Some changes in the sciences and humanities (1971-1991)

Pablo González Casanova*

On the 20th anniversary of the CCH[1], Pablo González Casanova talked about the many changes that have taken place since 1971 in the fields of mathematics, technology, communications and in the Spanish language; the institution's present and future needs, and the challenges they present both for teaching and research.

I would like to speak about some of the changes that have taken place over the last two decades and their implications for the College. I believe that the three problems that the College aimed to solve, from its outset, continue to be valid: to unite the different faculties, schools and institutes around a concrete project; to link secondary and professional education to scientific and humanistic research; to foster innovation in the University, and the University's adaptation to the country's requirements and to our times -and to do so as an interdisciplinary organization within the university system. All these objectives not only continue to be valid but have now taken on a special urgency.

The CCH was conceived as belonging to the whole University, to act at all levels of education, research and dissemination of culture. Many people thought -and still think- that the CCH corresponds solely to high school courses, due perhaps to the fact that this was the CCH's first big task -and what a task it was! I should therefore like to consider briefly the changes in some of the basic subjects appearing in the CCH's syllabus.

What has happened, between 1971 and 1991, to the two languages and the two methods considered fundamental in the pre-university syllabus, mathematics and Spanish, and the experimental method and the historical one? First of all, we should explain that those two languages and methods are related to other languages and methods. Mathematics and Spanish were chosen as the expression of the quantitative and the qualitative. The historical-social method and the experimental one are not the only possible ones, but rather the pillars in which philosophy, humanities and sciences converge.

What has changed, then, in mathematics? In addition to its numerous classical achievements, in these twenty years, mathematics has undergone innovations that are closely linked to the development of the technology that mathematics itself made it possible to build up. Its influence on computer science, microelectronics, communications, information -and even rhetoric- has produced a veritable revolution in the way we live and work. The "society of communication" has come into being and some of the greatest

[1] *El Colegio de Ciencias y Humanidades, CCH* (College of Sciences and Humanities) is a system of high-schools directly attached to the University which give special pre-university courses. Students from the CCH may enter the University directly without having to take an entrance exam.

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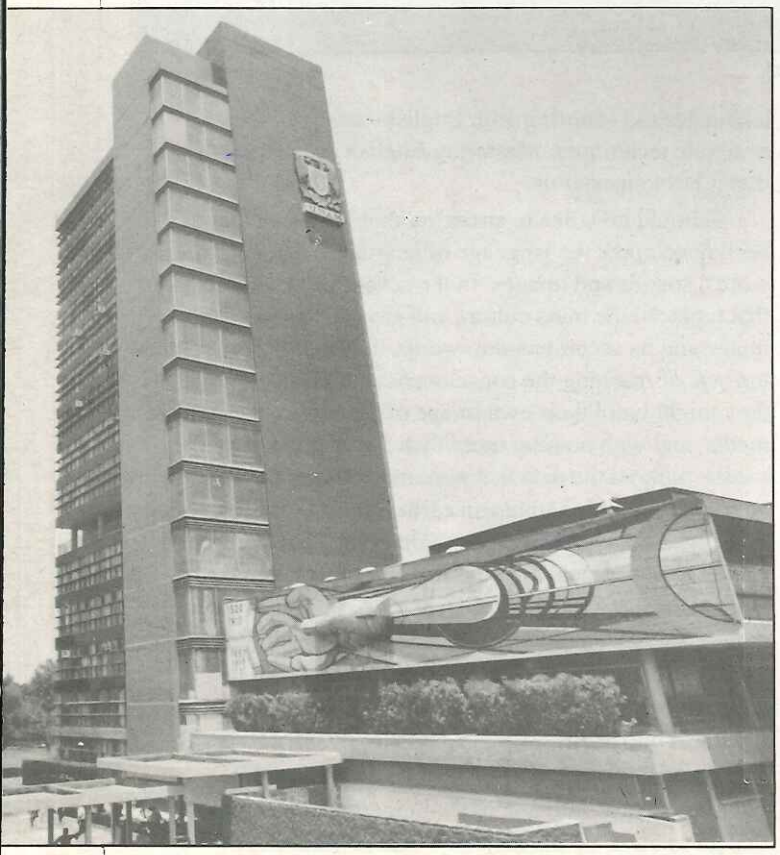
mathematicians, such as Neumann, have contributed alongside physics and engineering, the fields which developed it.

Computer science has enabled us to solve extraordinarily complex problems of numerical calculus that were formerly unsolvable, or would have required about 2,000 years of work to do what can now be done in a week. This calculating power, sometimes almost instantaneous, is the only thing that makes space flight possible.

Technology and mathematics not only enrich the language, but also the application of technology and language to methods used in the experimental and para-experimental sciences. Here too the main changes have been closely linked to those technologies they helped to create.

In the early seventies it was still not possible to replace the laboratory by the computer, although hypotheses were already being formulated on the computer. Neither was it possible to make such precise simulations of reality as we have achieved since then. The formulation and testing of hypotheses are now carried out with a technological and conceptual infrastructure that did not exist in those days.

One of the great discoveries of the mathematical and physical sciences is that of "chaos" as a universal phenomenon, the element coexisting with determinism, and which is responsible for the appearance of structures in complex systems. This has implications for the whole of human culture -meteorology, biology, medicine, the social sciences and philosophy. All of this would be impossible to understand if the computer itself were unable to simulate chance in a regulable, repeatable and controllable form.



National University of Mexico.

"Mastering English doesn't mean that it has to master us"

Recent discoveries in electronics and biology are creating a new world of "thinking computers" corresponding to bizarre new fields that we will have to learn to know and handle. People are even beginning to talk of a "new physics", with biological elements and metaphors.

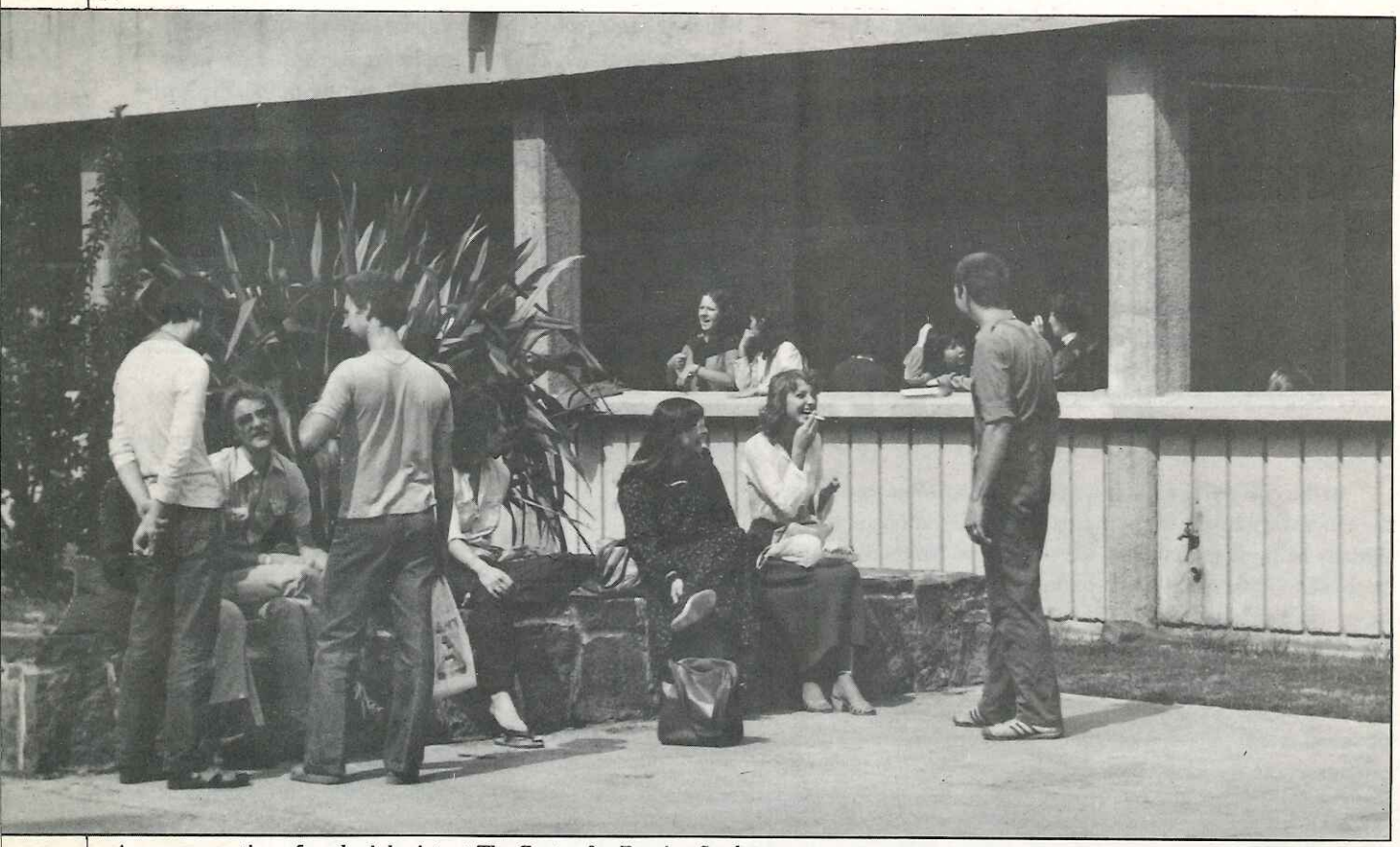
The challenge now is to study the essential changes in experimental method, science and technology in a society in which information has changed quantitatively and qualitatively in such a way that would be uncontrollable if we did not know how to handle and use the information provided by computers, and at the same time, how to select information using classical methods, with a critical sense and also a sense of what is essential. Qualitative selection takes on unusual importance when faced with the glut of information.

As for Spanish, we do not have sufficient grounds to say that it has changed more in these last twenty years than in the past, but it is in a state of constant change: in vocabulary, pronunciation and grammar. However, at the same time Spanish maintains a great unity.

The incorporation of foreign terms and expressions, slang words and idioms into Spanish has long been a subject of concern. In the last few years the balance has tipped toward defending the theory of diversity as a form of enrichment of the language. However, there is no doubt that although this current is extremely important for understanding the life of the language, so too is that of those who seek to assure that the 500 million Spanish speakers do not lose the unity that enables them to communicate.

The language is increasingly enriched by new words, many of which stem from English -as they came from Arabic in the days of the Cid. To adapt them, if and when they enable us to express something more precisely, is the task of our great writers.

This leads us to two points that are linked to present day Anglo-Saxon speech: the increasingly general knowledge of English and the growing unity between the language of words and that of images. English has become



A new generation of methodologists at The Center for Foreign Students.

the world language. It is the mother tongue of 400 million people, and the second language of as many again. The latter are not merely scattered all around the globe; they use English for their work, and in the field of entertainment the majority of songs and video-tapes are in English. More than 80% of the data stored in computers, and more than 90% of the programs, are also in English.

> *"The meaning of the expression is as important as its beauty"*

We have to have a good knowledge of Spanish, our national language, but we have to master English too -and perhaps a third language, such as French, Russian, Chinese, Japanese, or one of our Indian languages such as Nahua or Maya. If we wish to, we can all be bilingual or trilingual. The Indians of Mexico want to know Spanish as well as their own language; Americans are ever increasingly choosing Spanish as a second language. There is no reason for us not to study our own language very well and other languages too -starting with English- using all the available techniques. Mastering English doesn't mean that it has to master us.

I should now like to stress another language that has been developed: the language of languages that combines words, sounds and images. In the seventies a culture arose that replaced the mass culture and gave to the moving image and its accompanying words and background sounds the task of reaching the consciousness of people so that they might build their own image of the world, through the media, and with nothing more than data provided by the media, without the data that remained concealed from them.

Although this had begun earlier, from the seventies on it changed with regard to two main points that are central if we are to understand the domination of this language of languages: they changed resistance into merchandise, dreams into merchandise, and used the merchandise itself as advertising for the corporations that sold it and, again through these commodities, advertised the status quo itself.

Another change consisted of transforming the old mass culture into one of the numerous minorities that go to make up the majority. Ethnic minorities, sexual ones, urban-dwellers, and ecologists became

the targets of stratified messages that aimed to make each group accept its image as being tantamount to its identity.

Unamuno, in one of his ironical exaggerations, said that the important thing is not to know grammar but to know what to say. At the other extreme, a certain advertising expert has maintained that, "the important thing is not that the words mean something, but that they sound O.K. "The truth is that it is as important to know how to say something as to know what to say; grammar and syntax help to conceive things more clearly. The meaning of the expression is as important as its beauty; moreover, this may help to transmit it and understand it better.

"Success but not happiness"

The speech used in history and the social sciences now poses some problems that oblige us to clarify everything that we formerly took for granted. The changes in the historical-social method have strong ties with reality. In the last twenty years the most outstanding changes have been:

1. The increasing importance of the study of complex organizations which has achieved new technological and political combinations
2. The recognition of the importance of ethnic groups and other minorities
3. Changes corresponding to the triumph of neoliberalism and transnational capitalism over "real socialism", whose collapse embraces the methods the concepts and even the vocabulary of Marxism-Leninism
4. The rediscovery of mediations (such as the market), social ones (such as grass roots movements), political ones (such as democracy) and cultural ones (such as advertising as a socialization of dreams)

Another change is the growing conception of society as a world, of the history of the world as a global system. New ideas are also being developed on the trends or direction of history, in which the straight line is not always the shortest distance between two points.

The theory and methodology of progress, which was implicit in the projects for the liberation of peoples and "real socialism", has given way to those of cycles and spirals, and to the search for alternatives to survival posed by *perestroika*, with greater attention given to the defeat of socialism than to the forces for a new history.

In relation to the world of projects and tendencies Montesquieu's maxim that "the world of intelligence is far from being governed by physics, since the world of intelligence may make mistakes" has proved to function in the exact opposite sense in one regard: determinism in the social sciences has relatively different characteristics precisely because the world of intelligence can study and correct its mistakes, and thereby improve its decision-making processes and strategies.

The determinism of the late 20th century is very different from that of the 19th, due not only to long-term global changes but to other more recent ones taking place in organized subgroups of society in unprecedented positions of strength; but there has also developed a capacity for response, from cybernetics and systems analysis, that improves as it masters its mistakes. To ignore this is to be unable to understand the historical process of today.

Unfortunately, the intelligent organizations that have triumphed in these last twenty years, far from solving the problems of exploitation, polarization and repression of the majority of mankind, have accentuated them. As Habermas would say, "they achieved success, but not happiness, or only partial success that leaves us in a world that will probably go down in systemic chaos."

During these last two decades, at the same time that the technologically more advanced countries' intelligent organizations were being developed and perfected, the exploitation of the periphery was spreading and accentuating. Exploitation increased, marginalization grew apace and repression was the lot of the majority of mankind.

This left the social sciences with a question about new methods of study and struggle to prevent an ecocide that will become inevitable if the trends of the last ten years continue, and if the industrialized countries continue to transfer enormous quantities of resources at the expense of the ex-colonial or dependent countries.

"We cannot rest on our laurels"

This challenge places the question of methodology on a new plane. It can lead to the study of determinism in the light of the "constraints of the system", with its different degrees of freedom and with the alternatives contained therein, so as to arrive at or impose new values for the Modern Age -freedom, equality and fraternity- through democratic regimes that respect individual, collective and social rights, linking the intelligent organizations to the interests and forces of the majority of mankind.

This is the responsibility of all of us;
in commemoration of the 20th anniversary of the CCH, my aim was to speak about the present so that we may think about our responsibility toward the future, both in teaching and research