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LATIN AMERICA, SCIENCE AND THE WORLD AFFAIRS*

by

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The kind invitation which my dear friend D'Ambrosio addressed me last Saturday June 29, to speak to you tonight I saw it as an opportunity to meet some old friends again.

For 16 years I have been abroad to continue my career as a physicist, first as a Visiting Professor at Carnegie Mellon University in the U.S., then as a full Professor at the University of Strasbourg, France, after, independently of my will, this career was suddenly interrupted in Brazil. During these years I had the honour to be one of the first Brazilians to be invited to join The Pugwash Conference on Sciences and World Affairs. I then had the occasion to offer some remarks on the problems of underdevelopment and peace.

This is the first Conference in Brazil, and it coincides with my leave of absence from Strasbourg University to take up the Direction of the Brazilian Physics Research Center in Rio (CBPF) at the invitation of the Minister of Science and Technology, Renato Archer. I am just arriving and I must tell you I am happy with the new political atmosphere in this country. There is, I believe, after all these years of suffering by the people, from the rules and misrules of the authoritarian regime, there is a new political maturity of the Brazilian people. The problem however they have to face are enormous - the foreign debt is practically intolerable - the buying power of the workers decreased considerably, unemployment rose, misery and hunger strike millions, there is no generalized access of the population to health care, to education, to a minimal basket of food.

In scientific research, if the funds allocated to it are taken to be 100 in 1979, they are now 15 to 20.

The description of these problems, a result of historical errors of many past governments, many of them aggravated by the recent dictatorship, would take much time and economists, sociologists and political scientists are more competent to tell you the whole story.

Our interest in Pugwash is how to avoid the catastrophe of a nuclear war, but also the deeply related questions of science and peace, technology and war, the arms race, the reflection of the expenditure, of 800 billion dollars per year with armaments in the world, on the human problems of hunger, misery, children mortality.

Latin America is not at the center of the world attention, at least more or less permanently, as the Middle East is, as the Far East was until recently and still is.

The moments of crisis were the Cuban Missile crisis, the Malvinas-Falkland conflict, and is now Nicaragua.

But it would be too easy to say that those were the only important moments of crisis involving Latin America. The experts -among them those who are called Brazilianists - will offer you an impressive list of armed interventions from abroad in Latin America, mainly in Mexico and Central America.

I cannot fail to remind you the way a democratically elected Government in Chile, was brutally reversed in 1973 with the subsequent implantation of a military dictatorship which is supported by higher forces. But we have our specific responsibilities, each one for our peoples, we are the result of our history, we are also responsible for what we have been and must fight for meeting our higher goals - our destiny.

But now democracy is coming back to Latin America: Colombia and Venezuela, first, about 30 years ago, then Argentina, Uru-

guay and Peru, and Ecuador and the democratic process is gaining force in this country.

Pre-Colombian America was perhaps an alternative way of development of human civilization and culture. But then Europeans "discovered" these Americas and subjugated the civilizations they found. One of my great joys during these years of exile was the opportunity I had to come to Mexico several times, at the invitation of my Mexican colleagues. I was then fascinated by what I could see and learn about several civilizations which inhabited Mexico and parts of Central America - among them the Toltecs, Aztecs, Mexicas, Mayas - locally and as exposed in the beautiful Archeology Museum of Mexico City.

And then you had the Inca civilization which flourished along the Andean Countries, and you also had less sophisticated but still original indian societies in the Amazon, at the Marajo Island, in Brazil down to Southern Brazil, Paraguay, Argentina, as well as in North America.

Usually in the name of the Catholic Church and of Kings these civilizations were subjugated and almost totally destroyed.

So you see, even before the Industrial Revolution in Europe, before the eclosion of modern science in the XVII century, the Western European civilization committed the sin of wars of conquest, imperiastically called "discovery" of new continents.

Science is beautiful, the spirit of scientific research is noble and inspiring - to try to know about Nature, how things are built, what is inside the atoms and what are the limits, the origin and the evolution of the Universe, to investigate the mysteries of life, and then to study man, society, the human values, the

development of culture, art, music. All this ought to be not only preserved but stimulated and the joy of knowing what all this is and means, should be open to all men, to our youth.

But society imposed the institutionalization of science. If science is the catalogue of acquired knowledge and is therefore as such, universal, the institution of science - to use a word employed by my friend Bruno Vitale* - is what is needed for the practice of scientific research: scientists in their jobs, institutes and universities, journals and societies, administrative people, students, technicians and above all the funding agencies and all this is country-dependent.

You know that after enlightened princes hired or commissioned scholars, painters, scientists and musicians in the years 1500-1600 - we remember Leonardo da Vinci, Michel Angelo, Johann Sebastian Bach - scientists felt the need to meet and thus appeared in the early 1600's the first two Academies of Sciences, the *Accademia dei Lincei* of Rome and the *Accademia del Cimento* of Firenze. The condemnation of Gallileo Gallilei in 1630 by the Inquisition brought however these Academies into silence.

It was around 1660 that the two first important Academies were founded: the Royal Society of London recognized by Charles II and l'Academie des Sciences de Paris founded and funded by Louis XIV.

They marked the beginning of the institutionalization of Science and Academies were successively founded in Berlin (Leibnitz), Stockholm, Vienna, St. Petersburg down to the years 1800, in the U.S., the National Academy Sciences of Washington.

In Brazil, if you want to know something about the evolution

* B. Vitale, Military funded research: the institution of science and the military, to be published, preprint 1985.

of science, as you are now here, you certainly know that due to the conquest of the teaching establishments in Portugal and Spain by the Jesuits, Portugal could not bring to us in the early sixteenth and seventeenth century but religious teaching, the praise of medieval religious culture. This was also true in Spanish America. The aim of the colony in Brazil was to export raw materials to the metropolis - and gold was vital to Portugal which had to pay its importations from the United Kingdom. Experts say that Portugal was a kind of invisible colony of the United Kingdom and the latter was eager to have a direct access to the market which was South America. According to English historians this market was of the greatest value to the rising textile industry in England.

Portugal and Spain, because probably of the Church domination, were left out of the drive in the XVII century for industry and technology.

Printing was forbidden in Brazil but the conspirators of the so - called Inconfidência Mineira, led by our venerated hero, Tiradentes, in the eighteenth century, had a project of a university.

The great leap forward in Brazil in culture and in education was due to Napoleon. As he invaded Spain and Portugal, the King of Portugal, D. João VI (John VI) left for Brazil. He then founded many institutions of learning, the Botanical Garden, the Museum of Natural Sciences, the Military Academy which became later the Polytechnical School of Rio de Janeiro.

Independence was proclaimed by D. Pedro I in 1822 but he later left to take the throne in Portugal and left his son D. Pe

dro II who was a lover of art, and had correspondence with men like Richard Wagner and E.T. Bell.

I shall leave the historical details to say that scientific research started systematically in 1900 with the institutes of tropical medicine and biological research. In 1916 the Brazilian Academy of Sciences was founded (it took this name in 1922), Universities were founded starting in the 1920's. In 1948 the SBPC - Brazilian Society for the Progress of Science - was founded, in 1949 the Brazilian Physics Research Center was created and in 1951 the National Research Council was established and started the true institutionalization of science in this country.

The Ministry of Science and Technology, created in Brazil by the present Government, was indeed established in several countries in Europe about twenty five years ago and the idea of this Ministry was suggested by some of us in 1963.

Now I would like to make some remarks on two questions of interest to Pugwash: the nuclear question in Latin America and the growth of the armament industry.

A nuclear arms race in Latin America by Latin American countries would be ridiculous if not tragic. We need to strengthen our economy, generalize education, culture, arts, stimulate science and technology and above all to educate competent people. How can a nation build up a society in which human needs are well satisfied, fulfilled, without competent people?

The Tlatelolco Treaty would be good if it were not violated by industrialized nations which have military bases in Latin American and may thus have bombs and other advanced weapons deployed in our continent.

So I believe that one must demand that the more advanced coun

tries in Latin America such as Argentina and Brazil make a pact, a treaty by which they will pledge not to make the bomb. This pact might then be extended to include Mexico and Colombia, Venezuela and Peru and all other Latin American states.

Is this feasible? I propose that Pugwash, this Pugwash Conference, address a letter to the Presidents of Brazil and Argentina suggesting this pact.

As to the growth of the armament industry in less developed countries, particularly in Brazil, I do not see how you could ask them to shut down this industry. For if they have to have armies - have not some superpower asked Japan to develop their so-called self-defense forces? - these armies need armaments. If they can make them themselves and if they have to export arms in order that the industries may exist, is it not better than to import them, to buy them from industrialized countries?

So here you have to ask that the example come from above. If Boeing Co. makes their excellent airplanes, if Marcell Dassault and Aerospatial make their excellents airplanes for civilian use, clearly they are the ones which make military planes. In this country, industry reached the point of exporting certain types of airplanes and you could not ask our government to stop this initiative.

The arms race is scandalous among advanced nations and super powers. There is no conventional arms race in Latin America and I hope there will not be any such thing.

Construction of conventional arms for internal consumption and exportation of arms is what exists. It will stop only if arms and armed forces are abolished everywhere which, I am sure, would

make us all happy.

Finally, let us examine what is happening nowadays throughout the world. If the institutionalization of science received a great impulse during and after the first World War, science as a necessity for hot and cold war was the inheritance we received from the Second World War.

For some time, the peaceful uses of such scientific and technological advances were emphasized. I remember when I finished my Ph.D work at Princeton in 1945 that I had the occasion to attend what I believe was the first meeting of the American Physical Society after the war in New York, at Columbia University in January 1946. American physicists were energetically opposed to the control of the Atomic Energy Commission which was created or about to be created, by the military. And the image of Arthur Compton in making his speech to express this sentiment was impressive and was an inspiration to my efforts for the struggle for development later on in my country.

Unfortunately nowadays, the media transmit to us all the impression left by the decision of Governments on defensive initiatives, that progress in technology and in science will ultimately come from military projects.

Therefore not only the institutionalization of science, but the very idea of the discovery of advanced and sophisticated technologies is now associated to war work: optical lasers, X-ray lasers, particle accelerators, new materials, all kinds of machines and mechanisms which were confined to laboratories in their search for new ideas on matter, all of this now is connected to the so called star wars projects. And some scientists, some of them of

great reputation, are leaders in this new drive.

How can we then stop the militarization of science and tech
nology?

I therefore believe that a new declaration of Nobel laureates must be formulated and extensively published in the world to con
demn these initiatives and to counterbalance the propaganda which is now being transmitted on the inevitability of war work programming in order to achieve significant technological advances.

Recently, a scientist from IVIC, in Caracas, published a pa
per in which he calls for unification of science administration and funding for civilian and military purposes in Latin America. This is a proposal which we have to reject.

Research work in our institutes, in our universities, need to be free from secrecy. Let us defend science and technology for peace in Latin America, as in the whole world.