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# The Contributions of European Jesuits to Environmental Sciences

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## Abstract

Jesuit activity in the fields of the natural sciences manifest in the origins of the Society both as teachers and as missionaries. In particular, entomology, botany, meteorology, and geography attracted the attention of the early Jesuits. Always involved in scientific inquiry, the number of Jesuits today working in these fields has diminished tremendously. During the twentieth century though Jesuits established reputable institutions of agricultural education in both France and Spain. This article discusses the recent development of the discipline of ecology and other Jesuit contributions in the fields of agronomy, energy, economics, and social analysis.

## Keywords

European Union – science – botany – agriculture – energy – agroecology – cultivars – sustainability

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## Introduction

First, a preliminary remark should be made to explicate that the Jesuits in Europe have not chosen neither ecology nor the environment, as such, as a precise apostolate. Only in the last twenty years have the Jesuits in Europe, generally speaking, become more aware of the ecological challenges of our times. Still we can identify three broad initiatives out of the Society of Jesus that are related with ecology or environmental science: firstly, the work of individual Jesuits—mostly in the area of natural sciences—that continues the long tradition of Jesuits involved in that sciences that stretches to the early Society; secondly, the development of centers of formation in agriculture, especially in France and Spain, where Jesuits sustained a long effort to train the rural youth; and thirdly, more recent efforts that are primarily oriented to promote awareness of environmental issues and a commitment to environmental protection.

In this article, the first section is dedicated to the early history of the Society of Jesus—before the suppression—where I shall present the European Jesuits both in Europe and their endeavors abroad, specifically in the field of the natural sciences. The second section provides a national survey that sketches the corporate initiatives of the Society regarding natural and environmental sciences. Finally, the third section focuses on various individual Jesuits who have worked in scientific research since the restoration of the Society, and highlights several figures who recently made notable contributions.

## The Early Society

Although “ecology” was not used to describe the environment in scientific terms until Ernst Haeckel coined the term in 1866, it can be employed in this case to encapsulate the long tradition of Jesuit scientists, who worked as biologists and geographers.<sup>1</sup> In particular, this would include the Jesuit pioneers of the natural sciences, such as Christopher Clavius (1537–1612) in mathematics, Matteo Ricci (1552–1610) in astronomy, and also José de Acosta (1540–1600) and Cristóbal de Acuña (1598–1670). In addition to the influential work of these figures, it is important to recall that Jesuit schools in Europe typically had

1 For the term “oecologie” that Haeckel coined, see *Generelle Morphologie der Organismen: Allgemeine Grundzüge der organischen Formen-Wissenschaft, mechanisch begründet durch die von Charles Darwin reformierte Descendenz-Theorie* (Berlin: G. Reimer, 1866), 1:238.

observatories, labs, and museums of natural science that displayed the discoveries of the missionaries.<sup>2</sup>

The latter two figures stand out in this last regard. José de Acosta stayed in Latin America for fifteen years, travelling extensively through Peru, Bolivia, Chile, and Mexico. During his trips, he customarily took notes of the environmental conditions: temperature, rain, winds, volcanic activity, earthquakes, and he also described in a very detailed way the diversity of minerals, plants, and animals that he had found on his trips and some of which that remained under his attentive observation. In 1590, upon his return to Spain, he published the famous *Natural and Moral History of the Indies*, in which he aimed to understand the reasons for such biodiversity even though it might not be reconciled with an Aristotelian interpretation of nature.<sup>3</sup> Cristóbal de Acuña, another naturalist and geographer, travelled the Amazon River in 1639 pursuing research in this same intense manner. For instance, his technique for calculating the length of the river is in sharp contrast to modern calculations. He made a detailed account of plants, animals, the weather, and the human population that he encountered on his way into the Amazonia. Many others followed this Jesuit tradition of naturalists and geographers in South America, such as Bernabé Cobo (1582–1657) in Peru; Fernão Cardim (c.1549–1625) and Simão Vasconcellos (1596–1671) in Brazil; José Gumilla (1686–1750) in Venezuela; and Alonso de Ovalle (1603–51) in Chile. This model of the Jesuit scientist, however, was not confined to Latin America. João de Loureiro (1710–91), for example, described more than 2,000 plants of Vietnam and the Moravian Georg Josef Kamel (1661–1706) published extensively about the plants of the Philippines.

Now as climate change has become a major issue in our time, we can remember the saga of Jesuit meteorologists who already in the seventeenth century—but definitively in the nineteenth century—became invested in observatories throughout the world. In France, Laurent Beraud (1703–77) and Esprit Pezenas (1692–1776) established observatories in Lyon and Marseille, respectively; they were also capable of making measurements of temperature, atmospheric pressure, humidity, and rainfall. Many Jesuit schools all over Europe established meteorological observatories, while many Jesuit instructors of the sciences in these schools became involved in weather forecasting and the description of atmospheric phenomena. After the restoration of the Society in 1814, Jesuit

2 Agustín Udías, *Los jesuitas y la ciencia: Una tradición en la Iglesia* (Bilbao: Mensajero, 2014), 147–63 [English version: *Jesuit Contribution to Science: A History* (New York: Springer, 2014)].

3 See José de Acosta, *Historia natural y moral de las Indias*, ed. Bárbara G. Beddall (Valencia: Valencia Cultural, 1977); for an English translation, see Jane E. Mangan, ed., *Natural and Moral History of the Indies*, trans. Frances López-Morillas (Durham: Duke University Press, 2002).

interest in this kind of scientific activity grew and subsequently during the twentieth century more than thirty Jesuit-operated observatories were in service across the globe. In Rome, for instance, the first observatory opened in 1824, which eventually received the pontifical support of Leo XIII (r.1878–1903) when he founded the Vatican Observatory in 1891 and subsequently entrusted it to the Society of Jesus. Other Jesuit observatories soon followed elsewhere in Europe: Stonyhurst (UK) in 1838; León (Spain) in 1860; Mondragone (Italy) in 1868; Gozo (Malta) in 1882; and Tortosa (Spain) in 1904. On the British island of Jersey, near the French coast, the Jesuits ran an observatory for eighty-three years, from 1893 until 1976. The observatory is still operational under the name of St. Louis in commemoration of its Jesuit origin.<sup>4</sup>

## The Modern Society

### *France*

At the end of the nineteenth century, under the fiercely anti-religious regime of the French Third Republic, the Society in France concentrated its apostolic mission upon education—particularly in the agricultural sector—as a sort of investment in future generations. Part of the intent in these initiatives was to provide the rural elites with an education that could equip them with the technical expertise to operate their farms while cultivating in them Christian virtue. The earliest instance of this kind of educational institution is LaSalle Beauvais Agricultural Institute of Beauvais, established in 1854 by the Christian Brothers.<sup>5</sup>

In 1898, Ernest Vétillart, S.J. (1851–1930) launched a project of higher agricultural education that was linked to the Université Catholique d'Angers.<sup>6</sup> As a recent doctoral dissertation examines the impetus for these programs “to form the elites differently,” the apparent advantages of the Jesuits in this particular niche was the combination of a scientific approach to agriculture alongside an accompanying socio-political vision. In terms of timing, the founding of this kind of an agricultural program that aimed to train Catholic managers in all professions was firmly rooted in the 1891 encyclical *Rerum novarum*. In concert with Leo XIII's message, the mission sought to instruct that Christians should

4 Agustín Udías, “Jesuits' Contribution to Meteorology,” *Bulletin of the American Meteorological Society* 77, no. 10 (1996): 2307–15.

5 This tradition of Christian education was founded in close association with the Society of Jesus. As for the school, it currently operates as Institut Polytechnique LaSalle Beauvais.

6 Subsequently this institution has transformed into the Université Catholique de l'Ouest.

act in society to transform it and, in this case, the purpose of the Jesuits was to train managers with a scientific type of knowledge and a culture consistent with the doctrine of the church.<sup>7</sup>

With the support of professional associations, the college at Angers opened in 1899 under the administration of Alfred Foreau, S.J. (1884–1956) with six students. Reflecting the religious impulse of this school, as the doctoral research of Angèle Souryris demonstrates, the motto of its founder was: “petit paysan pauvre devenu prêtre.”<sup>8</sup> The program of study, planned over a period of four years, entailed two years of scientific training and two years of agronomic education. Moreover, the instruction provided lessons in social philosophy in order to prepare the groundwork for the students’ careers. Teaching was done according to an intermixture of pedagogical theory and on-site field visits, aiming to concretize the possible lessons and negating the distance between the classroom and the farmlands. Until the end of the First World War, the college developed slowly due to recruitment being typically directed toward the children of aristocratic families as well as the limited number of faculty and staff. Annually, in those early years the school had on average less than thirty students. Only after the war did the college enter a more prosperous period that included evening and correspondence courses, which engaged students more widely, and also those from a more modest background.

Likewise after the First World War, in 1918, Marc Dubruel, S.J. (1874–1928) designed the École Supérieure d’Agriculture de Purpan, a new project that was similar to the forerunners in Beauvais and Angers.<sup>9</sup> This reflected a social shift in the value of farming in the post-war period, and outlined the potential role of the church in that transition. The dissertation of Souryris provides a full account of this process and its “human and supernatural optimism,” highlighting the vision of Dubruel at the foundation of the college:

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- 7 Annie Dufour, “Les enjeux de l’enseignement de la sociologie dans une école d’ingénieurs” (PhD diss., Université Lumière Lyon 2, 1998), available online at: <http://theses.univ-lyon2.fr/documents/lyon2/1998/adufour#p=0&a=top> (accessed June 10, 2016), specifically section 2.1.2, “Des écoles privées pour former l’élite de la profession agricole,” the source of which is “Entretien n° 1, 1996”; the translation is the author’s own, unless otherwise indicated. For the referenced encyclical, see Leo XIII, *Rerum novarum*, May 15, 1891, sec. 27, available online at: [http://w2.vatican.va/content/leo-xiii/en/encyclicals/documents/hf\\_l-xiii\\_enc\\_15051891\\_rerum-novarum.html](http://w2.vatican.va/content/leo-xiii/en/encyclicals/documents/hf_l-xiii_enc_15051891_rerum-novarum.html) (accessed June 10, 2016).
- 8 Angèle Souryris, “Le C.E.R.C.A.: Spécificité pédagogique (1927–1960)” (PhD diss., Université Lumière Lyon 2, 1984), 54, available online at: [http://theses.univ-lyon2.fr/documents/lyon2/1984/souryris\\_a#p=0&a=top](http://theses.univ-lyon2.fr/documents/lyon2/1984/souryris_a#p=0&a=top) (accessed June 10, 2016).
- 9 Henri de Gensac, *Histoire de l’école supérieure d’agriculture de Purpan: 1919–1977* (Toulouse: École Supérieure d’Agriculture de Purpan, 1996).

At the end of hostilities, there will definitely be a return to the land. It is important that the Church is interested in this movement if it is to be advantageous for the good of souls and for the country's future. We foresee the extension of the small property where mixed farming (*polyculture*) will be practiced [...]. And so it would develop a rural middle class who can prosper and return of great service, provided that the most influential men exercise a social role of support and mentoring."<sup>10</sup>

The Society was integral in collating these various interests into the mission of the agricultural college at Purpan from the outset.

Similarly, the agricultural department of the Institute Catholique de Toulouse was intended for the formation of professional elite and gradually underwent this same transformation. The purposes were then defined to develop in students a technical ability, but also beyond those skills to instill that they should also be capable of leadership, which is explicitly Christian.<sup>11</sup> For several years, the student body remained very small—approximately twelve to twenty-five—falling below expectations. Yet the success of Angers and Beauvais encouraged the Jesuits at Purpan. Only after the Second World War did the college at Purpan expand by promoting methods of agricultural modernization. Its impact on regional agriculture was connected to the development of the professional association of unions in southeast France in 1913, and to the creation of a program of agricultural studies via correspondence in 1921, the success of which reinforced this collaboration. Thus, the influence of the school had reached the broad spectrum of farmers in addition to the elite that was initially targeted.

For more than one hundred years the centers, both Angers<sup>12</sup> and Purpan,<sup>13</sup> served as protagonists in the research and development of agriculture, food industries, and rural development. Very much intertwined with the regions where they are situated, these colleges provided training to thousands of responsible managers of both farms and the food sector. In recent decades, they evolved from a productivity-driven agriculture to a more sustainable model of production that is attentive to the central ecological and environmental challenges of our time. Distance-education, mostly through correspondence courses, in particular had a great influence facilitating the ongoing formation

10 See Souyris, "Le C.E.R.C.A.," 46–47.

11 De Gensac, *Histoire de l'école supérieure*, 112.

12 École Supérieure d'Agricultures de Angers, Loire, "Groupe-E.S.A.," <http://www.groupe-esa.com/> (accessed June 10, 2016).

13 École d'Ingénieurs de Purpan, <http://www.purpan.fr/en> (accessed June 10, 2016).

of students who may be scattered throughout the region. Unfortunately, the Jesuit presence in these institutions came to an end in the 1990s—a result of the lack of manpower.

In a parallel development to these farming initiatives, the French Jesuits also became involved in the formation of engineers—both mechanical and electrical—through the Institut Catholique d'Arts et Métiers (ICAM), which was founded in 1898 and presently establishes a network of Jesuit faculties of engineering. Across its fields of research, there are several topics interconnected with sustainability, such as waste recycling.<sup>14</sup> Furthermore, out of the French province's social apostolate, particularly the Paris-based Centre de Recherche et Action Sociales (CERAS), enormous interest has manifested in ecological issues, as such, and also through their social implications. This is especially especially in CERAS's journal, *Revue project*.<sup>15</sup> A special moment for CERAS was the 2014 international conference, "Quelle Justice Sociale à l'Heure de la Transition Énergétique?" (Which social justice at the time of energy transition?), an occasion that gathered more than one hundred people to discuss the technical options for an energy transition from fossil fuel sources to renewable ones. This colloquium brought particular focus to the impact upon the poor and lower-income households.<sup>16</sup>

### *Spain*

In a manner that is similar to the French history, the Society in Spain also has a long history of training youth in agriculture. In the 1960s, as Spain underwent an intense process of social change that shifted from an economy driven by agriculture to one based in industry and services, a large migration of laborers from rural areas re-located into industrialized cities. Yet in the Spanish context, this reduction of agricultural labor combined with the contemporary shift toward the so-called "green revolution," which has improved seeds, fertilizers, and machinery, and has subsequently transformed a relatively unproductive agricultural sector into an intense agribusiness. Accompanying this social transformation, the Spanish Jesuits also created several agricultural training centers as an adaptive measure. In 1963, for example, the Jesuits in Andalusia

14 Institute Catholique d'Arts et Métiers, <http://www.icam.fr/en/> (accessed June 10, 2016).

15 Centre de Recherche et Action Sociales, <http://www.ceras-projet.org/> (accessed June 10, 2016).

16 *Revue Project*, "Quelle Justice Sociale à l'Heure de la Transition Énergétique," [http://www.revue-projet.com/dossier\\_revue/quelle-justice-sociale-a-l-heure-de-la-transition-energetique/](http://www.revue-projet.com/dossier_revue/quelle-justice-sociale-a-l-heure-de-la-transition-energetique/) (accessed June 10, 2016). This international conference was organized in Paris, September 10–12, 2014.

decided to merge two institutions, the Instituto Social Agrario (INSA) and the Escuela Superior Técnica Empresarial Agrícola (ETEA), a new collaborative enterprise that offered a degree in economics and business administration and was strongly connected with the region's agricultural sector.<sup>17</sup> This was not the only instance of the Jesuits acting as catalysts in this regard.

In 1976, with the support from the governmental agency Instituto Nacional de Reforma y Desarrollo Agrario (IRYDA, Institute of agrarian reform and development), a federation of agricultural colleges was constituted, and so three similar institutions were established by the inspiration of and operating under the direction of the Society of Jesus, although each functioned independently.<sup>18</sup> Serving as model of these institutions, the Instituto Nevares de Empresarios Agrarios (INEA), an agricultural college associated with the Universidad de Valladolid and founded in 1964 by José Quintanilla, S.J. (1930–70), is actually the only of the aforementioned programs to still be in operation.<sup>19</sup>

At its establishment, the INEA only offered a private certificate in agricultural engineering. It was not until it formalized its institutional affiliation with the Universidad de Valladolid that its degree received official recognition.<sup>20</sup> Like the Jesuit French colleges, INEA is historically rooted in this region through a robust program of distance-learning via correspondence. Likewise the orientation of its studies has shifted toward a more sustainable model of agriculture, and indeed in Spain this also coincided with the period's radical alteration of demographics from rural to urban. Accordingly the college adapted to offer an education that aims to increase agricultural productivity, to implement new technologies, and to achieve efficiency. In the last ten years, the faculty and administration authorized a paradigm shift developing an agricultural vision based on organic fundamentals, which the present curriculum reflects under the framework of "agroecology."

17 Universidad Loyola Andalusia, "Escuela Superior Técnica Empresarial Agrícola," <http://www.etea.com/web/etea/home> (accessed June 10, 2016).

18 These institutions were: the Pyrenean Institute of Agricultural Entrepreneurs (IPEA), which opened in October 1976 in Sabiñánigo, Huesca; the IBEA in Badajoz, established in October 1977; and IGEA in Santiago de Compostela—this, however, never officially opened.

19 The INEA is the institutional namesake of Sisinio Nevares, S.J. (1878–1946), a famous Jesuit who was engaged in the social movements of the early twentieth century, and Quintanilla's inspiration. Quintanilla, however, died at forty years of age, while visiting Peru seeking to replicate the model of INEA.

20 Escuela Universitaria de Ingeniería Agrícola, <http://www.inea.org/index.php> (accessed June 10, 2016).



In theory and practice, the ethos of agroecology at INEA exceeds the academic setting. The college, under the pivotal leadership of Félix Revilla, S.J. (b.1958), generated and is conducting several initiatives throughout the region that aim to promote engagement and raise ecological awareness. Amongst others, the main two initiatives are:

1. Urban gardens for retired people—Since 2005 the project has created 430 gardens (105 square meters each) that becomes assigned to retired individuals through an agreement with the municipality of Valladolid. Per agreement, the retired participants commit to growing organic crops for personal consumption, and as a collaborative based on learning their participation also becomes enhanced through several training sessions on organic gardening, efficient consumption of water, and food and health. The program was initially developed on the premises of the college and has since expanded into the city once the municipality requested similar types of initiatives for other constituencies, such as the unemployed and marginalized families. In the last ten years organic gardening became a very effective tool in the repertoire of the Jesuits to promote social inclusion in the city of Valladolid.<sup>21</sup>
2. “Come sano, Come justo”—Formed by nearly 150 people who sought to promote organic and artisanal foodstuff consumption, this consumers’ cooperative—located on the ground floor of a Jesuit building in downtown Valladolid—both is a store that is open to the public and organizes various sessions to promote fair trade, organic products, and simple lifestyles. Inspired by ideals of sustainability, solidarity, and frugality, its mission is also embodied in its personnel, all of whom are physically disabled persons, and a part of the profit is delegated to projects of humanitarian development.<sup>22</sup>

In addition to these educational programs and grassroots initiatives, Jesuits are also involved in other ventures with ecological significance. For instance, in Madrid at the Universidad Pontificia Comillas, there is a joint collaboration with the energy corporation formerly known as British Petroleum to create the BP Chair on Energy and Sustainability. Its purpose is to study energy efficiency,

21 Escuela Universitaria de Ingeniería Agrícola, “Huertos ecológicos,” [http://www.inea.org/index.php?option=com\\_content&view=article&id=384&Itemid=895#arriba](http://www.inea.org/index.php?option=com_content&view=article&id=384&Itemid=895#arriba) (accessed June 10, 2016).

22 Come Sano, Come Justo, <http://comesanocomejusto.com/> (accessed June 13, 2016).

energy transition, and the social implications of energy systems.<sup>23</sup> This chair is also responsible specifically for fostering sustainable development in Spain as a whole, and is one of the most respected centers on these topics in the country.

### *Germany*

Although the German province differs from its French and Spanish counterparts in terms of agricultural involvement, it still holds promise for contributing in a significant way to environmental issues through higher education. In particular, the Institut für Gesellschaftspolitik (IGP, Institute for social and development studies), a research center associated with Munich's Hochschule für Philosophie, aims to contribute to poverty alleviation and to enhance justice in a globalized world.<sup>24</sup> The three specific areas of IGP's research agenda—political philosophy in a global context, just economic world-order and the sustainable use of resources, and religions and cultures—provide the context and ground for incorporating environmental perspectives and the social impact of climate change, specifically regarding such issues as cultural adaptation and migration.

A case of this is one IGP's recent initiatives, "Development that Serves the Global Common Good," a joint project with MISEREOR, placed particular emphasis on the academic assessment of the phrase "global common good," in dialogue with practitioners.<sup>25</sup> Its main method consisted in a series of consultation forums that took place in Peru, South Africa, India, the Philippines, Uruguay, and Côte d'Ivoire. Their meetings aimed at entering into dialogue with the local civil society. This series was an occasion to reflect together on the meaning of the concept of the "global common good" in a given regional context, by focusing on the obstacles that impede its implementation as well as possible solutions.<sup>26</sup>

One of the major outcomes of the debate on climate change that IGP conducted in conjunction with the Potsdam Institute for Climate Impact Research

23 BP Chair on Energy and Sustainability, Universidad Pontificia Comillas, "About Us," <http://www.upcomillas.es/en/bp-chair-on-energy-and-sustainability/about-us> (accessed June 27, 2016).

24 Hochschule für Philosophie, Institut für Gesellschaftspolitik, <https://www.hfph.de/forschung/institute/gesellschaftspolitik> (accessed June 10, 2016).

25 MISEREOR, <https://www.misereor.de/> (accessed June 10, 2016). MISEREOR is development cooperation branch of the German Catholic Bishops' Conference.

26 For the fruits of this process, see Michael Reder, Verena Risse, Catherine Hirschbrunn, and Georg Stoll, eds., *Global Common Good: Intercultural Perspective on a Just and and Ecological Transformation* (Frankfurt: Campus Verlag, 2015). A version also exists in German.

(PIK), a leading center on climate change, was the joint publication entitled *Climate Change, Justice and Sustainability*. This publication included critical contributions by several members of the IGP, such as Johannes Müller, S.J. (b.1943), Michael Reder (b.1974), Andreas Gösele, S.J. (b.1959), and Johannes Wallacher (b.1966).<sup>27</sup> IGP also established a new center for environmental ethics and education, which is financed by Deutsche Bundesstiftung Umwelt (German Federal Environmental Foundation), and officially started its mission on August 1, 2014.<sup>28</sup>

### *Belgium*

On a smaller scale, Brussels's Centre Avec is taking a visible role fostering ecological understanding and is elevating environmental problems for the French-speaking Belgian Jesuits, having built its reputation by focusing on issues related to human rights, such as racism, xenophobia, peace, and the integration of migrants. As part of its five-year action plan "World in crisis, ongoing transitions," the center intends to concentrate further attention to the ecological transitions, especially through its journal, *En question*. Furthermore, it also offers Jesuits and lay collaborators training sessions, while advocating for a kind of change in the lifestyles on the personal level, and the need for infrastructural changes—especially in energy and the redistribution of incomes. Accordingly, environmental issues have become framed as an crucial opportunity for growth in social justice.<sup>29</sup>

Though based in Brussels, the Jesuit European Social Service (JESC) is the actually the work of the president of the Jesuit Conference of European Provincials, and so is at the service of the entire European conference. Since 2010 JESC, jointly with the Environmental Science for Social Change, a Jesuit research institute that is based in Manila, publishes the electronic newsletter *Ecojesuit*. At present, the only Jesuit publication that deals primarily with ecology and sustainable science, *Ecojesuit* is a vital venue for all those interested in the environment.<sup>30</sup>

27 Ottmar Edenhofer, Johannes Wallacher, Hermann Lotze-Campen, Michael Reder, Brigitte Knopf, and Johannes Müller, eds., *Climate Change, Justice and Sustainability: Linking Climate and Development* (New York: Springer, 2012).

28 Institut für Gesellschaftspolitik (Munich), "Annual Report 2015," <https://www.hfph.de/forschung/institute/gesellschaftspolitik/nachrichten/annual-report-2014-available-online>.

29 Centre Ave, <http://www.centreavec.be/site/> (accessed June 13, 2016).

30 *Ecojesuit*, "Ecology and Jesuits in Communication," <http://www.ecojesusuit.com/> (accessed June 10, 2016).

### *Lebanon*

Although situated beyond what is typically perceived as Europe, the Jesuit Province of the Near East and the Maghreb is an official member of the Jesuit Conference of European Provincials. In addition to this formal status, and its relevance for the JESC, this region provides an interesting case for its historical connections with various European provinces as missionary territory, especially through the Université Saint-Joseph. The province itself, nonetheless, on its own merit provides several intriguing initiatives that are significant for the Jesuit participation in ecological endeavors.

In Lebanon, for example, the *École Supérieure d'Ingénieur et d'Agronomie Méditerranée (ESIAM)*, founded in October 1979 through Université Saint-Joseph's faculty of engineering, became nationally recognized in 1987 as an educational institution of agriculture, and has become a critical epicenter for transregional correspondence regarding environmental issues.<sup>31</sup> The center also was integrated beyond Beirut through its affiliation with the *Centre d'Études Universitaires de Zahlé et de la Békaa*, which is a regional branch of Université Saint-Joseph (Beirut).<sup>32</sup> In 1994, however, the premise of ESIAM re-located to the Society's property in Taanaïl, which is situated within predominantly a farming community of the Békaa Valley.

Another example of this type of programmatic field of study that the Jesuits developed is the *École Supérieure d'Ingénieurs Agroalimentaires (ESIA)* of Kfar Falous, a municipality in that is located near the port-city of Sidon. Founded concurrently with ESIAM, in October 1979, the activities of this program were associated to the Faculty of Engineering of Université Saint-Joseph. Its activities were suspended at various intervals due to violent events in southern Lebanon, but were finally reopened in Taanaïl in September 2003 as part of a joint operation with the ESIAM.<sup>33</sup>

Both centers operate in a context that is faced with immediate challenges for agricultural, rural, and industrial development and which are simultaneously intersected with emergent challenges of social justice, particularly regarding sustainable agriculture and food security. In 2009, the province entrusted the property in Taanaïl to Arcenciel, a Lebanese NGO, which took responsibility of

31 ESIAM, <http://www.esiam.usj.edu.lb/> (accessed June 13, 2016).

32 Centre d'Études Universitaires de Zahlé et de la Békaa, Université Saint-Joseph (Beirut) <http://www.ceuzb.usj.edu.lb/> (accessed June 10, 2016).

33 For further information regarding these two programs (i.e., ESIAM and ESIA) and their collaboration with the Islamic Foundation for Culture and Higher Education, see Byron G. Massialas and Samir Ahmed Jarrar, eds., *Arab Education in Transition: A Source Book* (New York: Garland, 1991), 202–3.

operating the farm while incorporating the goals of sustainability through land conservation, as well as the sustainable agricultural practices that include the maintenance of a dairy creamery, and eco-oriented tourism.<sup>34</sup> The experience thus far is a success, and has thereby ensured the future of this farm, which is a significant marker of Jesuit inheritance in the region.

### Contemporary Jesuits in the Natural Sciences: Notable Figures

Although exceeding the scope of this essay, the name of Pierre Teilhard de Chardin (1881–1955) must be invoked to acknowledge not only that his scholarship as a whole represented a significant contribution to the natural sciences, but also to recognize his popular influence upon so many Jesuits, and non-Jesuits, who admired his synthesis of faith and science. In particular, *Le milieu divin* (1926) represents a consummate effort to reconcile the theory of evolution and Christian faith that was seminal for those scholars of his generation, and several generations to follow.<sup>35</sup> His mystical theology with a cosmic perspective preserved a unique role of Christ the unity and transcendence of all material reality to Christ. Especially in this era, with such vast ecological challenges, this scientist and creative theological mind might be a helpful model.

Yet even beyond this paragon of the Jesuit scientist, Jesuits contributed in a myriad of meaningful ways to various fields of the natural sciences. Entomology, in particular, is the field of scientific study that has attracted more Jesuits. The Austrian Jesuit Erich Wasmann, S.J. (1859–1931), for example, described over one thousand species of ants, two hundred different termites, and two thousand myrmecophiles—933 of those were not previously known. Wasmann, moreover, was instrumental in his age for defending a certain integration of science and theology having stated that the theory of evolution was not contrary to the Christian faith.<sup>36</sup> Among the disciples of Wasmann those of special note are Karl Frank, S.J. (1875–1950), a biologist and professor

34 See “A Lebanese Exception: The Tanaïl Domain and the Challenge of Managing a Temporal Good,” *Ecojesuit*, June 15, 2014, <http://www.ecojesuit.com/a-lebanese-exception-the-tanaïl-domain-and-the-challenge-of-managing-a-temporal-good/6764/> (accessed June 10, 2016).

35 Pierre Teilhard de Chardin, *Le milieu divin: Essai de vie intérieure* (Paris: Vrin, 1957). This book has been published in English translation: Teilhard de Chardin, *The Divine Milieu*, trans. Siôn Cowell (Brighton, UK: Sussex Academic Press, 2004).

36 See Abigail J. Lustig, “Erich Wasmann, Ernst Haeckel, and the Limits of Science,” *Theory in Biosciences* 121, no. 3 (2002): 252–59.

of philosophy, and Adolf Haas, S.J. (1914–82), who collaborated with Konrad Lorenz on the concept of “instinct.”<sup>37</sup>

In this field of research there was also a cross-cultural dimension that enabled the Jesuits to play a particularly influential role in its advancement. The Spanish Jesuit Pelegrín Franganillo, S.J. (1873–1955), for example, specialized in the study of spiders, both in Spain and Cuba. Longino Navás, S.J. (1858–1938) worked on neuroptera, identifying 1,786 new species. Similarly, the Portuguese Joaquim da Silva Tavares, S.J. (1873–1955) cultivated a transatlantic dynamic to his research having worked not only in Portugal but also in Brazil and Argentina. His compatriot, Cândido de Azevedo Mendes, S.J. (1874–1943) focused his research on butterflies. Finally, in Hungary Xaver Ferenc Speiser, S.J. (1854–1933) through the course of his career studied 9,500 species of coleoptera.

Historically, botany also attracted the attention of European Jesuits. Baltasar Merino, S.J. (1845–1917)—in addition to his contribution in the field of climatology—studied the flora in the Galician region of Spain. Manuel Laínz Gallo, S.J. (b.1923) has lived and worked in Gijón, Spain, where he published extensively on the subject of botany. He donated a collection of more than 38,000 species to the Jardín Botánico Atlántico de Gijón.<sup>38</sup> The French Jesuit, Roland Cazalis, S.J. (b.1960), now working in Belgium at the Université de Namur, a Jesuit public university, is actively involved in the Groupe de Recherche en Cognition Végétale (Research group on plant cognition).<sup>39</sup> Balduino Rambo, S.J. (1905–61), originally from Montenegro, based his work in Brazil, where he was the founder of the Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul and the organizer of Herbarium Anchieta, which commemorates the work of the Spanish Jesuit José de Anchieta (1534–97) with its collection of more than 60,000 plants.<sup>40</sup> Another example of international correspondence was the well-known British botanist Gerald Wilson Browne, S.J. (1911–75), who pursued most of his work in Guyana.<sup>41</sup>

French Jesuits, for instances, the duo of Jules Carles, S.J. (1902–2000) and Gildas Beauchesne, S.J. (1919–2001), were also very involved in the field of botany. Carles received a degree in vegetal physiology, thereafter joining the

37 Lorenz won the 1973 Nobel Peace in Physiology or Medicine. See Richard I. Evans, *Konrad Lorenz: The Man and His Ideas* (New York: Harcourt Brace Jovanovich, 1975).

38 See the International Plant Names Index, “Laínz, Manuel (1923–),” <http://www.ipni.org/index.html> (accessed June 10, 2016).

39 Université de Namur, “Recherche en cognition végétale,” <http://www.unamur.be/sciences/cognivege> (accessed June 10, 2016).

40 Fundação Zoobotânica, <http://www.fzb.rs.gov.br/> (accessed June 27, 2016).

41 Udías, *Los jesuitas y la ciencia*, 310–12.

Centre National de la Recherche Scientifique (CNRS) in 1938. Appointed as director of the laboratory of vegetal physiology at the Institute Catholique de Toulouse where he stayed for forty-seven year. He wrote twenty books and more than 300 scientific articles on the subject. Beauchesne, on the other hand, received a licentiate in sciences from the Sorbonne in 1949. Assigned to Angers, he was responsible for a laboratory of micropropagation. After more than seven years of research, through in vitro multiplication he successfully found a remedy for the infection of Bayoud disease among the date palms. After retirement Beauchesne worked in Marrakech, Morocco, at Central Agrarian Station of the Sahara.

The Polish lay brother Stefan Franczak, S.J. (1917–2009), for his part, became a well-known horticulturist, famous as a *Clematis* breeder. Over sixty cultivars are officially registered and named by him, while quite a few of them received prestigious international awards. Several of the varieties that he cultivated such as Błękitny Anioł, Polish Spirit, and Warszawska Nike have been given the Award of Garden Merit, which is the highest distinction awarded by the Royal Horticulture Society in Great Britain to the best garden plants. In 2009, Franczak was awarded with the Krzyż Komandorski of the Order Odrodzenia Polski (Commander's cross of the order *Polonia restituta* [reborn Poland]) for his achievement in horticultural advancement.<sup>42</sup>

## Conclusion

As a result of a sharp decrease in the overall numbers of European Jesuits, the assignment of Jesuits to scientific research, including environmental sciences, has coincidentally diminished. Nevertheless, there is a long history of Jesuit involvement in the natural sciences that can serve as a vital resource in fostering greater environmental awareness as Europe, and the world, is currently confronting the effects and causes of climate change. This article, furthermore, might also demonstrate that many of the apostolates of Jesuits from past generations encompassed an ecological dimension through their research and also in the development of agricultural education.

42 Szczepean Marczyński, "Brother Stefan Franczak and His Clematis," *Clematis źródło dobrych pnączy*, <http://www.clematis.com.pl/en/vines-in-garden/articles/405-franczak-and-his-clematis> (accessed June 10, 2016).