

Professor Srđan Lelas: On the occasion of the twentieth anniversary of his death

On March 30, 2023, exactly twenty years have passed since the death of Professor Srđan Lelas, a distinguished Croatian philosopher of science, physicist, intellectual, and humanist of notable national and international reputation. On this occasion, the Institute of Philosophy in Zagreb is organizing the conference “Science, Technology, and Humanity” for its annual event in December 2023. The conference aims to pay tribute to Professor Lelas. It will do so not only by commemorating his life and work through presentations by his former associates, colleagues, and friends from Croatia and abroad, but also by inviting contributions on various general and specific topics in philosophy, sociology, and psychology of science and technology, as well as in economics, politics, and ethics of scientific and technological development. These topics were central to Professor Lelas’s fruitful and notable intellectual career, spanning four decades. On the occasion of the forthcoming conference, this brief recollection of Professor Lelas’s life, presented by his former student, then assistant, and finally, until his untimely death in 2003, a close associate at the Division of History and Philosophy of Science of the Faculty of Science in Zagreb, aims to provide basic biographical data and an overview of Professor Lelas’s contributions to the sciences of science. It is accompanied by a bibliography of his writings, which, while certainly incomplete, is hopefully instructive for any future researcher of his work.

Srđan Lelas was born in Split on June 21, 1939. After graduating from the real gymnasium in his hometown, he enrolled in the University of Zagreb in 1957 to study physics. He graduated in 1961 and became a teaching assistant at the newly founded Division of History of Science and Frontier Philosophical Problems at the Faculty of Science in Zagreb, under the supervision of Professor Ivan Supek, Croatian physicist, philosopher, writer, playwright, peace activist, and humanist, and former assistant of Werner Heisenberg. Within the program of post-graduate studies in the history and philosophy of science, which at the time took place at the Division along with regular undergraduate courses in the history and philosophy of science, Lelas defended his master’s thesis, titled “Causality in the Theory of Elementary Particles”, in 1969, earning his MS degree in theoretical physics. In 1973, he successfully defended his doctoral dissertation “The Copenhagen Interpretation of Quantum Mechanics and its

Consequences to the Problem of the Relation Between Subject and Object”, under Professor Supek’s supervision. Lelas’s academic career progressed steadily. He was elected Assistant Professor in 1976, promoted to Associate Professor in 1986, and finally obtained the position of Full Professor in 1992, all within the Division of History and Philosophy of Science. In 1994, he assumed leadership of the reorganized Division of History, Philosophy, and Sociology of Science, which had been formed by merging the Division of History of Science and Frontier Philosophical Problems with the Department for the Foundations of Social Sciences, previously chaired by sociologist Ante Marušić at the same faculty. Professor Lelas continued as head of the Division until his passing in 2003. Subsequently, Tihomir Vukelja, who had earned a PhD in philosophy of science under Professor Lelas’s supervision, took over as chair of the Division of History and Philosophy of Science. The author of this recollection remained a Senior Research Assistant at the Division until 2012 when, regrettably, the Division was disbanded by the Faculty of Science.

Throughout his four-decade university career, Professor Lelas proposed, developed, and taught numerous undergraduate and postgraduate courses to students in natural sciences, humanities, and social sciences in the history and philosophy of science at various institutions of the University of Zagreb, most notably at his *alma mater*, the Faculty of Science, but also at the Faculty of Philosophy and the Faculty of Croatian Studies. During his university life, Professor Lelas held various important administrative and government posts. He served as head of the Physics Department at the Faculty of Science from 1978 to 1980, and later as the director of the Faculty’s Natural Sciences Departments from 1983 to 1988. Finally, he assumed the role of director of the Faculty of Science from 1988 to 1989. From May 1992 to July 1993, he held prominent positions in the Ministry of Education and Culture of Croatia, first as the Assistant Minister of Higher Education, during which he co-authored the first draft of the Croatian legislative on higher education, and later as Deputy Minister. Professor Lelas visited and lectured at numerous universities around the world, including Boston University, City University of New York, Leigh University, Northwestern University, University of Chicago, Illinois Institute of Technology, Virginia Polytechnic Institute and State University, and the University of Oxford. He was also one of the distinguished directors and driving forces behind the annual Philosophy of Science conferences at the Inter-University Centre in Dubrovnik, along with other eminent names such as William Newton-Smith, Kathleen Wilkes, James Robert Brown, and others. These conferences, initiated in 1974 by Professor Ivan Supek and inaugurated with a lecture by Nobel Prize winner Werner Heisenberg, one of the founders of quantum mechanics and a

physicist with an extraordinary sense for philosophy, have continued uninterrupted to this day. They have consistently gathered the most distinguished figures in the history and philosophy of science, offering an authentic and encouraging platform for younger generations of philosophers of science.

While it is of course impossible to summarize Professor Lelas's intellectual life within the framework of a short recollection, which in his 1973 doctoral dissertation he anticipated as a path "winding between physics and philosophy, narrow for some and wide for others", we can reliably characterize it by notable consistency, constancy, and linearity of ideas. These traits persisted from the very beginning of his career, when he started as a young physicist turned philosopher of physics, up to his final and most significant contribution, the book *Science and Modernity: Toward an Integral Theory of Science*, published in 2000. In particular, although his work traversed broad and winding paths within science and philosophy, the common thread running through everything he wrote, said, and did was always centered on man and humanity. Thus, when he was at the outset of his career, and greatly inspired by his mentor Professor Ivan Supek, who introduced the Croatian academic and general public to the philosophy of science, particularly physics, and whose philosophy of physics was rooted in the tradition of the founding fathers of quantum mechanics like Niels Bohr and Werner Heisenberg, Lelas delved into the relationship between subject and object in modern experimental physics, and immediately recognized this problem as having broader philosophical implications. What he found particularly illuminating in the experimental experience of the micro-world was that in our experiments, micro-objects – inherently 'immersed' in the experimental apparatus – become one of the 'behavioral' aspects of our experimental devices. Experimental devices, on the other hand, as he soon also realized, must be treated as artefacts of a special kind. Their creation requires an idea and a plan, which, however, remain embedded in the experimental apparatus even after their construction. As a result of their epistemologically non-glassy essence, they possess ontological significance when employed in experiments. In particular, experimental devices, by embodying certain distinctive biological, historical, and cognitive characteristics of their makers, not only become ontic extensions of the knowing subject, but also transform quantum objects, which we can only perceive and interact with through these devices, into an integral and inseparable part of the subject. With this perspective, or as he liked to say, with the recognition that each quantum experiment conceals a brief history of human relationships with nature, Lelas understood early in his career that a broader philosophical framework was required to gain a clearer understanding of the true nature of modern science. Everything Professor Lelas pursued there-

after aimed at developing such a framework, a mission nicely encapsulated by Carl von Weizsäcker's saying: "Nature is earlier than man, but man is earlier than natural science", which Professor Lelas particularly favored. Furthermore, Lelas transformed these early ideas into a lifelong program focused on the naturalization, humanization, and historicization of science and epistemology more generally.

One of the main goals of that program became showing that neither the view of science as a form of 'divine knowledge', advocated explicitly by the founders of modern science like Bacon, Galilei, Descartes, and Newton, and implicitly still by a large proportion of its modern followers both in working science and philosophy, nor its 'philosophical surrogates', like logical positivism or various contemporary realistic interpretations of science – all obsessed with arriving at and defending the 'epistemology of subjectless knowledge' – offer an alternative to the view of science as inherently human or 'mundane knowledge'. Instead of these historically failed alternatives, as he saw them, Lelas took science as a natural-historical phenomenon essentially related to the modes of human existence, and one of the integral components of the modern way of life, which he analyzed through the lenses of five main media in which science takes place – biological, linguistic, technological, social, and historical – none of which alone, as Lelas believed, provides complete and convincing foundations for understanding modern science, but which, taken together, can provide a plausible ground for its truthfulness and trustworthiness. In particular, having expanded on the thesis of 'philosophically minded' biologists like Adolf Portmann and 'biologically minded' philosophers like Arnold Gehlen that humans are 'prematurely born, retarded and unspecialized mammals' and thus essentially in need of other survival and developmental strategies besides biological ones, Lelas emphasized that to comprehend not only the development of individuals but also the broader relationship between humans and nature, including human cognition and science, the biological dimension of humans must be integrated with other survival and developmental strategies settled in the course of our evolutionary history, most notably culture, which is collectively formed by our language, social institutions, and technology. Among these, the technological dimension of man was particularly important to Lelas because it brought his youthful interests full circle. In light of this broader philosophical framework, Lelas was able to frame his early views on technology and artefact-making in the context of modern experimental physics into a wider and especially distinctive onto-technological interpretation of scientific theories and techno-phenomenological interpretation of their theoretical entities, which is built against the traditional narrative of technology as merely an

applied science. Contrary to this, he saw science as a sort of applied technology, arguing for the replacement of the traditional slogan 'science discovers, technology invents' with the new one 'science discovers because it invents'. Of course, Lelas was aware that such a poetical outlook on the nature of scientific knowledge, in which 'nature is at once revealed and produced,' as he used to vividly put it, might be understood as implying a particularly disturbing form of relativism. However, to dispel these concerns, Lelas reminded us that there is yet another dimension in which science operates: the temporal one. Thus, while he did not deny that "scientific products, facts and theories, are social constructions", he also emphasized that the nature of these constructs is such that, over time, they "become free of personal and local, heterogeneous and contingent, psychological and social imprints", or in short, that they become 'sedimented'.

These, and other Lelas's ideas, the additional valuable characteristic of which is that they skillfully and convincingly overcome the so-called analytic-continental divide, have long since become part of the standard body of knowledge in the philosophy of science and technology, having found their way into contemporary academic courses, compendiums, encyclopedias, and anthologies in these fields. Admittedly, from the perspective of today's absurdly inflated and, ultimately, science-damaging quantitative scientometric standards of academic (hyper)production – more concerned with administrative counting and bureaucratic requirements of funding bodies than with genuine intellectual contributions – the volume of his scholarly 'output' would probably not be significantly 'evaluable' or 'measurable'. However, Professor Lelas wrote and published not merely to avoid academic perishing but to offer well-thought-out, original, comprehensive, and important ideas in the realms of science, philosophy, technology, and society, exercising restraint when he felt he had nothing substantial to contribute, and allowing his ideas to mature. As a result, his intellectual legacy has undergone a significant and noticeable qualitative leap, far distinct from the realm of academic consumerism, and certainly still inspiring for all those in hunger for important ideas of a renewing potential for intellectual dignity of both science and the sciences of science. Moreover, in today's highly polarized world, some aspects of his work, extending beyond the realms of science and philosophy, can serve as permanent reminders, if not warnings, of the historical man, for whom he deeply cared about, becoming sidetracked, as is particularly evident in the very last paragraphs of his magnum opus *Science and Modernity*, worth quoting in full:

"Science has been a hope for many generations, as they have seen in it the paradigm of reason, and have believed that it could be made the supreme ruler

even in human society and history so that the good life, authentic community, justice and equality could be achieved. This hope is nowadays philosophically and sociologically ‘demystified’. It could be envisaged that mass production of scientific papers fostered by growing competition can make free access futile and organised scepticism inefficient, if the predominance of mission-oriented research with the control over publications does not kill them sooner. If science surrenders to industrialisation and commercialisation, if scientific reason reduces to routine problem solving akin to decision making, even the little wisdom it offers could be silenced, the warning ignored. What, then, will reign all over the planet will be empty subjectivity with its slogan: anything goes if there is a place for it on the market. And this will be just the final victory of modernity, not at all the postmodern alternative.

Whatever the next stage in the ceaseless flow of history will be, science will share the fate of the mode of living it grew out and remains the part of. If our time witnesses the full blossom of modernity in its late-modern fashion (often mistaken for post-modernity), it also witnesses the full blossom of modern science in its late industrial form. If it is going to be a new post-modern mode of living, of which there is not any sign yet, then it is going to be a post-modern science. Science has already ceased to be fully cosmological and has become more terrestrial, less ontological and more technological, less expressed in the language of continuous functions in space and time and more in discrete algebraic forms, etc. It has demonstrated the capacity for change; it is as transient as is everything human. Despite all this, we can, perhaps, protect science from its full commercialisation, bring science and philosophy together, and with their help change our mode of living in a deliberate and controlled fashion. How likely is this to happen I do not know.”

Finally, no recollection of Professor Lelas would be complete without mentioning his captivating personality and kind, respectful, and encouraging character, witnessed by his students, colleagues, and associates, but also by his opponents, of whom there was no shortage, be they in academia or politics. Moreover, if any sense can be made of Fichte’s words that ‘the kind of philosophy one chooses depends upon the kind of person one is’, then this was certainly evident in the life and work of Professor Lelas. Those who had the privilege of knowing him, know well that his philosophical concerns about man and humanity were not merely theoretical and declarative but truly inseparable from his personality, as well as his thoughts, words, and deeds. What Professor Lelas said at a symposium on the identity of philosophy and pluralism of philosophical directions in 1989 should thus be seen not only as well-intentioned advice of an experienced intellectual to his colleague scientists and philosophers but also as the guiding thread of his own lived experience:

“Only through a genuine understanding of the world around us and within us, achieved by engaging in thoughtful philosophical dialogue, including the natural

sciences, among other disciplines, can we temporarily gather diverse experiences of the world into the self-consciousness of the historical man. There is no certain path to this meeting point, and remaining there is only temporary. Therefore, arrogance appears ridiculous, insecurity is natural, and dialogue and tolerance are essential. Only through them can we hope to restore some of the lost warmheartedness of the world.”

With his writings, his readiness for dialogue, his conciliatory and consistent tolerance, and above all, his perseverance in this even during his professional hardships and life challenges, Professor Lelas was certainly one of those who were restoring the lost warmheartedness of the world. His intellectual legacy, as well as his personality, should encourage us to continue believing in such a goal, despite challenges, difficulties, doubts, and the ‘ceaseless flow of history’, or, rather, precisely because of all this.



Srđan Lelas, photo from the back cover of his 1990 book *Promišljanje znanosti* (*Reflections on Science*).



Srđan Lelas (far right) at the 25th Anniversary of the IUC Philosophy of Science course series in Dubrovnik 1999, with other awarded course directors (Lars Bergström, Władysław Krajewski, and James Robert Brown, from left to right).

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