

“A personal vision”

"Don't believe because you've heard it.
 Don't believe because many rumor it.
 Don't believe because you read it.
 Don't believe because the masters say so.
 Only after observation and analysis, accept it."

Siddhartha Gautama (Sakyamuni, the Buddha).
 5th-4th century B.C.

Aeschylus writes at the very beginning of his *Agamemnon*:

“The gods invite me to celebrate this moment
 and for this I still have strength,
 because they have allowed
 a breath of persuasion,
 the vigor at an old age, to try to spin past songs”.

Although Cicero, in *On Old Age*, puts in the mouth of Caecilius:

“Truly I consider that, in old age,
 this is the most unhappy thing, to feel that in that age you are importunate to
 others”.

But, like Hugh Lofting's dilemma in *Doctor Dolittle's Zoo*, a character inspired by the Scottish surgeon John Hunter (1728-1793), father of the experimental approach to medicine:

“What to take away and what to put in?”.

And, moreover, how? In *Los Complementarios*, Don Antonio, in a *soleá*, left his poetic credo:

“Obscuro, para que atiendan; claro como el agua, claro, para que nadie comprenda”.	“Obscure, so that they will attend; crystal clear, clear, so that no one understands”.
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In memory of Álvaro Mutis:

“When gratitude is so absolute, words are superfluous”.

Even yes, “Thank you before I go,” wrote Walt Whitman.

Emulating a quipucamayoc I will try to unravel the knots of my quipu. But.
 “Follow the yellow brick road”.

A few references, accumulated over time, have accompanied my entire activity. Johann W. von Goethe's recommendation:

"It is not enough to know, one must apply. It is not enough to want, it must be done".

The *Wisconsin Idea*, which Charles R. van Hise, President of the University, included in an address to the Press Association in February 1905:

"I shall never be satisfied until the beneficial influence of the University reaches every family in the state. This is my ideal of a public university. It is not an abstract concept; it is the commitment that knowledge can and should have a practical impact on the needs, problems, and aspirations of society."

Bertrand Russell stated within a few lines of concluding his *Essays on Education*:

"A generation educated in freedom will have wider and bolder hopes than we had. It is not we, but the free men and women we form, who can contemplate a new world. A thousand fears obstruct the road to freedom".

That summarized *Project 2061*, released by the American Association for the Advancement of Science (AAAS) in 1985:

“The importance of achieving global scientific literacy [of the Nation] for future generations justifies universal public education in a free society”.

Karl R. Popper's sentence:

“*We do not study issues, but problems*; and problems can cross the boundaries of any object of study or discipline [...] We are scholars of *problems*, not of disciplines”.

The concept of “creative destruction,” today's 5G universe or exponential technology —convergence of AI, robotics, big data and virtual reality—, falls under the *Janelia Farm-Howard Hughes Institute of Medicine* (HHIM) philosophy:

"How to solve the most convoluted problems in science today.
 Breaking all the rules."

Joseph L. Goldstein, in his article on the origin and prevention of PAIDS (Paralyzed Academic Investigator's Disease Syndrome), insisted on the need to foster “technical courage” or the need to be aware of established technology and emerging breakthrough techniques. This window looks from the pipette to the architecture and engineering of structures and their management. Hence the projects on treatment of severe clinical syndromes, epidemiological molecular screening, circulatory assistance systems and command console — BIOMED-CAM—, on medical image reconstruction algorithms

—COVIRA: COmputer VIision in RAdiology—, design and construction of a microscope for molecular imaging, my relationship with architectural and engineering studies of structures —codirected the AIDHOS course (“Architecture and Engineering Study Of HOSpitals”)—, the animal house for housing minipigs with defined haplotypes donated by Prof. David Sachs of the National Institutes of Health, USA. or the master's degree in business administration (MBA, Instituto de Empresa). He later became director of the “National Plan for the Prevention of Handicaps”.

Recall David Weatherall, Regius Professor of Medicine at Oxford:

"The increasingly important role of science and the complicated social and ethical factors associated [with its application], which will guide the ability to determine the future, demand greater scientific preparedness from all of us. Policymakers must understand the rudiments of scientific evidence, and society as a whole must be sufficiently informed to be able to participate in the discussion of the complex implications that continually arise from the advancement of [scientific] research. This sensitivity to knowledge must begin at school, where scientific education must occupy a relevant place".

I end this “appropriation” of other people's ideas with David Krakauer, president of the *Santa Fe Institute*. Defender of the fusion of ideas and approaches from fields in principle disparate, beyond borders:

“The scientific opportunities enabled by ‘convergence’ will make fundamental contributions in our future to provide creative solutions to the most difficult problems that threaten our society”.

Apologies, I just remembered the closing of the moving salutatory address of the Master of Gonville and Caius College, Cambridge, in *Chariots of Fire*:

“Let no powers of persuasion deter you in your task.”

One of the latest press releases from the Nobel Foundation reads:

“The Nobel Prize in Physics 2021 was awarded ”for ground breaking contributions to our understanding of complex system“ [...]”.

Convergence enhances our ability to think beyond the usual paradigms and approaches the most diverse and complex situations from multiple perspectives instead of the prevailing mono-view. Convergence between life sciences and physical sciences — physics, chemistry, materials science, computer science and mathematics— offers the opportunity for new creative thinking and production strategies that will stimulate innovation, economic development and the solution of social problems and demands. It will only be necessary to realize its potential for action.

Generally speaking, our institutions of higher education remain entrenched in organizational structures and bureaucratic practices of the past, making the concept of “university innovation” a new oxymoron. The academy must aspire to become an

entrepreneurial organization, imbued with society, where intellectual fusion is an unequivocal aspiration. The reconceptualization of the university as an academic enterprise requires a series of adjustments that must be addressed in small steps: from a modest degree of its own to the entire curriculum. If primary and secondary education have become obsolete, higher education is not far behind. Innovative knowledge has escaped from the traditional university, which is what we have; faculties and departments have been overwhelmed, and the same can be said of “advanced” research centers, of “campuses of excellence”. There are people, undoubtedly, but not institutions.

Convergence — science-mathematics-technology and omniscopic (STEM extended: STEAM) — is a long-term enterprise whose goal is the education and training of citizens and, of course, of professionals capable of elaborating new questions to old issues to face as yet unsolved problems. This requires breaking down or ignoring disciplinary boundaries; only then will new paths of knowledge open up in distinctive learning environments. In short, broad, flexible minds that, regardless of the specialization of their daily work, are capable of tackling complex problems in a global world. This is based on a curricular revolution —a conceptual continuum— from ages five to 18: oral and written expression and reading comprehension of complex texts; multilingualism; mega-history; science-technology/engineering-mathematics; and learning by doing and risk-taking. The ambitious Plan began in 1985 with *Science for All Americans*. Project 2061. A 65-year Project: it began when Halley's comet visited us for the last time; it will continue when it reminds us of its presence again in 2061.

“Who has seen such strange dreams!”, recites Rosaura in *La Vida Es Sueño*.

All this leads, irremediably, to a “search without end”. José Saramago writes in *A Caverna*:

"Start at the beginning. As if that beginning were the always visible end of a badly wound thread from which it is enough to pull and keep pulling to reach the other end, the end, and as if between the first and the second, we have had in our hands a smooth and continuous thread from which it has not been necessary to undo knots or untangle tangles, something impossible in the life of tangles".

The Belgian physician, pedagogue and teacher Jean-Ovide Decroly (1871-1932) created in Brussels, in 1907, the *École de l'Ermirtage*, “the school for life through life” or “Decroly school”. In 1927, Don Ladislao Palenzuela Negrete established the private, secular Decroly School in Madrid. One of the most important and significant pedagogical principles is to train children in the values and conditions to face the real world through educational experience. To make education a pleasant and rewarding task by understanding the peculiarities of each one. The tools: motivation in an atmosphere of freedom.

In that environment, St. Mili Luengo awakened, back in nursery and kindergarten, the motivation. She taught first the meaning of the signs —now I would say that she was a

pioneer of von Petzinger —'s work, then the meaning of letters, the meaning of words and, after that, how to read. Also to write and, soon after that, basic arithmetic rules. The only essential thing, next to playing with a sheet metal or a robot, that a child has to be taught; although most of them are self-sufficient.

The still decrolyana distill, each and every day of the year, poetry, theater, a small orchestra, ballet —in remember María Esparza, appointed in 1933 director of the ephemeral *Ballet del Teatro Lírico Nacional*—, solfeggio and piano with María Cerrajería and maestro Gordillo, sports —“use your hands, not your feet ”— and nature. Also chess (allow me to quote my great uncle José Raúl Capablanca). And above all this, for years, D. Felipe, master, gentle and kind. Fortunately for us he ended up taking refuge in the Decroly. There he taught everything, which he alternated writing Western novels as F. G. Rich. “They study all day long —commented— they have no time to think or understand”. Let the memory serve as a tribute made of admiration and longing. The Decroly School, the closest thing to a liberal school at that time, which was able to incorporate a cast of teachers trained at the Normal and brilliant professors away from their professorships. Not to mention the carpentry shop located on “the sidewalk across the street” —as Gloria Trevi—'s song says about one of the school's headquarters, where one could spend hours admiring the mastery of that artisan wood designer; perhaps something premonitory to the admiration, years later, for the aforementioned Karl R. Popper. The years elaborated a change in the names of the Madrid street map. As soon as I crossed the street where I live, I noticed that the identifying sign read: Street of Max Aub, a writer about whom a distinguished teacher had told us at school. The next street, to finish, has on the sign the name of Ángela Figuera Aymerich, a writer who cultivated children's literature and the so-called uprooted poetry, and teacher in the initial stage, 1931, of my school, the Decroly.

After school, what I did and what I did not do. Theophrastus in his *Callisthenes* includes the maxim:

“Fortune governs life, not wisdom”.

It is said that no philosopher has ever said a more discouraging maxim.

Fortune, which was chance, because what I wanted to be was an aviator, led me to what Publius Virgil Maron related in the twelfth book of *Aeneis*:

“He preferred to know the virtues of herbs and the uses of medicine, and to practice this art quietly and without glory”.

In my case, without a doubt, chance —friendship— and necessity —justify my time— prevailed over vocation. Decisive was the magic word, the open sesame of all doors to which the master William Osler dedicated brainy lines: work. As much as curiosity: questions without apparent answers to tackle the complex. Although there must have been something at the bottom, because of the things I did that were worthwhile, if any deserved it, were three activities very early on: the “milkmaids” —an archaic version of SAMUR— that attended the emergencies in Vallecas pueblo, the guards on weekends at the

Carabanchel alto aid house and the surgery consultation of the Social Security ‘quota’ in the “ambulatory” of San Blas. Something anecdotal, but pleasant, were the substitutes at the Solán de Cabras spa. Years later, many years later, he would become president of the Unified Commission for the “toxic syndrome” and director of the Hospital General [Gregorio Marañón University] in Madrid.

I also quietly tried to serve as secretary general of the Instituto de España for too many years. From 1996 to 2003, by Royal Decree, and elected from 2010 until two weeks ago. Do you remember *Música Callada del Toreo*, by José Bergamín Gutiérrez? It ends with a sonnet by Rafael Alberti; its first tercet:

“A prodigious magical sense,
a silent remembering in the ear
and a feeling that in my eyes without seeing I see”.

In this and other cases, I can draw on what was written years ago, in 2002 to be exact, by Manuel Castellet, who was president of the Institut d'Estudis Catalans, in reference to the Instituto de España and its secretary general, in *Llengua, ciència i cultura. Crònica d'una passió matemàtica*:

«Amb l'Instituto de España o, més ben dit, amb el seu secretari general, hem mantingut una estreta i cordial col.laboració que ens ha permès, sense renunciar a res, beneficiar-nos de la seva posició, Gràcies, doncs».

For his part, the Cadiz native who bore the surname of a dear friend from Malaga — (“Rafalo”) —, who left just a few months to cross the Aqueron victorious, Cabeza de Vaca, wrote in *Naufragios* that:

“On that island they wanted to make me a physicist without examining me or asking for any accreditation, because there they cure diseases by blowing on the patient, and with that blow and their hands they expel the evil”.

The shipwreck happened as soon as I started. In the second year, actually the first year of Medicine, at the Complutense faculty, after a clash with a later esteemed professor of Anatomy, I abandoned my formal studies to study the rest of the curriculum “on my own”. I only set foot in the University for the memoristic exams. This resulted in a rather low-profile, low-flying curriculum. I lived in the Hospital, in an improvised room in a forgotten alcove, and I learned the quiet art in the General de Madrid, today a Museum - years later I coincided with the “reformer”, the beloved D. Antonio Fernández de Alba, in the RAE-, under the guidance of Amador Schüller, Pedro Gómez, and the nurses Sister Teodora and Sister Dominga and Adela Sauras. Thus began my relationship, strengthened after winning a competitive examination to become a boarding student and the support of those two teachers, with what is now the Gregorio Marañón Hospital, despite my continuous departures.

Heterodox training in medicine allowed other activities. I flew without engine in Somosierra, Monflorite and Ocaña; with engine in Grajera. I did the University Air

Militia (MAU) internship as a medical ensign in the Central Air Hospital and served a confinement in one of the Spanish-American airspace control bases. The “Matador” base, in Villatobas. A technological oasis in the Mesa de Ocaña, north of the Mancha Toledana. There, in 1968, I perfected my English, learned to play tennis with the priest of the squadron stationed there. And most importantly, I gained access to the cutting-edge ICTs of the time in a restricted environment of high strategic value. Over the years, I took a diploma course in “National Defense” at the Higher Center for National Defense Studies (CESEDEN). Years later, the Ministry of Defense welcomed me for a long period. And, why not, the annual interdisciplinary meetings of ASINJA.

From Villatobas to the Thoracic Centre in Sully, Glamorgan, attached to Cardiff University in Wales. Then the jewel of thoracic pathology. After some time, back to Spain. At that time if you wanted to do thoracic surgery you had to find a way to go to La Paz, with “the Marquis”. I had the opportunity to assist Christiaan Neethling Barnard in the heart transplant he performed on a dog in that Department of Surgery. At the end, we shared a “Celta”.

Given the environment —among others, the “Celts” were unbearable—, to see other environments. Northwestern University, Evanston, Chicago. Mariano Alvira (b. 1942), resident at Pathology. Roc Pifarré i Florejachs (1929-2010) and his dog. In 1993 the Roc Pifarré Foundation was created to manage and channel biomedical research in the health institutions of the Lleida Health Region), cardiologist and cardiovascular and thoracic surgeon, Loyola University Chicago. A stone's throw away, long distance, Madison, Wisconsin. Robert H. March (b. 1934) “taught” in an interdisciplinary program called Integrated Liberal Studies. He had just published the first edition of *Physics for Poets*, which he then reprinted in 1978, 1992, 1996, and 2003. I have all of them. I don't know if he published more. I went to his “classes”. I learned what it is to be a “teacher”. I went back during my stay in Michigan. I also met Leon Max Lederman (1922-2018), who acceded to the Nobel Prize in Physics in 1988—which he shared with Melvin Schwartz (1932-2006) and Hans Jakob Steinberger (1921-2020), whom I did not know, “for the neutrino beam method and the demonstration of the double structure of leptons through the discovery of the muon”-. He wrote *Quantum Physics for Poets*. He did it in collaboration with Christopher T. Hill (b. 1951); I was introduced to him by Murray Gell-Mann (1929-2019), who had won the Nobel Prize in Physics in 1969, “for his discoveries on the classification of elementary particles and on the interactions between them.” He was a great friend of my great friend Francisco J. Ayala (1934-2023).

Then Michigan. Finally, Spain. Priority, the doctoral thesis. I was able to publish it thanks to a grant from the Spanish Boxing Federation; in exchange, to work as a promoter of the fry of the golden age of Spanish boxing. A previous application to the College of Physicians was rejected because it was not considered a necessary “tool” to practice the profession. However, I was awarded an assistantship in experimental surgery at the Autonomous University of Barcelona.

The comings and goings continued. In London, Imperial College and the Mathematics Department of Eduardo Ortiz; in Houston, the MD Anderson Cancer Center with Frederick Becker, head of the Department of Molecular Pathology and pioneer in the epigenetic mechanisms of cancer; in San Diego, the Department of Aerospace Engineering-Jacobs School of Engineering of Juan Carlos Lasheras, a dear friend who passed away a few months ago; in Berkeley, Paul Feyerabend and epistemological anarchism; in Irvine, evolutionary biology with Francisco José Ayala, another close friend for many, many years, with whom I co-directed the Chair of Science and Law of the Garrigues Foundation - I was able to learn about the President's Committee of Advisors on Science and Technology (PCAST) from him -, and, above all, in Santa Fe, New Mexico, the Santa Fe Institute for the study of complexity. The SFI —*sanctum sanctorum* of complexity, without leaving aside the marimba groups in Santa Fe square— allowed me to taste, albeit in small portions, the now elderly George Cowan, first president of the Santa Fe Institute and a central figure in transdisciplinary science; Ellen Goldberg and Robert Eisenstein, both directors of the National Science Foundation; Geoffrey West, founder of the high-energy physics group at Los Alamos National Laboratory; Jerry Sabloff, chairman of the Smithsonian Science Commission; and writer and game designer Neal Stephenson. I must not forget one of the co-founders of the *sanctum sanctorum*, Murray Gell-Mann, winner of the 1969 Nobel Prize in Physics, a frequent visitor to Spain. Murray was a decisive factor in the future CSIC-INTA Astrobiology Center. Once I was fully involved and with the help of Ricard Solé, I was able to contact the current president, David Krakauer, also director of the Wisconsin Institute for Discovery, promoter of the convergence of knowledge, Big History and the InterPlanetary Project.

As in many other initiatives, on this occasion and despite Krakauer's strong support:

«This is a very strong letter of support for your new initiative relating to the creation of the Institute Comillas of Complexity. It is one of the most exciting and necessary proposals that I have read in a long time»,

the extensive writing begins, and numerous leading figures in the world scientific field, the pretension of implanting a “franchise” of the Center of Complexity, an exceptional project, was sent to limbo... computer science. Although with respected exceptions to whom I must acknowledge their explicit support beyond mere commitment; I am referring, among others, to Fernando Ruíz.

An aside. In the wake of Krakauer's letter, the dark side of the person emerges, the one marked by the flag of vanity -wasn't it raised a few lines ago? I am referring to the letter from Professor Ursula Schäfer Lamb, distinguished historian at the University of Tucson, in Arizona, specialized in Latin American History, in relation to my text *The Madrid Mathematical Academy of Phillip II*:

«Your sending the article to me is one the best things that has happened to me for a long time».

Through the Santa Fe Institute (Parallax) I also met three great mathematicians who disappeared in 2020: John Conway, co-creator of Game Life; the subversive Freeman Dyson, a legendary mind, a translator of physics into mathematics; and Ronald Graham, the driving force behind combinatronics and Euler medalist, whom I followed in San Diego with Lasheras.

Regarding the science-art dialogue, tensegrity with mathematicians Miguel de Guzman and Robert Connelly, and Donald E. Ingber, cell biologist and bioengineer installed at MIT dedicated to cytoarchitecture. My last directed doctoral thesis concerned a model of spinal tensegrity and its implications for the treatment of congenital deformities. After breaking down some barriers, two mathematicians and a structural engineer were part of the tribunal. A nod to the motto of the Chinese Jixia Academy —coetaneous to the Platonic Academy back in 380 B.C.— “innovation by opposition”.

I cannot leave out the Pamplona-born Ángel Jordán Goñi, Dean of the Carnegie Institute of Technology, a pioneer in robotics. Nor the Biennial Meeting of the Philosophy of Science Association, to which I belonged, in Philadelphia in 1982, with Bruce G. Buchanan —linguist, Professor of Computer Science and Philosophy, then at Stanford, today at the University of Pittsburgh— or what is the same as AI and language. Both entrenched the experience started in Villatobas on creative evolution. And of course two bookstores: Librería León, since lustrums ago a cocktail bar occupies its premises, in Madrid, and the Seminary Co-Op Bookstore on University Avenue, in Chicago, which is still a bookstore.

Nor ignore those moments of which I can say: I was there! Musical Youth. The indelible memory of the Bayreuth Festival 1961: *Das Geisterschiff*, conductor Wolfgang Sawallisch; the soprano Anja Silja performed the most captivating “Ballade of Senta” I have ever heard. Also, present on my name day in 1985: St. Peter's Basilica, Herbert von Karajan, Vienna Philharmonic Orchestra, soprano Kathleen Battle, officiated by John Paul II, Mozart's “*Coronation Mass*”. In November of the following year, the cycle of Beethoven's sonatas by Daniel Barenboim at the Real; or the violin solo of the *Benedictus of Beethoven's Missa Solemnis* by Thomas Brandis, concertmaster of the Berlin Philharmonic. How can we forget! the concerts of Francis Chapelet and Antonio Rodríguez Baciero with the organ of the Collegiate Church of Covarrubias, after the obligatory stop at Silos for matins. Without leaving the compositions of Antonio Vivaldi Gloria or *Juditha triumphans devicta Holofernis babrbarie, Sacrum militare oratorium*.

In the meantime, an advertisement in the Madrid newspaper, which had been closed, gave news of the first Molecular Biology course to be organized in Spain. It was directed by Ángel Martín Municio. Soon the ties were tightened. In his department I fiddled in the laboratory, I learned biology, I soaked in *Flamenco* —¿*Flamenco*? Yes, of *Flamenco*— and I taught Molecular Physiopathology which, over the years, crystallized into a Chair. Ángel Martín Municio, then an elected Academician since 1982 of the Royal Spanish Academy of which he would become, in 1992, its first vice-director, vice-president of the

European Language Resources Association and first Spaniard in the European Molecular Biology Organization (EMBO), together with Mr. Enrique Sánchez-Monge, a pioneer in plant transgenesis, and Mr. David Vázquez Martínez, first Spaniard in the Scientific Committee of NATO, presented my candidacy for the position of Full Academician of the Royal Academy of Exact, Physical and Natural Sciences in June 1983, vacant due to the death of Mr. Florencio Bustinza Lachiondo, who had proposed Mr. Ángel in 1969. I read the reception speech *—Lo Exacto, lo Físico, lo Natural, y la Medicina—*, under the presidency of Manuel Lora-Tamayo. Manuel García de Viedma e Hitos and Luis García Jodra tucked me up to the podium.

At that time —in 1973, on his return from the USA — he had organized and directed an unpublished course in a Hospital on “Advances in Biology”. Among others, Alberto Dou spoke on “Limitations and Logical Possibilities of AI”, or José García Santesmases who spoke on “Neural Networks, Shape Recognition and Learning Systems”.

Back to my friend. During his stay at the Rijks Universiteit in Utrecht, Martín Municio worked as a Spanish Reader. Among the regulars was Leo Elders, of the van Steyl congregation of missionaries, a Thomist —translated into Japanese all the Aquinasian work— and a precursor of what is now known as “biblical Thomism”. His countenance radiated serenity and calmness. What Anticlea, washing Ulysses' feet, praises:

“The calmness of speech”.

The same spirit I found in the Madrasa or University of Sankore, in Timbuktu or Tin Budt, the city of the 300 saints. Or, in the one considered by UNESCO as the oldest university in the world, the University of Al Qarawiyyin, in Fez, founded in 859. On the other side of the world, the Austral University of Chile, in Valdivia, with the sad memory of its double fire in the laboratories.

The meeting with Don Emilio Botín meant a change of course. The obstacles to setting up a Howard Hughes Medical Institute-type program in Spain led me to make repeated visits to the USA. The generosity of Francisco José Ayala allowed me, on the one hand, to meet the patriarchs of gene therapy: Theodore Friedman, the “father” of the revolutionary therapy, Helen Blau and David Curiel, and, on the other, the opportunity to attend the sessions of the US President's Science Advisory Group. Among others to Shu Chien, doctor and engineer, one of the few who belong to the three academies —Sciences, Engineering and Medicine— of the National Science Foundation who, years later, formed the commission along with Juan Carlos Lasheras -already mentioned-, Antonio Artés and who writes this for the development of the Department of Aerospace Engineering and Biomedical Engineering and Sciences at the initiative of the then Rector of the UC3M, Daniel Peña. I was also one of the eight members of the IAP (the global network of science academies)-IAC (the InterAcademy Council) joint Development Advisory Committee. Later I became a member of the International Advisory Committee of the Barcelona Knowledge Hub of the Academia Europaea. Years before, he was the Secretary General of the Spanish chapter of the International College of Surgeons.

The Botín Foundation's Science Program marked a before and after in the evolution of Spanish science; the book *28 Historias de Ciencia e Innovación Biomédica en España* (*28 Stories of Biomedical Science and Innovation in Spain*) describes it. I learned the job of “scouting” researchers. Getting to know them in their environment, participating in their seminars, a minimum follow-up of five years, did they maintain what they did in other environments in this one, what did they do and do? In short, evaluate people, not scales.

Living organizations are fluid and mobile. As a rule, I used to start my classes on Surgical Pathophysiology by telling my Complutense students that this subject, at least, was not the most important one. Thinking is. I added that I must have known this firsthand because during all those years I was the only professor of this discipline in the entire Spanish University, and the situation, apparently, continues. However, it serves as an example of the prevailing confusion. Surgical or molecular pathophysiology, or general pathology, are a mere administrative unit with several names. We must motivate the emergence not of denominations but of innovative ideas on a solid background. But there are no disciplines. There are only problems and the drive to solve them. On the first day, the teacher informed the students that the program had been explained. Attendance was voluntary. Recommendation: acquire *The Meaning of Physics*, by Don Carlos Sánchez del Río; when you have assimilated it, not before, you will be welcome. Read it. UCM students have another no less enriching opportunity: on the campus of the University City they can freely attend Mathematics, Physics and Chemistry, Biology, Law... and listen to, meet, and get to know teachers and students who are worthwhile.

Ramon Gomis, respected and admired friend — clinician, researcher, teacher ... and writer of prose and theater, Award for Creation Fundació Enciclopèdia Catalana —, comments:

“One specializes when one goes deeper, when one wants to know more, never as a refuge to avoid global knowledge, the one that goes from word to number, from idea to image, from science to art”.

The cost of the disciplinary approach is that it restricts the scope of our questions and many extra-disciplinary ideas that contribute to the progress of the cultural whole are lost. We are in a period of transience or convergence of knowledge, an expression that recalls Goethe's *Divan* and recognizes the value of approximation, of the synthesis of knowledge as an institutional priority, today through exponential technologies. Society and academia must wake up to the full involvement of this reality. Great ideas are often characterized by considerable generality. The greater the problems, the greater the opportunities. The mission of the Academies is to find them. Numerous institutions - unfortunately all outside our borders - have done so. Some were unknown only a few years ago.

I am not in favor of fashions, be they of opinion or scientific. I assume instead that simplicity, not simplicity, and clarity are values in themselves. Most of the fundamental

ideas of science, as a rule, can be expressed in a language understandable to all. I question the proliferation of experts, for “the prudent surpasses the prophet,” says the Talmud Babli. Also, Einstein's phrase: “Everything should be made as simple as possible, but not simpler”. Excessive respect for the specialist destroys the republic of knowledge, the rationalist tradition, and science itself. The COVID universe is a sample.

When I suggested, already as a university professor, that the basic philosophy of medical or any other university education and training should be directed, following the philosophy of Johns Hopkins — and Decroly —, not to create a cardiologist, a lawyer, an engineer... but to form, in their field, a totipotent, stem-cell type citizen, sufficiently well prepared —including practice [in the case of Medicine, Health Centers]— and with an open mind to be able to face the complex problems of the real world —risk culture—, or that the new curriculum must prepare people for the demands and responsibilities of a new era of knowledge in science, mathematics, engineering and the humanities, I received a warning from the University for “unregulated teaching.” Nor is this attitude of rejection new. Back in the 1990s I organized in “my” Hospital some “General Colloquiums”; open debate on topics of general interest. The closed-minded environment ensured their disappearance within a couple of years.

Remachar con las palabra de J. P. Kennedy en *Adventures in the Obvious*:

«I believe that the challenge to the universities is not to graduate students for survival in the technological world of today but to educate students for a meaningful life in the ethical world of tomorrow. There might be doubt if there is to be life tomorrow with the technology and ethics of today».

Recalling Xenophanes of Colophon:

"As for the certain truth, no human knows it and none will know it. All is a web of conjecture".

Alas, retirement came and the longed-for disciplinary correction was left unfinished. Instead, I am immersed in *Project Zero* of Harvard's Graduate School of Education, and in the Big History Project. It is worth mentioning that, hand in hand with Angel, we tried to launch, on two occasions, one of the first private universities in this country; with a different campus, an innovative, convergent curriculum. No de facto faculties, no departments; the big issues. Failure was assured. Also, the attempt to put together a Metapedia. An attempt to connect the totality of the available knowledge; chosen a word to reach the farthest one, apparently unrelated, following a logical path. At the Frankfurt Book Fair, back in 1991, Espasa received an international distinction for a sample, presented by this writer, related to the neuronal universe.

The pattern we observe in the evolution of the so-called scientific disciplines is what the late Buckminster Fuller characterized as “accelerated acceleration”, which implies that new ideas appear faster than the possibility of response through the reorganization of studies and departments.

Above all, language is the generator of tomorrow.

"Our lives depend on the ability to express hope, to entrust to conditional sentences and futures our active dreams of change, progress and liberation. More precisely —continues George Steiner—, of all the evolutionary tools toward survival, the most important is the ability to handle the future tenses of the verb."

“Without it —for Baruch Spinoza in *Ethica Geometrico Ordine Demonstrata*— men and women would be no better than falling stones.”

It is impossible to imagine being without discursive openness, without the potential to question. *Science Begins in the Word* is the title of Bertha Gutiérrez. Perhaps for this reason, Antonio Colino López, Margarita Salas Falgueras and José Manuel Sánchez Ron supported my candidacy to opt for the vacancy due to the death of Domingo Ynduráin Muñoz, in the Royal Spanish Academy. I read my acceptance speech —*De Calderón y Cibercirugía*—, on October 29, 2006. Francisco Brines Bañó and José Manuel Bleuca Perdices sponsored my entry. Víctor García de la Concha presided. Ten days ago I was elected Secretary of the Royal Institution.

My relationship with the RAE, however, dates back to 1992, with Ángel Martín Municio, recently appointed vice-director and Fernando Lázaro Carreter, director of the Royal Institution since the previous year. At that time the Academy wanted to “computerize” itself. With the collaboration of a then doctoral student in medicine and telecommunications engineering, we undertook the task. An important multinational company thwarted the attempt.

This linguistic impulse stimulated me to find some new word to describe part of the situation posed in my craft. “*Numeromics*” —the DLE does not include it... yet— describes numerous people who form substantial waiting lists, which the System intends to gobble up by attending to that crowd of users in the largest possible number and in the shortest possible time, without taking into account the substantial human and technical resources to do so. A word that has found its place in the great omics family: genomics, epigenomics, proteomics ... *numeromics*.

In the context of this large family, -omics, a term I cherish daily is “*culturomics*”; also not, as yet, in the DLE. The original word —*culturomics*— first appeared in the seminal article by Erez Lieberman —with whom I came into contact through SFI— and Jean-Baptiste Michel, along with eleven motley contributors and The Google Books Team, published in the journal *Science*, January 2011:

"Culturomics is the application of high-throughput data collection and analysis to the study of human culture. Culturomics' extends the boundaries of rigorous quantitative inquiry to a wide array of new phenomena spanning the social sciences and the humanities".

The corpus handled consisted of 500 billion (x 10⁹: m M) words; in English (361 m M), French (45 m M), Spanish (45 m M), German (37 m M), Russian (35 m M), Chinese (13 m M) and Hebrew (2 m M). This cloud computing involves, at least, virtual reality, artificial intelligence and big data. I indicated, lines back, my encounter with AI and language during the meeting of the Philosophy of Science Association in Philadelphia in 1982. Recall at this point the 1973 course, at the Hospital; AI was already discussed there. In 2015 I joined, on behalf of the Institute of Spain, the Committee of Experts for the Promotion of the Natural Language Industry (Secretary of State for Telecommunications and for the Information Society. Ministry of Industry, Energy and Tourism).

Also, remember the encounter with the Pirahā language and the work of linguist Daniel L. Everett during my stay in Medellin - a project funded by the Community of Madrid with the aim of studying certain conditions of the Amazonian ethnic groups - through the Caro y Cuervo Institute; or the direction for years of the journal ARBOR of the CSIC.

An aside. Years before, I had contacted Óscar González Quevedo Bruzan, the Jesuit “Father Quevedo” who implanted the *Isso non ecziste* in parapsychology. He had established himself in Brazil in the 50's. From his hand I tried to create a unit of “traditional medicines” which, as expected, did not prosper. He died without seeing it in Belo Horizonte.

Paolo Rossi comments that the gestation in Europe of the first scientific societies and academies, outside the sphere of the universities and far from ecclesiastical control, involved at least three fundamental ideas: to organize and coordinate ideas; to make the relations between the culture of mechanics and technicians and that of theoreticians and scientists stable and fruitful; and to communicate the results of research, of knowledge in general, to the widest possible public. A vision that must be defended, again, at all costs: Academies are not an appendix, a continuation of university departments. Academy and University must collaborate, cooperate, understand each other, but their mission is different in different fields. If we appeal to taxonomy, Academy and University are different realms. The Academy is not the last link in the university chain. Moreover, not everything is and should be Academia.

So we must decide. Mark Twain or Niels Bohr or..., the authorship is not clear, commented:

“Predictions are very difficult to make, especially when than deal with the future”.

We have two options. The sentence of Dan Quisenberry, who reached the baseball Hall of Fame and ended up in poetry:

“I have seen the future and it's just like the present, only longer”.

Or the reflection of Frank Rhodes, Rector of Rectors:

“The future has always been different, and it becomes less and less like the present or the past”.

It remains to go back to the beginning. The memories, which are names and situations. It was worth it.

I conclude with D. Antonio's words:

“The adjective and the noun,
backwaters of clean water,
are accidents of the verb
in lyrical grammar,
of the Today that will be Tomorrow,
the Yesterday that is Still”.

But “tomorrow is always late”, Federico Mayor titled.

Tomorrow is always late to enjoy our children
—Alberto, Ricardo and Marta— and grandchildren —Iván, Nadia and Maya—,
in each of their stages, while we last,
right, Nela?

PEACE and GOOD.

*The present narrative concludes on the eighth day of October 2022.
On that day a wound occurred that will take time to heal or,
most likely, will become chronic.
Alberto did not have the opportunity to say goodbye.
I long for the hope of the arrival of a reassuring oblivion.
This is not entirely true either!
The wound is the place where we are condemned to live.*

I close this saddened memory, transcribing the words of my grandson Ivan:

*"I could say a thousand and one good things about this special man in my life,
but I would fall very, very short.
I only ask You to take care of him and help him to find the way to You,
just like him, he guided me in such difficult moments and throughout my life,
to find and achieve everything I set my mind to,
I will never stop being Van Van.
Rest in Peace, Tito."*