Scientific Enterprise, Academic Adventure and Drawing-Room Culture in the Geodesic Mission to Quito

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During the first decades of the eighteenth century, Newtonians and Cartesianists confronted one another in a long and tense debate about the shape of our planet. While Newton sustained in *Principia* that the earth was flattened at the poles, Cassini, after triangulating the meridian of Paris between Collioure and Dunkerque, concluded that the flattening was equatorial. Two different methods, based on different empirical supports, were in confrontation. On the one hand, the theoretical consequences of the principle of universal gravitation, more or less justified by the measurements carried out with a seconds pendulum and, on the other hand, the systematic application of the techniques and methods of astronomic observation and geodesic practice. This contradiction was added to the one which already existed between the Newtonian and Cartesian cosmovisions of the universe; in fact, in 1722, Maupertuis publishes an essay which uses neo-Cartesian physics to provide theoretical support for the observations made by the astronomers in the Académie des Sciences. During the third decade of the seventeen hundreds, a slow academic rethinking of orthodox Cartesianism added such serious ideological connotations to the controversy that it appeared as though English and French science themselves were in confrontation with one another. Theory vs. observation, Newtonianism vs. Cartesianism, enlightenment vs. national science. Nevertheless, the intensity of this controversy also helped to create a program of investigation whose purpose was to resolve these bitter contradictions.

For many years, a large part of the European scientific activity, and more especially the continental scientific activity, was focussed, directly or indirectly, on the identification of relevant problems concerning the shape of the earth. This was of course accompanied by the search and development
of theoretical or experimental solutions to these problems. This influenced the decision of the Académie des Science, between 1733 and 1735, to not only revise and amplify the observations carried out by astronomers on French soil but to also send two scientific expeditions to Quito and Lapónia in order to determine the longitude of a meridian at two different latitudes and thus finally resolve the controversy.

The purpose of this essay is not to analyze the scientific dimension of the American expedition. On the contrary, our objective is to examine the consequences of the expedition, such as the repercussion it had on the intellectual activity of the Colony. We believe that these consequences, which are virtually unknown, had implications which are worthy of consideration.

Designing the expedition and assuring the smooth running of the geodesic experiments was not only an extraordinarily novel adventure for the Academy, it also involved dealing with a scientific activity whose character differed greatly from that of the cabinet. In addition it involved risking substantial financial resources which meant that the relationship between the Crown and the Academy, i.e., the State and its Men of Science, would be considerably reinforced. This is the context within which the Parisian Institution exported and internationalized its concerns about the shape of the earth and geodesic observations. Since Geography was still a science that had primarily an empirical and accumulative nature, it is obvious that this program not only permitted the smooth integration of certain scanty and isolated scientific communities to modern science, but also motivated the interest of public authorities in its practical applications. In the Royal High Court (the Audiencia) in Quito, the presence of the expeditionaries reactivated certain local enterprises and legitimized the cultural anxieties of some enlightened criollos. In short, as an adventure this expeditionary effort produced an international scientific experience which gave a new dimension to academic endeavours, and as an enterprise it contributed considerably to the integration of countries, people and knowledge in the culture of the Age of Enlightenment.

The Academic Adventure

L. Godin's project of measuring a meridian degree in the proximity of the equator was approved in the last session of the Académie des Science in 1733. However, before the scientific expedition arrived in Quito on May 29th, 1736, many organizational details had to be taken care of. The problems which faced the Secretary of the French Navy, Count of Maurepas, in order to guarantee the smooth running of this enterprise on foreign soil, were not few. The academic inexperience, the elevated cost and the extraordinary novelty of the adventure coupled with the fact that the experiments were to be carried out in colonial dominions belonging to a foreign power, meant not only that the entire leadership had to be left initially in the hands of the French government but also that delicate diplomatic steps had to be taken in regard to the Court of Madrid. Viewed as a whole, the project was an adventure not exempt from political, administrative, financial, institutional and, indeed, scientific implications. The Academy, as the enormous amount of reports and investigations concerning the experimental aspects and the theories of the shape of the earth show, adapted itself to the design of an experiment capable of discerning between rival theories. It was a scientific challenge whose novelty needs to be emphasized. It is important to mention that the organizational aspects of the venture did not play a secondary role. Indeed, in some cases they influenced the development of the projects as occurred, for instance, with the transfer of some of the precision instruments, which after their sea and mountain crossing, arrived gravely deteriorated. But let us now direct our attention to some of the more decisive aspects of the initial organization.

Spain, not without reason, distrusted any foreign embassy in its colonies, and in order to control its threatened commercial monopoly, demanded that a legal permit be obtained before allowing the free circulation of people in its colonies. The application for the permit had to be made in a diplomatic fashion before the Council of the Indies. By February 1734, the Count of Maurepas was issuing precise orders to this effect to the French ambassador in Madrid; one month later, the Secretary of the Spanish Navy showed his goodwill towards the project communicating "that it only needed a more concrete form".

The Council of the Indies, the most important institution of the colonial government, displayed reticence and imposed many specifications which

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indicated their hostility towards the project. Although the memoranda and reports which came before the Crown promised great benefits, the Council, in addition to being insensitive to demands of a scientific nature, saw only disgraceful intentions in the French enterprise. However, Royal permission had to be obtained in order to carry out this expedition. On its own the Council might perhaps have reached a decision but, as the documents show, this decision would have transformed the geodesic expedition into an expedition of a different type and subject to rigid Spanish controls. Fortunately, the Crown intervened: “your Majesty has resolved . . . that they be given the licenses in the form in which they are requested, without obliging them to state their intentions as the Council proposes”. This text, filtered from the Cabinet’s deliberations and transmitted hurriedly to Maurepas, gave the go ahead to the academic objectives.

Was the distrust of the Council of the Indies justified? Without a doubt, it was not completely without foundations. Why did the project, as it was initially conceived, consist in “tracing a meridian from Ecuador and the north of Peru to the extreme of Chile towards the Magellanic lands in order to ascertain if the land is as elliptic from that side as from ours”? Although the French petition, presented to the Council with cautious ambiguity, mentioned only the objective of “determining the exact position of the coastline of Peru” it is obvious that this pharaonic project would supply the French government with valuable knowledge of American geography. To identify, triangulate and map out half a continent was a venture whose political dimension does not need emphasis. It was because of this that the cosmographer mayor of the Indies, Carlos de Reguera S.J., recommended the presence of two “intelligent” Spaniards who could observe the progress and the objectives of the observations. . . . and become acquainted with any knowledge of a suspicious nature which could arise from the information acquired concerning the ports and fortresses and other layouts of these countries”. But that is not all, the possibility that commercial transactions could take place caused some anxiety. Indeed, in secret and without inform-

4. The file is found in Archivo General de Indias (Sevilla), (Hereafter referred to as A.G.I.) Indiferente General, 333.


6. This information comes from a letter from P. Soucié S.J., who was present in the Public Assembly of the Academy where the project was approved, to his correspondent J.N. Delisle; Paris, June 10th, 1734. Arch. Nat., Marine, 2)162, no. 120.

7. This memorial is found in A.G.I., Indiferente General, 333. It is found reproduced in L.J. Ramos Gómez, op. cit., p. 6-8.

8. Carlos de la Reguera’s report signed in the Imperial College belonging to the Jesuits in Madrid was dated April 11th, 1734. A.G.I., Indiferente General, 333. quoted by L.J. Ramos Gómez, op. cit., p. 9.


will inform you about the region and its governing, of the villages and places that it contains, the fertility or sterility of its lands, the industrial inclination or aptitude of its people, the courage or joviality of the irreducible Indians, and the ease or difficulty of their reduction". The Académie des Sciences didn't want to restrict the possibilities of their embassy either. Without a doubt there were very good reasons that the geologists were accompanied by experts in botany, medicine, architecture, drawing, machinery and cartography. To conclude, Godin's initial idea became more complicated due to the expansion of the scientific objectives and the political expectations incorporated into the expedition. It was so much so that J. Jussieu, even before arriving in Quito, could affirm: "I realize that this journey, which had no more than one objective, will transform itself in accordance with the number of facts, and the amount of geographical, historical, mathematical, astronomical, botanical, medicinal, surgical, anatomical, etc., information. We will continue along the path making instructive reports, all this will produce a strange and very complete piece of work".  

Later events did not contradict the Parisian botanist. In order to quote just a few issues, let us refer to the work of Jussieu and La Condamine related to quinine, the discovery of rubber, the scientific identification of the Amazon, the map of the Audienca de Quito, the delimitation of the frontiers between the Spanish and the Portuguese domains, the compiling of the important report Noticias secretas de América, the renovation of medical treatment for the smallpox plague or yellow fever, the enormous amount of ethnographic and anthropological observations regarding Andean villages, etc. This project, without a doubt, was a faithful reflection of the extraordinary intellectual curiosity which prevailed in those times with its ambition to produce results of great diversity and usefulness. It set an example for other European expeditionary enterprises that would follow in later decades.  

Several of the expeditionaries appointed by the Academy withdrew from the project prior to the departure from the port of Rochefort: Fouchy, Pimodan and de la Grive, fearful of the hardships which awaited them and less in need of the laurels of fame, were replaced by Bouger and Verguin. In addition to Jorge Juan and Antonio de Ulloa, a committee consisting of 22 people, seven of whom were servants and six negro slaves, arrived in Quito in May 1736. The luggage, carefully checked at the customs in Portobelo, occupied an amazing amount of space. 45 per cent consisted of books and instruments, the rest, besides many articles of clothing, were objects of diverse utility: rifles, guns, swords, gunpowder, saddles, tents, medicine, liquor, rope, kitchen utensils, etc. After its ocean crossing all of this had to be transported by pack mules from Guayaquil, crossing the western mountain ranges of the Andes in order to reach Quito. There was so much luggage that the Governor General of Santo Domingo, the Marquis de Fayet, could not find a way to assure the continuation of the journey to Cartagena de Indias: "... despite all the steps I have taken for the journey nothing is more difficult than finding a boat big enough to fit all their luggage". This problem becomes less acute if we compare it to those awaiting them during the ascent from the river Guayaquil where mosquitoes attacked them in swarms or during their climb up the famous St. Antonio slopes in the proximities of Chimborazo where, due to the sandy nature of the terrain, it took them nine hours to advance half a league.  

The inhabitants of the different villages that they encountered were both hospitable and suspicious. The villages competed amongst themselves with regard to the entertainment they were capable of providing for such an illustrious company. The Presidency, isolated by the orography of the terrain with respect to Bogotá and Lima, and so removed and marginal with regard to the metropolis, received the European committee with joy but also with a great deal of surprise. So many hardships, and in a country far removed from the real centers of power, seemed irrational, unless they had secret objectives. During the geodesic triangulation, signs had to be installed in the Andean peaks (Pichinch, Chimborazo, Catopaxi, etc.) where violent storms and cold glaciers surprised them. The natives were accompanied them not only abandoned them or even stole their tents with which they built observation posts but, to their amazement, spread the wildest hypotheses about the mission's true objective: "... all was confusion, even among the most cultured people... there was so much admiration and novelty that they did not know what to attribute it to. Some thought our resolutions were madness: others decided it was greed convincing themselves that we were searching for precious minerals by means of some particular method we had invented: others imagined we were magicians, and everyone remained transfixed in an unending confusion because in none of the things that their thoughts dictated could they find a degree of success corresponding to the fatigue and punishments of such a life". In reality, the academics themselves were also very surprised by the difficulty of the mission; a few days before arriving in Cartagena de Indias, Jussieu, Godin des Odonais, Moraliville and Bouger had contracted a disease which nobody was able to diagnose and which placed terrible omen on the expedition. When they reached Portobelo, Jussieu wrote to his brother that the city

12. "Copie de la lettre de M. de Jussieu écrite à M. de Par. A Panama à 15 février 1736" Bibliothèque Centrale du Musée d'Histoire Naturelle (Paris), ms. 179.


was "the most unworthy and unhealthy of the universe." A few days before arriving in Quito, Couplet died from malignant fevers. In short, throughout the following years there would be a continuous weakening of health brought on by endemic illnesses, a theme which we will not enlarge upon aside from adding that during their stay in Quito, they experienced the terrible yellow fever epidemic which razed the country in 1740.18

Before the expedition arrived on American soil, Maurepas had been in charge of the problem of financing. Apparently his management was conducted without much knowledge of the subject. When the expeditions reached Quito they had only 372 pesos at their disposal; they had spent 5,950 pesos during their stay in Santo Domingo. This situation not only forced them into debt but also, once communications with France were interrupted due to the war with England, the academics were forced to finance themselves. The mechanisms were diverse: La Condamine moved to Lima in 1737 in order to obtain 12,000 pesos against personal credit cards that he had taken the precaution of bringing from Paris; Godin had to stay, once the geodetic operations were concluded, in order to give mathematical lectures at the University of Lima until he was engaged to direct the Marineguard Academy in Cadiz; Seniergues and Jussieu profited greatly practicing medicine; Morainville did artistic and architectural work in different cities; Godin des Odonais married the daughter of a affluent criollo; Verguin and Hugot worked respectively as a cartographer and watchmaker for the Audiencia, Town Council and Cathedral of Quito. And everyone, sooner or later, found themselves involved in the illegal trading of precious stones and metals. The documents relating to this are extraordinarily ambiguous: even though, in the trials to which La Condamine was subjected to for activities in trading, testimony was presented from people who confirmed having received merchandise from him, nothing in fact, could, or was desired to be, indisputably proven. The last consignment of financial resources which arrived from France at the end of 1738 (24,000 pesos) was accompanied by a threatening order to Godin: "Take care to put the accounts in order so that the reasons for the expenditure can be submitted to the King with accuracy." The new fund proved to be very limited, it was necessary to cover La Condamine's personal credit and to pay off the debts incurred since 1736. However, these funds were provided "with the conviction that this sum will be sufficient for all your expenses and neces-

18. Both documents can be found among the papers compiled by Jules Maillard de la Gournierie, Bibliothèque de l'Institut de France (Paris), ms. 2118. The first text comes from a letter from Maurepas to Godin dated in Versailles, April 15th, 1737. The second text comes from another letter written by the French Consul in Cádiz, Partey, to Domingo Miranda, head of business affairs in Cartagena de Indias.
20. Letter from La Condamine to Bouguer; Quito, April 24th, 1741. Archives de l'Observatoire de Paris, ms. c2-7.

Philosophy in Solitude

Although the problems caused by the lack of funds and the isolation with respect to Europe were very serious, they were by no means the only ones. Not even, perhaps, the most important. We will not enlarge upon this theme; nor will the assassination of the surgeon Seniergues in Cuenca, the two...
hearings which La Condamine was subjected to under the accusation of illegal business transactions, the serious conflict between the Spanish sailors and the President of the Audiencia José de Araujo, be described in detail in these pages. Let it suffice to say that the expeditionaries found themselves involved in numerous conflicts, not only with the Colonial administration but also with the public. For example, during the revolt in Cuenca where Seniérques died and where other academicians would have met with the same fate had it not been for the intervention of the Jesuits, the people, offended by the foreigner’s behaviour, shouted feverishly: “...Long live the King and death to the terrible Government, kill the Gabachos and their supporters”. The document which follows the judicial process is very cautious with regard to the political dimensions of the events, since the close ties which Seniérques had with the Governor of Cuenca, who was overwhelmingly rejected by the local public, were well known. In short, the people of Cuenca mobilized themselves against the French and, perhaps only in a collective unconsciousness, against the winds of novelty and reform which could have been jointly embodied.

It is known that between 1736 and 1740 a strong political, religious, administrative and martial movement upset the country. At the same time, there was a serious crisis in the economic activities of the Royal Audiencia. Several important changes had intensified the old conflict between Chapetones (Spaniards who had only recently arrived in America) and criollos; the promotion of Araujo, a criollo, to the Presidency, thereby substituting Alzedo, a Spaniard, was one of them. The decisions adopted by the Inspector General, P. Andrés de Zárate S.J., in the hierarchical structure of Order in Quito, in favor of the Chapetones, also contributed decisively. Quito’s obrasjes and all of the textile manufacturing began to decline. This was attributed to the illegal competition which resulted from the systematic introduction of foreign merchandise. Some of the internal problems could be connected to the activities of the foreign company which had free access to the whole country. But the interests were so complex and varied that it was impossible to get all the facts; the silence of some and the complicity of others linked with the political implications of these facts resulted in cautious political action. It appears that this happened in La Condamine’s second trial which was ended by order of the Viceroy and accompanied by severe warnings with regard to the possible continuation of these non-scientific activities.

All the difficulties which afflicting the expeditionaries had, however, something in common. The environments in which the conflict between the two dominant castes were developed were, to a greater or lesser extent, different. The fact which stands out is that the mission’s projects were not developed outside the life style of the country and, indeed, they were slowly incorporated until they became a significant part of the activities of the Royal Audiencia: illegal commerce, participation in the struggle against diseases, financial debts, judicial trials, a notable contribution to geographical knowledge, integration of the Spaniards in the final system of battleship construction during the war with England, etc.; to conclude, activities with enormous social repercussions which were not in any way marginal. Without a doubt, Quito’s society was favorably influenced by the arrival of the Hispanic/French company. But, obviously, this relationship was not one-sided, the local conditions also greatly influenced the technical/scientific activities of the expeditionaries.

The mission’s objective was to determine the value of one meridian degree, which, when compared to the one measured in France, would decide the question of the earth’s shape. This proposal was out of place once the results of the northern expedition in 1738 were known. It was necessary therefore to justify the journey and the financial expenditure which it demanded, the perfection of whose design and execution as an experiment would surprise the Academy. In addition, the orographic conditions of the country forced the expedition to take into consideration a great variety of physical phenomena whose importance with regard to the observations in Europe were negligible. The scientific experience accumulated in regard to dilation, the variation of lead in the vertical position in the presence of large masses of material, the variation of refraction in altitudes and humidity, and the use of the barometer for the determination of altitudes, was very little. Let us add that the serious maladjustments of the instruments forced the construction of an astronomical area or of precision barometers. All of these were problems which excited the scientist’s creativity and resulted in extraordinarily novel solutions. But we will omit any further discussion of this subject as we have spoken of it elsewhere. With regard to the administrative and scientific problems already mentioned, the persistent presence of personal conflicts must be included. Even before the arrival in Quito, Bouger and La Condamine had declared their hostility towards Godin, the head of the expedition: “They and Mr. Godin” wrote Seniérques in February 1736 “have not spoken at all for some time...it is not possible for them to complete the journey together”. Later occurrences would only confirm beyond any doubt the French surgeon’s suspicions as they


only served to increase the internal divisions. There were truly chaotic moments in the relationships between the expeditionaries: let it suffice to say here that in reality three meridian degrees were measured, bearing in mind the differences produced in the intermediate points as in the vertices of triangulation. Our academics, in their strange American surroundings, not only violated the hierarchical discipline, but also, in their ambition to bring back the greatest number of observations possible, which would limit the error of the final result, embarked upon a proliferation of scientific experiments and precautions whose complexity was an obstacle for the conclusion of the projects.\textsuperscript{25} Without a doubt, the lack of communication between the expeditionaries and the Academy transformed the enterprise, that Maupertius could have finished in less than a year, into a hotchpotch collection of observations which complicated the global evaluation of the projects. This situation, although highly beneficial for European science in the end, caused them great anxiety, especially since the value of one degree, calculated separately by each one of them, differed greatly. It seemed that everything would end up as a complete failure. The personal strategies which were developed in order to defend themselves from a possible severe trial instigated by the Academy, were quite different. While Bouguer attempted to take refuge in the role of a man of science, solitaire and austere, La Condamine was determined to prove his resolute obligation to the government, the sponsor of the expedition. After his performance in defending the company's interests, he hoisted up the patriotic flag in order to safeguard the preeminence of France and the honor of the Academy in the project. It is not difficult to understand this position if we take into account the powerful ideological and nationalistic components which were an integral part of the debates in Europe concerning the shape of the Earth. La Condamine did not err in his actions: apart from the scientific recognition of his work, the Academy would know how to verify his actions and praise him in the controversy concerning Bouguer which would still be going on his return to Paris.\textsuperscript{26} This role was also very appealing to the two Spanish marines who accompanied the French academics. The participation of Jorge Juan and Antonio de Ulloa in the expedition meant that Spain became integrated into the problems of modern science: the publication of their work meant the introduction of Newtonianism, Copernicanism, infinitesimal calculus and the methods of practical astronomy and mathematical geography. After them, rather than talking about modern science, the


\textsuperscript{26} In regard to this question, one can consult J.B.J. Delambre, Grandeur et figure de la terre, Paris, 1912.

Spanish scientists began to do work using modern science. But although this is very important it is not everything; they, like La Condamine in the role of government agent, compiled valuable reports about the political, administrative, ecclesiastical, economical and military realities of the colonies. Their analysis, certainly highly critical, focuses on qualitative valuation but is sprinkled with all kinds of quantitative notes which aspire to give a certain objectivity to their affirmations. When the two young marines returned to Spain, nobody seemed to remember them and much less the scientific interest of the enterprise which had retained them in Peru’s Viceroyalty. However, after difficult negotiations, a luxurious publication of their work is talked about, which anticipates the work of Bouguer and La Condamine. Together these scientific works permit the commitment with the ideals of the Age of Enlightenment, upheld by the Bourbonic dynasty, to be vindicated. But, without a doubt, the main interest of the Crown was centered around the manuscript Noticias Secretas de América. More than the limitations of an academic or drawing room culture, the report of the two marines allowed the Marquis de la Ensenada, Minister of the Navy, the Treasury, of War and the Indies, to see the undeniable utility which this new type of men of science could have for the State. Different from the archetype of the savant characteristic of previous epochs, this new scientist not only felt very comfortable near to and under the protection of the organs of power, but also demanded some degree of participation in the State’s rationalization and modernization programs. It was a great novelty that would soon be made use of: In 1749 they travelled to London and Paris on secret missions of industrial espionage; more Spanish scientists would soon follow them. At the same time, they were entrusted with jobs of great responsibility in boat construction material, organization of arsenals, improvement of the running of mines, etc.\textsuperscript{27}

We have seen how the expeditionaries found it necessary to integrate themselves into Colonial life. The texts written by them show, however, notable differences in the perception of the environment as seen by the French academics and the Spanish marines. The first testimonials of the French regarding their encounter with America provide evidence of their prejudices as well as of their disinterest in social reality: “We go to a country”, wrote Jussieu in 1736, “where it is easier to find a gold mine than a savant. The old Spaniard is supremely ignorant, the difference is enormous, I admit it; however, I do recognize the fact that America is open space in which, on the other hand, with a little knowledge one can learn a lot”.\textsuperscript{28} It is indeed a fact

\textsuperscript{27} A. Lafuente and J.L. Peset, “Política científica y espionaje Industrial en los viajes de Jorge Juan y Antonio de Ulloa (1748-1751)”, Mélanges de la casa de Velázquez, 17, pp. 233-262, 1981.

\textsuperscript{28} Letter from Jussieu to his brother Antoine: Panama, February 15th, 1736. Bibliothèque Centrale du Muséum d’Histoire Naturelle, ms. 179.
that the ignorance and disinterest towards the sciences was generalized. This ignorance and disinterest caused La Condamine and Bouguer to take an interest in the illustrious men found in Quito’s Audiencia and to draw up a statement of acknowledgement concerning them. Magnin, Maladónado, Maronni, Alcedo and Dávalos were portrayed as if they constituted a phenomenon destined to excite European intellectual curiosity. This fact contrasts with the scarcity of information about these men in the work of Jorge Juan and Antonio de Ulloa which, on the other hand, are more sensitive towards the description of governmental and cultural institutions. They write in their Relación histórica...that the experience of the first hardships in the plateau of Pambamarca and Pichinchá...would act as an apprenticeship to the life we had afterwards”.29 Indeed, coming from a country where science was not yet a relevant social institution, their attitude in America was not so much that of bringing back interesting experimental observations for European Science, as that of submerging themselves in the environment which surrounded them. Voltaire, who had followed the whole process leading to the design of the expedition with great interest, published in Paris Alzire ou les Américaines (1736) in order to commemorate the man who was going to have this meeting with America: “The scene is Peru, ladies and gentlemen, an abode little known to poets. La Condamine measures this country, the Spaniards impoverish it and I sing about it”.30

In reality, there can be no objection with regard to the precision of the geographical measurements of the French; unfortunately the same cannot be said with regard to their descriptions concerning the situation in which the Americans lived. It cannot even be said that the latter interested them as an object of study; their descriptions are superficial at best and mere vague abstractions at worst. Such a long stay and so many serious conflicts did not help to soften the cultural shock; in the same spirit with which they viewed the physical, botanical, geographical and anthropological realities with merely technical interest and criteria, they only showed interest in the inhabitants capable of expressing themselves in French and of understanding geometry or of appreciating European music. The richest descriptions which the Spaniards have left us, which are of interest with regard to the flavor of a meal or the processes of native textile production for example, are the result of a more sympathetic attitude towards America’s future. Although they coincided with Bouguer and La Condamine in their contempt or rejection of the native’s values or lifestyle, they did concern themselves in imagining or discovering the grandeur of the civilization that

29. Jorge Juan and Antonio de Ulloa, Relación histórica...I, p. 315.

constructed Cuzco. When they explain the low cultural level of the region, they attribute it to the scarcity and poor quality of the existing educational institutions. And that is not all, when they do encounter cultured people, they point out the rhetorical nature and uselessness of their knowledge blaming it on “the little communication they have with people who could teach them”.31

As we have already said, an incipient influence with regard to scientific activities can be detected in Quito’s Royal Audiencia before the arrival of the expeditionaries. In contrast to other cities, such as Mexico and Lima, Quito’s two universities were of Jesuit and Dominican origin. This peculiarity does not imply any special servitude with regard to doctrines of the Church because the Spanish universities, as much as the others, continued to be bastions for a strict scholasticism; on the contrary, they benefited not only from a greater sensitivity towards the modern sciences, especially in the Jesuit centers, but also from the mobility of its professors and the frequent arrival of Europeans who came to reinforce the missionary work.32 In addition, the spacial distribution of the provinces and its vertebraion around the decision-making center, Quito, had necessitated a geographical knowledge of the extensive territories pertaining to Quito. All these observations, at times found in maps which traced the routes communicating distant missions with the capital, had accumulated experience which remained forgotten in the Company’s principal colleges.33 The possibilities of these subject matters materializing into the form of scientific works was limited due to the great distance from Europe’s academies. On the other hand, the mere exercise of administrative power, or the search for economic alternatives to the prolonged crisis in which the Quitan society lived, had generated a growing anxiety for information concerning natural resources, the distribution of the population, production and taxation of different cities, etc. This information of purely administrative use, along with that collected in the colleges, awaited the arrival of someone who knew how to emphasize its scientific usefulness. A certain number of criollos interested in European culture and drawing room conversational meetings, coexisted with the Jesuits and qualified bureaucrats. They were the friends and protectors of the expeditionaries, and especially of La Condamine: “In a country where the sciences and the arts are generally uncultivated, there are a small number of people who are the trustees of this sacred

some relief to the boredom which so many years of struggling against the Savages is bound to induce... Here I am in the most remote corner of America, where one misses everything, amongst half men and half animals, as are these Indians and who, like wild beasts, have their lairs in the middle of these jungles. However, before this escape along the sublime paths of metaphysical Cartesianism, he had already written Breve descripción de la Provincia de Quito (1740) and drawn a map of Provincia de Quito con sus Missiones de Succumbios de Religiosos de S. Francisco y de Maynas de Padres de la Compañía de Jesús (1740). In both cases Magín recognizes the debt he owes to La Condamine and the other academics; these are, obviously, less sublime works but equally influential; they go beyond a mere physical description of the territory and include descriptions of political aspects (administrative and ecclesiastical organization), economic aspects (communication, natural resources, production), natural aspects (botany, zoology, epidemiology) and even historical aspects of the country. Without a doubt these works were of great value for the mission's development since they constituted a first approximation to the cartographic knowledge of the region. For Magín as well as for Maroni, another enlightened Jesuit who had written Noticias auténticas del famoso río Marañón (1738), La Condamine had obtained the benefit of corresponding members to the Académie des Sciences; in this manner the priests who had been so solicitous towards the academics, obtained the prestige recognition of the Parian institution. La Condamine was very proud of the fact that his quarters, which had belonged to the Knight of Liouville, had fallen into the hands of Magín.

The same can be said about the Compendio histórico... de Guayaquil (1741) written by Dionisio de Alzóde, President of Quito's Royal Audiencia until 1736. The prologue of this book also recognizes the immediate motivation which afforded him the impulse to write it was the presence of the geologists. Historians do not yet agree as to whether or not Alzóde's work was a plagiarism of the Compendio histórico de la Provincia y Puerto de Guayaquil (1745) which had been written previously and presented for its approval by the Jesuit Jacinto Morán. Whatever the case, the truth is that from 1736, a certain cultural effervescence can be detected which manages to objectify itself around what could be called the scientific identification of the country.  


37. The prologue of the work quoted can be found as a biographical study in J. Tobar Donoso, “Un nuevo mapa de las misiones ecuatorianas”, Boletín de la Academia Nacional de Historia, (Quito), 35, pp. 72-89, 1955. This article also includes the reproduction of Magín’s manuscript Breve descripción de la Provincia de Quito (1740).

In none of the population in Quito was the influence as clear as with the criollo Pedro Vicente Maldonado. He belonged to an affluent and illustrious family who owned extensive properties throughout the kingdom and had proposed opening a route which would communicate Quito with the Pacific following the course of the Esmeraldas river. The project was of great interest because since the Guayas river was closed for half the year, it left "...the Quito Province in such a weak, scarce and costly correspondence with the rest of the kingdom, that not even can the Goods from Europe and the fruits from America arrive comfortably nor can they dispatch theirs". Beyond the technical and financial difficulties, what was needed was a precise geographical knowledge of the terrain which the arrival of the academics was going to modify substantially. What initially, as with Magnin, would not have gone beyond a more or less qualitative and approximate description of the country, would be transformed into a highly precise map with positions fixed by the methods and instruments of practical astronomy. The former enthusiasm of Maldonado and his family for the experimental sciences is substituted by a rigorous methodological discipline imposed by mathematical geography. The change was of such significance and magnitude that Maldonado is justly called the first Ecuadorean scientist and the first American geographer; Ecuadorean in so far as his project entailed the identification of a market and the integration into it of certain territories which until then had been divided according to the metropolitan perspective and interests; and American geographer in so far as was added to his condition as a criollo, the elaboration of such a precise map that it merited the eulogies of the Royal Society and the Académie des Sciences. Unfortunately, Maldonado, who had accompanied La Condamine in a descent down the Amazon river, contracted a sudden disease in London where he died in 1748. By that time, in the four years he had been in Europe, Maldonado had accumulated a great collection of machines, instruments and books, acquired with the money he had obtained by the sale of all his American possessions and which he had planned to take back to Quito in order to continue his studies.

Without a doubt, this expedition had important repercussions on science in France, Spain and in Quito’s Royal Audiencia. To conclude, let us discuss these repercussions. It cannot surprise us that it was in connection with this generically geographic knowledge where the cristallization in the form of scientific activities, which until then had only occurred parallel to academic culture, would be produced. In the first place because the expedition had an eminently geodesic objective, but, in the second place and above all, because it dealt with a knowledge devoid of great methodological complications which already existed previously in a long empirical tradition, especially amongst the Jesuits, and had had considerable social demand. Geography, physical and political, became not only the discipline from which science would develop in this part of Colonial America but would also be the vehicle for the process of birth of a certain national consciousness. Juan Pio Montúfar’s book Razón acerca del estado y gobernación política y militar... de la Real Audiencia de Quito (1755), a synthesis of all that had been produced during these two decades of study, demonstrates this clearly. Moreover, beginning with the geodesic mission the denomination for the territory where the research was carried out would gradually become “the territory of the equator”, until 1830 when, with the independence, it is assigned the significant title of the Republic of Ecuador.