

Dreams and Sciences in mirror, from a world to the other one*.

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You are an angry researcher and maybe decided to resign¹. Halt your steps on the Parisian asphalt, close your eyes and start to dream. For example, of a long strip of beaches gilded by a summer sun in the Brazilian Nordeste (Rio Grande do Norte). Here you are, escaped from the Parisian wintry weather to join, for the inauguration of the International Institute of Neuroscience of Natal, the two French representatives including myself, miraculously supported by the Ministry of Foreign Affairs in this period of scarcity.

The planning of this new research center in an economically disadvantaged region, miles away of any preexisting economic niche, had begun like the speech of Martin Luther King, "I had a dream". The Professor Miguel Nicolelis, a famous researcher in Neurosciences in the United States, and two of his colleagues², among who a specialist of traditional capoeira³, all three Brazilian expatriates, had convinced the government of their country of origin and their emblematic President, Luiz Inácio Lula da Silva ("LULA"), to dash into the construction of a scientific and educational complex with an international vocation. This complex, to be build within the next five years, will be implanted near the city of Natal. It will group together an Institute of Neuroscience composed of twenty-five independent laboratories, a third of which will be exclusively dedicated to collaborations with the rest of the world, a clinical health center dedicated to prevention in neonates by vaccinating against infectious agents related to the environment, a pilot school of excellence for the benefit of children and adults living in the neighborhood of the Institute, allowing to fight the increasing illiteracy in the Nordeste, and a museum of Science. This dream does not end at the beaches of Natal, because the ambition of this first project is to demonstrate the feasibility of a concept-example intended to be cloned in other needy regions of Brazil and extended to other domains such as genetics, food production, the nanotechnologies, the environmental sciences⁴. Given the socioeconomic stakes, such an attempt seems feasible only with the indefectible support of a president of the Republic who is a humanist, and such is the current situation in Brazil.

Reopen your eyes for an instant. The awakening is hard. In this hemisphere, it is the end of winter. You are back in Paris, beating the pavement towards the City hall with your colleagues protesters. Remember, Paris, March 9th, 2004. The demonstration to which you participate on the Parisian side is not about the celebration of creation of new institutes. Quite the opposite! It is the expression of the concern of all the signatory lab directors of the movement "Sauvons la Recherche" ("Let's save research"), facing at that same moment the disdain of a government without ambition nor scientific prospective.

The speech that you are told back is nevertheless clear, and, strangely, the image in negative of the speech of Miguel Nicolelis and the letter of support of president LULA. From the French presidential palace, you have received the day before a letter from the master of the place in which you did not find any answer to your concerns about the lack of scientific job security and the asphyxiation of laboratories budgets. It is little to say that since the beginning of the mandate of a French president elected with 82 % of the votes, you have been deprived by the political authorities of a national debate on the big societal issues and on the role of the Science. It nevertheless happened in the past, with Mendès France and De

¹ Web Reference of the Movement of the researchers: <http://recherche-en-danger.apinc.org>

² Sidarta Ribeiro, postdoctoral fellow in the laboratory of Miguel Nicolelis at Duke University and Claudio Mello of the University of Oregon in Portland.

³ Traditional Brazilian dance the origin of which goes back to the time of the Angolan slavery, where the slaves hid their combat training by making ritual sequences of acrobatic and stylized wrestling movements.

⁴ Triunfol, M.L. and Mervis, J. (2004). «Brazil Institute charts a new hemisphere for Neuroscience». *Science*. 303 : 1131-1132.

Gaulle, the scientific research being then the object of national conference, and this is happening in another way in Brazil.

The institute of paper Miguel Nicolelis is telling us about in the conference room of the Hotel Pyramids in Natal still belongs to the world of dreams. The magazine Science, authoritative in international Research, will publish the photograph of a hut lost in a jungle of mangoes and coconut trees⁴. The field of the dream, gracefully given by the Brazilian government is still only a fallow land, at the edge of a national park, bounding a empty space of hundred of hectares, on a cliff ending just in front of the ocean. The committee of international experts, gathered for the occasion of the meeting of Natal, removed with difficulty their shoes and socks, to walk bare-foot on the road diluted by the last tropical rain and that leads them to the announced site in the humming of mosquitoes and the oppressive heat of Nordeste. In a collective effort of mental depiction, they imagined all together the virtual silhouette of the architectural project reproducing that of the pioneering airplane of Alberto Santos Dumont in this unusual decor. What man is Miguel Nicolelis then, to start the move in the mud of a bunch of leading scientists, including several Nobel prizes, and to entrain them later at night in a round of capoeira, a Brazilian traditional dance, to participate to his dream?

His bet is the bet of forced innovation. Referring to recent economic studies⁵, linking the gross domestic product to a factor characterizing the capacity of innovation of a particular nation (taking into account the crossed influence of several economic variables), Miguel draws your attention onto the line along which the performances of the various countries scatter, with France at the end of the leading group of the so-called "developed" nations, and Brazil at the head of the secondary group of nations "in development". Miguel's *credo* is that Brazil, by a voluntarist policy, will be able to shift from a culture of imitation (where it excels, in the same way as India, with skills well above the level predicted by the average level of economic development) to a culture of innovation usually reserved to the developed nations.

Facing such comments, you cannot refrain from thinking again about the report "Education et croissance" ("Education and growth"), compiled by two researchers of the CNRS (National Center For Scientific Research) and Harvard⁶, which shows that France "dropped out" of the group of the innovative countries. The group of innovation naturally includes the United States, but also other European Scandinavian countries like Finland, Sweden or Denmark, where efforts in innovation and the investment by the industry and public funds in basic research are the main engines of the economic growth. As raised by these researchers, for the countries of imitation, it is the primary and secondary educations that count. In the countries of innovation, higher education⁷ is the driving element. In France, the political power leaves universities lying fallow and the massive decrease of student registrations that results from this, does not affect all the scientific fields, but mainly the education in the University⁸. France thus seems eventually condemned and destined to return to the rank of the countries of imitation from which Brazil wants exactly to escape.

What is striking, viewed from Natal, when you find yourselves surrounded by researchers, politicians and entrepreneurs from other countries, is the ideological divorce in the French crisis between the world of the decision-makers and the world of research. What shocks is this absence, in our country, of respect for the actors of research⁹. It is not surprising that, in these conditions, the students themselves

⁵ Porter, M.E. et Stern, S. (2003). « Ranking national innovative capacity : findings from the national innovative capacity index. » In Innovation Policy and the Economy, Vols. 1-3 (edited with A. Jaffe and J. Lerner), Chapter 2.2. pp. 1-25, MIT Press.

⁶ Report by Elie Cohen (CNRS) and Philippe Aghion (Harvard) for the Conseil d'Analyse Economique (Council of economic analysis) connected to the Cabinet of the French Prime Minister.

⁷ Higher Education in France costs 1.1% of the Gross Domestic Product versus 2.3% in the USA!

⁸ In Life Sciences, the first-year registrations in Physics and Chemistry decreased by 46% and by 27% in Earth Sciences (statistics between 1995 and 2000). Three out of four students decide to stay in the US after their doctoral degree in an American university.

⁹ The market value that the French society grants to the apprentice-researcher illustrates this lack of respect. It is not disgracing the police to notice that a policeman trainee earns as much as a young researcher with 12 years of higher education. However it is truly denying the added value of any academic training, as recently underlined by the Academy of Sciences and his President Etienne Emile Beaulieu. The young generation of scientist is condemned to be poor besides being disliked.

feel the abandonment of the research and the university, and, through them, the cultural and intellectual ambition supported by the State. This statement, of a loss of respect for the function of researcher and for the national institutions dedicated to public research, is specifically French, and does not apply to Brazil or to the USA. It is not only the opinion strongly expressed by a caste of leaders disconnected from the world of science and basic research, or by manufacturers blinded by a policy of immediate profitability, but it also curiously appears in the comments of former scientists, taking their definitive retreat from the citadels of knowledge, but still aspiring to remain men of power¹⁰. The apocalyptic vision of a quasi-Soviet dinosaur on the eve of an extinction that they give of the biggest research institute/instrument at the national level, the CNRS, is closer to a rhetoric of lounge than to any objective observation. The specter of trade unions and committees of apparatchiks deciding on the researchers' careers only frightens the politicians and the mandarins, and this point of view cannot be seriously sustained. For a long time, the CNRS has reduced the trade-union power, and the national committee has acquired a professionalism in the scientific evaluation that exists in France only in the main research institutes and regrettably little or not in the universities. Let us clearly denounce partisan affinities and political calculations which in France constantly take the step on the simplest observations, thus generating a perverse, because chronic, controversy. Likewise, the criticisms made by the Cour des Comptes ("Revenue Court") or the internal reports of the Inspection Générale des Finances on the administrative heaviness in public research institutions also seem so inequitable, because imposed by the Ministry of the Budget and not the Ministry of Research¹¹. The first step in the reform asked by the CNRS itself would be to remove the administrative constraints generated by the State which transform the researchers-directors of laboratory into people in charge of procurement contracts and add to their daily practice of research a multitude of tasks of management, control and administration, some of these tasks being clearly beyond their original competence and their function. When will the administration understand that it has to serve the research effort and not to paralyze the scientific actors under a stiff hierarchy of administrative constraints?

In Natal, no dissension appears yet between politicians, decision-makers and researchers. The vision of a Science as social engine lauded by Miguel Nicolelis received the immediate respect and the intellectual support of all. The scientists present at the meeting were also moved by the rumors from France. After the scientific debates, foreign researchers of renown, under the leadership of Gordon Shepherd from the University of Yale¹², Rodolfo Llinas from the University NYU and the German Nobel prize, Erwin Neher, met spontaneously in the room of the restaurant of the hotel Pyramids. They signed a motion, telling their support for their French colleagues, warning the French authorities against the risk of an irreversible decline of French science¹³. The fact that we find side by side in this list of support, which lengthens from day to day, the 1972 and 1991 Nobel Prize of medicine winners, eminent members of Royal Society (United Kingdom) and National Academy of Science of the United States thoroughly contradicts and at the same time, makes ridiculous the comments of the French Minister delegated to the social liberties, Patrick Devedjan, who, as an ideologist of a badly enlightened right, allowed himself to write about the researchers that "*in the United States, they have Nobel prizes, here they make petitions*".

The congress of Natal ended on tuneful sambas and capoeira songs. The comparison between both conceptions of the role of research expressed on March 9th, at the same moment, and nevertheless on one side in summer and the other in winter, in two places separated by an ocean of cultural differences, illustrates the cleavage between two political conceptions of Science: The one in Brazil, where the research has to carry culture, education and the scientific development under a profoundly social banner¹⁴, the other, organized by the French government in countercurrent to the public opinion¹⁵,

¹⁰ Interview of Jean-Didier Vincent by Luc Bronner, "We shall not spare a total reform of the CNRS: it must not be anymore a citadel where one makes a career from 30 to 65 years ". Le Monde, March 20th, 2004, p. 11.

¹¹ Year 2003 Report of the Cour des Comptes made public on February 4th, 2004, and internal report of the Inspection Générales des Finances, supervised by Henri Guillaume, pre-published by the Express and Les Echos, and having required a right of answer for the Director of the CNRS. The latter report denounces an institution "weakly reactive, incapable of reforming itself, a disastrous joint management of the scientific policy, a pleasing/convenient evaluation of the quality of the works, a plethoric and expensive administration".

¹² Shepherd, G. «France, ta recherche perd la tête» ("France, thy Research is losing its mind"). Libération. 16 janvier 2004.

¹³ The list is available on the website «recherche-en-danger.apinc.org».

¹⁴ Hoffmann, R. (2004). «Science to a samba beat». Nature, 428 : 21.

limiting "the reason of being of Science to only one of its functions, to be the auxiliary of an economic system and of one type of social structure". As said so well by Axel Kahn of the movement "Let's save Research", "by reducing the image of science to its auxiliary functions, we take the risk of making it what it is today, a variable of adjustment to the budgetary consequences of the political decisions"¹⁶, a point of view nevertheless far from making the unanimity within the public opinion¹⁷.

Of course it is not a question of confronting directly the capacity of France and Brazil on their resources for scientific and technical development.

- Maybe the International Institute of Neurosciences (IINN) of Natal is stillborn with 1.5 million Euro on the table while around thirty millions will be necessary to launch the project.
- Maybe Miguel Nicolelis will never build on a Brazilian ground a ship carrying proudly the wings of the idol airplane of Santos Dumont.
- Maybe the Brazilian government will become afraid to spread so much money on a subject with impact, not so directly societal, while the immediate reality highlights other health issues such as AIDS or the nervous disorders transmitted by the Amazonian mosquitoes.
- Maybe that DARPA, the Pentagon's Advanced Research Projects Agency in the field of the defense, that supported until now the researches of Miguel's and his colleagues on brain-machine interfaces, will be frightened of the slowness imposed by the South American administration in the implementation of futuristic projects.
- Maybe the American Foundations patrons, whose representatives accepted to walk on the road of the dream in Natal, will whorl on themselves and finance causes that are closer to their national interests.
- Maybe that the French government will have definitively managed to keep the movement of the researchers silent and will have thrown the last hopes of the research in the sea.

But, during the dozens of meetings throughout the world to which you participated, never had you seen such an emotion gaining a crowd of personalities so diverse and respectable, standing and pushing in an ultimate ovation in the territory of Natal, sturdily applauding to greet the dream of a visionary, their brother and their "peer", out of any economic and monetary contingency.

Your voice now joins the clamor of other researchers which grows on the Parisian side. Not allowed to meet at La Sorbonne, the procession settled at the City hall of Paris. "It is 1:55pm and we are March 9th, 2004. On the facade of the Hotel de Ville which faces the church Saint-Gervais, above the portico bordered by the statues of Théodore Rousseau and Jacques Fromental Halévy, a monumental window opens in front of the crowd. An arm comes out: like a gesture of leniency - mythical of the Roman emperors, the hand raises the thumb up, towards the sky", celebrating the unanimity of the directors of laboratory in their collective resignation. "The gesture is immediately greeted by a clamor of victory"¹⁸. From today on, France research laboratories declared themselves on fight.

On both sides of the Atlantic Ocean, a virtual dialogue takes shape. And everywhere the same shout. "Le rêve, bordel !" ("The dream, damn it!"). To dream in order to create and innovate. And, in the affirmation of this essential privilege, the recovering of the respect from the public for the ceaseless quest of the spirit that neither French politicians or other cold-blooded animals¹⁹, definitively deprived of electric dreams, will ever stop.

(Translated by D.Gervasoni 05-05-04)

¹⁵ The movement of the researchers is approved by 82% of the French according to a survey from CSA-La Croix performed on March 3rd and 4th 2004 on a sample of 1001 individuals.

¹⁶ Axel Kahn's intervention during the same colloquium.

¹⁷ The petition launched by the weekly publication Les Inrockuptibles about the war against intelligence that the government would lead was signed by more than 100 000 persons. "A policy of impoverishment and endangering of all the spaces considered as unproductive at a short term, useless or dissident, of all the invisible work of the intelligence, of all the places where the society thinks about itself, dreams, invents, cure itself, judges himself, repairs itself.". Address: appel@inrock.com.

¹⁸ Foucart, S. «Plus de 2000 responsables de laboratoire ont démissionné ». Le Monde. 11 mars 2004, p. 10.

¹⁹ Jouvét, M. (1992). Le sommeil et le rêve. Editions Odile Jacob. 220 p.