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## Intellectual Migration, Industrialization, and Educational Reform in Colombia: Juan Luis Consuegra de la Cruz's Case

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### Abstract

This paper remarks the noteworthy role of the European intellectual migration of the first decades of the 20th century in the configuration of higher education linked to industry in Antioquia, Colombia. We use as a case study the Spanish chemical and industrial engineer Juan Luis Consuegra de la Cruz, who was the first dean of the Faculty of Chemical Engineering at the Universidad Pontificia Bolivariana, and one of the personalities who contributed to the advancement of governmental entities focused on economic and social development in Colombia. The primary sources used to reconstruct the case derive from historical archives, mainly university archives, and the press of the time. Studies on the impact and consequences of migratory phenomenon on the Colombia industrialization, and particularly in Antioquia, are scarce. The obtained results are consistent with the hypothesis about the close relationship between intellectual migration, educational reforms, and industrialization in Latin America during the period under review.

### Keywords

Intellectual migration, history of education, history of engineering, industrialization in Colombia, chemical engineering

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## Migración Intelectual, Industrialización y Reforma Educativa en Colombia: el caso de Juan Luis Consuegra de la Cruz

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### Resumen

Este trabajo profundiza y resalta el importante papel que tuvo la migración intelectual europea de las primeras décadas del siglo XX en la configuración de una educación superior vinculada con la industria en Antioquia, Colombia. Empleamos como caso de estudio al español Juan Luis Consuegra de la Cruz, quien fue el primer decano de la Facultad de Ingeniería Química de la Universidad Pontificia Bolivariana y una de las personalidades que contribuyeron al avance de las entidades gubernamentales enfocadas en el desarrollo económico y social en Colombia. Las fuentes primarias utilizadas para reconstruir el caso provienen de archivos históricos, principalmente universitarios, y de prensa de la época. Los estudios sobre el impacto y consecuencias del fenómeno migratorio en la industrialización en Colombia, y específicamente en Antioquia, son escasos. Los resultados obtenidos concuerdan con la hipótesis según la cual existe una estrecha relación entre migración intelectual, reformas educativas e industrialización en América Latina durante el período considerado.

### Palabras clave

Migración intelectual, historia de la educación, historia de la ingeniería, industrialización en Colombia, ingeniería química

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This paper aims to contribute to the understanding of the role of Spanish intellectual migration from the first half of the 20th century in the configuration of higher technical education focused on industrial development in Antioquia, Colombia. It also seeks to learn how the 1930s educational reform shaped such configuration. To this end, we used as a case study the Spanish Juan Luis Consuegra de la Cruz, the first dean of the Faculty of Industrial Chemistry, today the Faculty of Chemical Engineering, at the Universidad Católica Bolivariana (UCB), today the Universidad Pontificia Bolivariana (UPB), Medellín, Colombia. In addition, we show how this configuration process is framed in the Latin American context, in which the European intellectual migration and educational reforms linked to student movements were no exception. We aim with this paper to contribute to developing a Latin American history of education and its relationship with industry in the early 20th century.

In Europe, the transition from the 19th century to the 20th came with many changes. The Old Continent experienced an unexpected schism that developed slowly, but suddenly was presented itself with two major wars. Latin America suffered the effects of these shocks, resulting in political, social, cultural, and economic transformations in its territory. One of the main consequences of the European sociopolitical context in America was the migration wave from countries like Germany, England, Ireland, Italy, Portugal, and Spain, among the most studied.

For the case of the United States, Mexico and Argentina, the literature on these migratory flows is relatively extensive because those were the countries receiving the most immigrants, and where the impact on industry and culture was most visible (Bryce, 2018; Foote & Goebel, 2017; Navarro Azcue & Prado, 2016). Even though these studies include multiple aspects of such phenomena, we focus on intellectual migration. This concept is understood as the arrival of highly qualified migrants who, due to the unstable situation in their home country, decided to try their luck by crossing the Atlantic. First, we present this topic in general terms and then focus on the Spanish migration in the 1930s, in which our case study, Juan Consuegra's story, is set.

The connection between the Latin American student movements and the migratory flow in the first half of the 20th century has been studied in the field of the history of ideas, since it represents a matter of interest in understanding the circulation of ideas and the encounter between academic cultures (Cancino Troncoso, 2004; Labarca et al., 1977). It is worth noting that such migratory flows not only influenced the academic field, but also left a significant mark on the industrial development of the host countries (Acevedo, 2000; Romero, 1956). Presenting this connection between the Latin American educational transformation and the intellectual migration enables us to expose how the educational reform in Colombia, the circulation of ideas brought by European intellectual migration and the industrialization process converged in our country. The case of Juan Luis Consuegra de la Cruz is a particular example of articulating these factors in our region.

We have used various primary sources to build this narrative on the history of Antioquia's education and industry. In the archives of the UPB's Department of Document Management, we found unpublished minutes and graphic material of crucial interest. We researched Juan Consuegra's background in Spain through newsletters, educational brochures, Spanish press

from that time and historical archives of the School of Industrial Engineering of the Universidad Politécnica de Cataluña and from the Escuela Industrial de Terrassa. For the Colombian context and Consuegra's activities in the country, we traced press releases and magazines from the Antioquia region from the period between 1936 and 1940. We also interviewed professors of the UPB's Faculty of Chemical Engineering and some of the earliest graduates. Lastly, secondary resources contributed to constructing the historical analysis where different elements converge, from a social history standpoint: the intellectual migrations, educational reforms, and industrialization.

The paper starts with (1) a short description of the European intellectual migration in Latin America and Colombia during the first half of the 20th century, to focus on the Spanish intellectual migration in the 1930s, where Juan Consuegra appears. Subsequently, (2) we review the Latin American student movements and their connection with the liberal reformist policies in Colombia, which is a key issue that shapes the establishment of the UCB and the strengthening of an industrial approach to engineering education in Colombia. Finally, this historical framework concludes with (3) an introduction to the status of the industry and higher education in Antioquia at the beginning of the twentieth century. There, we highlight how the process of circulation of ideas, due to the arrival of intellectual migrants, impacted the development of those two sectors in the region. Then (4) we present the intellectual migrant Juan Luis Consuegra de la Cruz, starting with his academic training before arriving in Colombia and (5) we deepen his academic contributions to the UCB's Faculty of Industrial Chemistry. To conclude, (6) we present information on Consuegra's performance in the Colombian industry and government by highlighting the cohesion that we aim to prove between education, industrialization, and intellectual migration in Colombia during the studied period.

### **European Intellectual Migration in Latin America and Colombia**

European migration to America between the 19th and 20th centuries was not a secondary phenomenon. Acevedo Tarazona describes it in figures:

From the second half of the 19th century to the first thirty years of the 20th century, the figures refer to an approximate 52 million Europeans crossing the Atlantic. Most came from the United Kingdom, Ireland, Italy, Spain, and Germany. 21.5%, 11 million, settled in Latin America; of these, 46%, 5.06 million, in Argentina. Of these 11 million Europeans, 38% were Italian, 28% Spanish, and 11% Portuguese (Acevedo Tarazona, 2000, p. 186). [Translated from the original quote]

These significant numbers give clues to the importance of the consequences of this migration. This is the reason why this phenomenon has been carefully studied in some countries.

We are especially interested in Spanish migration in the first half of the 20th century. In the 1930s, political changes (like the Second Republic triumph in 1931 and the outbreak of the Spanish Civil War in 1936) together with the social and economic crisis in Spain

promoted various migratory waves. The intellectual expatriates had to flee abroad for many reasons, not necessarily political:

In fact, the intellectual expatriation had already begun before the military insurrection. The tense atmosphere foretold the tragic outbreak that led to a not only political, but social and economic crisis that would last almost a century and a half [...]. There were multiple families of notable people [...] formed by dynasties of university professors [...] who decided to leave Galicia, Castile, or Catalonia and moved to France, fascist Italy, England, and [...] Portugal (Maestre, 2009, p. 16). [Translated from the original quote]

In the case of Juan Consuegra, the one we are discussing, it is very likely that he would have been part of the group of migrants from Catalonia in the 1930s. This is because of his period of arrival in Colombia, his nationality, and the place where he did his university studies, although we do not know the exact reasons why he left Spain.

As mentioned above, the effect of the migratory flow in the Americas has been broadly studied in countries with a relatively high number of intellectual immigrants. On the contrary, in Colombia, this has been a marginal topic. In “Política y saber en los años cuarenta” (Silva, 2011), Renán Silva states that in Colombia there has been that belief about migration not having a significant impact, and that, therefore, such phenomena did not play an important role in establishing national culture or strengthening the local academy during the first half of the 20th century. However, studies such as those of the Escuela Normal Superior, the Universidad Nacional de Colombia and the Universidad Industrial de Santander seek to dispel such myth (Acevedo, 2000; Herrera & Low, 1994; Silva, 2005, 2008, 2011; Universidad Industrial de Santander, 2018). These institutions attracted an important number of foreign professors who exchanged their world views and, specifically, their visions on the academy in the 1930s and 1940s (Hernández, 2012). This paper continues along that line, providing the case of Juan Consuegra at the UPB.

The study of the migration phenomenon in Colombia has also been neglected because it has been believed that either most of the newcomers had a poor intellectual level or had high academic qualifications, but there were no people in Colombia who could exchange or benefit from their contributions. It has also been thought that migrant participation in big national cultural institutions was scarce. Silva has been interested in disproving such beliefs (Silva, 2011). He highlights that migrants’ intellectual training was high, to the extent that they were actively involved in academic and cultural institutions.

Such low recognition of the immigrant impact mainly arises from the difficulty of accessing records: the vestiges of the migrants’ work are scattered throughout Colombia, and studies on this matter have focused on the most noticeable ones, that is, the archives preserved in Bogotá. Additionally, it is easier to retrieve information from universities than from other institutions or cultural enterprises, and even governmental technical agencies such as the Instituto de Fomento Industrial (IFI) and the Contraloría de la República (Silva, 2011, p. 11).

One important part of Silva’s work has focused on reviewing unexplored archives to add arguments to the thesis of European immigration in Colombia decisively contributing to the cultural transformation of Colombia, despite being less numerous in comparison to other

countries in the Americas. We add arguments for this research program through the story of Juan Consuegra by recovering contemporary archival and press material that allows us to expand the vision of the impact of European cultural migration in Colombia.

### **Latin American Student Movements and Educational Reform in Colombia**

In addition to the migration phenomenon, the starting of the 20th century came together with a variety of student movements in the Southern Cone (Cancino Troncoso, 2004, p. 12). The reform atmosphere, which slowly expanded to Brazil, Peru, Colombia, and even Mexico, marked part of these countries' social and political dynamics during the first half of the 20th century. The movement's ideology intended the "modernization" of education, especially in universities that were perceived as "monarchist and monastic" (Tcach, 2012). At the heart of this reformist wave is the notable Córdoba Movement, whose 1918 manifesto was the ideological basis for many movements in Latin America. Once more, the role of the European migratory flows in this period can easily be traced to Argentina and Chile, where there were a considerable number of migrants compared to the population.

Just before the university reform movement, the traditional society was, however, undergoing the brunt of a transformation process, which introduced changes in the social structure with the rise of middle classes and the insertion of growing groups of foreign emigrants (Cancino, 2004, p. 14). [Translated from the original quote]

We are interested in briefly presenting the impact of these student movements on the state's educational reforms in Colombia during the 1930s, particularly observing how the government of that time approached the intellectual migrants seeking new ideas for education.

Even though we cannot talk of a student movement such as Córdoba's in Colombia, it is important to highlight the continental context in which reforms arrived in Colombia.

In 1918, reformism went beyond the limits of the age group leading it, joined to the demands of other social sectors, operated as a catalyst for activism and political participation of relevant groups of Argentine intellectuals, and offered an inescapable –moral and programmatic– reference point to students in Chile, Peru, Colombia, Mexico, and other Latin American countries (Tcach, 2012, p. 132). [Translated from the original quote]

In this sense, between 1920 and 1929 Colombian students faced university authorities through strikes and demonstrations, in which the principles of Latin American student movements were identified. These pressures and the erosion of the conservative government – which had been in power for many years – as a result of the inadequate use of the resources obtained after the sale of Panama, and the uptake of liberal, socialist and communist ideas by considerable sectors of the population, strengthened demonstrations that became increasingly common in Bogotá and in the rest of the country.

This situation produced a high degree of tension between the government and those sectors, resulting in riots violently dissolved. For example, the Banana Massacre in 1928 or the repression to protest in Bogotá in June 1929 (Melo, 2017). The claim for an educational reform was growing more and more, both in universities and in certain sectors of the opposition. The traditional approach to education, described as “colonial”, was criticized. It was an education that prioritized learning over practice. Protesters demanded a reform based on the need for qualified personnel that supported the first steps of industrialization (started in the beginning of 20<sup>th</sup> century).

Given this background, in 1925 the government formed the German Mission, whose goal was to design a proposal for educational reform, being careful not to refute the ideals of the most conservative sectors (Sarría, 2008, p. 333). However, a structural reform to education would take a few years.

The political erosion mentioned above favored a political regime change in the 1930s in Colombia. The Conservative Republic (1886 to 1930) was replaced by liberal governments between 1930 and 1946 with Enrique Olaya Herrera, a moderate liberal, as the first president of this cycle (1930-1934). In 1931, the first actions towards the improvement of the coverage and quality of education started to be applied. Thus, creating new education centers for teachers, based in the approach suggested years earlier by the German Mission. The Faculty of Educational Sciences was established, turning into the Normal Higher School in the following government.

Nevertheless, the scope of the first reforms of the early 1930s were limited due to the State’s fiscal difficulties and the political transition happening at the time. Additionally, as a counterbalance to the reformist airs of this period, the first rapid development of private education took place (Sarría, 2008, p. 333). [Translated from the original quote]

It was a favorable context for the creation of private universities such as the Pontificia Universidad Javeriana in 1932 or the UCB in 1936.

After Olaya Herrera came Alfonso López Pumarejo (1934-1938), who promoted substantive educational changes, like a reform that sought to free education from religious supervision (Melo, 2017). Regarding the university, in his inaugural speech, he stated:

Our universities are academic schools, separated from the Colombian problems, a situation that forces us to seek in foreign professionals what national teachers cannot offer for the material and scientific progress of the nation (Sarría, 2008, p. 334). [Translated from the original quote]

His reform project was consolidated in Law 68 of 1935 which included the German Mission recommendations of 1925 and materialized some of the main principles of the Córdoba Movement. Resulting from this law, new faculties, beyond the traditional ones, were created (Sarría, 2008, p. 334). In this context, the UCB founded the Faculty of Industrial Chemistry in August 1937, under the deanship of Juan Consuegra, an initiative totally influenced by the new air of industrialization from the professional training introduced by the López Pumarejo reform.



The series of liberal governments continued with Eduardo Santos (1938-1942), who was more moderate than his predecessor. He established the above mentioned IFI, which played a crucial role during World War II, supporting the local assembly of factories with products, until then imported, that had become scarce due to the war (Saavedra, 1996). Some years after joining UCB, Juan Consuegra was part of IFI, contributing directly to the development of the Colombian chemical industry.

### **Industrialization and Engineering in Antioquia at the Beginning of the 20th Century**

We consider relevant to first provide a context on Engineering education in Antioquia and its connection with industrial development in the 20<sup>th</sup> century, with the purpose of presenting then the role of Juan Consuegra in the foundation of the first Faculty of Industrial Chemistry in Colombia, as well as some of his interventions in the national industry.

Chemical Engineering emerged from Industrial Chemistry, a technical knowledge focused on applying formulas and procedures for manufacturing chemical products practiced in Europe during the mid-19<sup>th</sup> century. Germany was the pioneer country in this field. However, it was at the Massachusetts Institute of Technology in the United States, in 1888, where Chemical Engineering was formalized as a university career (Riveros et al., 1999).

According to Mejía and Riveros (2011), in Colombia, until late 19<sup>th</sup> century, the needs of the emerging industry were covered by immigrant engineers, and progressively by Colombian engineers who had studied abroad. In Bogotá in 1868, during a period of relatively political and social stability, the first School of Engineering in Colombia that graduated civil engineers started at the Universidad de los Estados Unidos de Colombia – now the Universidad Nacional de Colombia. Then, another school, the Escuela Nacional de Minas, was founded in Medellín, in 1887. Years later, since 1934, the Escuela Nacional de Minas joined the structure of the Universidad Nacional, as part of the higher education reforms of 1931.

We know that the first graduated engineers in Colombia were involved in cartography, public works and management of public companies. When referring to national engineering schools, Mejía and Riveros point out that “among the objectives of the majority of their directors, there was not that one of training professionals for the industry” (Mejía & Riveros, 2011, pp. 9–10). Preparedness for industrial tasks, such as technical supervision of processes and quality control, was in charge of schools of arts and crafts. It is worth mentioning that, at that period, the limited national industry was formed by craft workshops mainly of manual work. These workshops were mechanized primarily with the support of foreign engineers who trained the first national industrial technical. Technical schools in Colombia were scarce (Grupo de Historia Empresarial EAFIT, 2013; Mayor, 1997).

In the late 19<sup>th</sup> century, Antioquia experienced a coffee expansion that promoted new employment and encouraged the establishment of small industries. At the same time, mining and metalworking activities brought foreign technical personnel: forges received British and French civil engineers, and gold and silver mining attracted German technicians and engineers, as well as Colombian engineers from the Escuela de Minas.



Mining exploration tasks enhanced the emerging of organic and inorganic chemistry courses in the curriculum as of 1910. Somehow, by that time, civil and mining engineers performed tasks of chemical engineers in the local industry (Riveros et al., 1999).

There was soon a period of strengthening of regional industry. Food industries emerged and publishing industry grew. In 1907, the Compañía Colombiana de Tejidos (Coltejer) and in 1923 the Fábrica de Hilados y Tejidos del Hato (Fabricato), two textile companies key for local and national development in the 20<sup>th</sup> century, were founded (Riveros et al., 1999). This gives us a glimpse of the process that occurred in the 1920s, when a change of mindset in the region favored the later foundation of the professional program of chemical engineering: some traders became industrialists and started to consider the need for specialized personnel in their companies, with a vision of industrial processes. In parallel, the first Colombian chemists graduated abroad began to arrive in the country. Thus, producing the seed for the future training of chemical engineers demanded by the local industry.

By that time, Medellín had become one of the industrial centers in Colombia (Saavedra, 1996). One of the driving factors for such growth in the industrial sector was the availability of nearby sources of hydroelectric power (Hurtado, 2014; Poveda, 1996). On the other hand, the development of communication routes, led by the Colombian president Pedro Nel Ospina since 1923, played a crucial role in the expansion and integration of the domestic market by connecting Antioquia with other regions in Colombia (Riveros et al., 1999). Furthermore, towards the end of the 1920s Colombia received investments of international finance capital that contributed to the dynamization of the coffee and industrial economy (Mejía & Riveros, 2011).

The first years of the 1930s were difficult, as the Great Depression was reflected in a significant decline in exports of Antioquia's products, such as coffee. This situation affected the region's economy, although some important economic efforts continued to be carried out, such as the Hydroelectric Complex and the construction of the aerodrome in 1931, including a large industrial exposition in 1932 (Pérez & Restrepo, 2004).

The first signs of recovery began to be observed in 1934, and some authors propose that the Great Depression itself was an incentive for Colombian industrial development, because it forced the creation of national companies and the optimization of existing ones for import substitution (Jaramillo-Echeverri et al., 2016).

These circumstances reinforced the need for specialized technical personnel to manage such industrial transformation. In particular, the demand for chemical engineers, who could fully comply with the tasks of plant management, technical supervision and quality control, personnel management, and resource management, was strengthened (Jaramillo-Echeverri et al., 2016).

In 1936 the Faculty of Chemistry of the Universidad Nacional was founded in Bogotá. It was designed by the Spanish chemist Antonio García Banús, a case widely studied by Silva (2011). However, this career is focused on pure chemistry, that is, the study of chemical theories and its experimentation on the laboratory, and not the implementation of this knowledge at the industrial level, unlike chemical engineering or industrial chemistry.

The European political instability prior to World War II caused a cessation of imports of raw materials, among them the supplies for the textile industry, which Colombia required. In

addition, German engineers working in the national industry were deported in order to comply with international requirements. Those factors meant that the urgency of having high-profile technical personnel to lead local industry could wait no longer (Riveros et al., 1999).

In August 1937, after carefully and timely understanding the needs demanded in such context, the Economic Board of the UCB invited Juan Consuegra, a Spanish immigrant who had been working for some time in chemical companies in the city, to present a curriculum for the Faculty of Industrial Chemistry, the first of its kind in Colombia. The curriculum was approved, and Juan Consuegra was appointed dean of the new faculty. Classes began in 1938. In December 1942, the first four chemical engineers educated in Colombia graduated in Medellín. It is important to point out that, since its beginnings, the diploma awarded by the UCB to the graduate entitled him/her as *Industriali in Chimia Ingenieri*, Industrial Chemical Engineer, as decided by the Board of Directors in December 1938, as can be seen in minutes No. 24 (Consejo Directivo de la Universidad Católica Bolivariana, 1938).

In the following years, different national universities saw the need to train chemical engineers, and thus, during the 1940s, another four study programs in this field were created (Riveros et al., 1999).

### Juan Consuegra, an Intellectual Migrant

The University's Department of Document Management of UPB archive provided us the first data about Juan Luis Consuegra de la Cruz role in the UCB, as well as some photographs of him and his family (see illustration 1).

#### Illustration 1

*Juan Luis Consuegra de la Cruz and his family. Photo from the Department of Document Management*



We found additional information in the Escuela Industrial of Terrassa (Catalonia), in news about graduates, published in the newspaper *La Vanguardia*, in 1931. There it is evidenced that Consuegra graduated as Chemical Expert in this school (Claver, 1931, p. 4).

Antoni Roca-Rosell, director of the *Centre de Recerca per a la Història de la Tècnica "Francesc Santponç i Roca"* at the *Escola Tècnica Superior d'Enginyeria Industrial* in Barcelona (Universidad Politécnica of Catalonia), states that the degree of "Chemical Expert" at that time is equivalent to today's Chemical Engineer.<sup>1</sup> The Colombian newspaper *El Tiempo* (*Diario El Tiempo*, 1941a, p. 12) reports the degrees of "Industrial Engineer and Chemist from the faculties of Barcelona and Lyon and the École Polytechnique", obtained by Consuegra.

We do not know much more about Consuegra's history prior to his arrival in Colombia. He emigrated from Spain sometime between 1931 and 1934, during the Second Spanish Republic, which located him in the migration of the years prior to the Spanish Civil War (Acevedo, 2000). As we have previously stated, Consuegra's departure would have been part of the Catalan migration of the 1930s in the 20th century (Maestre Alfonso, 2009). We have no evidence yet of his motivations for emigrating, still, the social, political, and economic turmoil of those years in Spain were reason enough for many Spanish.

According to the minutes No. 96 from the UPB's Department of Document Management, on August 17<sup>th</sup>, 1937, the Economic Board welcomed Juan Consuegra. The minutes of the day contain his words:

A stay of more than two years of continuous activities in this beautiful Colombian land and in the Industrial Chemistry field, and as professor of Industrial Chemistry at the Escuela Nacional de Minas of Medellín, may give the undersigned some humble power to comment, not on the convenience of such beautiful work, but on the immediate need for it (*Junta Económica de la Universidad Católica Bolivariana*, 1937). [Translated from the original quote]

Until then, the only training program on engineering in Antioquia was the one of the Escuela de Minas, training civil engineers (Torres & Salazar, 2002).

In July 27<sup>th</sup> 1937, before this meeting with Consuegra, the members of the UCB's Economic Board had already declared the need for training programs for high-level technical personnel for the development of industries and management of the companies that emerged in Antioquia and Colombia. Minutes No. 89 of the Economic Board states:

Mr. Julio C. Hernández informs that, knowing that the Rector of the U.C.B. wished to found soon the Faculty of Industrial Chemistry, he undertook the task of getting, along with people interested in this founding, economic support for the purchase of Laboratories, and has already several promises. Mr. Hernández had spoken with Mr. Consuegra, a Spanish Chemist employed by Inquico Co., to check if Mr. Consuegra could help the University in this matter, and Mr. Consuegra promised to collaborate (*Junta Económica de la Universidad Católica Bolivariana*, 1937). [Translated from the original quote]

We know that in August 1937 Consuegra was in Medellín working for the Industria Química Colombiana S.A (Inquico S.A.) and was also a chemistry professor at the Escuela de

Minas (School of Mines). Inquico was part of the emerging chemical industry in Colombia. It was founded by Colombians in 1936 and, a few years later, was partially owned by Anilinas Alemanas, a subsidiary of I.G. Farbenindustrie (Concannon, 1945, p. 1; United States Congress. Committee on Military Affairs, 1945, pp. 1038–1039).

### Juan Luis Consuegra's Contributions to the Circulation of Ideas in Education and Industry in Colombia

The phenomenon of intellectual migration throughout America triggered the circulation of ideas, fostering profound changes in education and industry. As an example of such phenomenon, we find the first program of Industrial Chemistry proposed by Consuegra. This program acknowledges Consuegra's work experiences and academic training in Spain and France. It is documented in the Economic Board's minutes No. 96 and shown in Table 1 (Junta Económica de la Universidad Católica Bolivariana, 1937).

**Table 1**

*Curriculum proposed by Juan Luis Consuegra de la Cruz for the UPB's Faculty of Industrial Chemistry – 1937*

Year 1	Year 2	Year 3	Year 4	Year 5
Higher Algebra	Analytic Geometry	Applied Mechanics	Electrical Engineering	Industrial Chemical Technology and Statistics
Trigonometry and Topography	Differential and Integral Calculus	Magnetism and Electricity	Organic Industrial Chemistry and Practices	Organic Chemical Analysis and its Practices
Natural History	Descriptive Geometry	Thermodynamics	Electrochemistry and Electrometallurgy	Physical Chemistry
General Physics	General Mechanics	Chemical Analysis and its Practices	Thermotechnics	Industrial Railways
General Chemistry	Inorganic Industrial Chemistry and Practices	Metallurgy and its Practices	Construction and Industrial Architecture	Political Economy, and Social Legislation
	Industrial Drawing	Industrial Drawing	Project sketches	Industrial Hygiene Project

According to the "Memoria Estadística" (Statistic Memoir) of the 1927-1928 class, part of the Escuela Industrial de Terrass (*Escuela Industrial y de Ingenieros de Industrias Textiles de Tarrassa, 1929*), the Chemical Expert program applicable during Juan Luis Consuegra's

period of studies was the one enacted by Royal Decree on December 16, 1910, and published in the *Gaceta de Madrid* on December 28 of the same year. The courses used in the curriculum proposed by Consuegra for the UCB (Table 1) are highlighted in blue in Table 2.

**Table 2**

*Curriculum for Chemical Experts, Escuela Industrial de Terrasa – 1910*

<b>Preparatory Course</b>	<b>First Group</b>	<b>Second Group</b>	<b>Third Group</b>	<b>Fourth Group</b>
Practical Arithmetic and Geometry	Arithmetic and Algebra	Trigonometry and Topography	Electrical Engineering	Electrochemistry
Notions of Physical, Chemical and Natural Sciences	Plane and Space Geometry	General Physics	Magnetism and Electricity	Organic Chemistry
	Industrial Geography	General Mechanics	Inorganic Chemistry	Metallurgy
	French	General Chemistry	Chemical Analysis	Economics and Industrial Legislation
	Geometric Drawing	French	Industrial Drawing	Practices of Electrochemistry
	Technological Conferences at Iron and Locksmith Workshops and Practice in Lime	Geometric Drawing  Practices of Workshop Practices of Chemistry	Practice in Electrical Engineering and Electricity  Practices of Inorganic Chemistry and Chemical Analysis	Practices of Organic Chemistry and Metallurgy

The courses proposed by Consuegra to build the Industrial Chemistry program correspond to courses studied from the “Second Group” of the Chemical Expert program, that is, advanced courses within the program. This meant an adaptation based on Consuegra’s previous knowledge about the Colombian students’ training in high school before they started their engineering studies.

In the Industrial Engineering curriculum, published on October 19, 1926, in force at that time in Spain, there are other courses corresponding to those of the UCB’s Industrial Chemistry program. This information was obtained from the official journal *Gaceta de Madrid* ([Ministerio de Trabajo Comercio e Industria, 1926](#)) and the courses common to both curricula are highlighted in blue in Table 3.

It can be noticed that from the First term (first and second annual course) seven subjects were taken; from the Second term (from third to fifth annual course) six were taken; and from the Third term, only two subjects were taken. In the table, in addition, the annual courses in

which each subject was taken are indicated by numbers in parentheses. For the Third term (the Sixth annual course), groups of subjects were taught, being chosen by students based on their interests. These groups are denoted in parentheses with the letters A, B, and C.

**Table 3***Schools of Industrial Engineers curriculums*

<b>First Term (1) and (2) Scientific preparation</b>	<b>Second Term (3), (4) and (5) Technical studies</b>	<b>Third Term (6) Specialized subjects</b>
Analytic geometry and monograph (1)	Industrial Applications of Heat (3)	Mechanical constructions (Production of profiled iron, manufacture, and adjustment of machine parts, boiler work, metal constructions, millwork, etc.) (A)
Descriptive Geometry and its applications (1)	Mechanics applied to construction (strength of materials and calculation of machine elements) (3)	Yarn and Textile industries (A)
Algebraic and Infinitesimal Analysis (1)	Machine elements and mechanisms (3)	Crushing and grinding industries (half course) (A)
General Chemistry (1)	Industrial Chemistry (inorganic and organic) (3)	Extension of the automotive and airplane study (half course) (A)
Industrial artistic drawing (1)	Hydraulics and hydraulic machines (3)	Naval architecture (A)
Extension of general physics, understanding thermodynamics and applications of light (2)	Projects (3)	Project sketches (A)
General and specific chemical analysis (2)	Knowledge and testing of material and industrial constructions (4)	Sugar and Fermentation industries (B)
Rational Mechanics (2)	Knowledge and testing of material and industrial constructions (4)	Silica industries (ceramics, glass, concrete, etc.) (B)
Physical Chemistry (2)	Heat engines (4)	Colors and textile dyeing industry (half course) (B)
Topography and geodesy (2)	General metallurgy (4)	Industries of fuel distillation and derivatives (B)
Workshop drawing (2)	General mechanical operations in industry and machine tools (4)	Electrochemistry and electrometallurgy (B)
	Electrical engineering (4)	Extension of the study on iron and steel industries (B)
	Projects (4)	Project sketches (B)
	Iron and steel metallurgy (5)	Extension of the study of construction and exploitation of electric power distribution (C)
	Overall transport and railways (5)	Construction of machines, devices, and electric materials (C)
	Political economy and industrial legislation (5)	Overall telegraphy, telephony, and electrical communications (C)



<b>First Term (1) and (2)</b>	<b>Second Term (3), (4) and (5)</b>	<b>Third Term (6)</b>
<b>Scientific preparation</b>	<b>Technical studies</b>	<b>Specialized subjects</b>
	Electrical Engineering (second course) (5)	Extension of the electric traction study (C)
	Organization and accounting of industrial companies (5)	Electrochemistry and Electrometallurgy (C)
	Projects (5)	Project sketches (C)

We can identify that the existing programs of Chemical Expert in Spain, in 1926, from the Escuela Industrial de Terrassa and Industrial Engineering provide 80% of the courses of the UCB's Industrial Chemistry program. The remaining courses, such as Industrial Hygiene, may have been inspired by the specific needs of the field identified by Consuegra, or by his experience in other professional environments, like the Escuela de Minas and Inquico S.A.

The way in which the curricula of Chemical Expert and Industrial Engineering in the 1920s in Spain impacted the creation of the first Industrial Chemistry program at UCB, enables to track a route of circulation of ideas in the engineering education field, between Spain and Colombia, as an outcome of the Spanish intellectual migration in the early decades of the 20th century.

Learning about the activities of Juan Luis Consuegra in the years following the Faculty of Industrial Chemistry allow us to witness the consolidation of his contributions to our country in the educational, social, industrial, and technological fields.

As dean of the Faculty of Industrial Chemistry, Consuegra was a member of the UCB Council between 1938 and 1940. The first time he was mentioned in the Council's minutes was on February 17, 1938, the year when the Faculty of Industrial Chemistry began its operations, and the last time was on November 25, 1940, apparently when he retired from his ([Consejo Directivo de la Universidad Católica Bolivariana, 1938, sec. Acta No. 16, 1940, sec. Acta No. 35](#)). This time as member of the Council and dean, enables us to understand the importance he had in the UPB's consolidation and, therefore, in the private educational system in Antioquia.

Among the records of Juan Consuegra's actions in the Faculty of Industrial Chemistry, are curricular, administrative, and economic initiatives. In the curricular sphere, by 1938, at the end of the first year of the faculty's operation, he proposed two types of degrees to be granted: Industrial Chemical Engineer and Doctor of Chemical Sciences ([Consejo Directivo de la Universidad Católica Bolivariana, 1938, sec. Acta No. 24](#)). The first type of degree was granted as such until the 1950s, when the faculty changed its name to the Faculty of Chemical Engineering, and since then graduates were called Chemical Engineers.<sup>ii</sup> As for the degree of Doctor of Chemical Sciences, it was granted until 1965.<sup>iii</sup> In terms of the academic system organization, Consuegra left his mark through the regulations for the Faculty of Industrial Chemistry, approved by the Council in 1939 ([Consejo Directivo de la Universidad Católica Bolivariana, 1939, sec. Acta No. 26](#)). .

In 1938, for the economic field, Dean Consuegra presented to the Council an offer from the company Anilinas Alemanas, which consisted of supplying the Faculty with both materials and relevant knowledge free of charge, for the Dyeing applied to textile printing

course. That offer represented a valuable support for the emerging UPB (*Consejo Directivo de la Universidad Católica Bolivariana, 1938, sec. Acta No. 17*).

In the social section of *El Tiempo* newspaper, we found information about Consuegra's other activities: he is acknowledged for his "important role in the industrial development beginning there [in Medellín] in recent years." (*Diario El Tiempo, 1941a, p. 12*) [Translated from the original quote]. There is also a mention about his participation in the Escuela de Minas, the UCB, Inquico and the Compañía de Productos Químicos Nacionales. Moreover, the article states that Consuegra "has been called to Bogotá to serve as a technical advisor for the Ministry of Economy and the Instituto de Fomento Industrial [IFI]." [Translated from the original quote]. The IFI was created in 1940 (*Ministerio de Hacienda y Crédito público, 1993*) and was the driving force of Colombian industrial development during several decades of the 20th century.

Sometime between 1940 and 1941, Juan Luis Consuegra moved to Bogotá (*Diario El Tiempo, 1941a, p. 12*), where he worked with the national government. He collaborated with the management for the nationalization of the work of rectification of the Medellín River, receiving an award from the Sociedad de Mejoras Públicas in Medellín, as stated in *El Tiempo* on November 2, 1941 (*Diario El Tiempo, 1941b, p. 3*). The rectification and the canalization of the Medellín River was one of the largest engineering and urbanism works undertaken in the city in the middle of the last century, and its development remains recorded in historical documents concerning the city (*Sociedad de Mejoras Públicas de Medellín, 1940*). These documents show that the work began with the city's resources, but the nationalization of the work promoted by Juan Luis Consuegra allowed the central government's to finance its completion. According to Mario Beuth Monsalve,<sup>iv</sup> one of the earliest graduates from the UPB's Chemical Engineering program, Consuegra returned to Spain. However, despite various research, we have not been able to obtain any trace of him after 1941.

## Conclusions

Through Juan Luis Consuegra de la Cruz's role, the first dean of the UPB's Faculty of Chemical Engineering, we intended to show the importance of European Intellectual migration in the changes that occurred in the Colombian industry and higher education during the first decades of the 20th century.

Although in Colombia this migratory phenomenon did not have the magnitude it had in other countries of the Americas, such as the United States, Mexico, Brazil, Chile, or Argentina; following previous studies on these cases enabled us to clarify the influence and changes caused by the migratory phenomenon in Colombia. In this path, we delve into the dynamics emerging from industrialization, higher education, and cultural enrichment after the arrival of highly skilled migrants to Colombia. Thus, we have supported Renán Silva's hypothesis, under which intellectual migrants' contribution to our country was important, and that there is still more to be studied and shown about it.

Overall, we can state that this migratory flow was decisive for cultural construction and the circulation of ideas during the first half of the 20th century in Colombia. In this country, the industry and the academy were opened to apprehend, contextualize, and apply knowledge and skills from abroad, aiming to strengthen local processes that would enhance Colombia's viability and autonomy.

The episode about the foundation of the first faculty of Chemical Engineering in Colombia proves to be of great interest for reconstructing the history of intellectual migration in Antioquia, and its influence on the consolidation of the educational and industrial sectors in the region. Engineer Juan Consuegra's time in Medellín – and later moving to Bogotá– and his performance in different business, educational, social, and governmental positions adequately illustrate this influence. It also allows us to consider the close connections emerging between student reforms and educational transformations; industrialization and the creation of universities and educational programs aligned with a new regional reality (that shifted from the prevalence of trading to industrialization). In this context, we highlight the decision of UPB, a pioneer in offering a leading-edge higher education: training of chemical engineers, professionals in demand to carry out the industrialization project proposed by the region and the country.

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### **Notes**

I Personal communication from Antoni Roca-Rosell, head of the Centre de recerca per a la Història de la Tècnica "Francesc Santponç i Roca" at the Escola Tècnica Superior d'Enginyeria Industrial in Barcelona (Universidad Politècnica of Catalonia). September 29, 2019.

<sup>II</sup> The change made in the 1955 brochure can be seen. The brochures were booklets printed and distributed by the UPB among its professors and students at the beginning of each year with relevant administrative and academic information, including curricula, professors and degrees awarded by each faculty and department of the University.

<sup>III</sup> The elimination of the Ph.D. degree can be seen by comparing UPB's brochures for 1965 and 1966.

<sup>IV</sup> Interview to Mario Beuth Monsalve, Chemical Engineer from UPB enrolled in 1941 (fourth promotion) and graduated in 1946. Medellín, May 23, 2013.

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