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Introduction: Marxism and Systems Science

Sascha Freyberg

Dialectics and Complexity

Marxist thought and practice have always been oriented toward the analysis and transformation of systems – from social communities to technological infrastructures. The primary Marxist tool for addressing historical and structural complexity has been dialectics, or 'dialectical logic' (Ilyenkov 1977), with one of its central tensions lying in the relationship between the development of historical and natural structures. Any approach that claims such broad explanatory reach will inevitably attract critical scrutiny, but such engagement should not be avoided.

Systems science and systems theories have similarly aspired to a unified framework capable of grasping natural, social, and technological processes within a single conceptual architecture. This shared ambition might suggest a kind of affinity between Marxist thought and systems-theoretical approaches – yet the actual relationship has been anything but straight-forward. From Lenin's polemic against Bogdanov to the Soviet rejection and later embrace of cybernetics (Gerovich 2002), from structuralist debates in Western Marxism to the algorithmic governance of platform capitalism today, the encounter between dialectical and systems thinking has been marked by productive tensions, outright hostilities, and renewed controversies. This special issue takes up that relationship at a moment when the convergences and contradictions between these traditions have become particularly urgent.

The tension between 'dialectical' and 'systemic' thought, however, is not merely a matter of external theoretical encounters. It runs through the heart of Marx's own work, manifesting in what might be called the fundamental problem of relating part to whole, individual to totality, concrete social relations to systemic formations. On the theoretical level the issue can be framed as one of unity in diversity: how can we establish a many-sided, perspectival but integrated view? The early Marx,

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• *Correspondence: Sascha Freyberg,* Hamburg University.
• e-mail: sascha.freyberg@uni-hamburg.de
• ORCID: 0000-0002-7108-9976
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following Feuerbach's transformative critique of Hegelian abstraction, placed the direct social relation between humans—'man to man'—at the center of his theoretical project. Human 'essence', Marx argued in the *Economic and Philosophical Manuscripts* and especially in the *Theses on Feuerbach*, is 'the ensemble of social relations,' graspable through the concrete interactions and productive activities of actual human beings. This emphasis on living, sensuous human activity seemed to ground theory in the immediacy of human social practice.

Yet in *Capital*, Marx presents what appears to be a radically different theoretical architecture: a systematic analysis of capitalism as an objective structure of social relations that operates according to its own immanent logic, seemingly independent of the intentions and consciousness of the individuals who participate in it. Here the commodity form, value relations, and capital accumulation appear as systematic determinations that dominate human activity rather than as transparent expressions of it. Louis Althusser famously theorized this apparent discontinuity as an 'epistemological break' between the anthropological, humanist Marx of the early writings and the scientific, structuralist Marx of *Capital*—a split that seemed to privilege systemic analysis over human praxis, objective structures over subjective agency. Whatever the philological worth of the thesis, from today's perspective this approach clearly contributed to the ideologies of 'posthumanism', void of any emancipatory agency.

If Marxism—in its socialist contexts but also in its plural form—insists on such emancipatory perspective it cannot accept such a division without abandoning what is essential to its project: to keep engaging with the tensions between, what Ilyenkov called (1975) 'Humanism and Science', i.e. emancipatory and epistemic perspectives. If Marx's mature work truly dissolved concrete human beings into mere bearers of objective structures, if systemic analysis truly displaced attention from the lived reality of exploitation and struggle, then the critical-practical orientation of Marxism would be undermined. That is, however, the case rather with embracing eco-animism or techno-futurism—often based on desperate modes of speculation—instead of engaging with deeper and more sober understandings, such as the circular human-labour-nature model (the 'metabolism') already proposed by Marx drawing on natural philosophy (our issue #10 will be devoted to the topic of 'Dialectics and Life', see the call at the backmatter).

The challenge, therefore, is to develop adequate understandings of the relation between concrete social relations and the social formations

they constitute and are constituted by—to grasp how individual human actions generate systemic patterns while being simultaneously shaped by them, what role alienation and submission play, and how this is all embedded in a natural setting.

This shows, in fact, the basic tension in every theory between whole and part—what Hegel called 'concrete universality': the understanding that universals are not abstract generalizations imposed from outside but are realized through and constituted by their particular instances, while particulars achieve their determinacy only through their relation to the universal whole. It is a problem that haunts not only Marxism but philosophy and the sciences at large: How do we theorize systems without losing sight of their constituents? How do we understand parts without abstracting from the wholes that give them meaning? How do we grasp both structure and agency, both determination and freedom, both necessity and possibility?

This special issue is thus situated at a crucial intersection. It addresses contemporary issues—the problem of the social and ecological orientation of knowledge, of theory and practice, of science in the Anthropocene and the technosphere, Earth system science, international relations, infrastructures and resources, artificial intelligence and algorithmic governance—that require both integrative understanding and practical intervention. At the same time, it returns to almost perennial discussions in Marxism and in theoretical thought more generally: the systematicity of knowledge, totality and particularity, structure and subject, synchronicity and process, recursion and reflection (Chukhrov 2024), formal analysis and historical concreteness, scientific objectivity and political commitment. What makes these discussions not merely perennial but perpetually renewed is that each historical conjuncture poses them in new forms, with urgency, and with new resources for their elaboration. These developments do not simply repeat old debates but pose their essential questions anew under current conditions, transforming both the terrain on which they must be conducted and the stakes for which they matter. This provides an occasion to revisit resources for understanding human labour and the relations of things in capitalism in connection with the 'scientific-technological revolution' and the 'great acceleration' of the twentieth and twenty-first centuries—at epistemological as well as historical and practical levels.

A Strained Relationship

The fact that two of the first versions of systems science were developed by prominent Marxist theorists—Alexander Bogdanov's *Tektology* (1st vol. 1912, 2nd vol. 1917, in 3 vols. 1922, published in German in two vols. 1926 and 1928) and Nikolai Bukharin's *Historical Materialism: A System of Sociology* (1921, English 1925), both working with an equilibrium model—only to be suppressed and then re-emerge in post-war contexts, speaks volumes about the fraught relationship between Marxism and systems thinking. Lenin's criticism, which started in 1908 with his attack on Bogdanov and 'the Machists,' in *Materialism and Empirio-Criticism* and later on Proletkult (Sochor 1988) marginalized in consequence one of the most sophisticated early attempts to develop a systems theory, one that anticipated cybernetics and complexity science by decades. The reasons for this suppression were multiple and not all of them were unfounded or confined to political struggles within the Bolshevik party. However, in retrospect it becomes clear that the potential of Bogdanov's approach and the vision of providing a "proletarian" alternative in the sciences, was mostly ignored. Later philosophical concerns about idealism and positivism (lending themselves to technocracy), and the tension with dialectical thinking, as well as questions about whether systems thinking was elitist or could adequately grasp historical specificity and revolutionary transformation played a role as well. Still today the discussion on questions like Proletarian Science, Proletkult and Culture in terms of Organization are not settled (see Potamias' and Şenalp's articles and the theses by Bogdanov in this issue).

This ambivalence toward systems approaches persisted throughout the Soviet period (see the path-breaking study by Susiliouto 1982), manifesting in shifting attitudes that reflected broader ideological and political currents. Cybernetics, initially denounced in Stalin's USSR as a 'bourgeois pseudoscience,' was rehabilitated in the post-Stalin era and became central to discussions of socialist economic planning and computational methods. The Stalinist denunciation rested on the charge that cybernetics was an idealist reduction: by treating all systems—biological, social, and mechanical—as formally equivalent information-processing units, it appeared to dissolve the historical specificity of social relations and the directional logic of dialectical materialism into an ahistorical calculus of feedback loops and control. The rehabilitation under Khrushchev was driven by more pragmatic pressures—the demands of military-industrial planning, the race with the West in development,

computing, and the need for more sophisticated tools of economic coordination—but it remained ideologically contested, since the question of whether cybernetic formalism could be reconciled with dialectical materialism was never definitively resolved. The work of Soviet systems theorists like Igor Blauberg, Vadim Sadovsky, and Erik Yudin in the 1960s and 1970s (as well as others in the socialist countries, like Georg Klaus in the GDR) represented serious attempts to examine differences while developing a dialectical materialist systems theory that could combine formal systems analysis with Marxist philosophy (see Chukhrov 2024; and also Biggart et al. 1998). Yet these efforts always operated under tension, navigating between the demands of dialectical logic and formal logic—a tension that Evald Ilyenkov explored in his critical engagement with positivism and cybernetic reductionism. From the start the intervention by party and state created a strange—sometimes dangerous—situation for scholars and scientists who wanted to develop their approaches further but were confronted with more general demands or completely different issues on other levels as their research activities were based on.

In the Western Marxist tradition, the relationship proved equally complex and contentious. The structuralist turn in French Marxism, exemplified by Althusser's appropriation of systems-theoretical concepts, generated fierce debates about the compatibility of structural analysis with historical materialism. Lucien Sève (1984) and others criticized structuralism and systems theory for dissolving human agency and historical process into static structures and functional relationships. The famous Adorno-Popper debate highlighted fundamental disagreements between critical theory and analytical approaches to social systems (Adorno et al. 1976), while the later Habermas-Luhmann exchange (see Harste 2021) dramatized tensions between emancipatory critique and systems-functional analysis. From a Marxist point of view, one question that persisted in these debates is crucial: Is systems science—not as a set of specific methods, but as a general approach—more than a theory of an administered world? Does it go beyond an effort to straighten out problems and superficially improve the status quo?

The question of technocracy loomed large in these discussions (also in its postmodernist turn, as Meisner's and Hwang's articles in this issue remind us) and it remains pertinent today, perhaps more than ever in the digital age. Time and again, critics worried that systems thinking, with its emphasis on optimization, control, and functional integration, served ultimately to rationalize and stabilize existing power relations

rather than to transform them. The application of cybernetics to socialist planning—from Stafford Beer's Project Cybersyn in Allende's Chile (see Bouchardeau's article in this issue) to various computational planning initiatives in the USSR, GDR, and China—raised practical questions about the relationship between technical rationality and democratic participation, between algorithmic optimization and political contestation. While this story has long been perceived as an economic dead end, the development of the Chinese economy in the last decades, where planning and market play a role, puts a question mark at the end. These historical experiences, whatever their outcomes, demonstrated both the appeal and the dangers of systems-theoretical approaches to socialist organization. The ongoing societal questions concerning commons versus private or corporate ownership of essential resources and infrastructures must be recognized as systemic ones in all kinds of contexts, even if they cannot be solved with systems-scientific proposals alone.

Dialectical Thought and the Systems Paradigm

Despite these tensions, the contemporary scientific landscape increasingly demands precisely the kind of integrative thinking that these debates have revolved around. The challenges facing researchers today—from the feedbacks of the Earth system to the seemingly quasi-autonomous dynamics of the technosphere, from the emergent properties of ecological networks to the nonlinear behaviors of socioeconomic formations—cannot be adequately grasped through isolated disciplinary perspectives or simple linear causal models. The dominant reductionist paradigm, the conviction that complex phenomena can be understood by decomposing them into simple causal chains, or that one framework can explain everything, has reached its limits.

The Nobel Prize in Physics awarded to Syukuro Manabe, Klaus Hasselmann, and Giorgio Parisi in 2021 marked an institutional acknowledgment that understanding complex systems—from Earth's climate to disordered materials—requires fundamentally different conceptual and methodological frameworks. Earth system science exemplifies this transformation, integrating the interactions between atmosphere, hydrosphere, biosphere, cryosphere, lithosphere, and the anthropogenic technosphere into a unified analytical framework that recognizes multiple, intertwined causality chains rather than isolated variables. The challenge posed by complexity is not merely technical but philosophical and methodological, demanding what we might call a correlational or systemic approach to scientific inquiry—one that attends to networks of relationships, feedback loops, and mutual determinations.

This recognition resonates with the Hegelian-Marxian insistence on 'the concrete'—not as immediate empirical givenness, but as the comprehension of phenomena in their rich determination and multiple mediations. Marx argued in the *Grundrisse* that genuine scientific knowledge must reconstruct the concrete as 'a synthesis of many determinations,' as the outcome of multiple interconnected processes rather than a simple, given starting point. The statistical and thermodynamic approaches proving invaluable for understanding tipping points and phase transitions in Earth systems point toward frameworks capable of grasping qualitative transformations emerging from quantitative change—precisely what dialectical thought emphasizes through the transformation of quantity into quality. The sciences, in their confrontation with complexity, seem increasingly to follow the demand that Hegel and Marx articulated: theory as an attempt to show coherence and interdependence in terms of a unity in diversity (see Remida in this issue).

Bogdanov positioned his *Tektology* explicitly as a materialist extension and generalization of the organizational principles already implicit in dialectical thinking, while remaining critical of the contemporary understanding. Ludwig von Bertalanffy (1972) drew on the concept of organized wholeness from the morphological tradition of *Naturphilosophie* in articulating the genealogy of General Systems Theory, acknowledging that the idea of the organism as a structured totality resisting reduction was mostly developed in German idealist philosophy present in its Marxian transformation too. Both traditions share a common demand for scientific knowledge adequate to organized, structured totalities—and both insist (see Bertalanffy 1968) that the fragmentation of knowledge is not merely an epistemological failure but carries direct consequences for how human beings act in, and on, the real world. Mario Bunge (1979), developing an emergentist systems ontology, credited the dialectical tradition (especially Engels) with having grasped—but not formalized—the key insight that wholes exhibit properties irreducible to their parts, and that levels of organization are constituted through their mutual interactions.

Engels's project in the *Dialectics of Nature* has faced criticism, above all for the applications it often received in Soviet dialectical materialism. Yet at its core it represented something more ambitious: an attempt to bring dialectical thinking into productive engagement with natural science—to show that the principles of interconnection, contradiction, and transformation operative in social history also characterize

natural processes. Contemporary research on complex systems, self-organization, emergence, and far-from-equilibrium dynamics provides new resources for such a dialectics of nature, though it demands critical appropriation rather than straightforward vindication. The challenge is to avoid both crude reductionism and mystical holism, developing frameworks that can grasp the material processes and energetic flows constituting natural systems while recognizing their emergent, self-organizing character—particularly urgent where natural and social processes have become inextricably entangled in the Anthropocene.

The relationship between dialectical logic and formal logic—between the methodological principles of Hegel and Marx and the analytical techniques of systems science—has if not seen as complete incompatibility. Ilyenkov's critique of positivism articulated a fundamental concern: that formal-logical and cybernetic approaches, in abstracting from the content of social relations to focus on purely structural or functional relationships, lose precisely what is essential for understanding historical development and revolutionary transformation (see Ervin's essay in this issue). The attempt by Blauberg, Sadovsky, and Yudin to develop a dialectical systems theory represented one important effort to address this tension (Chukhrov 2024), though questions remain about how successful such syntheses can be. A case in point is the more general discussion on the Anthropocene, where the metabolism paradigm could be central, but the potentials but also the flaws of systemic approaches can also be observed. The main issue of the systems approach from a critical perspective has always been if it can help to overcome the managerial, instrumental logic in the application and pursue of the sciences towards (what Bogdanov might have called a "proletarian" or rather) a general social orientation.

The Technosphere and Earth System Science

These discussions alongside the question of machinery and technology (see Meisner in this issue) have gained renewed currency in the digital age and in light of the debate around the Anthropocene—which can be productive and deceptive at the same time. In itself it poses a problem of integration for science at large (Renn 2020). It remains to be seen if science can play a critical role or be subsumed under managerial or technocratic views. While attention for other global critical attempts, like world systems analysis, has waned, the work of geologist Jan Zalasiewicz and his colleagues has introduced new notions, like the 'technosphere' (2017). As Zalasiewicz (2018) writes, 'The technosphere encompasses all of the technological objects manufactured by humans,

but that is only part of it.... [It] comprises not just our machines, but us humans too, and the professional and social systems by which we interact with technology.'

Thus it is claimed that the technosphere represents a phenomenon of unprecedented complexity and scale: weighing approximately 30 trillion tons (roughly five orders of magnitude larger than human biomass), it constitutes what geologist Peter Haff terms "the defining system of the Anthropocene" and exhibits characteristics that demand systemic analysis: it is an emergent, self-organizing system that constrains even as it enables human action; it processes vast flows of energy and materials according to quasi-autonomous metabolic requirements; and it generates feedback effects on the Earth system that fundamentally reshape the conditions of life on the planet.

However, the agency behind this complex system often remains vague, despite eco-socialist attempts to relate it to extractivist, capitalist dynamics. Understanding the technosphere requires integrating insights from multiple disciplines—geology, engineering, economics, sociology, ecology—in ways that transcend conventional disciplinary boundaries. It provides an occasion to revisit Marxist resources for understanding human labour and nature. The metabolism of capital and the metabolism of the Earth system are not separate processes but deeply intertwined aspects of a single, complex dynamic. This realization places, e.g., Marxist political economy and Earth system science in necessary dialogue, demanding frameworks that bring the social relations of production and the biogeochemical transformations they drive into analysis as aspects of a single, articulated process.

The debate around the technosphere also intersects with discussions of the Capitalocene—the argument that our current crisis should be understood not simply as the product of anthropogenic activity in general, but specifically as the outcome of capitalist accumulation and its distinctive socio-ecological metabolisms. This perspective insists on understanding the technosphere not as a neutral assemblage of technological artifacts but as a system shaped by and reproducing specific relations of production, exploitation, and accumulation. It represents precisely the kind of synthetic analysis that this moment demands.

Historical Trajectories

What role has systems theory played in Marxist thought and the history of socialism? The question requires attending to multiple traditions and trajectories. Beyond the systemic approach of Marx and Engels, and

Bogdanov's pioneering *Tektology*, we can trace a longstanding relationship between systems theory, political economy, organization theory, computational means, theories of economic planning, and global social history. Immanuel Wallerstein's world-systems theory, building explicitly on Marxian foundations while incorporating Braudelian historiography and dependency theory, analyzed global capitalism as an integrated, hierarchical system characterized by core-periphery relations and long-term hegemonic cycles. This approach demonstrated an understanding of capitalism as a world system rather than as an aggregation of national economies.

The French Regulation School similarly employed systems-theoretical concepts to analyze the institutional frameworks and modes of regulation that stabilize capitalist accumulation during particular historical periods, developing concepts like 'regimes of accumulation' and 'modes of regulation' that capture both structural stability and historical transformation. These Marxist approaches, whatever we make of them today, shared a commitment to understanding capitalism as a structured totality while remaining attentive to its historical specificity, internal contradictions, and crisis tendencies.

The application of cybernetics and computational methods to socialist planning represented another crucial trajectory. From cybernetic socialism to practical experiments in algorithmic planning, these efforts grappled with fundamental questions about the feasibility and desirability of centralized economic coordination through computational means. The failures and limitations of these projects—alongside their occasional successes—provide important lessons for contemporary discussions of economic planning in the digital age, particularly as artificial intelligence and big data analytics present new epistemic possibilities and political challenges. These conditions have sparked new discussions about planning economy today, even though the premises are still controversial (Grünberg 2023). A predecessor of this discussion is Polish economist Oskar Lange, who debated Mises and Hayek on socialist calculation, then later embraced cybernetics and attempted to reconcile Marxist political economy with systems-theoretic planning, arguing in his late work *Wholes and Parts* (1965) that cybernetic feedback mechanisms could provide the computational infrastructure for rational socialist allocation. The potential of morpho-systemic analysis and its limits, with the risk of technocracy and a "dictatorship over needs" (Fehér et al. 1983) become graspable here.

The relation between Marxism and Systems Science can also be viewed from the other direction. Debates and developments in systems-theoretical approaches throughout the twentieth century frequently unfolded against the backdrop of geopolitical tension—as in game-theoretical modelling—and one can ask to what extent systems thinking offered (or at least promised) a remedy for the perceived lack of integration in the capitalist world. While the dialectical-materialist framework demanded precisely such integration, alongside the connection of theory with practice, capitalist intellectual life was characterized by increasing fragmentation and the absence of any overarching approach. Yet historical development did not simply vindicate this contrast. In socialist countries the theoretical demand was more often than not left unrealized—as committed Marxists within those contexts were often the first to acknowledge. The problem lay not in the integrative ambition of dialectical materialism as such, but in the gap between that ambition and practices still dominated by party apparatus, bureaucratic and technocratic routine, positivist habits of thought, and material constraints.

The history of systems science cannot be separated from its capitalist appropriation. From the Club of Rome's *Limits to Growth* (conducted mostly at MIT, see Meadows et al. 1972, with its anti-natalist agenda) to neoliberal governance theory, from the RAND Corporation's strategic systems analysis to contemporary complexity economics, systems-theoretical frameworks have been deployed in service of capitalist rationalization and management. Important work was also done in socialist countries—notably the famous report by Richta et al. (1966–9), which prefigured developments towards knowledge economies, degrowth, and issues of epistemic integration (Renn 2020). The rise of complexity science in the neoliberal era occurred in contexts that shaped both the questions asked and the answers proposed. Platform capitalism today represents perhaps the most advanced form of capitalist systems integration, where digital infrastructures enable unprecedented levels of coordination, surveillance, and extraction.

The rise of machine learning, big data analytics, and algorithmic governance presents both opportunities and dangers for integrative understanding and political practice. On one hand, computational methods enable the processing of vast datasets and the modeling of complex interactions at scales previously impossible, potentially enhancing our capacity to understand and intervene in complex systems. On the other hand, these same methods can obscure social relations, human labor

and power asymmetries, reducing political questions to technical optimization problems and reinforcing technocratic governance. The problem of inherent positivism in techno-futurist ideas—the tendency to treat technical solutions as politically neutral and to mistake computational tractability for genuine understanding—remains acute in the digital age. A critical Marxist epistemology of systems must navigate these tensions, appropriating the analytical power of dynamic systems approaches and computational tools while subjecting them to immanent critique. The guiding questions are not only what can be computed but what should be, not only what is technically feasible but what is politically desirable.

Marxist and post-Marxist critics have persistently interrogated these developments, analyzing how systems thinking serves power while also identifying some of its emancipatory potentials. The question is not whether to embrace or reject systems science wholesale (as distinct from a 'holistic' systems ideology), but how to engage it critically—attending to both its analytical power and the interests it has historically served. The history of capitalist appropriation of systems thinking is itself a lesson in how formal frameworks can be detached from the social relations that generate the problems they purport to solve, and redeployed in their service.

An Invitation in lieu of a Conclusion

The articles collected here examine key moments in this history and point to new combinations (see Lattanzi in our issue on Marxist IR) and open questions. These questions are not confined to the academy. It has been argued that current capitalist conditions amount to a totality that systematically obstructs the integrative thinking that science itself demands—through commodification, disciplinary fragmentation, and a pervasive positivism that mistakes technical tractability for genuine understanding (Sheehan 2025, see also the whole issue of the comreditors of *Science for the People* magazine on 'The Political Economy of Science' Vol. 27, No. 2, 2025). That such systemic analysis is both possible and necessary is itself part of the argument of this special issue, which has to be understood as an invitation not a presentation of solutions or verdicts. In particular we invite the engagement of scholars, educators and scientists with the positions and problems presented here.

What emerges from these investigations is – again – not a unified position but a plural Marxist perspective—one that acknowledges the diversity of approaches within the tradition and seeks productive en-

gagement with systems science while maintaining a critical, emancipatory orientation. This pluralism is not relativism; it recognizes that complex realities demand multiple perspectives, that different analytical frameworks illuminate different aspects of phenomena, and that theoretical development requires ongoing dialogue and mutual critique rather than dogmatic adherence to established positions.

The tensions between formal and dialectical logic, systems analysis and historical materialism, computational methods and political economy, remain contested. Yet the urgency of contemporary crises—ecological, economic, political—demands engagement. The technosphere continues its apparently inexorable expansion, generating planetary-scale transformations that exceed individual human control. Climate change accelerates, propelled by the fossil-fueled metabolism of industrial capitalism, generating feedback effects and tipping points that threaten the conditions of human flourishing. Platform capitalism integrates surveillance, extraction, and algorithmic control into unprecedented configurations.

The dialogue between Marxism and systems science, pursued in a spirit of critique and synthesis, offers resources for developing the theoretical frameworks our moment demands. This special issue contributes to that ongoing project, demonstrating that despite the historically strained relationship between these traditions, their encounter remains vital and necessary. The shifting attitudes—from Soviet dismissal to embrace of cybernetics, from structuralist enthusiasm to post-structuralist critique, from planning optimism to technocratic anxiety—reflect genuine tensions that cannot be wished away through synthesis alone. However, they also reveal possibilities for productive appropriation and development. In an era when the administered world seems to have achieved unprecedented reach and sophistication, the question how to develop systems science to contribute to emancipatory transformation has never been more urgent. This special issue takes up that question, not to provide final answers, but to advance the exchange on which better answers depend.

According to the issue topic we have chosen the texts of the archival section ('From the Archives'). We publish the two versions of Alexander Bogdanov's 1918 theses on Proletarian Science, giving credit to the renewed interest in his work and the question of how to transform science to gain a more social orientation. We invite reactions to these theses and will follow up with commentaries in the next issue. We also publish a

talk which Peter Damerow and Wolfgang Lefèvre presented in the context of Hegelian studies on 'the unity of science' in historical perspective. We would like to honour them here as proponents of a materialist approach to historical epistemology and the history of science and knowledge.

Given the, often, abstract level of the discussions here, and the promises of scientific-theoretical synthesis mentioned above, we should finally recall the Czech Marxist Ivan Sviták, who cautioned the intellectuals of the Prague Spring not to change one authority for another (1972,112): 'Rely on your own common sense and do not believe in the revealed certainty of any churches, parties, or messiahs. The specialists will always tell you that things are more complicated, although the basic questions of human rights, of the fate of man, and of personal freedom are open to all, to every sound reason.'

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