

From Sustainability to Gravity: The Research Path of an Engineer

Nicolas Vantis

IFAC Sup'IFAC Campus of Brest, Brest, France

My career as a scientist has been a passionate pursuit of knowledge, objective knowledge devoid of ideology, that could prove useful in understanding and transforming the world. As an engineer, I aimed to produce planning solutions which would be economically feasible, technically viable, and socially acceptable. Disappointed by the ineffectiveness of methodology and planning initiatives to attain sustainability, I turned to the history of science to find answers, and finally to physics, searching for an explanation of gravity. I traced a path from social to natural sciences. My attachment to my values and ideals, my commitment to my goals costed me dearly. It led me to quit applied research, to move to a desert island in the Atlantic Ocean, to be consumed for years by a Galileo-like obsession. "I must create a system, or be enslaved by another man's. I will not reason and compare: my business is to create" (Blake, 2002, p. 210), has been my life's motto. Have I succeeded in my self-appointed task or have I just wasted valuable years of creative research building sand castles? I don't have the answer to this question. What I know for sure is that I do not regret hanging to what I thought to be right.

Keywords: gravity, gravitational waves, sustainability, critique of scientific method

Introduction: Galileo Revisited

For the last six years, I have developed a Galileo-like obsession. Every day, after my demanding teaching schedule, I conduct research on gravity, from a historical, then from a theoretical perspective, hoping to come up in the long term with a valid experimental protocol. Lately, I put on hold this demanding work, because I felt the need to review it and more importantly, to communicate with other researchers, reach out to the scientific community (the scope of this article). How did I enter this research field? (Originally I am an engineer specialized in sustainable development.) How did I come to consider gravity to be so important for the necessary breakthrough to overcome current problems that I devoted myself to discover its cause? In this paper I tell this story, and I also present some of my preliminary findings.

The Quest for Objective Knowledge

In the beginning of my career, I acquired a degree in civil engineering. During my studies, I developed an engineer's point of view, a commitment to produce practical, useful, and affordable planning solutions. At the end of my studies, I developed a keen interest in the social implications of technology. I did a master's dissertation on the field of Philosophy of Technology. I then pursued doctoral studies. My dual point of view of philosophy and technology got me interested in sustainability, since it was a subject that combined social theory and technical

planning, theoretical sciences and engineering. Moreover, it represented a great social and technical challenge of our times. I did a PhD in sustainable planning. In my thesis, I criticized contemporary modeling techniques and I proposed new principles of planning, taking into account the qualitative parameters of sustainability. After obtaining my PhD degree, I conducted postdoctoral research. I had paved the way for an academic career. Then I quit. I experienced an academic burnout. How did it come to this?

A research path is like a funnel. “We are getting to know more and more about less and less”, is a truth first expressed in a philosophical journal as soon as 1911 (Fowle, 1911). As T. S. Eliot put it in his play *The Rock* of 1934: “Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?” (Eliot, 1934).

As I advanced in my career as a scientist, my research interests became broader, my questions of a philosophical rather than technical nature. But research imperatives got more and more limited. Curiously enough (from my point of view), my fellow researchers didn’t share my preoccupations, as long as research grants were available and career opportunities came up. As for me, I couldn’t continue this path any longer. My decision to become a scientist was inspired by an existential need to discover objectivity. My primary drive was the hope that objective knowledge was attainable with the right research methodology. So maybe it was a problem of method?

My Methodological Problems in Scientific Research

I started to grasp the methodological discrepancies in current research of my field since I started writing my first scientific papers. In 1998, I compiled a paper on a subject which was considered controversial back then: urban tolls¹ (Vlastos & Barbopoulos 1998). I reviewed the scientific literature at the time. I was astonished to discover that respectable studies and reports existed, which claimed exactly opposite findings and conclusions, using the same established methodology.² How was this even possible? How to explain it? Where did objectivity lie?

I turned to philosophical readings to find answers. After a lot of research, I adopted a point of view expressed by Jürgen Habermas in his essay *Technology and Science as Ideology* (Habermas, 1990). According to Habermas, in capitalist societies, science and technology are being objectivised to serve the prevailing ideology of the capital. As for what ideology is, I referred to another German thinker. In his book *Ideology and Utopia*, Karl Mannheim provided me an insight for a clear understanding of ideology, as a knowledge system serving a certain historico-social group (Mannheim, 1936, p. 49). Needless to say, to come up with these specific sources meant to review numerous others and more importantly to acquire a sufficient level of philosophical understanding to contextualize them and to support them. There I was, soon to be trained a specialist, posing philosophical questions, becoming a student of philosophy to back up a technical thesis.

These new findings created more complex questions. If science was submitted to capital, if knowledge was confounded with ideology, where did objectivity lie? How would I evaluate studies in my field (something necessary for my thesis)? I had to answer this question in order to proceed, I had to find the right evaluation criteria. I decided (in accordance to my supervising committee) to consider that objectivity lied in the quest for sustainability. I judged that attaining sustainability was right, objective, a rationalization of the current

¹ Please take note that since my naturalisation as a French citizen in late 2019, I changed my name from Barbopoulos Nikos to Nicolas Vantis. See Dossier n° 2019X 010611 29, 2019.

² I am referring to the established scientific methodology: hypothesis, elaboration of data, conclusion.

unsustainable planetary and local material flows, an exact science opposed to the ideology of systemic resilience, the knowledge produced by trusts and status quo interests.

My troubles weren't over. Far from it. When I came to the final part of my thesis, I was asked by my supervising committee to plan a sustainable system. After all, since in my thesis I had so heavily criticized current trends and the methodologies that backed them up, I ought to suggest an alternative. I had to propose a new planning methodology, as I had argued that it was necessary. This new methodology I had to invent posed technical challenges: models weren't adapted to sustainability, I had to invent a new one. More importantly, it also posed social and cultural challenges: even if I succeeded in planning a sustainable system, how could I convince people to use it? How (why) should people adapt to it?

I was able to overcome the latter question in two ways. Firstly, I jumped up a level in my argumentation and presented my proposal primarily as a policy model: I was attempting to prove that a different planning method was technically possible, this was the primary scope of my scientific exercise. Secondly, I adopted a supply-based model: I argued that people would eventually adapt to the new supply. Demand-based models followed unsustainable trends, so to attain sustainability, we had to reverse them. All this said, the method was genuine (Vlastos, Barbopoulos, & Milakis, 2005): it was a bottom-up approach in which I first described ideal environmental and social conditions, and then I gradually adapted planning to attain them: a technical tool towards an environmental utopia. The jury unanimously proposed my admission.

Even if I got my PhD, my questioning endured. I felt that I knew less than when I started, or that I had even less certainties. The fact that I couldn't prove that my method was of practical importance made me question my results. I applied for a postdoctoral grant. I got it (using the magic word ("sustainable") made things easier). This time, a field research was possible, sufficient funds were available. I conducted this research for four years, in a medium-sized town where some of my laboratory's planning initiatives had been realized.

I was excited by the perspective of an eventual generalization of my findings. Finally, I could prove that sustainable planning was possible, seriously influencing policy making. I conducted quantitative sociological research with questionnaires and interviews, following statistical laws and established methods, with objectivity in mind. I elaborated the results. They were disappointing. People who intuitively conformed to sustainable patterns had developed them much earlier than our realizations ever took place, they didn't even take advantage of the new possibilities offered to them by our novel planning initiatives. They hung to their older habits. They were a minority, and most importantly, a diminishing one: young people didn't follow these trends. Our planning was technically correct, the methodology seemed right, but it had failed socially, since it didn't have a major societal impact after all (Vlastos et al., 2006).

At that point, I decided to put on hold applied research. I lost faith in it. Something was wrong in my assumptions and methodology.

Back to Where It all Began

When I rebooted this research, some years later, I started reading textbooks and articles on the Scientific Revolution (Applebaum, 2000; 2005). Since I considered that there was a problem with methodology of modern science, I thought that I would find answers if I acquired knowledge on how this methodology was conceived in the first place. I first needed to acquire this encyclopedic knowledge. I read the fascinating story about the changes in astronomy brought about by Copernicus, Kepler, and Galileo. I studied the immense contribution of Newton, I also read about the major contributions in methodology by Descartes and Francis Bacon. I found out that there

was another important change during the scientific revolution: the scientific networking, the creation of scientific societies and journals which facilitated communication and publication, constant dialogue between scientists and boosted scientific progress. In order to acquire a critical point of view on this subject, I found the work of Thomas Kuhn really valuable (Kuhn, 2012; 1990, p. 143): he had argued that the scientific revolution had brought about a paradigm shift (geocentricity) and that this was the primary drive of the upcoming progress.

As an engineer, I had an inherent urge to think in practical and material terms and as a scientist I had developed an important background in the relationships between science and technology. Under this scope, I easily theorized that it was the scientific revolution that paved the way to the industrial revolution (MacLachlan, 1989). The modernity of the 20th century world had been created back in the 17th century, due to the Scientific Revolution. I found it to be a fascinating discovery. Then, I was inclined to read about 20th century science, the advances in physics. A new paradigm in physics had been developed since the end of the 19th century (starting with Maxwell's theory on electromagnetism and later on the works of Einstein, De Broglie, Heisenberg, etc.) (Al-Khalili, 2004). Physics had dethroned the Newtonian world-view. A new scientific revolution had already taken place, and it would eventually pave the way for a new industrial revolution, a new society. Why hadn't it happen yet?

Pondering on this subject, I discovered a possible link in the research I had been conducting earlier: we had created a material world based on the scientification of technology, as Habermas had put it, an immense economic and industrial system resilient to change and to progress. Bacon argued that natural philosophy was the mother of sciences (Bacon, 2000, p. 64). He thus predicted the profound impacts of the Scientific Revolution. But since the industrial revolution and the objectivation of science and technology, this link was broken. We had to restore it. How?

What if there were a single parameter which could change everything? We are inclined to consider that the monumental change in modern science was the shift from geocentricity to heliocentricity. Newton's accomplishment was immense at this field, since he proved heliocentricity mathematically, with his calculus and his law of universal gravitation. What if the most important parameter in Newton's accomplishment were the theory of gravity? After all, it was exactly this theory that was being questioned ever since the theory of general relativity of Einstein was published, and not heliocentricity.

Quitting research didn't help my professional prospects. I lingered in my country for some years, working in the publishing field and reading philosophy. Then, the Greek debt crisis broke, and this didn't help things either. In a context of social upheaval and gloomy perspectives for my future and the future of my family, I decided to leave my country once in for all (I haven't returned ever since). My first step was a bit radical: I went to visit an isolated island in the Atlantic Ocean (Ushant Island in France). I had in mind to stay there some months to clear my mind before taking another step. Finally, absorbed as I was from my ideas and research, my stay there lasted two and a half years. I discovered how storms and windy rain devouring the rocks could restrain your life. I hiked the cliffs every afternoon no matter how the weather was like to take a glimpse of the immensity of the ocean. Nature was prevalent in this rocky piece of land in the middle of the Atlantic, and life seemed so different from the metropolitan frenzy I had experienced so far in my life. Was it? What if we could devise a theory of unification of social and physical phenomena? What if we got it all wrong since the start, since the Scientific Revolution?

A British old-timer I met on the island told me one night that the island helped you pose the right questions. I was fascinated by this phrase, firstly because it attributed to the island a metaphysical individuality (almost like

a deity), secondly because it made me wonder what would be its meaning for me. I pondered a lot about it during my stay there. What was the question the island urged me to pose? I revised my research path under this scope. I had spent years of researching and experimenting in order to answer the following question: “How can we attain sustainability as a civilization?” What if the question was wrong (or wrongfully expressed) from the start? After all, you cannot change a system while thinking in the terms of the same system. You cannot produce new science that overcomes the scientific principles on which your research is based. Maybe my research was doomed from the start. There was no possible answer to this question. If it was so, what would be the right question that would help me explain current chaotic world phenomena and pave the way to a better future?

It had took me twenty years of researching and a lot of thinking to come up with (what I believed now that was) the right question. When I found it, I was convinced that I was finally on the right track. I was certain that after all these years of deception and confusion, this time I got it right. The primary question that I should research was the following:

“What is gravity?”

Living on the island gradually influenced deeply my way of thinking. I had landed there from a City on Fire, Athens burning with mass protests. I found myself in the Realm of Water, a little rock in the middle of the Sea, ravaged by storms and ocean waves. Violent social upheaval on the one hand, brutal natural forces on the other. What if we could unify these phenomena under a single theory³.

I left the island with the feeling that if there was to be an explanation in gravity, it would include waves as patterns of an energy field, propagating around us like the ocean waves that devoured the island. My memory was eternally marked by the violence and the splendor of Nature.

The Road to Gravity

Unfortunately, I was obliged to put on hold this research project for some years. In fact, there is a price to pay for your ethics (Leishar, 2024), and it was time I paid mine. I had quit the easy path of applied research, I became so absorbed by my questions that I found myself on an isolated island in a foreign country. I had to find a way to reconnect myself to the World. I thought that if I got a research grant, I could conduct this research staying on the island, teleworking and networking. This seemed to be an ideal issue for me at that time. I needed some new contacts, researchers who would be interested in my proposal, in order to get a research grant. When I came up with this idea, I reached out to former colleagues of mine, whom I had helped out in their research and academic career, with whom I had collaborated for years. I hoped that they would pay it back to me and help me set up a valid research program, since I was no longer affiliated to a lab. I got no help from them, not even answers to my queries. I painfully discovered that it is naive to believe that people will pay back the helping hand you gave them with good heart. This lesson I learned dearly.

³ The scientific necessity for a theory that would unify phenomena under one general theory was expressed as early as the 19th century, by the positivist Auguste Comte, who also predicted the role of gravity in this unification: “The theological system arrived at the highest perfection of which it is capable when it substituted the providential action of a single Being for the varied operations of the numerous divinities which had been before imagined. In the same way, in the last stage of the Metaphysical system, men substitute one great entity (Nature) as the cause of all phenomena, instead of the multitude of entities at first supposed. In the same way, again, the ultimate perfection of the Positive system would be (if such perfection could be hoped for) to represent all phenomena as particular aspects of a single general fact; – such as Gravitation, for instance”. Auguste Comte, *The Positive Philosophy of Auguste Comte Volume 1*, trans. by Harriet Martineau (p. 27, London: J. Chapman, 1853). In Le Van Baumer, 1978, p. 525.

It is strange how you react when you are feeling betrayed. At first, you do not react at all, you don't feel anything, you just keep on going because you have to. Years later, your memory comes back to the incident, and then you finally come to understand how painful it had really been.

My island days were over. Professionally, there was nothing there for me, and I got short on money. I moved to the continent, the nearby coastal city. I had to provide for my family (I had a wife and a son with me). I tried to resume my academic career, with my research project at the back of my mind. I found out after a lot of work and two years of struggle that the French system is quite selective, especially when it comes to people whose academic references are, well, not French. To lecture in a French university, you need an accreditation given by an exam, your PhD credentials and international publications are not enough (not even valid). I tried to pass this demanding exam. The candidate has to compile an extensive file on his achievements, diplomas, publications, etc. (all in French). The exam consisted in the assessment of this file by a committee. I spent a lot of time and effort on getting this file right, compiling hundreds of pages with translations of articles, diplomas, etc. I failed the exam. I officially demanded to have access to my assessment report of the examining committee. I verified what I had thought. The chairman of the committee "cast serious doubts on my candidacy".⁴ I found out that the chairman of the said committee was the director of the local school of planning. I searched on the school's website and their publications. My expertise wasn't really needed. The local planning school wasn't into my specialization and apparently they didn't plan to invest in this topic by hiring me.

To make a long story short, after several years of decent and hardworking struggle, I finally succeeded in getting a steady payroll teaching job in a Vocational Campus (delivering up to Master's degrees) in 2018, teaching mathematics and sustainable development.⁵ I didn't lose time. I immediately resumed my research, even if my daytime job was very demanding (at least in the beginning).⁶

I started working in the evenings, weekends, and during holidays. I was eager to test my hypothesis: could gravity be an explanatory parameter to nowadays unsustainable chaos? I needed a coherent, solid methodology. I decided to use a systemic approach, I attempted to overview the intellectual history of the West applying a reductionist method (Donadieu et al., 2017). My system had three parameters:

- (1) The worldview: in every era, there is a particular conception of the world, defining (in short), what is real, what is ethical, what is worth-doing.
- (2) The prevailing gravity theory: what people believe gravity is, why things fall.
- (3) The scientific method: what is science in every period, what method scientists and philosophers use to conduct research.

I "run" this conceptual model in four distinct historical periods:

- (1) Ancient times: I refer to the classical period, to the Aristotelian system and its legacy.
- (2) Medieval times: mainly the late Middle Ages, with the development of universities and the publishing of treatises.

⁴ I passed the exam for two consecutive years. In 2015, I formally requested the committee's report. The chairman had rejected my candidacy on the basis that the original text in Greek was not included (I had included a certified translation of the diploma and a publication (Vlastos et al., 2005) based on my thesis). The other two members aligned to his decision; the report's official feedback was that the file should be solidified. Next year, I applied anew including the 600 pages Greek original and a lot of other references. My candidacy was refused again.

⁵ My assimilation in France finally went well, I even succeeded in acquiring French citizenship in 2019 (Dossier n° 2019X 010611 29, 2019).

⁶ Before starting on my own, I emailed a query of affiliation in a French laboratory nearby conducting research in the history of science, explaining my background and the scope of my research. I didn't get any answer.

(3) Modern times: the period of the Scientific Revolution and on.

(4) Postmodern times: I placed post-modernity in the beginning of the 20th century. Based on Physics, I considered that the gradual dethronement of Newtonian physics paved prematurely the way for a new scientific revolution and postmodern relativism.

I defined every parameter for each period through primary research (original texts from every period) (Le Van Baumer, 1978) and then searched for the interactions between the three parameters. It worked. As history unfolded, gravity proved to be a crucial explanatory parameter of our postmodern chaos: gravity had profound cosmological and ontological implications since Aristotle's *Physics*, something that we had lost on the way. To put it simply: when Newton published his "Principia" (Newton, 1999), not a lot of people were even able to understand his work. If we could do a poll in scientists and philosophers of his time asking them to explain the moon's orbit, not a lot of them would be able to explain that it was due to centripetal and centrifugal forces between the Moon and the Earth, some would not even be convinced that the Earth was not the center of the Cosmos.

Newtonian physics became the norm (and they still are today in educational curricula) only after modernity had provoked the industrial revolution, which gave birth to the material world as we know it today. If we look into our period with these findings in mind, we find out that we still don't have a clear understanding of gravity, and that very few people would be able to explain that the Moon's orbit is due to riddles in the spacetime fabric provoked by gravitational waves emitted from the Earth, as Einstein would have it. A new era will finally dawn, when this revolution is finished⁷ (Smolin, 2019), in which laymen will have this intuitive understanding, as technology around them will comply to the new concept of gravity, a new cosmology. In this era, we will have attained sustainability and we will have mastered matter with technology in ways unimagined so far.

There are many methodological and historical findings from this study, but I don't have enough space to report them here, since in the present article I am just telling my story. What is important to bear in mind is that, after finishing my report, I got convinced that I was on the right track and thus I immediately started the theoretical part of my research.

Searching for Gravitational Waves

This part was the most difficult so far. I needed a solid background in physics to proceed. I hadn't studied physics since the second year in the Polytechnic school. I started by thoroughly reading university college textbooks, to refresh my layman's point of view (Urone & Hinrichs, 2020). Even in this preliminary phase, I had gravity on my mind. I took notes about this subject and started formulating early hypotheses. When I finished this first step, I entered more deeply into the subject. I acquired more demanding textbooks (Hewit 2015; Walker, 2014) and started to refine my hypotheses. I applied a reductionist method to clarify my goal and specify my research: I decided to search an explanation of Earth's gravity, why do things fall, and to put aside universal and astronomical implications of any gravity theory (like Black Holes, planets orbits, etc.). That said, the more and more I learned about the subject, the more it became clear to me that the explanation of gravity is a complex, interdisciplinary matter, which demands a solid understanding of various physics subjects.

⁷ Smolin (2019), a renowned physicist, argues that "a radical change in our understanding of nature is required" (Preface) and that will be achieved by quantizing gravity (unifying quantum theory with gravity and spacetime). He also considers that a new complete theory of physics will also be a cosmological theory. It has to be noted that in Aristotle's physics, gravity is an integral part of a complete theory of the natural world, with cosmological and ontological implications.

Newtonian physics was easy to revise, but to step forward, I needed to refresh mathematics. This was also a demanding work (Mathematics Education Centre, 2005; Fleish, 2008). I acquired a sufficient understanding of Einstein's relativity, and then I thought that I also ought to fully comprehend Maxwell's theory of electromagnetism. I was encouraged by the fact that I was making progress by refining my hypotheses, which became more and more elaborate.

A research path is like a funnel, as I said in the very beginning. First, I wasn't convinced by Newton's theory. Even if Newton devised valuable laws of motion, he was not able to propose a theory to explain the cause of gravity (Newton, 2012, p. 943). I wasn't convinced by general relativity theory either. Even if the curvatures of spacetime and the gravitational waves could elegantly explain astronomical phenomena⁸ (Hewit, 2015), this theory couldn't provide clear answers to simple earthly mechanical phenomena that were studied by the time of Galileo and Newton (like projectile motion). I had a hunch that the answer laid in Maxwell's theory of electromagnetism.

After all, it was Maxwell with his equations on electromagnetism who had seriously put in question Newton's scientific world-view that prevailed then, the assumption that everything is made of particles of matter or bodies of mass attracted to each other. With Maxwell, we entered a new world-view of waves and force and energy fields. I acquired the necessary level in vectorial calculus (Mathematics Education Centre, 2005; Fleish, 2008) in order to understand mathematically Maxwell's equations, and to acquire a solid understanding of electromagnetism: how a moving magnet provokes an electric field, and how a moving electric field creates a magnetic one.

Since the very beginning of this questioning, when I was in Ushant Island, reading about the scientific revolution and thinking about gravity, I had formulated an early hypothesis that the answer to gravity lies in the concept of waves and fields. But what field in particular? We know the gravitational field to be a force field. We also have knowledge of the magnetic field of the Earth. Could it be that the two fields were interconnected?

Finishing the demanding work on Maxwell, I came across the theory that I was searching for: gravitomagnetism. It existed (Evans, 2021)! There were analogies between the equations for electromagnetism and the ones of relativistic gravitation. Assuming a weak gravitational field or reasonably flat spacetime, we can derive gravitational equations by Maxwell equations: the gravitational field could be linked to the magnetic field of the Earth, something implying that laws that resemble Maxwell's concept of electromagnetism existed for gravity and magnetism. I thought it to be a capital discovery, that opened the next step on my research: the search for gravitomagnetism and gravitational waves. Maybe, I was close to moving to phase 3. Even if it demanded a lot of work, the stage was set. I had to master general relativity mathematics (tensor calculus), in order to be able to derive the gravitational equations from Maxwell's equations. I also needed a solid understanding of the interaction between the two fields (gravitational and magnetic) in a subatomic level. Then, I could hopefully come up with an experiment.

Back to Square One

In the meantime, I had also advanced at work. I had it made known in my campus that I was an expert in sustainable development. Since the first year I taught there, I was giving lectures and was creating self-learning

⁸ For example, Einstein's general relativity theory has been proven valuable to fully explain and successfully calculate Mercury's orbit precession, using the general relativity field equations in order to establish the curving of spacetime in the vicinity of the Sun (Hewit, 2015, p. 694). See also the gravitational redshift phenomenon (*Ibid.*, pp. 691-693).

modules on sustainable development, to be put at the disposal of the staff and the students. In the post-Covid era, this subject as well my expertise suddenly became very interesting for my superiors. I was offered new responsibilities: conduct a carbon audit, propose a transition strategy, conceive courses and sessions on sustainability, do networking. I successfully carried out this mission and reached out to relevant task-groups in the area as a part of my mission. I accidentally crossed my path with local researchers who had finally started working on the subject of my expertise, even if they came from different backgrounds (it was ironic to discover this, given that ten years ago, my expertise was not considered worth-hiring). This time, knowing the French system, I didn't lose time or energy hanging to any hopes, I wasn't even discouraged by the mistrust with which these new experts saw my expertise and my successful endeavors in my campus.

In a social instance, I met with the head researcher of the sociology lab of the local campus who had recently gone sustainable. After exchanging on sustainability issues, I was eager to communicate with her on my current research. After all, I was conducting this work in solitude for six years, I felt the need to talk about it. When I started describing it, I immediately realized that I couldn't easily communicate on my subject. It proved rather difficult to explain how I got from sustainability to gravity. Instead, I talked vaguely about my work as a historical and sociological research on the methodology of science.

This incident influenced me deeply. It made my mind travel back to the very beginning of my quest, when I was a young and promising PhD student, with faith in the objectivity of science, and strongly opposed to the specialization and compartmentalization of knowledge.

Was I making the same mistakes again? Weren't I following a one-way funnel path, once more? Where was this path leading me to?

I took a semester-long sabbatical from my research. After all, I was conducting this work without a supervisor, I didn't have any deadlines, the primary drive was my intellectual pleasure, pleasure that I curiously felt no more. On the contrary, I sensed that taking some distance was necessary and would be beneficial. I also seriously needed rest, as I discovered: I had been working hard, keeping a day job, a family life, and a night research job from which I earned nothing.

I traced an intellectual path from social to natural sciences, from engineering to philosophy, from sustainability to gravity. Was it the right path to take? I never discovered an alternative, even if I always questioned my findings. However, I finally come to realize, as I am writing these lines, that, committed as I was to my ideals and to my quest for objectivity, self-centered, self-absorbed, and obsessed by my ideas, maybe I have unknowingly conducted a research that was methodologically against method. Maybe I was into epistemological anarchism from the very beginning (Feyerabend, 1993). Maybe, opposing firmly to the ideological character of knowledge, wanting dearly to come up with a science that would change the world, I invented and unquestionably followed my own ideology, restraining unintentionally the scope of attainable knowledge. Or maybe, devoted as I was *not* to be enslaved in another man's system, as William Blake had eloquently put it, I unwillingly got trapped in my own.

I needed a fresh start, a feedback. I felt an existential need to communicate about my work. I wondered where I should address my work (and which part?), and more importantly who would be possibly interested in my unusual research and findings. Since the beginning, my questions were of philosophical nature, and they continued to be. I thought that I should address myself to philosophers. Yes, but on which subject? Through my recent research work, I had come up with a lot of ideas that I considered worth publishing. However, it was obvious to me that the most important and the hardest step, the first that I should take, was to tell my story.

References

- Al-Khalili, J. (2004). *Quantum: A guide for the perplexed*. Quezon City: Phoenix Publishing House.
- Applebaum, W. (2000). *Encyclopedia of the scientific revolution from Copernicus to Newton*. New York: Garland Publishing.
- Applebaum, W. (2005). *The Scientific revolution and the foundations of modern science (greenwood guides to historical events 1500-1900)*. Westport, Connecticut, London: Greenwood Press.
- Aristotle (2008). *Physics*. (R. Waterfield trans). Oxford: Oxford University Press.
- Bacon, F. (2000, first edition 1620). *The new organon*. London: Cambridge University Press.
- Blake, W. (2002). *Collected poems*. W. B. Yeats (Ed.). London: Routledge.
- Donnadieu, G., Daniel, D., Dani ěe, D., Emmanuel, N., & Lionel, S. P. (2017). *The systemic approach: What is it all about? Synthesis of the work conducted by the AFSCET group "Dissemination of the systemic thinking"*. Paris: AFSCET. Retrieved from <https://www.afscet.asso.fr/Archives/Systemic-Approach-eng.pdf&ved=2ahUKEwjK79Hagd2FAxXjVqQEhQthDXAQFnoECCUQAQ&usq=AOvVaw1RzNsmkRmQPlhMH9Kc8sw2>
- Eliot, T. S. (1934). *The rock*. In *Complete poems and plays*. New York: Faber and Faber.
- Evans, Ronald, D. (2021). *Gravitomagnetism: Gravity's secret*. Leicestershire: Matador Press.
- Feyerabend, P. (1993, first edition 1975). *Against method: Outline of an anarchistic theory of knowledge*. New York: Verso Books.
- Fleish, D. (2008). *A student's guide to Maxwell's equations*. Cambridge: Cambridge University Press.
- Fowle, W. W. (1911). Book review of "De Nuditate Sacra Sacrisque Vinculis". *Josephus Heckenbach Theology & Philosophy*, 6(12), 730.
- Habermas, J. (1990, first edition 1973). *La technique et la science comme "idéologie"*. (J. R. Ladmiral, trans.). Paris: éditions Gallimard.
- Hewit, Paul, G. (2015). *Conceptual physics* (12th ed.). Boston: Pearson.
- Kuhn, T. (1990, first edition 1959). *The Copernican revolution: Planetary astronomy in the development of western thought*. Harvard: Harvard University Press.
- Kuhn, T. (2012, first edition 1962). *The structure of scientific revolutions. With an introductory essay by Ian Hacking*. Chicago: Chicago University Press.
- Le Van Baumer, F. (1978). *Main currents of western thought. Readings in western European intellectual history from the middle ages to the present*. Yale: Yale University Press.
- Leishar, R. A. (2024). The price of engineering ethics: A personal story. *Philosophy Study*, 14(1), 22-29. doi:10.17265/2159-5313/2024.01.004
- MacLachlan, J. (1989). *Children of Prometheus. A history of science and technology*. Toronto: Wall and Thomson.
- Mannheim, K. (1998, first edition 1936). *Ideology and Utopia: An introduction to the sociology of knowledge*. (L. Wirth and E. Shils, trans.). London: Routledge.
- Mathematics Education Centre. (2005). *HELM workbooks (helping engineers learn mathematics)*. Loughborough: Loughborough University. Retrieved from <https://www.lboro.ac.uk/departments/mlsc/student-resources/helm-workbooks/>
- Sir Newton, I. (1999). *The Principia: Mathematical principles of natural philosophy*. (I. B. Cohen and A. Whitman, trans.). Berkeley and Los Angeles: University of California Press.
- Sir Newton, I. (2012). *Opticks: Or a treatise of the reflections, refractions, inflections & colours of light* (based on the fourth edition London, 1730). Dover: Dover Books on Physics.
- Smolin, L. (2019). *Einstein's unfinished revolution. The search for what lies beyond the quantum*. London: Penguin Press.
- Urone, P. P., & Hinrichs, R. (2020). *College physics*. Houston: OpenStax.
- Vlastos T., & Barbopoulos, N. (1998). The road pricing controversy—Review of the related argumentation and proposal. In Borrego C. A., & Sucharov, L. J. (eds.), *Urban Transport IV* (pp. 225-235). Wessex: W.I.T. Press. doi:10.2495/UT980221
- Vlastos T., Barbopoulos, N., & Milakis, D. (2005). The spatial capacity approach for a sustainable urban transport planning: The case of Kallithea/Athens. In Kungolos, A. G., Brebbia, C. A., & Beriatos, E. (eds.), *Sustainable planning* (Vol. I, pp. 25-34). Wessex: W.I.T. Press. doi:10.2495/UT030141
- Vlastos, T., Barbopoulos, N., & Milakis, D. (2006). The social background of travel choices. Contribution to the land use and transport research. In *Proceedings of the "world planning schools congress 2006"* (pp. 344-345), Mexico City, 11-16/6/2006.
- Walker, J. (2014). *Halliday & Resnick Fundamental of physics* (10th ed.) New York: Wiley.