story here is necessarily somewhat sketchy, sweeping through decades and dealing with many thinkers, theories and debates. For the fuller story, see my more comprehensive account in Helena Sheehan *Marxism and the Philosophy of Science: A Critical History* (Atlantic Highlands, NJ: Humanities Press, 1985, 1993; London: Verso Books, 2018).

² For a good account of the whole history of this debate, see Kaan Kangal, *Friedrich Engels and the Dialectics of Nature* (London: Palgrave Macmillan, 2020).

³ The Soviet papers from this congress were published as NI Bukharin et al *Science at the Crossroads* (London: Kniga 1931, Frank Cass, 1971).

⁴ Nikolai Bukharin *Philosophical Arabesques* (New York: Monthly Review Press, 2005).

⁵ For more on this congress and its aftermath, see Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s* (London: Allen Lane, 1978); Christopher Chilvers, "Five Tourniquets and a Ship's Bell: The Special Session at the 1931 Congress," *Centaurus* 57, no. 2 (2015): 61-95; Sheehan, *Marxism and the Philosophy of Science*.

⁶ Christopher Caudwell *Studies and Further Studies in a Dying Culture* (New York: Monthly Review Press, 1971), Christopher Caudwell *Heredity and Development* (London: Routledge & Kegan Paul, 1986), *The Crisis in Physics* (London: Verso Books, 2018).

⁷ JD Bernal *Aspects of Dialectical Materialism* (London, Watts & Co, 1934); Helena Sheehan “JD Bernal: philosophy, politics and the science of science” *Journal of Physics: Conference Series* 57, 29-39, IOP Publishing, 2007/2/2.

⁸ Gary Werskey, *The Visible College*; Robert Young, “Science is Social Relations,” *Radical Science Journal* 5 (1977): 65-129.

⁹ Richard Levins and Richard Lewontin *The Dialectical Biologist* (Cambridge: Harvard University Press, 1987).

¹⁰ For a more elaborate account of these conferences and other events and movements of these years, see Helena Sheehan *Navigating the Zeitgeist* (New York: Monthly Review Press, 2019).

¹¹ Loren Graham *What Have We Learned About Science and Technology from the Russian Experience?* (Stanford University Press, 1998).

¹² Barry Barnes *Scientific Knowledge and Sociological Theory* (London, Routledge & Kegan Paul, 1974), Barry Barnes *Interests and the Growth of Knowledge* (London, Routledge & Kegan Paul, 1977); David Bloor *Knowledge and Social Imagery* (London, Routledge & Kegan Paul, 1976).

¹³ The catalytic events were the publication of Gross and Levitt *Higher Superstition* in 1994, the infamous Sokal hoax in 1996 and the flurry of publicity surrounding it, the science wars special issue of *Social Text* with the Sokal article in it and the book without it, the New York Academy of Science conference published as *The Flight from Science and Reason*. For an overview, see Ullica Segerstrale, ed, *Beyond the Science Wars: The Missing Discourse about Science and Society* (Albany: State University of New York Press, 2000) and Helena Sheehan, “The Drama of the Science Wars: What Is the Plot?” *Public Understanding of Science* 10, no. 2 (2001).

¹⁴ For example, see Mario Biagioli (ed) *The Science Studies Reader* (New York, Routledge, 1999).

¹⁵ Helena Sheehan “Class, race, gender and the production of knowledge: Considerations on the decolonisation of knowledge” *Transform* 7, 13-30, 2020.

¹⁶ John Bellamy Foster, *Marx and Ecology* (New York: Monthly Review Press, 2000); John Bellamy Foster, *The Return of Nature* (New York: Monthly Review, 2020); Ian Angus, *A Redder Shade of Green: Intersections of Science and Socialism* (New York: Monthly Review Press, 2017); Andreas Malm, *The Progress of This Storm: Nature and Society in a Warming World* (New York: Verso Books, 2017); Andreas Malm, *Corona, Climate, Chronic Emergency: War Communism in the Twenty-First Century* (New York: Verso Books, 2020).

¹⁷ Mike Davis, *The Monster Enters: COVID 19, Avian Flu, and the Plagues of Capitalism* (New York: Verso Books, 2020); Rob Wallace, *Big Farms Make Big Flu* (New York: Monthly Review Press, 2016); Rob Wallace, *Dead Epidemiologists: On the Origins of Covid-19* (New York: Monthly Review Press, 2016).