

Latin-American Physics, Cold War and Science Diplomacy: the case of CLAF

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Today, I present a study of the Latin American Center for Physics (CLAF), understood as an attempt to provide physicists from countries such as Argentina, Brazil, Mexico, and others with an institution capable of performing political, scientific, and diplomatic functions in support of local science, while also integrating the region into existing governmental and intergovernmental structures elsewhere in the world.

When we consider the evolution of Latin America between 1945 and 1989—from the end of World War II to the fall of the Berlin Wall—it is possible to entertain a wide range of thoughts, some positive and others negative. For roughly twenty years, Latin American societies nurtured optimistic expectations about the region's future, a sentiment that persisted until the mid-1960s. From the second half of that decade onward, optimism gave way to a sense of defeat, brought about by the suppression of democratic regimes, their replacement by military dictatorships, and the prolonged economic crisis triggered by the first oil shock. The conviction that U.S. hegemony was among the root causes of the difficulties affecting the vast expanse of territory stretching from Uruguay to Mexico was also widespread.

Another widespread belief held that the hegemony of the “great northern power” had been secured through violent means, as U.S. actors supported various coups that overthrew legitimately elected reformist governments. Yet it would be mistaken to conclude that force was the only instrument through which the United States sought to keep Latin America within its sphere of influence. Science and the arts likewise played significant roles. Scientific missions and scholarships were deployed to attract Latin Americans, and universities and research centers in the United States were frequently cited as models for Latin American institutions. At the same time, many recognized that closer ties to the United States entailed a reduced capacity to pursue another task to which Latin American scientists willingly dedicated themselves: the development of their own countries and societies. Scientists in the region were fully aware of the contradictory nature of this situation. While collaboration with North American colleagues could advance their own research, such cooperation could simultaneously undermine efforts to develop a conception of science and practical measures aimed at reducing the profound inequalities present in Latin American society.

Attempts to address this dilemma centered on building a community of physicists across Latin America who could influence their respective governments. Given the similarities among many of the region's structural challenges, physicists advocated strengthening regional ties to secure political and financial support, while also formulating scientific projects tailored to local realities without turning their backs on the developed world. Regional interaction was thus understood as a strategy for integrating Latin American physics into the global scientific arena.

It is important to remark that such regional interaction did not originate after World War II. Movements and initiatives that are better characterized as transnational were already present before the conflict. Indeed, it is no exaggeration to say that transnational flows constitute a defining feature of Latin American history. During the first half of the twentieth century, these flows occurred primarily between Latin America and Europe. Among Latin American countries themselves, however, such exchanges had few substantial consequences. With the onset of the Cold War, transnational flows between Latin American nations came to be viewed as a means of escaping the constraints imposed by global bipolarity.

In her introduction to the edited volume *Science and Technology in the Global Cold War* (2014), Naomi Oreskes writes: "Science and technology were more different after the Cold War than they were before; this claim is undeniable." Oreskes is interested not only in what happened to science during this period, but also in what happened *because* of it. She likewise emphasizes the need to include regions such as Asia in our analyses. Indeed, understanding what happened to—and within—science elsewhere in the world is essential to grasp the transformations experienced by various scientific disciplines during this period.

Since the early twentieth century, and especially from the 1930s onward, Latin American scientists—particularly those working in the natural and health sciences—have sought to build appropriate institutional foundations for scientific practice. As the social anthropologist Hebe Vessuri notes, their work unfolded "under a cloud of tension between the need to join the international scientific community and the desire to achieve an independent voice, i.e., autonomy in defining their role and interests."

By examining the state of physics in Latin America after World War II, I hope to contribute to the broader effort proposed by historians of science such as Vessuri, Oreskes, Hunter Heyck, and David Kaiser, who observe: "Variation is now the theme, whether

geographical, institutional, intellectual, or moral. For example, in recent work, the Cold War is not merely a military-technical-ideological dispute between two relatively unified blocs. Rather, it is understood as a global transformation that was fueled and shaped, though not determined, by the conflict between the two superpowers, a transformation that took a wide range of local forms. Similarly, as recent work has shown, Cold War science was far more than Big Science and Big Weaponry.”

Examining the Cold War period helps clarify the context. As the Norwegian historian Odd Arne Westad writes, “[Cold War events in Latin America] ... are also linked to class and ethnic conflicts within Latin American republics and to the rise of nationalism, populism, and left-wing movements.”

In other words, focusing exclusively on the U.S.–Soviet rivalry, as has often been the case, is insufficient. Latin American countries cannot be treated as mere pawns in a geopolitical chess match. The persistence of the view that the Cold War was primarily a conflict between two superpowers obscures the fact that the history of the Cold War in Latin America remains largely unwritten. Understanding this history requires examining the degree of autonomy Latin American nations and actors retained amid global dynamics that restricted their room for maneuver.

The Latin American Center for Physics (CLAF) was established on March 26, 1962, in Rio de Janeiro. On that day, representatives from fifteen Latin American countries signed an agreement aimed at promoting and strengthening the presence of physics in the region. The initiative originated with the Brazilian government, which in December 1960 submitted a proposal to UNESCO. The UNESCO General Assembly accepted the request. Between December 1960 and March 1962, a meeting was held in early 1961, also in Rio de Janeiro, to discuss the objectives of the future intergovernmental center. With the creation of CLAF, the region gained a third UNESCO-supported center. The two existing centers were devoted to mathematics and computer science. In CLAF’s case, however, the agreement establishing official and formal links with UNESCO would not be signed until years later. In 1962, only an expressed intention to cooperate existed.

Those who proposed the creation of CLAF understood that achieving its goals required a clear assessment of the state of physics teaching and research in each Latin American country. Exchanging information on local realities was one of the goals of the March 1961 meeting. It

quickly became evident that the region exhibited significant disparities in physics development. Three countries—Argentina, Brazil, and Mexico—had already established scientific communities recognized beyond their borders. All others were still in the early stages of forming professional groups. A shared characteristic among the three most advanced countries was that physics remained a relatively young discipline: professional communities of physicists had formed only in the 1930s.

Before turning fully to CLAF, it is necessary to mention a previous initiative intended to disseminate and strengthen physics across the region: the Latin American Schools of Physics (ELAF). Beginning in 1959, an annual school was held each year in a different country, offering advanced courses in specialized subjects. Although ELAF was a positive and helpful initiative, it proved insufficient, as simply identifying the most advanced areas of physics did not automatically make scientific practice more robust or widespread. For this reason, Latin American physicists recognized the need for governmental support. Their advocacy efforts with national governments dated back to the 1920s but had yielded limited results. Securing such support was not easy, despite scientists' persistence.

In the case of Latin American physicists, it is important to consider the role attributed to atomic energy in scientific and national development. Let me focus briefly on the Brazilian case. After World War II, the small Brazilian scientific community—supported by nationalist military figures such as Admiral Álvaro Alberto da Motta e Silva—advocated an independent national policy for developing atomic energy. Until 1954, this independent course enjoyed substantial governmental backing. However, the political crisis that culminated in President Getúlio Vargas's suicide in 1954 brought an end to this nationalist project.

After the Soviet Union detonated its first atomic bomb, the United States recognized that a policy of strict nuclear secrecy could not be maintained indefinitely. To remain an influential player in nuclear affairs, the U.S. government launched the Atoms for Peace program in 1953. In contrast to the position taken by theoretical physicists such as José Leite Lopes and Mário Schenberg, the Brazilian government accepted the American proposal. As a result, any plan that placed nuclear energy at the center of Brazil's scientific, economic, or industrial development policies was abandoned for decades. For Leite Lopes—one of the scientific secretaries of the first UN-organized World Conference on the Uses of Atomic Energy in 1955—the Atoms for Peace program represented the demise of a genuine national nuclear policy, one that could have shaped the independent development of Brazilian science.

Brazil's participation in the Atoms for Peace program, regarded as a failure, produced certain conclusions that later shaped the design of what the Latin American center for physics should become. The first conclusion was negative: national governments were unable to appreciate the importance of both pure and applied science for development. Even scientific societies proved insufficient to make scientific concerns heard politically. This was partly due to the fact that academies and scientific associations had been created to support pure science.

The solution proposed by Leite Lopes in 1959, after his return from a visiting professorship in Mexico, can be understood as a broadening and deepening of the objectives underlying the Latin American School of Physics. ELAF's structure had both positive and negative aspects. The central challenge was clear: how could an institution be created that represented physicists without depriving them of control? The answer, he believed, was to establish an institution supported and sponsored by UNESCO.

The early 1960s proved conducive to such a project. From the presidency of Jânio Quadros (which began in 1961) through the government of João Goulart (1961–1964), Brazilian foreign policy shifted away from automatic alignment with Washington. Brazil sought greater autonomy in international affairs.

The terms of the agreement signed in March 1962 demonstrate that physicists acknowledged—at least formally—that they needed to act not only as scientists but also as diplomats. Notably, neither individual scientists nor scientific societies were members of CLAF; the member entities were nation-states. Representatives appointed by member governments constituted the General Assembly, the center's chief governing body. These representatives did not need to be physicists, nor was the CLAF Director required to be one. physicists were represented on the Board of Trustees instead.

Although CLAF's primary objectives were to promote and strengthen the presence of physics across the region, development—understood in a broad, global sense—was not to be neglected, as the following excerpt makes clear:

“The Centre will implement special programmes in the various branches of physics where such programmes are needed in order to solve in particular problems which are of national interest to one or more Member States and in particular by providing the technical advice which may be requested.”

From a global geopolitical perspective, CLAF's creation can be interpreted both as an effort by physicists in Argentina, Brazil, and Mexico to secure greater support for their discipline and as an attempt to demonstrate the social relevance of physics. According to developmentalist ideas prevalent among Latin American physicists at the time, science was a cornerstone of national development. CLAF thus emerged from aspirations for autonomy and development in a broader sense.

In 1969, CLAF's second director, the chemist Roberto Bastos da Costa (the first having been the theoretical physicist and naval officer Gabriel Fialho), remarked: "As a member of the Latin American scientific community, however, your communication needs may be different. It is not simply a matter of intercommunication between scientists for the purpose of disseminating their research. This member is now a person with a social dimension, not only in relation to the professional community to which he belongs, but also to his entire society, aware that a cooperative effort is necessary to bridge the gap that separates him from the so-called developed society."

From the start, CLAF's leadership understood that initial efforts should focus on gathering data about the state of physics in the region. It was well known that material resources for physics were distributed unevenly. To gather information, questionnaires were sent to all participating countries. In addition, the CLAF director personally visited several nations to raise awareness of the institution. In 1966, four years after its founding, CLAF began publishing a newsletter to disseminate information about its activities as well as contributions from Latin American physicists. As was common with such publications, the newsletter served to help integrate physicists across the region, reinforcing their sense of belonging to a shared community.

During its first four years, CLAF was unable to convene a General Assembly. Without the election of a director by the Assembly, the center could not operate fully. Even so, relying solely on Brazil's annual financial contribution, CLAF awarded scholarships—many for graduate studies at the Brazilian Center for Physics Research (CBPF)—and financed regional scientific meetings and travel throughout Latin America.

Given CLAF's dependence on Brazil for financial and institutional support, it is unsurprising that the country's political situation affected the center's operations. CLAF's headquarters were located at the CBPF, which since 1964 had been headed by Admiral

Octacílio Cunha, a supporter of the military coup that overthrew the national-developmental government of João Goulart. As Cunha consolidated his authority at the CBPF, CLAF had to operate with increasing caution to avoid open conflict.

Rather than prioritizing relationships with national governments, CLAF chose to strengthen ties with individual physicists who were interested in the support it provided. As an institution that sought to defend science as a fundamental component of development strategies aimed at increasing Latin American autonomy, politics was inescapably part of CLAF's daily activities. The only pragmatic response to these circumstances was to adopt a form of political realism widely practiced in the region: adapting to dominant forces while waiting for more favorable conditions.