

## The teaching of biological evolution in Mexican socialist textbooks in the 1930s

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**ABSTRACT:** This manuscript presents the genesis and development of the so-called “Mexican socialist” school system of the 1930s, whose leading stakeholder was President Lázaro Cárdenas. At the beginning of the socialist project, Mexico underwent the most politicized and controversial education reform in its modern history. Much has been said about this ambitious project of social change. However, a thorough exam is still needed, especially on how socialist values were globalized and appropriated in the Mexican scenario regarding the new State project of basic education. In this sense we are interested in how science was portrayed in Natural Sciences textbooks, especially focusing in biological evolution.

**KEYWORDS:** Evolution; Textbooks; Socialism; Mexico; Circulation of ideas; Enlightenment; Positivism.

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**RESUMEN:** *La enseñanza de la evolución biológica en los libros de texto socialistas mexicanos en la década de 1930.*— Este manuscrito presenta la génesis y el desarrollo del llamado sistema escolar “socialista mexicano” de los años 30, cuyo principal protagonista fue el presidente Lázaro Cárdenas. En los inicios del proyecto socialista, México experimentó la reforma educativa más politizada y controvertida de su historia moderna. Mucho se ha dicho sobre este ambicioso proyecto de cambio social. Sin embargo, todavía es necesario hacer un examen a fondo, especialmente sobre cómo se globalizaron y se apropiaron los valores socialistas en el escenario mexicano en relación con el nuevo proyecto de Estado de la educación básica. En este sentido, nos interesa saber cómo se retrató la ciencia en los libros de texto de Ciencias Naturales, especialmente enfocándose en la evolución biológica.

**PALABRAS CLAVE:** Evolución; Libros de texto; Socialismo; México; Circulación de ideas; Ilustración; positivismo.

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## INTRODUCTION

As a paragon of social transformation, a revolution may be without equal. To be sure, the Mexican revolution of 1910 brought about many significant ideological, political and social changes in Mexico. Moreover, the underlying goal of revolutions around the globe at the beginning of twentieth century was “to remold the mind, psychology, and even character of individuals by means of various party and state policies” (Cheng, 2009, p. 1). This episode of Mexican history has been addressed time and again, and yet no study has reviewed how post-revolutionary socialist values were incorporated into the new educational policy of the presidency of Lázaro Cárdenas during the 1930s, by placing emphasis on the way biological evolution was incorporated into the curriculum of the new Mexican educational project of that time. This paper arose out of a questioning that, we warn, we have not been able to resolve completely. In Mexico during the 1930s there was an unprecedented but short-lived change, which was the implementation of a socialist state policy.<sup>1</sup> With this movement, interesting proposals arose in the field of education, of which we are particularly interested in those related to life sciences teaching. Considering that at this time the subject of biological evolution was for the first time incorporated into the curricula of basic education as a means of promoting skepticism, we wonder how this subject was addressed if, on the one hand, there was a plurality of explanations of the evolutionary process (Darwin’s ideas, orthogenesis, Lamarck’s ideas and finalistic theories), and on the other, which of these explanations were considered adequate with the socialist proposal: those of Trofim Lyenko (Argueta et al., 2003), Leon Trotsky (Gall, 2012), Herbert Spencer (Ruiz et al., 2016), Charles Darwin (Ruiz, 1991; Barahona, 2009), Ernst Haeckel (Ruiz, 1991), among others?

We intend to respond to these questions in a national context, but without losing sight of the global framework (if only superficially) that shaped the series of ideas, exchanges, collaborations and social actors that made it possible for Mexico to experience a brief “socialist turn” in education. Although it is not our intention to elaborate on the extensive bibliography on global history, and above all, how it has fundamentally affected the social history of socialism and the labour movement,<sup>2</sup> we aim to show that the interconnection of socialist ideals originated theoretically in Europe, and related to the teaching of evolution in Mexico, were part of an appropriation and assimilation, allowing to place Mexican science education within a global context in which connected narratives describe the interplay between global trends and national contexts.

The burgeoning field of research into the history of science education has expanded during the past two decades, and publications have acknowledged changes in relation to narratives, protagonists, problems, sources, and frameworks (Bertomeu-Sánchez, 2015). Many authors have called attention to cross-national studies and have brought to the fore many unknown historical actors,

material culture, spaces, textbooks and educational practices (Olesko, 2006; Vicedo, 2012). Taking this into account and although the article has a predominantly national perspective, we shall try to show how Mexican socialist education was born out of different European influences, such as the Enlightenment tradition that led to French and Russian Revolutions, to achieve a distinct state policy that tried to fit in the Mexican scenario with its many doubts and resistances.

Moreover, we will stress that not only the socialist education was heavily influenced by pedagogical conceptions such as the Rational School and the “movement of modern schools” led, among others, by Spanish anarchist educator Francisco Ferrer Guardia (Guevara Niebla, 1985) and by the Pragmatic School of Thought based first on that of Ovide Decroly and later on that of John Dewey, but also the initiative of the National Revolutionary Party to transform the entire Mexican educational system (Quintanilla, 1996).

The attempt to bring some of the strands of socialist Mexican education together, such as the foundations of the post-revolutionary education system, the debates and conflicts between advocates and opponents of Socialism, and even the precise meaning and limits of socialist education, among others, has been made using a variety of theoretical approaches and from different disciplinary perspectives. During the 1970s, various key studies on the topic were published: the ambitious and comprehensive works of Vázquez (1969, 1975), Britton (1973, 1979), Raby (1976, 1981), Raby and Donis (1989), Lerner (1979) and Córdova (1972), among others, provided important methodological and conceptual tools for the review and embellishment of previous studies on the Mexican Revolution and the birth and development of modern Mexico. In the 1980s, “research on socialist education reform, and generally on the presidency of General Lázaro Cárdenas, diversified their objects of study and interest and reached levels of analysis only glimpsed before” (Quintanilla and Vaughan, 1997, p. 11). These works include several done-on textbooks and educational programs for the years 1920-1940. However, no one has analyzed the approach of scientific topics in the textbooks approved by the Mexican Ministry of Education under the precepts of socialist education during the 1930s.

Based on the above, this paper first presents the implementation of socialist education in Mexico (deeply interpenetrated with the emergence of forms of medical and biological knowledge, original or introduced and appropriated), then the influence of three authors: the Spanish anarchist pedagogue Francisco Ferrer Guardia, the American philosopher John Dewey, and the Russian pedagogue Anton Makarenko. Subsequently, the implementation of this vision of education as part of the program of changes that the Cardenist government considered necessary for the improvement of Mexican society. And finally, it will be shown how this socialist vision was presented in textbooks, particularly in relation to evolutionary thinking.

## MEXICO BECOMES SOCIALIST: EDUCATION AS AN ENGINE OF SOCIAL CHANGE AND IMPROVEMENT

The Mexican socialist project was inspired and fed back from interconnected transnational ideological expressions, among which the values of the European Enlightenment, the ideals of the French Revolution and the socialist ideology of the Russian Revolution stand out. By the mid-nineteenth century, Enlightenment ideals were re-constituted under the broad term of ‘Liberalism’. Later, in the dawn of the twentieth century, Enlightenment beliefs in reason, science and education were adopted strongly by many to face the challenges of the new mass societies and technological cultures (Cheng, 2009). Along with press freedom and prohibited re-election —triumphs of the liberal movement of the 1860s— this new liberalism was concerned with the incipient social needs of post-revolutionary governments: education and labour.

In post-revolutionary Mexico, and under the canopy of secularization and rationalization, this quest to establish a powerful form of sovereignty in education increased. It began to grant education the function of generating feelings of loyalty and unity that would lead to a true nation-state, as well as to a specific attitude of the mind that is distinguished by a belief that human reason, science and education are the main means to achieve a free society. As a consequence of the crisis of the late 1920s, the Mexican political class began to push a struggle to transform institutions that had remained in the past (in many schools the process of secularization had not yet occurred) and against oppression and inequality through various political maneuvers, of which education stands out.

During that time, Socialism was a global historical phenomenon with complex humanistic dimensions.<sup>3</sup> In the Mexican scenario, Socialism adopted the form of various state policies, whose extremely ambitious and comprehensive goal was to remould the mind and even character of the Mexican people (heterogeneous in its socioeconomic, ethnic, linguistic composition) to achieve a much-needed change in a country that was mostly rural and mostly poor. The question of the nation, in the Mexico of the 1930s was assumed by the left wing mainly as a problem of independence and national sovereignty, as well as the struggle against external oppressive powers. In this sense, for leftist thinking, socialism was the key to a transformation that would allow to overcome national antagonisms and to achieve national independence. The left should be understood here as the currents of ideas and their organizational forms (i.e. political parties) that sought a social transformation based on work, solidarity, collective property and economic planning. However, in order to achieve socialism “there is room for different ways, methods, deadlines and programs —sometimes very different and even antagonistic— to reach this goal” (Gilly, 1986).

In its origins in the Mexican nineteenth century, socialist ideas appear above all as agrarian utopias. It was

only after the armed revolution (1910-1921) that the so called “constitutionalists” (that follows almost identically the ideas of Russian populists) gained strength and formed the first socialist current that formulated a modern proposal for the Mexican nation. Then, “during the years of President Lázaro Cárdenas [1936-1940], not only did the Mexican State end up being shaped, in the midst of great confrontations, but also what are still the four fundamental currents of the Mexican left: Cardenism;<sup>4</sup> Lombardism;<sup>5</sup> Communism and Radical Marxism” (Gilly 1986).

Now, although it is complicated to answer the question of what exactly was socialism under Lázaro Cárdenas (for Cárdenas’ social ideas are one thing and the practice of his State or the ideas of his followers other), since there were the aforementioned currents of the Mexican left in the 1930s that confronted (as in the Russian controversy) the agrarian socialism of the populists and the workers’ socialism of the Marxists (to call both in some way), which proposed two different national projects (Gilly, 1986), it seems necessary to us to at least refer to the issue of Mexican socialist education. It could be said, that the main ideologues of Mexican socialist education: Rafael Ramírez, Alberto Bremauntz and Ignacio García Téllez were convinced that it was possible to avoid going through a prolonged stage of development of capitalism, in what is called “Cardenist populism.” The main idea of this type of socialism is that it placed the Mexican state, supported above all by agrarian reform and the peasantry —hence socialist education— as the subject and guide of socialist transformation.

To better understand the above, it is necessary to mention that the Mexican Constitution of 1917 was heavily weighted in social content. During the first decades of the twentieth century, significant actions in the field of public health took place in Mexico including health campaigns, vaccination and health education, conducted by the Department of Health, which was created in 1917 (Ochoa, 2006).<sup>6</sup> As of 1934, with President Cárdenas’ first six-year plan (Plan Sexenal), these campaigns spread across the country and the systematic provision of health services was set in motion. To perform these functions, the Ministry of Public Assistance (Secretaría de Asistencia Pública) was established in 1938 (Zorrilla, 1988).

With some previous years of impulse to the change in the social order, it was during the government of Lázaro Cárdenas (1934-1940), (remembered as the main architect of the nationalization of the most valuable heritage of Mexico such as oil and rail) when the educational reform that implemented socialist education in Mexico was put into effect. It was in Jalapa, in the Pedagogical Congress meeting of 1932, that the first proposals designed specifically to innovate the educational practices of elementary schools took place. Among the commitments established by the participants, the most important was to strengthen the world’s materialist<sup>7</sup> concept in students and to combat religious prejudice that was long thought to have only served to kill the individual initiative. During the early 1930s primary education became under the sole control of the State, both in public and private schools. This same

power allowed the State to develop plans and programs of study and determine the working methods that should be followed in all primary schools of the country. This unique power was also extended to schoolbooks whose contents were reviewed and approved by the Ministry of Public Education (Secretaría de Educación Pública, SEP). The implementation of socialist education in Mexico during the years 1925-1945 (although its real effect was only during the Cárdenas administration [1934-1940]) is one of the most extraordinary achievements in Latin American education. It would serve as an educational tool to promote a real scientific understanding of life and the world among children and young people. Raising the quality of life and social welfare was considered key to the country's development. The first post-revolutionary governments had already had the idea of implementing socialist schooling aimed at rationalistic thought, whose relevance and influence were developed in the states of Yucatan and Tabasco in southern Mexico, through the anarchist pedagogy of the Catalan Francisco Ferrer Guardia. These ideas support solidarity, cooperativeness, community life, secularism and the direct observation of reality. As will be shown in the following section, besides Ferrer Guardia's ideas, Mexican socialist education was profoundly inspired by other radical pedagogues such as John Dewey and Anton Semyonovich Makarenko and others.

Mexican socialist education began during the 'Maximato', in the last years of the 1920s. However, Socialism was not implemented until 1933, when the deputies and senators of the "National Revolutionary Party" (PNR), in compliance with the agreements of their convention, initiated the amendment to the third Article of the Constitution (devoted to education) to implement socialist schooling. Cárdenas was a candidate for the presidency of the Republic back then, and like other revolutionaries, thought that when the Revolution project had run its course, Mexico would achieve a socialist system and society. Also, he gave a major boost to socialist education by supporting the educational reform laid out in the Plan Sexenal, for he was convinced that education should transcend the purely pedagogical and be an instrument for achieving authentic national economic and social reconstruction.

Beyond the question of whether this educational policy — with its strong ideological content — was possible in capitalist Mexico of the 1930s, it is essential to consider it as a real attempt to achieve radical change in the Mexican education system and to encourage and support the process of social change that Cárdenas and others considered not only necessary but crucial (Raby, 1981). That is why an amendment to the third article of the Constitution installed socialist education in Mexico. The newly amended article stated:

The education provided by the State shall be socialist and in addition to excluding any religious doctrine, it shall combat bigotry and prejudice for which purpose schools shall organize their teachings and activities in such a way as allows the creation of a rational and exact concept of the universe and social life among young people.

Its main goals were:

1. Education should be socialist. That is, one of the rights of all Mexicans regardless of creed, race, gender and socioeconomic status.
2. Education should fight fanaticism by inculcating a rational and exact concept of the universe and social life.
3. To extend the authority of the federal government to control the various levels of the education system and to monitor the operation of private schools.

The reform retained free education as well as including the compulsory-schooling clause and made Congress responsible for coordinating and unifying education around the country. This reform increased the number of primary schools from 200 in 1921 to 14,384 by late 1930s; the state also controlled 184 secondary schools, eight fine arts schools, 18 cultural brigades working with indigenous groups, and several rural schools for teachers in many states. The new school system would be democratic, scientific and labour-oriented, would not have any doctrines, would be emancipatory, and upraise children, women, the productive class and the dispossessed (Raby, 1981).

#### **APPROPRIATION OF PEDAGOGICAL CONCEPTS THAT UNDERLIE MEXICAN SOCIALIST EDUCATION**

In October 1933, the Mexican Congress approved a proposal to modify the third article of the Constitution, dedicated to the issue of education in Mexico. With this political manoeuvre, the most controversial education reform in the history of Mexico was set in motion: the socialist school (Booth, 1939, p. 602). Thus, from 1934 such article was amended to read: "State education will be socialist in character." According to Mary Kay Vaughan (1997), a professor of Latin American Studies at the University of Illinois-Chicago, Mexican socialist education was profoundly inspired, in addition to Ferrer Guardia and John Dewey's ideas, in those of Anton Semyonovich Makarenko and others.

There are several studies on the development of socialist thought in Mexico in the 1930s (Carr, 1991; Liss, 1991; Ruiz, 1991) and its influence on pedagogical thought and educational policy at that time (Loyo, 1991; Quintanilla, 1994). According to Quintanilla "such research attempts to show that Socialism was more than a rhetorical resource of a populist order, or a transitory fashion adopted superficially by opportunist intellectuals. The world crisis suffered during this decade prompted sectors of the population to seek alternative models of social progress and adapt them to the Mexican reality. The search transformed the lives of thousands of people, altered the traits of intellectual life and gave new meanings to aspirations born during the previous decades. In the field of education, left-wing cultural formations renewed faith in the school's capacity for change and favored the development of educational experiences unprecedented in the country's history" (Quintanilla, 1996, p.139).

Like any other mundane aspect, the educational reform of 1934 did not come out of nowhere. In the post-revolutionary years (1921-), diverse political and civil actors pushed for the implementation of radical educational experiences in different states of the Mexican Republic such as the school of action (based on the educational thinking of Decroly and later of John Dewey), Article 123 schools (federalized state schools) and rural proposals such as “Casas del Pueblo” (promoted by José Vasconcelos<sup>8</sup> in 1923 for literacy and indigenous education), “Cultural Missions” (in charge of systematizing, expanding and optimizing the orientation courses for rural teachers), and magisterium rural schools “Escuelas Normales” (in order to train teachers to become community leaders, according to John Dewey’s pedagogical proposal). The common theme of these experiences was to promote the organization of workers and peasants, to empower them in order to undertake social reforms for the benefit of the majority and the defense of national interests, among others. This shows that these educational experiences served as favorable situations for the development of projects and ideas that went beyond the acritical appropriation of projects and international pedagogical experiences and even local governmental principles.

To begin with, it must be borne in mind that Mexico’s population is not only socially heterogeneous in economic terms, but also ethnic and cultural. Since the end of the nineteenth century, and with the recognition of Mexico’s racial diversity, efforts have been made to homogenize the country through *mestizaje* and importantly, through educational acculturation of indigenous populations (López-Beltrán and García-Deister, 2013). The latter gives us an indication of how a global doctrine such as Socialism (with the myriad of self-proclaimed socialist movements around the globe: anarchists, revolutionary unionists, Christian socialists and Tolstoians, to name a few), could be (and was) locally and even regionally appropriated.

Thus, although during Socialist Education the climax of the struggle against religion was reached and established the need for children and adults to organize themselves to improve the social life of communities, to make labour rights effective and to defend themselves against abuses by the authorities, socialist education is a network of diverse ideological contents, in accordance with local problems and the pedagogical currents of the time (Cueva, 1996).

### **Ferrer Guardia, John Dewey and Anton Semyonovich Makarenko’s ideas**

The proposals of the Rational School (Ferrer-Guardia) are characterized by addressing the problem of education and the educational system from the libertarian education, conceiving the school scenario without hierarchies, where the teacher acts more as a companion than a professor, without practicing authoritarianism and verticality, where there is no place for religion and its dogmas and where the study of natural sciences becomes crucial to achieve rational and critical women and men. The proposal of the

modern school of Ferrer Guardia served as inspiration for the school of the socialist model, considering the teacher, not as a paragon of wisdom, but as a facilitator of libertarian elements for learning in community and solidarity. The main function of the teacher was to urge the reflection of students encouraging the critical and curious spirit from science and leaving aside indoctrination, dogmas, fantastic explanations and authoritarianism. On the other hand, the proposals of the Pragmatic School of Thought (John Dewey) were also in opposition to traditionalist teaching but were sustained mainly in the idea that education should be based on the child’s own experiences, needs and interests, as well as in his/her relationship with the external world. Thus, the center of the curriculum was based in the expressive or constructivist activities of children and teachers were to seek that children would have opportunities to use their own powers or faculties in meaningful activities. The pragmatic school of thought gave a naturalistic understanding of the theory of knowledge based strongly on Charles Darwin’s theory of natural selection. In Mexico it was adapted to this country’s reality. As will be seen in more detail a few pages later, in 1923 the implementation of the so-called “School of action” was approved, which established that the most important thing in the education of children was to promote experiences in the field, manual work as the foundation of scientific research and classes based on observation and experimentation.

In Mexico, these proposals reached national strength in the 1930s owing, among other circumstances, to the radical educational experiences tried out in different states of the republic, to the global economic crisis of 1929, changes in the relationship between the Mexican State and workers’ organizations, and the triumph of Cárdenas’ candidacy in 1933.

For its part, Makarenko’s model served both as a reference and as a starting point in the local organization of the contents of post-revolutionary Mexican plans and programs of primary education (for example, the importance of reading as a way for transforming the collective consciousness; which can be seen in urban and rural literacy campaigns, in the organization of collective readings and in the development of support materials). This represented an attempt to rescue the ideals of the Mexican Revolution and to strengthen strategies for the formation of large unions, based on Makarenko’s idea of social change by means of the appropriation of the concepts of common and social goods. The influence of the socialist ideology in the mandate to change the third article of the Mexican constitution (which refers to Education and its underlying ideology), occurred in 1933, with the subsequent Educational Reform of 1934 (Guevara Niebla, 1985), as well as in labor requirements that workers and union movements demanded in Mexico from the end of nineteenth century.

The new socialist pedagogy took elements of these pedagogical projects. It emphasized the importance of collective effort both at work and in education, such as the learning of productive habits through collective gardens and co-operatives. The Mexican socialist ideology, then had a strong liberal and positivist character, deeply laicist,

since it sought to turn away from superstition and fanaticism, defied institutionalized religion and tried to rely on rational and scientific thinking. In this sense, the process of secularism that took place in this period in Mexico was peculiar because it was anchored to an unprecedented political expression, which also did not see continuation.

Thanks to the previous context it is possible to appreciate that the socialist school looked for the concrete knowledge of living beings (particularly of those animal and plants present in the country) in order to take economic and social advantage of them and develop an open mentality, free of prejudices to explain and interpret the world. In this sense, the socialist school was associated with a radical materialist thought. According to Paz and Martínez some characteristics of this materialist thought can be broken down in its main ontological and epistemological aspects, which were carefully addressed in the design of the curriculum to support socialist ideology. “In ontology, the intention was to study the things of the natural world, their characteristics (anatomy and physiology), processes (evolution) and relations (ecology) of living beings, including man, this gave the basis of the biologicist approach proposed by Enrique Beltrán.<sup>9</sup> In the epistemological, priority was given to practice and usefulness, the way to learn, to know living beings was from their usefulness (pragmatism), supported by empiricism under the motto, “you can only know what you can observe” (Paz and Hernández Martínez, 2017, p. 914). There was a materialistic approach, so all explanations were based on laws of matter, including those of the origin of life and biological evolution.

As for pedagogy, the ideas of the aforementioned pedagogues were put into practice, trying to translate the empiricist, materialistic and utilitarian orientation into the needs of Mexico at the time. In rural areas, the form of teaching that had the most impetus was the Pragmatic School (school of action) because it was based on the experience and practice that the students could have in their respective communities. In addition, as a fundamental criterion for education was the economic, thus although the recommendation was to teach the subjects of Biological Sciences with an evolutionist approach, priority should be given to knowledge for the possible exploitation of natural resources. Finally, teamwork was encouraged for the practice of pro-social collective action,

for socialist education, scientific knowledge is not only imparted as simple cultural information [...] it wishes to form active and just generations who always know how to use science and culture for collective benefit [...] for this reason it gives them unity and groups them together in knowledge about nature, the centre of humanity’s activity (SEP, 1935, p. 205).

### CIRCULATION OF IDEAS: TEXTBOOKS OF THE SOCIALIST EDUCATIONAL SYSTEM

During the socialist period in Mexico, there were profound and controversial changes in public education.

At this time, the democratization of reading took on new meanings when it seeks to make accessible materials to children of the countryside and the city, children of peasants and workers. Of course, new curricula were developed for many subjects, and the need for textbooks as solid supports, not only for the consolidation of knowledge, but for the ideology of the moment, was made explicit, among which natural sciences and national history textbooks stand out. These textbooks were important since they meant a break with previous educational policies.

Textbooks used in Mexico in elementary schools during the Cardenista government were edited by the Popular Publishing Commission, official organ of the Ministry of Public Education (SEP). There were two series, one to be used in urban primary schools: “*Serie SEP*,” and “*Simiente*” (*Seed*) for rural schools written by Professor Gabriel Lucio (Fig. 1).

The sorts of contents children encountered in their textbooks, unlike the previous ones, contained real and concrete situations of social and natural life, focused in activities related to economic production, social struggle and physical culture and hygiene, and considered the actual interests of children both in urban and rural spaces (As Rousseau, Claparede and Dewey had indicated). Also, peasants and workers became the main actors of textbooks and the family had a deeper role than in the past (STERM and CTM, 1939, p. 32).<sup>10</sup> There was a strong emphasis in the role of workers and peasants as the main protagonist of the Mexican Revolution and crucial to the country’s future. An example of the type of texts in the *SEP series* is the following that talks about Labor Day (May 1<sup>st</sup>) for second grade students (STERM and CTM, 1939, pp. 82-83):

Since we didn’t have to go to school today, I got up a little late.

I saw my father going out and asked him:

-Are you working today, Dad?

-I’m not going to work, son, he replied. I’m going to the



FIGURE 1. As a fundamental part of this important educational transformation, through the “Comisión Editora Popular,” new textbooks were published for the country’s primary schools. Two series of books were prepared for all grades: the “S.E.P. Series,” for urban primary schools; and the “Seed” series.

workers' demonstration. This day is called "Labor Day," and all the workers took advantage of it to make a great demonstration in the streets. In this demonstration we, united, demand from the authorities what we need, by means of signs and speeches.

We also remember the comrades who died in Chicago for getting us to work eight hours a day.

-Dad, what are you going to do at the demonstration?

-I'm going to drive a truck where the members of our Drivers Union are going.

My father left very happy, and I was left with the desire to be as big as he was to go to the workers' party.

An example of the type of texts in the *Seeds* series (*Simiente*) is *Ahuímol* for second grade students (STERM and CTM, 1939, pp. 68-69):

Ahuímol is a congregation located near Chicontepec, a picturesque town in the rich Huasteca Veracruzana.

In Ahuímol, war has been declared to the death on all kinds of intoxicating beverages, since the peasants have been convinced that alcohol is the workers' worst enemy.

The farmer who gets drunk spends money on drinks that damage the body; he neglects work, and, for the same reason, his land produces little; his home is always miserable; there is no tranquility in him, because the drunkard mistreats even the people in his family. The children of alcoholics are weak and sickly boys.

In Ahuímol the peasants are constantly dedicated to their agricultural tasks; that is why one sees well cultivated lands, which give abundant harvests.

When there is a session in the Agrarian Committee, the discussions are very orderly, because there are no drunks who interrupt with their nonsense; agreements are made for the benefit of the community. If anyone takes Ahuímol to sell alcoholic beverages, he is punished by the peasants themselves.

The school is always full of children, happy and healthy, who will be educated to become educated peasants.

We must imitate Ahuímol's companions!

Alcohol is the enemy of the improvement of the peasants!

Also, key political actors of this period were both rural and urban teachers as they were highly involved in mobilizing and unionizing peasants and workers. Vaughan (1997) suggests that a crucial aspect of socialist education in Mexico is that the State was able to promote a multi-ethnic nationalism based on its promise of social justice and development; and at the same time rural communities managed to create new spaces to preserve their local identities.

Taking into consideration a little of the history of textbooks, during the presidency of Alvaro Obregón (1921-1923), an extensive editorial work was carried out, which interestingly sought to disseminate classic authors and works (Tolstói, Rolland, Shaw, Cervantes, and so forth, whose choice shows that the preferences of the person in charge of the Secretariat of Public Education (SEP), then Vasconcelos, became governmental

decisions). We say interestingly because a few years later, during the 1929 crisis that affected mainly the United States but also various regions of the Western world, the growing expectation in a new social order through the emancipation of workers, strongly impacted the development of textbooks. During this time, unions and workers' cooperatives began to emerge and the government in turn (Portes Gil) included the study of various Socialisms in Mexican textbooks with references to class struggle and worker and peasant emancipation. These textbooks for basic education were part of the already mentioned series of four reading books called *El Sembrador* (*The Seeder*) (Loyo, 2011). In 1933 the SEP published 182,000 copies, which had not happened before.

### EVOLUTIONARY THINKING IN MEXICAN SOCIALIST TEXTBOOKS

In the following paragraphs, the authors want to show that the ideas presented in socialist textbooks and in Cardenist education in general, were part of an appropriation that in some way sought to connect local ideas with those of modernity, coming in this case from Socialism.

Charles Darwin's effect on culture has been truly profound. On the topic of this paper, a point of interest is the concrete scope of Darwinism with socialism, both understood in a broad sense. Beyond the myth that has been created around the relationship between Darwin's ideas and the political left (Stack, 2003), it must be considered that there is a broad discussion on the subject. By way of conceptual clarification, just as there is no single definition for Darwinism, neither is there one for socialism. Both are umbrella concepts, within which there is room for different meanings. For example, in historical terms, there was a greater involvement of Darwinists like Alfred R. Wallace and Herbert Spencer with some version of socialism. Wallace, for example, was committed at a very young age to the utopian socialism of the philanthropist Robert Owen, a form of community organization with no defined social organization and with positive ideals for the future. Spencer, on the other hand, in his *Social Statics* (1851) maintained that the land should not be in private hands, although over the years his position as a socialist was ambiguous. Another example is the different ways in which Darwinism and socialism were related in countries such as Russia, where the role of cooperation was privileged, while in the United States it was individualism and competition that were promoted (Stack, 2003, p. 7).

Perhaps one of the most interesting aspects of current studies on the history of evolution is the growing interest in exploring its role and scope in non-scientific fields. In this sense, the field of education has become important. Some scholars have explored how the theory of evolution was introduced into the classroom and when efforts to include the subject in textbooks began (Skoog, 1969; Puelles-Benítez and Hernández Laille, 2009; Torrens and Barahona, 2017).

In Mexico, from an intellectual perspective, it was Justo Sierra who first called attention to the ideas of Darwin in 1875, provoking a debate that took place in the

main scientific societies and the press, a debate unleashed by Santiago, the brother of Justo, a few years earlier with the publication under the pseudonym *Eleutheros* of a vigorous article in favor of science attacking religious teaching, with reference to the explanation of the origin of human beings in Darwin's terms (Ruiz Gutiérrez et al., 2014, p. 107). As in other parts of the world, biologists and physicians of that time—mainly those who devoted themselves to the teaching of science—became preoccupied with evolution, Darwinism and Mendelism, such as French naturalist Alfredo Dugès, Mexican physician José Ramírez and Mexican pharmacologist and naturalist Alfonso L. Herrera. Also, in Mexico as was the case in other countries, the acceptance of Darwinism was peculiar: to quote Darwin himself on this cultural phenomenon, “It is curious how nationality influences opinion: a week hardly passes without me hearing of some naturalist in Germany who supports my views, and often puts exaggerated value on my work; whilst in France I have not heard of a single zoologist except M. Gaudry (and he only partially) who supports my views” (Darwin, 1870;<sup>11</sup> see also Ruiz Gutiérrez et al., 2014). It is worth noticing that many naturalists of the late nineteenth and early twentieth centuries confused Darwinian ideas with evolutionism, that is, Darwin's evolution by natural selection, with other ideas that conceived the transformation of species through time but without giving natural selection a fundamental role. For some historians (Hull, 1988; Bowler, 1988), the evolutionary vision that became popular after the publication of *The Origin* in 1859 “was not strictly Darwin's, but one that was progressive, fast, orthogenetic, and Lamarckist” (Ochoa, 2017). For Bowler (2013), the historical evidence points to the idea of natural selection as highly controversial for many decades in the nineteenth century, being accepted later in the twentieth by the whole community, where some forms of evolutionism would have emerged in the nineteenth century given scientific discoveries and cultural developments and given the fact that there were trends towards evolutionism. In the Mexican case, evolutionary pluralism was present in the ideas of Dugès, José Ramírez and Alfonso L. Herrera. Dugès held evolutionary ideas accepted in other parts of the world although he was always skeptical of Darwinism, however, he accepted some central ideas of Darwin such as transformism and adaptation. Herrera's ideas about evolution were not strictly Darwinian but pluralistic ones that tried to reconcile the different ideas of the time. He is considered by many Mexican historians as the main introducer of Darwinism and evolutionism in the country, although he supported Lamarckian ideas, and some other peculiarities. According to Ochoa (2017), Herrera tried to synthesize the inheritance of acquired characters within the central core of Darwinism, and although he thinks of evolution as continuous, his vision is more progressive than in Darwin.

In the second half of the nineteenth century, the Mexican medical community was able to develop a notion on heredity in a sense to appreciate certain traits or diseases which appeared repeatedly in family bloodlines, or age ranges, using genealogical or pedigree trees. José

Ramírez, a very well and respected physician, was acquainted with the different debates that the introduction of Darwin's ideas provoked at the end of the nineteenth century and the beginnings of the twentieth in Mexico. The written works of Ramírez were important in the medical discussion about heredity and evolution at that time. He pointed out that there is a relation between heredity and evolution stating that heredity and adaptation are the two great vital activities of the organism, whose combination produces diverse organic species; he explained that there is a possibility that certain monstrous characteristics be transmitted to conform a new species. Although he only quoted Darwin sporadically, he showed great knowledge of other authors such as Haeckel (Barahona, 2010).

The Mexican scenario is interesting in this regard and has been studied by Genovés (1959), Maldonado-Koerdell (1959), Moreno (1984, 1988), Ruiz (1991), Glick (1988) and Barahona (2009). In Mexico, as in France, there was a “delay” in the introduction, adaptation and acceptance of Darwinism, although such an assessment should be reconsidered, at least in the sense of understanding that the development of Mexican science was different from that of other countries. According to Genovés, this “delay” happened mainly because of the armed conflict that destabilized the country at the turn of the nineteenth century and, according to Maldonado-Koerdell, the most important factor was the Mexican ‘frenchification’ (or gallicization) of the time, that extolled both the ideals of spiritualists and positivists.

Frenchification was the ideal course that Mexican and Latin American elites took during the nineteenth century to integrate globalization processes. This is not only because both cultures, Iberian and French, share common roots, Catholic and Latino, but also because of the role played by the French historical experience as a paradigm for the former Iberian colonies [...] among the Anglo-Saxon, materialistic, liberal, dynamic, efficient model and the Spanish fanatic, despotic, decadent model, elites chose frenchification to accompany the independence, and the moving towards “progress” to achieve “civilization” (Pérez Siller, 1998, p. 12).

In the late nineteenth century, most of the Mexican intelligentsia advocated some sort of ideal of French philosophy. On the one hand, the key to positivism was to find the truth, proving its worth through experience. In the field of education, during the ‘Porfiriato’ and soon after, the education of students under positivist ideals was achieved through a series of logically ordered subjects that would allow them to discover what “really exists and what is expected or believed to be out there” (Bazant, 2000). “Knowledge turned into science, as sciences are exact and order the mind, while the humanities digress it” (Bazant, 2000, p. 160). Biological evolution in this sense was considered a historical science that was not sufficiently substantiated, or in the words of Herrera: it was not ‘proven’ (Beltrán, 1945, p. 106). The concrete case of Darwinism, or more precisely evolutionism, for example, serves to understand the complexity of the process of appropriation, and to a certain extent, the asym-



metry that emerges as part of the circulation of ideas in a global context (Ruiz Gutiérrez et al., 2014, pp. 108-109), although it is clear that the influence of Darwinism took place in the political and intellectual field, while as we have already seen, it was positivism (both Comtism and Spencerism) that definitively marked Mexican education by late nineteenth century. As Adriana Novoa has pointed out, in Latin America it was that mixture that allowed a form of science to be sustained in order to understand and articulate social progress. An important part of the landscape of the evolutionary discussions that appeared at the beginning of the twentieth century also has to do with the appropriation of French proposals, such as Neolamarckism, whose influence was notable in biology and medicine (Novoa, 2010, p. 243), and orthogenetic and other finalistic evolutionary theories, such as the one proposed by Haeckel. With this, although the historiography of biology in Mexico has focused on highlighting the role of Darwin's ideas, it is important to remember that evolutionism is not synonymous with Darwinism, but on the contrary, there were various influences and interpretations that marked the biological explanations on the origin and transformation of organisms.

According to Alexandra M. Stern “during the Porfiriato, Mexican científicos held distinct and often competing interpretations of Darwinism and positivism” (Stern, 2003, p. 189). While, for instance in Germany and the United States the theories of August Weismann and Gregor Mendel were of paramount importance, in Mexico the Neo-Lamarckian theory of inheritance of acquired characteristics predominated.<sup>12</sup> “To a great extent, neo-Lamarckism flourished in Mexico because it implied that human actors were capable, albeit gradually, of improving the national “stock” through environmental intervention and, eventually, of generating a robust populace” (Stern, 2003, p. 190). These ideas fitted perfectly with the search for biosocial factors necessary for the construction of Mexico as a nation state and for the promotion of nationalism. On the other hand, for spiritualism, which during the 1920s caused a dramatic effect on Mexican education (Bazant, 2000), what was fundamental was to promote humanism to achieve a moral, just, free society. In the words of its greatest advocate, Victor Cousin (1792-1867):

Spiritualism teaches the spirituality of the soul, freedom and responsibility of human actions, moral obligations, disinterested virtue, dignity, justice, the beauty of charity and—outside the boundaries of this world—a God, author and model of humanity who, having created it, obviously with great purpose, will not abandon the development of its mysterious destiny. This philosophy is the natural ally of all good causes. It holds religious sentiment, supports true art, worthy poetry and great literature; it is also a supporter of the right, and equally rejects demagoguery and tyranny, & c. (Cousin, 1853).

This philosophy was adopted as an education system in several Mexican schools as long ago as 1870 but did not reach its peak until the early twentieth century in

response to disenchantment with positivism which, according even to Justo Sierra, suffered from the vices of science excess and encyclopedism (Bazant, 2000). And even though Sierra was ambivalent toward spiritualism, Charles Hale makes us see that, as the French spiritualists, what he really sought was to reconcile metaphysics with science, with an emphasis on spiritual freedom and free will as opposed to determinism. However, in 1877 Sierra changed his view for Spencerian positivism, a situation that, as already mentioned, marked in a definitive way his career as an educator and as a politician (Hale, 2002, p. 387). Thus, the establishment of the humanities such as national language, psychology, morality, Greek and Latin roots, and French and English was favored and promoted over the teaching of sciences. However, discussions of evolution were not absent in Mexico and were important for the development and establishment of modern biology (Barahona, 2009).

As far as education is concerned, when did the subject of biological evolution find its way into classrooms and basic education textbooks? In the sphere of higher education, Dugès (1826-1910) published *Program of zoology* in 1878 and *Elements of zoology* in 1884, both of which (albeit somewhat ambiguously) briefly mentioned the main aspects of Darwin's theory (Dugès, 1878, 1884; Beltrán et al., 1990). Other important works of the time that mentioned evolution were those of Dr. José Ramírez (1852-1904) and particularly the book *Notions of Biology* that Alfonso L. Herrera (1868-1942) published in 1904 (Herrera, 1904; Barahona, 2010). This book has enormous significance because it represents the first of its kind dedicated to this emerging discipline in Mexico (Cardona et al., 2006).

It is also important if one considers that the science teacher's education reflects what the State considers to be fundamental for children and young people to learn. Succinctly, as of 1902, the teacher training curriculum came into being with the inclusion of General Biology while the main curriculum for upper primary included the subjects of zoology and botany (Art. 10). Considering that normal schools of that time adopted traditionalist practices, i.e. training based on the transmission of theoretical knowledge, it might be inferred that children received some evolutionary notions. In fact, Herrera emphasizes to teachers the importance of communicating various ideas from his book such as the Mendel and De Vries theories, ideas about biological inheritance, which in those same years was debated about its relationship with evolution. This serves to consider how current the discussions on biological issues could be in the Mexican educational sphere. As for the introduction of the subject of biological evolution in textbooks of basic education, it was during the last years of the nineteenth century when the theme began to be considered for elementary school children.

According to Francisco Ziga's list in his *Pedagogical Bibliography* (1988), there were nine books of natural sciences and 'lessons of things' most used in Mexico during the last decade of nineteenth century and the early twentieth, of which only one explicitly contemplated

the topic of biological evolution. Thus, in 1898, Julio S. Hernández published the first book to teach evolution to Mexican children. The brief paragraph reads as follows:

To constitute later the world of animals. A series of successive evolutions that mark different stages operate in organic life, allowing us then, with the passage of time, to admire all of our planet's natural beauty: moss from the poles to the giant trees of the tropics, from the zoophyte to higher vertebrates, and through this concert of diverse beings intermingled with plants and animals, the haughty figure of the fiercest of all appears, the most terrible, his superb tamer [...] man (Ziga, 1988, pp. 97-98).

It is interesting to note that the paragraph only mentions evolution. It does not explain or give evidence of the process. In fact—in accordance with its time—it mentions that evolution has produced all the animal and plant diversity that is useful to humans. As if the word ‘creator’ was only changed by evolution, for the anthropocentric notion of a servile nature is very much present. This shows the spirit of the times, as seen in Bonnier’s book *New Lessons of Things* (1893), which explains with attention to detail how animals and plants are useful to humans in domestic surroundings and how, as inert material, they are useful for construction or the production of fuel and other raw materials.

However, it was not until the presidency of Abelardo Rodríguez (1932-1934) and the socialist school system of the 1930s in Mexico, that the topic of biological evolution was finally included in the official plans and curricula of primary and secondary education.

As a fundamental part of this important educational change, new textbooks were published for primary schools through the “People’s Editorial Board.” Two sets of books for all grades were written: the “SEP Series” for urban primary schools; and “Simiente” (*Seed*) for rural primary schools, written by Professor Gabriel Lucio. The contents of the books were similar (they only dealt with the topics of history, mathematics and literature). The scenarios were different: the countryside and the city, but the lessons children had to learn were the same. Since the distribution of land to the peasants was a major movement supported by Cárdenas and one of the central policies of his government, agrarian reform and land distribution had a central place. This is important for the topic of this article, since although these series of textbooks did not directly address the subject of biological evolution, those who did make special emphasis on those utilitarian concepts of the theory to manage the land and improve agriculture.

However, faced with the lack of books that included the contents of the new socialist school and subjects such as Natural Sciences and Geography, different from those used before the reform, the editorial house *El Nacional* devoted itself to publishing textbooks and pedagogy books to reinforce the new education in Mexico. Books such as *Letters to Rural Teachers* by León Díaz Cárdenas, *The Method of Projects in Rural Schools*, by Fernando

Sáinz, *Use of Radio as an Educational Means*, by Simón Serna, *Proletarian Liberation Primer for Teaching Reading to Children*, are just a few examples of books provided by different Editorial Houses with the approval of the SEP (Montes de Oca, 2007)

Here, it is important to mention that in the history of socialist education (from Carrillo Puerto in 1922, through Monzón and Portes Gil) the fight against religious obscurantism and superstition was vital, as were encouraging efforts to improve children’s physical and mental health and the introduction of new teaching methods. However, many books that were very important in the era of socialist schooling, both for their widespread use and the number of editions produced, did not deal with the origin of species and if they did, they resorted to divine explanations.

It is significant to stress, with respect to primary and secondary school curricula and programs adopted as the basis of socialist schooling, that the commission charged with preparing a detailed plan for the teaching of natural sciences established that, in contrast to previous books, “whose starting point for the study of any group is the monographic description of a typical animal,” the new socialist teaching system should consider as fundamental “the biological characteristics that distinguish the remarkable gradation in the evolution of living beings in their respective groups.”

Among the *Activities to Learn About Nature*, the general topics for urban primary schools were:

1. Man and the Preservation of his Life
2. The Human Body
3. Prevention of Childhood Diseases
4. Personal Hygiene
5. Man in Relation to Things, Events and Natural Phenomena
6. Earth
7. Sidereal Bodies
8. Natural Elements Necessary for Life
9. Living Things: their Usefulness, Structure, and Adaptation to the Environment and their Way of Life.

The study of both animal and plant origin and evolution is assigned to topic 9. With respect to the syllabus for each school year (grade), the study of animal origin and evolution formed part of the zoology syllabus in the second cycle, second grade, (4<sup>th</sup> grade at present), while plant origin and evolution was taught as part of the botany syllabus in the third cycle, second grade, (the 6<sup>th</sup> grade at present).

Some of the approved ‘socialist’ books by the Ministry of Public Education for the teaching of Natural Sciences, were the series “Nature and Sciences” written by R. Jauregui for all grades of primary school. The topic of evolution (in accordance with the official syllabus) can be found in his book for sixth grade. Of the total 348 pages, the topics of evolution and heredity (with a high eugenic content) are briefly explained in the last seven pages.

Regarding evolution, Jauregui explains natural selection as follows:

Natural selection occurs without ever stopping, but with extreme slowness. The seeds of the plants for example are carried by wind or ocean currents or are transported in feathers or on the legs of the birds to places more or less distant from those in which their ancestors lived, they try to adapt to the new environment. If it is entirely unfavourable for climatic conditions or soil conditions, they perish. But if they are likely to develop in this environment, certainly begins the struggle for existence, perhaps very rough, perhaps in very difficult circumstances, growing stunted at first, but finally acclimatizing. Successive generations continuing the same struggle amend their roots or leaves to adapt to the new environment, and after years or centuries, will be varieties of the same family with certain different characteristics in two different places on earth (Jáuregui, 1955, p. 345).

It is interesting to note the Lamarckian discourse of necessity and intention, entirely consistent with the time.

As far as secondary school programs and curricula are concerned during the 1930s, the Biological Sciences teaching objectives statement addresses the following point: “to put students in touch with nature in order to: a) embark upon their studies of life and the interpretation of the laws of biology and evolution of organisms.” This, on the understanding that, in the design of the new second-year zoology syllabus, an attempt would be made to use “all the resources that science and pedagogy recommend: the careful observation of animals (preferably alive), dissection, comparison, drawings, sketches, etc. [...] emphasizing the biological characteristics observable in the evolution of living beings.”

The teaching of biological sciences at secondary school level during the 1930s was divided into botany first, then zoology and anatomy and, finally, physiology and hygiene (like the American education system’s *Civic Biology*).

During socialist schooling, the authorized secondary-school Zoology book was the *Guide for the Course of Zoology at Normal and Secondary Schools* published in 1928 by Maximino Martínez. Martínez was a student of Alfonso Herrera in 1908, so he had a strong conviction regarding the importance of the teaching of biological evolution. In this book, the topic of evolution is at the end and is covered in five pages. After stating that there is evident variation among members of each species, Martínez says the following: “It can be concluded that species vary. Based on this principle and supported by facts of anatomy, embryology and palaeontology, the theory of evolution states that species are derived from each other by successive improvements” (Martínez, 1928, p. 304).

He goes on to mention the evidence citing anatomy, palaeontology and embryology: he explains the principles of natural and sexual selection and concludes with the idea that “evolutionist doctrine is not new and has been discussed by different philosophers since ancient times; furthermore, considerable proof has been provided by recent research” (Martínez, 1928, p. 309). He then proceeds with a brief discussion of Buffon, Lamarck and Leibnitz.

As for the evolution of humans, Martínez states the following:

The theory of evolution does not hold that man is the direct offspring of neither fossil nor modern apes. Supported by the fact that species vary, and by the evidence provided by anatomy, embryology and palaeontology, it states that the organization of beings evolves slowly and steadily; that today’s predominant animals were not the same in past geological ages; that they descended from them and that will be the source of the evolution of new fauna that will eventually populate the Earth, as Earth’s conditions change as they have throughout the ages. As for man, [Darwin] states that he could only have developed from a primitive type, a “missing link” that connects human species to lower species as, materially speaking, they share undeniable similarities in their structure, their functions, their needs and their miseries (Martínez, 1928, p. 309).

Plans and curricula of primary and secondary schools, adopted on November 22<sup>nd</sup> 1939 as the basis of the socialist school, are distinguished from previous ones by emphasizing the biological characteristics that distinguish each group because of the process of evolution of living things, in contrast to the earlier books that based their information in monographic description of typical animals. Thus, the ideology behind the teaching of biological evolution in this period was, on the one hand, the formation of a critical and scientific spirit in people that would promote rationality over superstition and religious dogma, that lead a critique of deterministic thinking unique vision; linking education with mainly agricultural production and people’s organizations and social struggles. On the other hand, the transformation of the teaching of natural sciences was sought to allow academic freedom by introducing a system based on natural laws to explain the origin, diversity and classification of living things (which implies the recognition of deep time in the history of the earth and living things, the mutability of species contrary to fixism and the reassessment of the nature of human beings and their place in the Universe). Also, of importance is the fact that textbooks emphasized the possible applications of evolutionary theory. That is, how to manage crops, explaining the methods for the domestication of animals and stressing the importance of artificial selection in the agricultural production system. This to provide students with the necessary knowledge for the effective control and mastery of their environment by organized biological principles such as the laws of adaptation and classification of local species, as well as the recognition of its economic value.

In any case, it is important to highlight the complexity involved in teaching evolution at the basic level, regardless of the theory that supports it. The social implications provoke, even today, that many people perceive their teaching with suspicion, which results in many occasions in a scarce understanding of living phenomena. At the end of Cárdenas’s term (1940), lack of theoretical clari-

ty about the education project that Mexico should adopt impelled the following president, Manuel Ávila Camacho (1940-1946), to set public education on another, more liberal, course. Thus, despite Cárdenas's socialist efforts, education and therefore the topic of biological evolution, remained inaccessible to most Mexican children.

## CONCLUSIONS

In the early 1930s, the general feeling of the Mexican population was that the country was on the brink of an abyss. In little more than a hundred years of independent life and a few post-revolutionary years, Mexico had lost half of its territory and had committed the other half: it had rehearsed with diverse systems of government (the empire and the republic, unitary and federal; the dictatorship and the democratic system) never having achieved true stability. Constitutions, plans, promises and proclamations had happened without interruption and without resolution. And the conundrums that were (and still are) in the air were of the type:

We Mexicans have a big enough and rich enough territory to live decently, why do we starve? We have great natural terrain and yet people live in frightening misery. We are peace-loving and yet we have experienced many wars, is it that we are incapable of governing ourselves? (García Cantú, 1969, p. 363).

Cárdenas faced some of these challenges, mainly those related to taking people from poverty, freeing them from ignorance, creating national industry, boosting trade, establishing lasting peace, ensuring national independence and safeguarding revolutionary ideals through the establishment of Socialism (or better, a welfare state) in various fields. Thus, socialist education was a key instrument for achieving social justice and progress and for conferring public education a privileged space in public policy.

While using a global perspective but addressing the national context, we have tried to reconstruct the history of Mexican socialist school to show the particularities of the project that began as soon as the Mexican Revolution ended. Although the subject of the Mexican socialist school is propitious to be approached from a transnational historiography, in the sense that socialism as a globalized doctrine was appropriate in different ways in different local contexts, it is necessary to warn that we are considering the “local” to be the Mexican State educational policies. We understand these policies were not necessarily welcomed and put into practice in all regions of the country. In this sense, it is perhaps important to mention that there were outbreaks of disagreement with the Cardenist Reform in vast territories, but also, in diverse scenarios of the republic some of the population shared the principles of the reform and supported the campaigns headed by the SEP and the magisterium.

By means of this renewed historiography it is evident that the 1930s meant a major change for Mexico, not from the outskirts of global events, but as a main part of

those that marked that era. Many societies and institutions were established, printed knowledge circulated profusely, scientific conferences were organized, and a ‘network’ of connections and communications began to be structured. Thus, Mexico during this time was a part of a complex network of exchange, migration and communication. These networks, together with Mexican post-revolutionary governments boosted the idea of the school as a major force in the moulding of a national identity and the necessity to separate religion from educational spaces. Thus, during the 1930s Mexican State gave an unprecedented importance to primary school and founded secondary school. It also secularized education, made it mandatory and gratuitous and took it completely under its power emulating the French system.

However, despite the appeal of the socialist project—regarding education at least—due to many political and economic pressures that Mexico faced during Cárdenas' administration, socialist schooling did not continue when President Ávila Camacho took office at the end of 1940. In part, some global dynamics helped the socialist project to lose its momentum and pushed Mexican State to adopt a more capitalist and liberal view of politics, economics, and education, which continue to this day.

As Horta states “recent research has shown that Latin America is the product of the meeting of many peoples, forged from myriad local worlds where the movement of people, objects, ideas, and knowledge scoffs at borders” (Horta, 2013, p. 781). Mexico's socialist schooling is a local case study that is a part of a broader reality concerning education in global history. Global socio-political wars and movements, local post-revolutionary culture, enlightenment ideals and socialist ideological and political rationale were all particularly relevant in Mexican 1930s context to push forward—or at least—to aspire the achievement of a more equitable society.

Without a doubt, Mexican socialist education experienced a tension between promoting national science with a strong patriotic tenor, while participating in ‘universal’ science. In this sense it is curious how the topic of biological evolution for primary and secondary schools treated the subject as a global phenomenon with important national implications. The plan of Cárdenas socialist school sought to teach the natural sciences as a discipline that would provide rational thought, through a secular approach and materialistic explanations of reality, prioritizing the practical part to exploit nature for the benefit of society. For this reason, in the theme of evolution, emphasis was placed on artificial selection, thinking of its future application by farmers and breeders. This evolutionary approach to the study of living beings would not appear again in textbooks until 1993.

The diversity of evolutionary explanations that could exist in Mexico at the time was not necessarily reflected in the textbooks promoted by socialist education. The contrast between the classical views on Lamarck's proposal and Darwin's is what most clearly marked the evolutionary explanations. However, the greatest emphasis was placed on highlighting the evolutionary process

as a natural matter, in a purely materialistic sense. One question that could possibly be contradictory – at least in the sense of possible ideological closeness – is that, despite the emphasis on Socialism, there does not seem to be any noticeable influences from authors like Trotsky. And other authors such as Spencer and Haeckel do not seem to have had the same impact on basic education as they did on higher education.

As stated before, unfortunately, despite Cárdenas administration's best efforts, socialist schooling was in effect for a short time and it faced many difficulties of which we will only mention five. First, its advocates sought to clarify the meaning and limits of socialist education, which was a truly problematic undertaking. Second, its critics pointed out the shortcomings and dangers of the new government measures and led the struggle against it. Third, Mexico was deeply fragmented due to the mobilizations that came about in the aftermath of the revolutionary war and the nationalization of oil, provoking a dispute that lasted until the early 1940s; the economic pressure imposed on Mexico by the US government and the oil companies took place during an economic crisis that made Mexico's position unstable. Fourth, there was not one Mexico but many, so there was no strong unified state truly capable of imposing its educational programs nationwide. And finally, the struggle between Church and state to control education and the intention to impose socialist schooling revealed that the school system is not only an institution of state domination but an historical construction in which the State and civil society intersect and where daily negotiations occur between political powers and diverse cultural conceptions (Quintanilla and Vaughan, 1997).

Finally, we consider important to point out possible further research on the topic. On the one hand would be very interesting to study how some other socialist education systems introduced (if so) the topic of evolution and how it is similar or different from what happened in Mexico. On the other, in the interest of a global analysis, it would be important to specify how this study informs or could inform the teaching of evolution currently in Mexico.

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## NOTES

- 1 This was the first time that the Mexican socialist left (in one of its tendencies) was in government and tried from there to make its project of nationhood a reality under the Cardenist project described below.
- 2 This, in addition to being complicated, would lead us to address the comparison of the transnational turn in anarchist studies, which transcends the objective of the present manuscript.
- 3 The authors are aware that when talking about "socialism" one can make the mistake of being excessively rigid and/or imprecise. The Congress of the Second International of 1896 was held precisely because it sought to subject to a certain ideological

discipline the myriad of movements that proclaimed themselves socialist throughout the world. The authors will try to specify later on what exactly socialist education consisted of under the presidency of Lázaro Cárdenas.

- 4 Cárdenas' project of nationhood was based on the corporate organization of the social sectors, the ejidal agrarian reform and the oil expropriation. Cardenism conceived of a paternal, independent and sovereign State, supported by the peasants and an organized national community, being owner of the agrarian and oil rents as the great levers for the industrialization and modernization of the country.
- 5 In the 1930s, a Marxist-Leninist left current (although it was never part of the Communist International) emerged known as Lombardist Marxism, given the preponderant role played in it by its creator, Vicente Lombardo Toledano.
- 6 Ochoa, S. M. (2006) Centro de Estudios Sociales y de Opinión Pública *Desarrollo Social* [Last update: 24 March 2006] <http://www.diputados.gob.mx/cesop/>
- 7 As with other terms, it is useful to clarify what is meant by materialism in this paper. Given the interest that Cardenism had in consolidating an education based on a "rational and exact concept of the Universe and social life," referring to materialism meant seeking to explain nature in strictly material terms, without appealing at any time to supernatural aspects.
- 8 During the presidency of Alvaro Obregón (1920-1924), José Vasconcelos was nominated as Secretary of Public Instruction. In his position he carried out the first educational reform, which influenced the entire Mexican Republic. Thus, he began an ambitious project of cultural diffusion in the country, with programs of popular instruction, rural schools, edition of books and promotion of art and culture. The objective was to integrate Mexico more broadly into the great transformations that followed the end of the First World War.
- 9 Enrique Beltrán (1903-1994) was a Mexican biologist and botanist who strongly promoted the teaching of biology in Mexico. He was the author of numerous influential books such as *Biology Course for Secondary School*, *Practices of Biology*, *The Natural Resources of the Southeast and their Exploitation*, and *Half a Century of Mexican Sciences*.
- 10 STERM y CTM (1939) Memoria de la Conferencia Nacional de Educación celebrada en el Palacio de las Bellas Artes (11-17 de diciembre de 1939) organizada por el STERM y la CTM. Mexico: STERM y CTM.
- 11 Darwin's letter to Jean Louis Armand de Quatrefagues de Bréau, dated May 28, 1870; *Darwin Correspondence Project*, "Letter no. 7204," accessed on 13 February 2018, <http://www.darwinproject.ac.uk/DCP-LETT-7204>. [Accessed 17 Oct. 2019].
- 12 Here perhaps it would be appropriate to distinguish more surgically between Lamarck, Lamarckism and Neo-Lamarckism, since things are often attributed to Lamarck that he never said for at least two important reasons, because many Neo-Lamarckians wanted to support his particular vitalist perspective in the authority of Lamarck, and because not a few Darwinists wanted to ridicule the figure of Lamarck in the heat of the debate between Neo-lamarckians and Neo-Darwinists. Jean Baptiste de Lamarck developed his theory in the early years of the nineteenth century. Very succinctly, he established a transformist theory that proposes that species derive from each other and that changes that occur between one generation to another are due to the action of time, that is, that changes experienced by organisms due to environmental factors could be transmitted to their descendants. Thus Lamarckism begins as a current that considers the environment as the spark that initiates evolutionary change, and that organisms have an internal tendency to perfect their physiology and/or morphology in order to survive in their ecosystem. In the late nineteenth and early twentieth centuries, many evolutionists and physicians were convinced that various conditions and affections such as alcoholism, poverty, mental states, syphilis and tuberculosis, for example, could find their way into the offspring of their holders. This type of thinking is called Neo-Lamarckism and had various and powerful influences in social and political affairs of different countries such as Mexico.

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