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April 1, 2020

On January 15, 1960, Fidel Castro declared that “The future of our country has to be necessarily a future of men and women of science; it has to be a future of men and women of thought.” He asserted that the revolutionary government is fully committed to scientific development, because scientific development is the foundation to the economic and social development of the nation.

Fidel’s January 15, 1960 address before the gathered representatives of Cuban science was an appeal to Cuban scientists to remain in their country and to participate in its development. However, the emigration of professionals in a wide variety of fields continued, and it adversely affected the universities, scientific societies, and the research institutions that then existed. In order to compensate for this loss, the Cuban revolutionary government has given emphasis to the formation of scientists and other professionals through the expansion of primary, secondary, and university education. `

In the period 1960 to 1962, a radical reform of the university was undertaken, with the intention of facilitating the sustained development of scientific investigation in the universities. At the same time, recognizing that the three universities in the country did not have sufficient professors to prepare the necessary number of scientists and engineers, scholarships were granted for study in countries of the socialist camp, including the Soviet Union, Czechoslovakia, Hungary, and the German Democratic Republic, nations that had a considerable level of scientific development. The Cuban students who studied in those countries, upon being incorporated into the Cuban system of higher education and research, maintained ties with the specialists and laboratories of the countries where they had studied.

In the period 1962 to 1973, fifty-three “units of science and technology” were created, including research institutions in the natural sciences, medicine, technology, agricultural sciences, and social sciences. The National Commission of the Academy of Sciences of Cuba was created on February 20, 1962, which included prominent scientists and intellectuals of the time. It reorganized the disparate academic societies and placed them under the direction of the government ministries or universities. The academy followed the model of the academies of sciences of the socialist countries, which was different from the “university model” of the advanced capitalist economies, which decentralized research in universities or research organizations.

On October 17, 1962, the “Victoria de Girón” Institute of Preclinical and Basic Sciences was inaugurated. Formed by a group of fifteen university professors of medicine and other teaching and laboratory personnel, its mission was to strengthen education in the medical sciences. However, it soon became evident that it was necessary to considerably expand the facilities for biomedical research. The creation of a new research center was announced by Fidel in a speech of March 13, 1964. The National Center for Scientific Research, which became known for its initials as CNIC, was created by presidential degree on July 1, 1965, located near the “Victoria de Girón” Institute. CNIC was formed at first by a small group of recently graduated doctors who responded to the call to dedicate themselves to biomedical research, some of whom had been “student assistants” at the “Victoria de Girón” Institute. Some would later occupy important posts in Cuban science.

The principal purpose of CNIC in its first years was to elevate preparation in the basic sciences (Mathematics, Physics, Chemistry, and Biology) of young graduates of medicine, and to initiate them into research tasks. For this purpose, courses and labs were organized, and after completing these courses, several young researchers were granted post-graduate scholarships for study in countries of Western and Eastern Europe.

CNIC became the national “center of excellence” for chemical and biological research and experiments. Laboratories of the genetics of microorganisms acquired special importance, where important research collectives emerged in the 1980s.

The need to link in a more direct manner the providing of medical services to scientific investigation led to the founding, on November 25, 1966, of eight scientific institutions associated with specialized hospitals. Prestigious figures in each of the specializations were named as directors. These entities contributed in a notable manner to the elevation of the knowledge of the medical personnel and to the introduction of new techniques. In addition, medical research was developed at the large hospitals in Havana and in the provincial capitals.

By 1974, the total number of workers in science and technology had reached 17,709. In that year, the formulation of a national scientific policy was initiated. One of the goals of the resulting policy was “the rapid introduction of the research gains to production and services.” There was much discussion of the problem of “the introduction of gains.” There emerged the creation of “units of research-production” (UIP), inspired by the creation of such units in the Soviet Union and Bulgaria. In the UIP, the unit of production was a dependency of the scientific institute, whose researchers could interfere in a direct manner to ensure the assimilation of the research results in the productive process.

In the early 1980s, the “biological front” was considered the field with the greatest possibilities for the introduction of high-technology in Cuba. In 1981, a group of researchers, having learned relevant techniques in Finland, was able to abstract Interferon from leukocytes in a laboratory in Havana. In 1982, the Center for Biological Research was created, which in 1985 and 1986 conducted experiments in techniques of DNA combination (genetic engineering) for the production of drugs, especially Interferon, and in 1986, the Center for Genetic Engineering and Biotechnology (CIGB) was created. This center created the Interferon Alfa-2B compound, which it began to commercialize.

The unity of research-production model acquired great importance in the late 1980s with its application in biotechnology, when various entities of research and development in biomedical high technology were gradually conceived as units of production-research, which in some cases added the direct commercialization of its products.

In 1992, the National Center for Biopreparation (Biocen) was established. It fabricates products from its own research as well as that of other research centers, including the Center of Biotechnology and Genetic Engineering, the Center for Immune Biology (founded in 1991), and the Finley Institute (also founded in 1991). Among the products that it fabricates is the Interferon Alfa-2B compound of the CIGB, which Biocen fabricates in a liquid form as well as freeze-dried powder. In the production process, the active pharmaceutical ingredient is formulated at CIGB; then at Biocen, the ingredient is poured into vials, inspected, and packaged for presentation to national and international markets.

Interferon Alfa 2B also is fabricated in China. In 2003, the Changchun Heber Biological Technology company, a Chinese-Cuban mixed company, was created in response to the common interest of Cuba and China in the production and commercialization of biotechnological products. The Cuban Interferon Alfa 2B technology was transferred to the mixed company for the fabrication of this antiviral, therapeutic medicine. The commercialization was initiated in 2007, and since then, four million doses have been administered to more than 100,000 patients in China in the treatment of respiratory infections and other diseases.

Interferon Alfa 2B has become one of the most utilized medicines in the treatment of the Covid-19 pandemic. To date, forty-five countries from all regions of the world have placed an initial order with CIGB for the product.

The Center for Biopreparation presently has the capacity to produce the Interferon Alfa-2B Compound that is required to combat COVID-19. It can produce 50,000 vials daily in a liquid form and 40,000 weekly in a freeze-dried form. In April, a new line will be authorized that will make possible the production of 100,000 vials daily of the liquid form of the drug.

The Cuban capacity to commercialize internationally its pharmaceutical products constitutes an emancipation of the nation from the peripheral role assigned to it by colonial Spain and neocolonial USA. In the world-economy, the peripheral role involves the exportation of raw materials (such as sugar) using a cheap, uneducated work force that lives in wretched conditions, while the core nations of the world-economy produce more technologically advanced products that required an educated work force that received relatively good wage. A country that exports sugar is condemned to poverty; but a country that exports pharmaceutic and medical products and education is a country that has attained a certain level of economic development, which enables it to continue to develop further.

Dedicated to the social and economic development of the nation, the Cuban Revolution has sought to transform the economic role assigned to it by the colonial and neocolonial powers. Its strategy has been to develop forms of production and services that generate more income for the nation and can sustain a high standard of living for the workers. Accordingly, it has sought: to mechanize the production of sugar; to produce a diversity of residual products from sugar for commercialization; to develop diversity in agricultural production for national consumption and exportation; to develop the manufacturing of nickel for exportation; to develop tourism, including high-quality cultural, educational, ecology, and medical

tourism; and to develop high-tech pharmaceutical and medical products.

Cuba has insisted for six decades on its right as a sovereign nation to establish priorities in production that respond to the needs and values of its people, rather than the interests of foreign powers and the corporations they represent. Its capacity to supply a needed medicine in the context of a pandemic is a result of this persistence, and it could have significant implications for its future development.

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