NICOLAS-JEAN BOULAY (1837-1905), BOTANY AND EVOLUTION

OLIVIER PERRU

ABSTRACT. In this paper, we consider the scientific activities of Abbé Boulay at the end of the nineteenth century, especially in paleobotany, and we will analyze some of Boulay's papers about evolution. As a priest of the Catholic Church and a dean of the Faculty of Sciences in a Catholic University, was Boulay completely opposed to biological evolution or did he change his position concerning this problem between 1875 and 1900? In 1898, in a paper about survival, he recognized the possibility of an evolution in plants and animals. He wrote that the derivation of species from common ancestors was possible. Thus, in the papers written at the end of his life, he did not still reject the evolution of plants and animals as a scientific fact. Nevertheless, Boulay argued repeatedly against Darwinism and he explored the relationship between the Christian teaching on creation, "scholastic" philosophy and the possibility of an evolutionary theory. Today, this thought seems too apologetic.

KEY WORDS. Boulay, botany, paleobotany, evolution, Transformism, species.

INTRODUCTION

Father Nicolas-Jean Boulay (1837-1905) was born in Vagney in the department of Vosges; he studied at the Petit-Séminaire de Saint-Dié, then he took up theology at the major seminary, while beginning to make observations and botanical descriptions on different species of brambles in their environment. André Borel, who includes a note on his work, writes about this period of his life: "Without neglecting anything of his priestly training, he is strongly interested in the natural sciences, and especially in botany. Advised by Godron, he undertakes in 1858 the study of the genus Rubus, the genus, he will write later, where the diversity and the uncertainty of the variations constitute a real plague for the botanist" (Borel, 1986: 11). At that time, Dominique-Alexandre Godron (1807-1880) was a professor and Dean for the Faculty of Science in Nancy (from 1854 until 1871).

Nicolas Boulay was ordained priest for the diocese of Saint-Dié on May 25, 1861, and appointed vicar to Rambervilliers where he continued his

Sciences et Société, Historicité, Education, Pratiques EA n°4148, S2HEP, Université de Lyon, Université Claude Bernard Lyon 1, France. / olivier.perru@univ-lyon1.fr

works on brambles and in phytogeography. During 1865, Boulay taught sciences at the major seminary of Saint-Dié. By 1861, it appears that he was already an active botanist as between 1861 and 1869 he collected a selection of plants from the departments of Vosges, Haut-Rhin and Haute-Saône, which can still been seen today in the University of Strasbourg herbarium. We also find the name of Father Boulay as the author of some collections or determinations in various herbariums, in particular that of the General Council of Lozère, in Mende, or that of Father Coste, which is kept in the University of Montpellier herbarium and contains contributions from several fathers and brothers. At the Museum of Grenoble, we find a herbarium created by Boulay and Maurice Bouly de Lesdain. The diocesan Association of Nîmes has preserved a herbarium of mosses, created by Boulay, from the Gard Department.

Throughout and after 1870, he was a teacher at Assumption high school in Nîmes (he was a friend of Father d'Alzon, 1810-1880, general vicar of Nîmes and founder of the Assumptionists); he then taught at Belzunce high school in Marseille where he experienced a lack of interest by some members of the catholic hierarchy for the scientific activities. In 1873, at age 36, "he takes successfully the Baccalaureate in Science—this examination not being for the program of the seminaries; then he prepares alone the Bachelor of Science." During his stay in Nîmes, he established a relationship with Jean-Henri Fabre (1823-1915), the famous entomologist who lived in Avignon and Sérignan du Comtat. On April 15, 1874, he wrote to Boulay, giving him precise details for the examination of Bachelor and augurs: "The Faculty in front of which you will appear will have the honor to welcome well a person who already has your honorable precedents in the science. You will be graduated in science when you want it, you will be a doctor in the near future and, if you feel like it, the high education of the faculties waits for you as a professor. This is my firm conviction…" (Borel, 1986: 12). On November 19th, 1874, the Bachelor's degree of natural sciences was conferred on Nicolas Boulay, by the Faculty of Science of Marseille (Boulay, Archives Université catholique de Lille).

Boulay defended his dissertation of botany, on general principles about the geographical distribution of mosses, by insisting on the relationship between mosses and the physico-chemical parameters of the environment, so making a premature work on ecology (Boulay, 1876a) [1]. His thesis on geology was based on the coal ground of the north of France and its plants fossils, as Morière had recommended (Boulay, 1876b). This thesis was published the same year, and it was the beginning of Boulay's works in paleobotany. His thesis of botany was published the following year: *Études sur la distribution géographique des mousses en France, au point de vue des principes et des faits* (Boulay, 1877). Even before his thesis, in 1875, Boulay was appointed as ordinary professor of botany to the Catholic Univer-

sity of Lille. He would be appointed to the Faculty of Sciences on January 18 1877, at the time it was created: the Chancellor of the University appointed then Boulay full professor to the chair of botany (Borel, 1977: 25-26. Borel, 1986: 12). There are few detailed elements on Boulay's career in Lille, especially as many letters and documents have doubtless been lost, either in Lille or during the burning of the diocesan archives of Saint-Dié, at the time of the withdrawal of the German forces in 1944. We know that he was corresponding with numerous scientific societies, among them the Society of Natural Sciences of Cherbourg and the Academy of Vaucluse (from 1886). In December 1896, he wrote a small report after a request emanating from the Catholic University to cancel an F. 500 allowance, which was paid every year to Boulay, as compensation of his research and for the donation of his collections to the university. This report is today precious for us since he recorded there all the researches made since his appointment in Lille and their cost [2]. At first, he demonstrated that this allowance was voted, in the language of the time, in order to promote his later studies. He also gave precious information to his research activities and to their costs, from 1875 until 1896. Boulay enumerated his scientific activities and the resultant spending: the researches for paleobotany in the coal fields, for example in Vosges in 1878-79, the researches and a work on mosses in 1884, after four years of researches and for F. 3,000 of printing cost (Boulay, 1884). Finally, Boulay explained his activities in paleobotany on the Auvergne fossil flora from 1885: "Having discovered on the central plateau some deposits of interesting and not still studied fossil plants, I began their exploration. (…) The printing of the *Flore du Mont Dore* cost me F. 1,600 "(Boulay, 1892). From 1885 till 1895 up to and including, with the aim of completing these researches for plant palaeontology, every year, I matched the holidays a last great journey of exploration concerning the departments of Auvergne, Velay, Vivarais and those of the Rhône Valley" (Boulay, 29 décembre 1896, p. 6).

PALEOBOTANY PAPERS

The archives of the Catholic University of Lille contain Boulay's correspondence in relationship to the defense of his thesis. Boulay defended his thesis on the geographical distribution of mosses, a work that resulted in the publication of a book in 1877. In a letter dated March 25 1876, a Caen Faculty of Science professor advises Boulay "to reshape" and "to condense" his work, and to write his second thesis, this time in geology. It was followed by several letters of encouragement. On March 28, 1876, at Lille, Boulay answered: "if you think that I have to write a second thesis, you would have the benevolence to let me know if a comprehensive study on the fossil vegetables of the French-Belgian coal ground would

have any chance to be accepted. I do not know of a special publication on this subject" (Boulay, 28 March 1876). However, in a letter dated April 5th 1876, in answer to the correspondence from Boulay, Morière repeated his warning:

> Don't get lost in detail, please and attach yourself specially to highlight well the general facts which result from your observations and which demonstrate the relations of mosses with the physical and chemical properties of the ground. You can perfectly, in your second thesis, deal with a comprehensive study of the vegetables of the French-Belgian coal ground; you should describe the coal field before approaching the study of the flora that it contains and to indicate the new facts resulting from your personal observations (Morière, 5 April 1876).

> On May 22, Boulay answers in an elaborate way: "I took actively care of the thesis subject the honour of which I had to talk with you and which you were kind enough to approve: study of the fossil plants of the coal ground in the French-Belgian basin. Now, I wish to restrict my work to the French part of the North and Pas-de-Calais departments. Otherwise, I would fall in the inconvenience that you indicated me on my thesis on the geographical distribution of mosses in France. A too much widened subject prevents from reaching details" (Boulay, 22 May 1876).

Then he explains his method: he went himself in the mineshafts, he examined and sampled materials of extraction, and he gathered a "collection of plant imprints." He characterized new species and completed the descriptions of already known species. He was inspired by some works by Adolphe Brongniart (1801-1876) and by the *Treaty of Plant Paleontology* by Guillaume-Philippe Schimper (1808-1880). However, this period's archives show only 30 species identified for the North and 75 for the whole French-Belgian basin. In the same letter, Boulay writes that he had already exceeded the 75 mark, but only for the department of the North; he explains his intention to discuss the distribution of species according to ground layers. Boulay listed species layer by layer but admits he had no exhaustive knowledge because we always neglect the thinner layers which are not exploited and which have their plant fossils. Boulay's interest in the fossil flora would not much later contradict itself. Abbé Boulay was again considered as having an interest in the paleobotany, while on a trip to Auvergne during September 1884, Boulay was welcomed to Godefroy de Bouillon boarding school, in Clermont-Ferrand. He went with the Brothers Héribaud-Joseph and Adelphe to the plant fossils' deposit in Saint Saturnin, known as Bezac: "They liberally gave me the most interesting specimens of their previous harvests. With their help, I did on site, in September 1884, an ample supply of materials used in this note. I still owe to excellent Brother Gennardien, superior of the boarding school of Saint-Amand-Tallende, detailed information on the same subject espe-

cially drawn from the local traditions" (Boulay, 1877: 177). Brother Héribaud-Joseph (1841-1917) was a high school science teacher, in Clermont-Ferrand, as well as Brother Adelphe-Laurent Roux (1853-1932). He was the author of numerous botanical works, which included the *Flore d'Auvergne* and *Muscinées d'Auvergne*. Brother Gennardien (Pierre Vaurs, 1828-1904) was headmaster at Saint-Amand-Tallende.

Having described the fossiliferous layers, on the banks of a tributary of Veyre where the author discovered some very light slated plates which contain fossils of diatoms (Boulay, 1887: 179), he found other fossil objects, such as acorns, and concluded from its position that the deposit was laid down after a volcanic flow. Having said that, this fossil Flora of Bezac does not seem to be of great interest and the author does not establish the detailed composition. He so concludes:

> The vestiges of these ancient times are rather interesting by themselves to deserve to be indicated and described. They also have possibly some importance for the history of the living beings, in the sense that some naturalists, moreover partisans of Transformism, like to give to the Quaternary period an excessively long duration. Yet in this hypothesis, it is singular that the vegetable remnants of this period correspond so exactly to the current forms. If indeed, one hundred or two hundred thousand years ago, our oaks, our alders, our maples, etc., were exactly that we see them nowadays, our mind cannot grasp any more the part which we attribute to time in the theory of the insensible variations (Boulay, 1887: 181).

We can see that Boulay, opponent of the transformist theories, looks for any argument in his writings to oppose an evolutionary view of the living world. We shall return to this point.

In *La Flore pliocène du Mont Dore*, Boulay again mentions his excursions to Auvergne, together with tireless Brother Héribaud-Joseph. Anyhow, the introduction of this work shows us that the Auvergne Flora, including the paleontological flora, was already developed at that time, and that Boulay builds on the works of numerous scientists.

> Thanks to the Brothers Héribaud-Joseph and Adelphe, science teachers at the Boarding school of Clermont-Ferrand, a few years ago, I had knowledge of fossil plants of the lake Chambon. In the course of my research, I learnt that the diverse deposits of this region were repeatedly explored by Mr. Julien, professor of geology at Clermont's Faculty of Science, and by amateurs, in particular, Father Forestier, parish priest of Saint-Nectaire and Dr. Gourbeyre, of Ambert (Boulay, 1892: 36).

Let us specify here that Pierre-Alphonse Julien (1838-1905) was director of Clermont's Botanical Garden at the time of Boulay's explorations. Appointed professor of natural history at the University of Clermont-Ferrand,

he became the first holder of the chair of geology and mineralogy in 1875. Father Forestier was the parish priest of Saint-Nectaire from the 1870s and, like many country priests, he conducted historic and naturalistic works as an informed amateur. Doctor Antoine Imbert-Gourbeyre (1818-1912) was a professor at the School of Medicine of Clermont-Ferrand from 1852 until 1888. He was known for works in physiology, pathology and in botany. Nicolas-Jean Boulay attributes the first paleobotanical discoveries in Auvergne to Pomel, director of the Sciences College in Algiers and to Henri Lecoq, director of Clermont's Botanical Garden and predecessor of Julien in this post. Boulay also takes into account contributions from Saporta on the discovery of fossil tree remains in Auvergne. According to the logic of the works of this period, Boulay lists specimens attributed to his predecessors and he adds his own discoveries of described and classified fossil plants from the region of the Mont-Dore.

In 1899, Boulay published *Flore fossile de Gergovie* (Boulay, 1899a). In this work, he also redraws the history of the paleobotanical research on the plateau of Gergovie. We find Father Croizet, one of the pioneers of geological research in Auvergne; Croizet published a report on the fossil flora of Gergovie in 1835-36 (Croizet, 1836), as well as Pomel and Lecoq. More importantly, in 1878 Gaston de Saporta (1823-1895) made a fundamental contribution to the study of the fossil flora of Gergovie and Boulay seems to be in agreement with him, in particular regarding the establishment of the first list of the fossil plants of Gergovie (Boulay, 1899a: 9). After this long quotation of the works of Saporta (Saporta, 1878), Boulay returns to his own works by writing:

> By 1885, I did a first running in Gergovie with the Brothers Adelphe and Héribaud, with the aim of paleontological researches; since then, repeated excursions put me in possession of numerous and instructive specimens. I do not claim to be able to believe that everything is finished, but it is time to collect and to publish the documents I have on this interesting locality. It will be a starting point for more thorough and complete studies (Boulay, 1899a: 9).

Brother Adelphe as well as professor Julien are again cited to have given Boulay some of their fossil collection and Boulay includes an inventory of these discoveries in his work to reconstitute the "Flore du Miocène" on the plateau of Gergovie.

BOULAY AND EVOLUTION

It is easy to understand that the botanical and geological works of Father Boulay as well as the epistemological and cultural context of the end of the nineteenth century lead Boulay to take a stand on the transformist theories. From 1875, Boulay is interested in the questions raised by Trans-

formism, especially in the 1890s, when the debate feeds on new scientific facts he writes several papers on the question. In 1875, in the *Bulletin of the Botanical Society of France*, Boulay argues "the question of the species and the evolutionists," where he takes up and comments on Charles Naudin's point of view (1815-1899) on the plant variations (Boulay, 1875). If the species are not unchanging, their noticeable variability is nevertheless very limited. We cannot allow the crossing of "facts of very limited variability that we know to the absolute variability from these same forms." It would "still exceed (…) the reach of the experiences" (Boulay, 1875: 106). Like his contemporaries, Boulay admits the variability but also the uncertainty in the determination of species and varieties; however, he considers himself less skeptical than Naudin on the limits to impose on science. Concerning browsing animal, plant embryogenesis and metamorphoses of insects, Boulay sees no argument to support the idea of Evolutionism.

> The evolutionary theory takes place contrary to the current facts, because it takes its starting point in the hypothesis of a primitive protoplasm which escapes any scientific investigation. (…) The theory of the stability of botanical species remains an opinion most in compliance with the observed facts and with the data of reason, without however being demonstrated by science. Observation indeed establishes the following conclusions: the current vegetable forms are generally stable in the important characters for the physiological or morphological point of view; the variations usually concern secondary details of the organism. In the present world, variability is thus subordinate to stability. It is more in accordance with the reason for thinking that it was always the same: it is improbable to imagine transformations of which there is no trace. Paleontology confirmed this opinion regarding the stability of species, proving the relatively recent origin of the current forms. These forms did not have time to vary in a considerable measure (Boulay, 1875: 107-108).

Boulay's reasoning has nothing original. He is only taking back the opinion of the time. Contrary to Naudin, who admitted to a certain evolution, he opposed some arguments, which could be attributed to Flourens or Quatrefages. The impossibility of demonstrating the existence of a first "protoplasmic" being, confusion between species and varieties, the stability of the current forms suggesting fixedness (which also implies that the old forms revealed by paleobotany definitively disappeared as the result of a disaster and that they were not able to evolve into the current forms). In fact, this argument was not very original. Concerning the continuity of the living beings named by Naudin to support evolution, Boulay answers by arguing the "principle of causality of Scholasticism" which would have enabled better understanding of these questions than "the modern scholars" (Boulay, 1875: 108). In a way, Boulay returns to Scholasticism, which is here a scholastic Creationism. If he was open to the evolutionary theo-

ry, Naudin was not however an unconditional defender but he was very careful in this connection.

Jean-Louis Fischer published the correspondence on this matter between Charles Naudin and Camille Dareste, who was an experimental transformist. Commenting on both letters (1867), he writes:

> Naudin like Dareste does not favorably incline to the idea of the origin of species occurring following some modifications 'acquired with an excessive slowness and by insensible transitions', these modifications that must occur over 'several thousand generations to transform one species into another congeneric species'. (…) However, Naudin, contrary to Dareste, is not a defender of an evolutionary Transformism. 'I am not here the defender of the evolutionary doctrine, I only say that the biological phenomena in this day and age do not justify in any way the hypothesis of an insensible degradation of the former forms and the necessity of millions of years to change the face of species.' What is interesting in Naudin's academic note and in his design is that he explains that the temporality of nature was punctuated, to use a contemporary term, by phases of immobility followed by active phases of transformation (Fischer, 1997; Naudin, 1867).

Besides, according to Boulay, the construction of the evolutionary theory corresponds to a multiplication of undemonstrated and unscientific hypotheses. He writes:

> Science does not live on hypotheses, whatever says Mr. Naudin about it, it lives on truths. By a daily and mindless use of free suppositions, we confuse in the same assembly some strictly noticed facts as well as their logical consequences, with other little known facts or with theses, the demonstration of which is far from being finished. I think it would be very useful to establish a more clear-cut demarcation line between the science itself, that is the set of knowledge that, being true, would not become false the next day and the still moving area of issues in dispute (Boulay, 1875: 110).

This vision of science, which Boulay maintains, is positivist, factual and ahistorical at the same time. The facts of which he thinks are observation facts, generally naturalistic descriptions and the text highlights that in a still quite immature biology, some known truths seem acquired and based on facts, hypotheses seeming much more difficult to demonstrate or to refute. It will be necessary to wait for molecular biology and for genetics (or biochemistry) so that the biological sphere aligns itself more or less with the physico-chemical sphere in terms of hypothetico-deductive reasoning. However, it remains true even today that hypotheses connected to the evolutionary theory remain difficult to demonstrate; what is true is that the confirmation of the evolutionary fact has reached such a level as it could not be refuted. We can give as example the fact that Popper

spent forty years integrating the scientificity of the evolutionary theory into his epistemology. The last part of this paper concerns the relationship between science and faith regarding evolution. We find here the usual discussions in the nineteenth century concerning Genesis and the deployment of a concordist apologetic to harmonize agreement between the Bible and scientific data. Like Saint Augustine, the author agrees to accept long-time periods and some possibilities of transformation for plants and animals, but the origin of man remains an obstacle (Boulay, 1890). To Naudin, who explains that what we would call a literalist reading of Genesis today strengthens an "improvable" category (Boulay, 1875: 113), Boulay answers by arguing the scientific nature of a theology which uses demonstration even if it is based on the Christian faith. This answer fell on deaf ears.

Some texts show that Boulay did not change his point of view from 1875 until 1890, approximately, at least in the face of materialistic aspects of Evolutionism. We can wonder if he would have changed opinion before his death in 1905; it would seem so according to paper that appeared in 1899, entitled "The evolution and the dogma" (Boulay, 1899b). This paper is a criticism of the book of the same title by Father Zahm, an American Augustinian, translated at the time by a priest from Autun, Father Flageollet, which appeared in 1897. Boulay criticizes Zahm, because he wants "to soften and to modernize former and different views" (Boulay, 1899b, 482) and that he considers too strongly Saint Augustine as a precursor of the evolution; Boulay also underlines that "the fixedness of species is a scientific faith and not a religious belief" (Boulay, 1899b: 490). In this text, Boulay finally introduces a limited possibility of evolution in the animal and plant kingdom: the role of evolution would be worthless if the specific types were directly created and invariable, yet they could vary in a limited way. "If they were variable to a certain degree, it would be necessary to suppose furthermore that these variations, even restricted, would occur untidily and at random. Indeed, as we know it, if the variability is submitted to some laws, for example, adaptation laws in the conditions of environment, heredity laws, etc., we are already in the presence of a restricted evolution, if we want, but a real one." Boulay thus opens the door to a still uncertain and not theorized scientific evolution: "when we meet in nature some specific types who seem to us very fixed and very different from congeneric species, however are we able to assert that all the species were created in any given period, such as we see them? If we assert it, this is without any serious and valid proof" (Boulay, 1899b: 483). Boulay concludes that "the idea of evolution cannot be banished from the study of living beings; it holds usefully its place; you should not either delete it or exaggerate it" (Boulay, 1899b: 495). He cautiously postulated the idea of evolution without setting a new paradigm.

Here we also discover with interest a text on "The theory of evolution in botany," in the *Revue des questions scientifiques* in 1894, where the author also seems to be making some concessions and evolving in his approach to Transformism (Boulay, 1894). Boulay recalls first that theories of natural science base on facts, that the hypothesis is the place of "dry plains" where the naturalist "inevitably roams at random and without compass." Few changes since 1875 on this point; certainly, we do not especially have to try to apply these theories to man, but their conclusions "would be maybe tolerable when it is about animals and vegetables" (Boulay, 1894: 6). We find here the Augustinian point of view: make way for a certain evolution, on the mode of the spontaneous generation, in a fraction of the animal and vegetable kingdoms, especially without touching humankind. Concerning the vegetable kingdom, Boulay very cautiously writes: "the diversion of the current botanical species from a small number of primitive types thus being admitted as a possibility, without affronting any dogma nor even any metaphysical principle, it is necessary to examine firstly what is the nature of this possibility. Then, we shall examine which support it meets in the study of current facts and palaeontology" (Boulay, 1894: 7). Thus, it would seem that in 1894, in view of the facts seeming to become more plentiful, Boulay decides to half-open the door in a still reticent and partial evolution to plants. However, in the text, he begins by looking for arguments contradicting the hypothesis of a "primitive and unique plant" (Boulay, 1894: 8). It is a little bit surprising that, in 1894, ten years after Pasteur's first revolutionary microbiological discoveries, we could use the term "spontaneous generation" applied to evolution. The author insists moreover on the compatibility of any spontaneous generation with creation and so he reveals his apologetic intention in the case of what he calls "the transformist hypothesis": "The spontaneous generation admitted by all the scholastic doctors of the Middle Ages can be understood in a perfectly orthodox sense, if we suppose that it fits into the creation plan, wanted by an author. It is however certain that the ordinary transformist hypothesis, pushed to its last logical consequences, makes the necessity of recognizing the world over the work of a superior intelligence and a creative will more striking" (Boulay, 1894: 10). Indeed, the author considers that the appearance of the primitive plant cell, which occurred only once and at the origin of all the plants, cannot be due to the effect of chance. What is interesting here is that, from the pen of a catholic author and from 1894, we come to envisage the relationship between creation and evolution, the idea for which Teilhard will put forward a few decades later.

Boulay then resumes the evolutionary argumentation concerning variability: do the intraspecific variability and the improvement of plants (which is rapidly increasing at the end of the nineteenth century with the multiplication of the hybrid varieties) justify all Evolutionism? Boulay bor-

rows fixist arguments from Vilmorin, in which we cannot deny the solidity of their experimental works and their help in the improvement of the varieties in this period.

> It will be well committed for us to reflect on the fixedness of the botanical species which is very remarkable and very deserving of admiration, if we only envisage it for the period which our investigations can embrace with some certainty. We indeed see species submitted to the culture from prehistoric times and exposed to all the modifying influences, which accompany the ceaselessly repeated sowing. We see the transport from a country to another one, the most remarkable changes of the crossed environments in nature, and these species keep nevertheless their very different existence; while presenting perpetually new variations, they never exceed the limits which separate them from nearby species (Boulay, 1894: 13-14).

Boulay returns to Vimorin's experiments on gourds and cabbages, "plants at the same time very formerly cultivated and very variable" (Boulay, 1894: 14). Vilmorin insists moreover on the convergence between the variability of the plant forms and the fixedness of the contemporary species of man (Léveque de Vilmorin, 1883). We always have the same problem envisaging an evolution, which, by nature, widely exceeds the prehistoric and historic periods. The horticulture and thus the improvement of vegetables would not provide evidence of an evolutionary and virtually endless variability of the botanical species. Boulay draws on then the plant kind, which he mastered best, Rubus, to show that plants adapt themselves to their environment. We see multitudes of forms appearing or disappearing but it would be useless to put forward the hypothesis that they are former species evolving and that they are going to disappear or that they are some simple varieties stemming from crossings [3]. Without completely excluding evolution, Boulay puts into perspective what is, for him, a fact: the species. From a paleobotanical point of view, species appeared or disappeared throughout the geological eras, the current kinds actually appearing very late; but "from the beginning of the Quaternary, the flora had completely acquired its current face in the morphological point of view" (Boulay, 1894: 19). According to Boulay, paleobotany does not convincingly demonstrate the evolutionary hypothesis; he thus seems to close the door, which he cautiously had half-opened. The possibility of the evolution of plants is not in question; but nothing is proved, even if "paleontology supplies some indications in favor of evolution" (Boulay, 1894: 21), it does not permit the recognition of the diversion of species from one another. Boulay avoids the question by concluding that the evolution of the species remains in a state of research.

In fact, although he was rather fixist, at least at the beginning, Boulay tried to establish that the evolutionary theory would not oppose the reli-

gious conception of creation if it came to be scientifically more established, which he anticipates. In another paper entitled "The struggle for life," he tried to underline and to show this absence of opposition (Boulay, 1898): "At the moment, we move away the scientific viewpoint and we simply ask this question: is the fundamental principle of evolution as a principle of progressive development of plants and animals formally set against the catholic dogma? In this question, it is necessary to answer: no" (Boulay, 1898: 7). This paper is a helpful criticism of Darwin's *Origin of Species*. The author tends to replace the Darwinian principle of the struggle for life by a kind of Vitalism articulated around the search for final causalities. He would wish a return to Scholasticism in accordance with contemporary science; at the end of the nineteenth century, he is not the only one.

CONCLUSION

In summary, the author changed his thinking about evolution between 1875 and the 1900s. Even if by 1875, he took up a position against Transformism, in the papers that he wrote at the end of this period, he did not reject anymore the evolution of plants and animals as a scientific fact. However, Boulay argues repeatedly against Darwinism and he explores the relationship between the Christian teaching on creation, "scholastic" philosophy and the possibility of an evolutionary theory. It is not lacking in interest, although the descriptions and arguments seem very long and apologetic today, which can be seen particularly in certain papers published in the *Revue de Lille*. Thus, we shall remember about the life of Father Boulay that the Church of the nineteenth century was much more open than we may imagine; the Church encouraged the activity and the testimony of valued scientific priests such as Boulay. We shall also hold that multiple texts written by Boulay show to what extent the latter gave importance to science and to the relationship between works of human reason and works of the Christian faith, which is not reduced to a mystical, disembodied and irrational expression as some Christians believe it to be today. Boulay, priest, palaeontologist and botanist, present in all the debates of the time since the question of evolution was first posed until the beginning of the teaching of sciences in the seminaries and the catholic institutions, is a beautiful example of a committed man and Christian scientist.

NOTES

1 Boulay did a lot of work concerning phytogeography. He probably knew Charles Flahault's works, and his own works are to situate in a phytogeographic framework ((botanical geography). Concerning the great importance of these studies, see Matagne, 1995.

2 Boulay, *Eclaircissements et justifications présentées à Mgr Baunard, Recteur des Facultés catholiques*, 29 décembre 1896, Archives de l'Université catholique de Lille, S1B/b.

3 Concerning the diverse forms of Rubus, we have to remember here that the community of botanists during the second part of the nineteenth century discussed a lot about criteria used to define Jordanian taxa. According to Boulay, species is a fact, but he did not attach great importance neither to Jordanian taxa, nor to evolution of plant species. About Jordanian taxa, see Bange, 2000.

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