Scientific passion and religious commitment in the Republic of Letters: Nicolas Fatio of Duillier (1664-1753)[1].

INTRODUCTION

For a couple of centuries, the history of sciences had been a "juged history" (or "histoire jugée" according to Gaston Bachelard[2]) which analysed the progressive defeat of irrationality in front of a triumphing reason. The so called "scientific revolution" of the 17th century was seen has the starting point of that unstoppable process towards modernity. From the 1970s and even more from the 1980s, that idea became more and more criticized, first by the English and American historiographies, then by the French. The social dimension of science started to be analysed, while some interest was given to the links between science and all the other disciplines that had been neglected because seen as irrational and belonging to a dark past, such as astrology and alchemy. That conception of the modern science as the end of "obscurantism", developed from the 19th century mostly by the positivist philosophers such as Auguste Comte, had created an impassable line between reason and faith, and so between science and religion, which were seen as the two protagonists of an endless war[3] . One of nowadays great challenge is to reconcile these two, showing that their separation is anachronistic when analysing the seventeenth and eighteenth centuries[4].

One of the ways to get out of that positivist history was to focus on some of the main actors of the so called "scientific revolution", in order to see what the ideas behind the discoveries were. Robert Boyle and Isaac Newton specifically interested the historians[5]. Both

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[1] This work is part of a PhD work in progress on Nicolas Fatio de Duillier, started in September 2014 at the University of Lyon 3. Most of the quotes in that paper were originally in French; translation is the author's work.

[2] Georges Canguilhem, *Etudes d'histoire et de philosophie des sciences concernant le vivant et la vie*. Paris, Librairie Philosophique J. Vrin, 1994 (7th edition).

[3] The construction of the "warfare" theme is well synthetized in Margaret C. Osler, "Religion and the changing historiography of the Scientific Revolution", in Thomas Dixon, Geoffroy Cantor and Stephen Pumfrey (eds.) *Science and religion: new historical perspectives*, Cambridge, Cambridge University Press, 2010, pp. 71-86.

[4] If some works were precursory, the 2010s reveal a renewed interest for these questions: John Gascoigne, *Cambridge in the age of the Enlightenment: science, religion and politics from the Restoration to the French Revolution*, Cambridge, Cambridge university press, 1989; John Hedley Brooke, *Science and religion: some historical perspectives*. Cambridge, Cambridge university press, 1991; Thomas Dixon, Geoffroy Cantor and Stephen Pumfrey (eds.) *Science and religion, op.cit.* ; Peter Harrison (ed.), *The Cambridge companion to science and religion*. Cambridge, Cambridge university press, 2010.

[5] In the case of Newton, it goes on with a revaluation of the importance of his "other" studies such as chronology, biblical criticism, prophecies and alchemy. On that subject see J. E. McGuire and P. M. Rattansi, "Newton and the Pipes of Pan.", *Notes and Records of the Royal Society of London*, n°21, December 1966, pp.

of them had an important religious life, and despite some accusations of heterodoxy, worked to combine their works of natural philosophy with their Christian beliefs. Robert Boyle's scientific work for example was almost considered by himself as priesthood[6].

The biographical approach is particularly interesting to work on the links between science and religion. Much criticized during the 1980s, especially by sociology and Pierre Bourdieu[7], biography soon found its defenders[8] and knew a great renewal around the 1990s, a "biographical turn[9]" along with a change in its goals. The great linear narrative of a famous political actor's life gave way to more diverse subjects. Scientists were one of them. Furthermore, the aim of the biography was not so much to glorify a character's life, but to question and analyse a society through the case of one of its members. Its renewal often was fed by new (or renewed) historiographical fields such as gender, history of the individual, history of private life, history of sciences and technics. Reflections on points of view, aims and writing processes gave to biographical studies the theoretical background of an academic discipline.

Inside the renewed history of science, biography offers new opportunities to study the links and mutual development of science and religion. Analysing the different networks in which a character is involved, their convergence points and the variety of information shared and exchanged can reveal some convergence that were invisible from a purely scientific or religious perspective. Furthermore, a study of personal archives (or "archives du for privé") unveils some personal beliefs and convictions that might not appear in the publication and public papers. It also allows us having some concrete elements on the practice of sciences,

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108–43; Franck Manuel, *The religion of Isaac Newton*, Oxford, Clarendon Press, 1974 ; Richard S. Westfall, *Never at rest: a biography of Isaac Newton*, Cambridge, Cambridge University Press, 1980 ; James E. Force, and Richard Henry Popkin, *Essays on the context, nature, and influence of Isaac Newton's theology*, Dordrecht, Kluwer Academic, 1990; Scott Mandelbrote "A Duty of the Greatest Moment: Isaac Newton and the Writing of Biblical Criticism", *The British Journal for the History of Science*, n° 26, September 1993, pp. 281–302.

[6] Harold Fisch, "The Scientist as Priest: A Note on Robert Boyle's Natural Theology", *Isis*, vol. 44 n° 3, september 1953, pp. 252-265. See also Jan W. Wocjik, *Robert Boyle and the limits of reason*, New York, Cambridge University Press, 1997.

[7] Pierre Bourdieu, "L'illusion biographique", *Actes de La Recherche En Sciences Sociales*, n° 62–63, 1986, pp. 69–72.

[8] In the French historiography, we can name Jacques Le Goff "Comment Écrire Une Biographie Historique Aujourd'hui?", *Le Débat*, n° 54–2, 1989, pp. 48–53 ; Jacques Revel "L'histoire Au Ras Du Sol" *in* Giovanni Lévi, *Le Pouvoir Au Village. Histoire D'un Exorciste Dans Le Piémont Au XVIIe Siècle*, Paris, Gallimard, 1989. The Italian *microstroria* greatly contributed to this renewal with Carlo Ginzburg, *Le fromage et les vers: l'univers d'un meunier du XVIe siècle*, Paris, Flammarion, 1980 and Giovanni Levi, "Les Usages de La Biographie", *Annales. Economies, Sociétés, Civilisations*, no. 6, 1989, pp. 1325–36.

[9] If Britain and the USA had not been very touched by the criticism against biography, they did participate to its renewal. Northern European countries such as Finland were too, along with the Netherlands and Germany. See for instance Willem Frijhoff, who uses the concept of "biography in context" in his study *Fulfilling God's Mission. The two worlds of Dominie Everardus Bogardus, 1607-1647*, Leiden, Boston, Brill, 2007.

and at the same time on the expression of faith and beliefs. It permits to work on the evolutions in the practices and in the faith on a life-time scale that can be compared and combined with longer term scales. Finally it can even allow questioning the relevance of those two historically created categories, science and religion, at an individual scale[10].

Today Nicolas Fatio de Duillier is not one of the greatest names of the scientific revolution. However, he was at his time quite famous in the Republic of Letters. He was made a fellow of the Royal Society at the age of 24 for his skills in astronomy and mathematics. He had been raised in a Swiss protestant tradition, but by the end of the 17th century, he started to show some "heterodox" beliefs. In 1706, he joined the French Prophets, a religious group of inspired created by three Cevenol leaders who had fled to London to escape the Protestants hunt in the Cevennes[11]. Fatio became an active member of their group and one of their secretaries, writing down their inspirations. This commitment was deeply criticised by his contemporaries, and even more by the historiography, which considered that he had fallen into madness and had stopped a promising scientific career. But a closer look to him reveals that none of that is true. Fatio never stopped his scientific activities, and he did not seem mad. His religious ideas and beliefs evolved through his life along with his scientific activities and interests, one feeding the other.

In order to analyse the links between science and religion in Fatio's life, we can identify different moments when his scientific activities had an influence on his religious ideas and conversely. To be more precise in our analyse, we have to notice that Fatio himself, in his different papers that we used for this work (letters, drafts, treaties[12]), used the word "religion" only to talk about the Roman religion or the Protestant religion, which refer to the confessions of the time. In order to analyse his religious convictions, we rather focused on his

[10] For a very stimulating analysis of the creation of those categories, see Peter Harrison, "Science and religion: constructing the boundaries" in Thomas Dixon, Geoffroy Cantor and Stephen Pumfrey (eds.*), Science and religion: new historical perspectives*, *op. cit*. pp. 23-49.

[11] On that question: Jean-Paul Chabrol and Philippe Joutard, *Élie Marion, le vagabond de Dieu (1678-1713): prophétisme et millénarisme protestants en Europe à l'aube des Lumières,* Aix-en-Provence, Édisud, 1999 ; Jean-Paul Chabrol, *Élie Marion, 1678-1713, le camisard aux semelles de vent*, Nîmes, Alcide, 2008 ; Yves Krumenacker, "Les French Prophets, Français ou Anglais ?" *in* Anne Dunan-Page and Marie-Christine Munoz-Teulié, *Les Huguenots Dans Les Îles Britanniques de La Renaissance Aux Lumières*. *Ecrits Religieux et Représentations*, Paris, Honoré Champion, 2008, pp. 227–243; Lionel Laborie *The French Prophets. A Cultural History of Religious Enthusiasm in Post-Toleration England (1689-1730)*, PhD thesis, University of East Anglia, 2010; Hillel Schwartz, *Knaves, Fools, Madmen, and that subtile effluvium: a study of the opposition to the French prophets in England, 1706-1710,* Gainesville, University presses of Florida, 1978 ; Hillel Schwartz, *The French prophets: the history of a millenarian group in eighteenth-century England*, Berkeley, 1980.

[12] Most of the sources we used for that work are kept at the University of Geneva Library (BGE). Fatio's correspondence is kept in the "manuscrits français" (ms. fr.) 601 and 602, his works on alchemy and cabbala in ms. fr. 603, his "Brouillards" (drafts) in manuscrits Jallabert 47. His publications in various journals of the time (the *Bibliothèque Universelle* for instance) are mostly available in the online versions of those journals.

mentions of God and of Providence, which are the most frequent terms he used. As for "science", it is important to notice that Fatio never talked about "the" science, as a general concept. At his time, science was defined as "knowledge on a matter that has been deepened, reduced to rules and to a method for its perfection"[13], such as geometry and astronomy. There was no equivalent of our modern term of "science" in general, so "sciences" in plural will here be preferred. I identified four times which are characterized by main changes in Fatio's scientific practise or religious beliefs, and I am going to analyse the dynamics that were at the origins of those changes, showing how scientific activities and religious beliefs and commitment worked together.

I. The Cartesian formation

Nicolas Fatio grew up in a protestant family and received his formation in the protestant college of Geneva before studying in the Academy with the protestant Jean-Robert Chouët. He attended the "lectiones philosophicas" between 1678 and 1680, where he studied logic, metaphysics and physics[14]. Chouët was influenced by Cartesianism, but in his teaching, he was very careful to separate natural philosophy and theology[15]. That was very important at a time when the protestant world was facing a conflict between the tenants of a strict orthodoxy and the tenants of a critical approach[16]. During his formation, and in the years following, Fatio had a traditional conception of God, who he saw mostly as the creator of the laws of Nature. Being a protestant, Nicolas Fatio was quite familiar with the Bible and had been educated in the literary approach that characterised the protestant reading of the Bible[17]. The Scriptures were for him a historical book and could be then studied and analysed by the prism of reason. This rational approach had been reinforced for some decades by the critical movement that was developing, mostly in the Saumur Academy, against the protestant orthodoxy. Critical theologians insisted on the historicity of the Biblical texts and on the contexts in which they had been written. According to them the Bible could be analysed by philology and was a valuable source for the history of the world, a source of historical and

[13] "Se dit plus specifiquement d'un art particulier, de l'application qu'on a euë à approfondir la connoissance d'une matiere, de la reduire en regle et en methode pour la perfectionner", « Science » *in* Antoine Furetière, *Le Diction(n)aire Universel*, La Haye, A. et R. Leers, 1690.

[14] We can find Fatio's notebooks of Chouët's classes at the University of Geneva Library, ms. lat. 221.

[15] Michael Heyd, *Between Orthodoxy and the Enlightenment. Jean-Robert Chouët and the introduction of Cartesian Science in the Academy of Geneva*, La Haye, Boston, Londres, M. Nijhoff, 1982, pp. 114-115.

[16] It was particularly significant in Geneva where one of the last defender of a strict orthodoxy, François Turrettini, was opposed to Louis Tronchin, tenant of the critical approach. For a precise insight into that context, see Maria-Cristina Pitassi, *De l'orthodoxie aux Lumières: Genève, 1670-1737*, Genève, Labor et Fides, 1992.

[17] The protestant literary approach of the Biblical texts is analysed in Peter Harrison, *The Bible, Protestantism and the rise of natural science*, Cambridge, Cambridge University Press, 1998.

geographical knowledge[18]. In October 1683, Fatio wrote down some notes about the miracle of Josué stopping the Sun and the Moon.

> When Josué made the sun and the moon to stop we can notice that if the earth is revolving and that it stopped, both the sun and the moon would then seem motionless. One miracle was enough instead of two. But the sun being awaken Josué did not need the moon and it seems that he said "Moon stop too" just as pushed by God to say something that was anyway going to happen by the freezing of the earth movement[19].

This particular miracle is partly rationalized by Fatio, in order to make it fit within the laws of Nature: the miraculous origin stays but the phenomenon is rationalized. The choice of the miracle is significant: this particular biblical episode had been used against Galileo by several of his opponents who insisted then on the literal sense of the Scriptures[20]. This little exercise was for Fatio a way to reconcile the Bible with the principles of the new astronomy. In 1687, he published a letter about the dimensions and representations of the bronze sea of Salomon, that circular basin that was in front of Jerusalem temple. For that work, Fatio used four different sources, two from the Bible (Book of Kings and Chronicles) and two from ancient authors (Eusebius of Caesarea and Flavius Josephus). If the Bible could be used as a source for historical and geographical knowledge, it could also be compared with other writings, to clarify some points which were not directly related to the doctrine itself, such as chronological details, geographical and historical descriptions, and law practices in the Hebrew society. At the end of his study, Fatio wrote:

> May I be allowed to complain in one word about the unfairness of those who boldly censor and condemn without reasons the Holy Scriptures, because they cannot or do not want to examine its truth carefully. Acting like this is very unfair and would not be acceptable even towards purely human writings[21].

This accusation seems to be addressed both to the Catholics and to the orthodox Protestants, who were very hostile towards that critical movement. Fatio was committed to the critical approach of the Bible, as were most of the learned, philosophers and scientists of his

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[18] François Laplanche, "Débats et combats autour de la Bible dans l'orthodoxie réformée" *in* Jean-Robert Armogathe, *Le Grand siècle et la Bible*, Paris, Editions Beauchesne, 1989, p. 130.

[19] Bibliothèque de Genève (BGE) ms Jallabert 47 vol I. f° 296.

[20] Peter Harrison, *The Bible, Protestantism and the rise of natural science, op. cit.* p. 112.

[21] "Extrait d'une Lettre Latine de M. N. Fatio de Duillier à M. Bernard, docteur en Théologie à Oxford, du 1er de Décembre 1687 touchant la Mer d'airain", *Bibliothèque universelle et historique de l'année 1689*, vol.14, La Haye, at Jean Mart. Husson's, 1738 (3rd edition), pp. 424-425.

time. On one hand, the development of new sciences such as critical history and philology transformed the way of reading the Bible. On the other hand, that new approach of the Bible made it a source for scientific works, mostly astronomy, chronology, geography and law. Fatio was deeply influenced by those dynamics in his early scientific practise.

II. Prophecies and alchemy: new experiments, new experiences of God

Around 1692-1693, Fatio experienced a personal religious crisis. On the 3rd of February 1693, he wrote to his sister Alexandrine

> And to speak freely I could not teach him [a potential nephew he would raise up] our religion for I know it is false, although far better than the roman religion. The Truth and the Church of God have been crawling for a long time, persecuted and overwhelmed beneath Princes and Churchmen's intrigues[22].

At that time, his separation from the protestant Church was achieved. Several factors might have driven him to that rupture, such as a terrible illness in 1691 and 1692 and the death of his mother on December 1692. It could also be linked to his new life in England, where he had travelled in 1686 then settled after his election in the Royal Society of London in 1687, and his new acquaintances with several scientists whose orthodoxy might have been questioned. Isaac Newton for instance had a particular influence on Fatio. Under the influence of those men, or at least living in that environment of natural philosophy and experiment, Fatio started questioning the truth of the official churches. That tendency might have been strengthen by the discovery of new forms of knowledge and the practise of new activities.

Fatio developed a new interest for chronology. With the progress of astronomical observations, and the development of the "critical" approach of the Bible, many learned of that period intended to give a new and precise system of dating to the Bible and to the human history from the time of the Creation. Fatio was greatly interested by those works and we know that he read *L'Antiquité des Temps rétablie contre les Juifs et les Nouveaux Chronologistes* (*The Antiquity of Times restored, against the Jews and the new Chronologists*) by Paul-Yves Pezron, published in 1687. He also insisted that Mr de Cartier, a chaplain in Christ Church College in Oxford who he wrote a letter to, published a Chronology

[22] BGE ms. fr. 602 f° 85v.

treaty that he had written before Pezron's book was published[23]. He even encouraged de Cartier to submit his manuscript to the Dutch editor Leers in Rotterdam. Fatio's curiosity for chronology was real and demanding. His interest for the biblical texts as sources of knowledge got even stronger when Newton introduced him to a new activity: the identification and interpretation of biblical prophecies. Newton had been interested in biblical studies since his youth. He had retarded the publication of his *Principia Mathematica* because he was too busy working on a commentary of the Book of Revelation[24]. In the following years, he had worked on the prophecies of Daniel and those contained in the Book of Revelation. There was a global craze for prophecies in seventeenth-century England, mostly in the revolutionary periods as they were seen as guarantees of success for the Protestants. The Book of Revelation was the most commented text announcing the end of the reign of the Devil, identified with the Pope[25]. Newton initiated Fatio to this work. On January the 30th 1693, Fatio wrote to him:

> Since I had the honour to see You Sir having perused very diligently several books of Scripture I have had some odd thoughts which yet I think I could make out beyond all manner of exceptions.

A bit later in the letter, Fatio commented his work and ambitions:

> But I am persuaded and as much as satisfied that the book of Job, almost all the Psalms and the book of proverbs and the history of the Creation are as many prophecies, relating most of them to our times and to times lately past or to come[26].

Fatio clearly intended to continue or to extend Newton's work on prophecies to the entire Bible. For him, the Adam and Eve episode was the main prophecy whose pattern had to be found in the whole Book. He was also convinced that his time was that of the fulfilment of the prophecies. However, and surely to his disappointment, Newton did not show much enthusiasm for this theory. On February the 14th 1693, he wrote "I am glad you have taken the prophecies into consideration and I believe there is much in what you say about them, but I

[23] BGE ms. fr. 602 f° 73.

[24] Richard H. Popkin, "Newton et l'interprétation des prophéties" in Jean-Robert Armogathe, *Le Grand Siècle et la Bible*, *op. cit.*, p. 750.

[25] François Laplanche, « Débats et combats autour de la Bible dans l'orthodoxie réformée » *in* Jean-Robert Armogathe, *Le Grand siècle et la Bible*, *op. cit.* p. 124.

[26] Isaac Newton, H. W. Turnbull (ed.), *The Correspondence of Isaac Newton, vol.3, 1688-1694*, Cambridge, Cambridge University Press, 1961, p. 242.

fear you indulge too much in fancy in some things[27]". Newton's reluctance to share Fatio's exhilaration might be explained by two different conceptions of what prophecies were about. Fatio seemed to privilege a quantitative approach, multiplying examples and trying to cover the whole Bible. He was convinced that the Temptation episode was the main prophecy in the Holy Scriptures, whose evocation and pattern could be found more than thirty times in the Book, and which was then to be considered as the matrix for all prophecies[28]. His good knowledge of the Book allowed him multiplying examples and references in order to find within each of them the common pattern of the Temptation episode. Then Fatio looked for correspondences with contemporary events. That was the method he chose. But in his work on prophecies, Newton privileged a qualitative approach. He was not trying to find a global pattern, nor immediate correspondences within the present days. He rather tried to interpret the events in the light of prophecies after they had actually occurred[29]. Furthermore Fatio presenting himself as "persuaded" and with "odd thoughts" revealed an intuitive approach that contrasted with Newton's caution and patience when he was working on his Biblical studies[30]. Despite his attempt to present his method as serious and promising, Fatio did not convince Newton who saw him as too much enthusiast to seriously work on that matter, and surely too speculative. Through chronology and prophecies, Fatio revealed his deep attachment to the Scriptures, along with a degree of familiarity and appropriation that might have been made easier by his separation from the moral authority of the Churches. His approach was deeply influenced by the critical movement that was developing against the protestant orthodoxy, and also by the debates on the status of the scriptures that occurred within the scientific circles. His interest for text analysis and critics was also strengthened by his practise of new activities.

Around the same years Fatio became interested in alchemy. It was mainly Newton who trained him into it, but he might not have been the only one, as seems to suggest the correspondence between Fatio and the Dr Vincent D'Erressart of Holland concerning what appears to be chemical medicine[31]. Fatio's archives contain many alchemical titles (around 24

[27] *Ibidem*, p. 245.
[28] *Ibidem* p. 242.
[29] Richard H. Popkin, *op. cit*,. p. 751.
[30] Scott Mandelbrote, "A Duty of the Greatest Moment: Isaac Newton and the writing of Biblical Criticism", *The British Journal for the History of Science*, vol. 26, n°3, September 1993, p. 299.
[31] We have today 9 letters Fatio wrote to D'Erressart between 1692 and 1694 (BG ms. fr. 602 f° 75v, 77r, 78r, 81r, 81v, 83v, 94r). They met in 1691 when Fatio was the tutor of the young chevalier Ellys who got sick and died during his academic travel to Holland. D'Erressart was one of the doctors in The Hague who tried

from which some are collections of treaties), and some partial copies of books[32]. Fatio also wrote some experiments descriptions, mostly in May 1693, in letters to Newton. He tried to introduce him to another Adept who was a French refugee he had just met in London, in those words: "I perceive by his discourse he has the same idea of the Science as you have yourself and as my friend in Holland has[33]".

Alchemy was considered as a science by Fatio who characterized it mostly by two kinds of activities described in the same letter: alchemical books interpretation and experiments. These two sides of the practice were surrounded by secrecy, and Fatio took care not to expose Newton when he talked to his other friends, but he finally decided that "knowing his reservedness and secrecy I could speak freely to him of You[34]". Fatio tried to create a network of adepts around him, in order to improve the science and help Newton leading it to the highest levels. He even interpreted his role of intermediary as a sign of Providence.

> I thought I might be much guilty if I did not try to engage him so far as he is come to, not knowing but that these may be the means by which God is willing you should come to this knowledge, perhaps that you may so much the more perceive the concourse of Providence in that matter and possibly to make a straighter union between us[35].

At that time, Fatio thought that Providence had a role to play in their works, and that Newton had been chosen by God to access high alchemical knowledge. Practising alchemy appeared as a way of fulfilling God's design. Furthermore his practise of alchemy did not appear quite different from his Biblical studies, for the main work in both case consisted in interpreting writings and finding hidden truths in Scriptures on one hand, in matter and ancient books on the other hand. This idea of living in a spiritual and natural world filled with hidden truths became a conviction that won a great importance in Fatio's life. Following that conviction he became interested in the Cabbala[36], and tried to find correspondences between all his knowledge in order to unveil some hidden truth. That appears the most clearly in a

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to cure him and Fatio kept strong links with him. During his own sickness in 1692-1693, it was D'Erressart who prescribed him some medicines and gave him some of his own powders.

[32] BGE ms. fr. 605.

[33] BGE ms. fr. 602 f° 87r.

[34] *Idem*.

[35] *Idem.*

[36] For the links that existed between alchemy and cabala, see Peter J. Forshaw, "Cabala Chymica or Chemia Cabalistica -Early Modern Alchemists and Cabala", *Ambix*, vol. 60, no. 4, 2013 , pp. 361–89. See also the short chapter "Alchimie et Kabbale" *in* Bernard Joly, *Rationalité de l'Alchimie au XVIIe siècle*, Paris, Vrin, 1992, pp. 45-48.

document we found in his papers[37]. Fatio has drawn a calendar that divides the year in six periods, corresponding to the six first days of World's Creation by God, to which are associated the days of the week from Sunday to Friday, the seasons, astronomical observations, colours. Even more interesting is the fact that to create this calendar, Fatio used a great number of different sources. We identified alchemists such as Raymond Lulle, Sendivogius, Jean d'Espagnet, Thomas Norton, Thomas Charnock, ancient authors such as Virgil, Nonnus and Hesiod, an agronomist with Jean-Baptiste La Quintinie, and the Bible with the evocation of the Psalm 104. Fatio described the different seasons through the weather they are associated with. Comparing different sources, and especially ancient ones, he comes with the conclusion that the six days of the Creation which are described in the Bible correspond to a whole year. He wrote that he discovered that reading the Philosophers and that he also found out that Moses was "one skilled in those high mysteries". In those years, by reading and observing the earth and the sky, Fatio developed the idea that secret meanings had to be discovered in the world, and that all kinds of knowledge –or science- were linked and served the purpose of apprehending God's work. His method to understand these mysteries was mostly based on a critical approach of books, the Holy Sciptures but also ancient books and more recent works that were describing the "Book of Nature" with the tools of the new science.

Those new practices kept Fatio very busy at the beginning of the 1690s, along with the necessity of finding a source of income. However, he did not stop practising mathematics and geometry, which he also considered as the keys to unveil the secrets of nature. In 1699, he published a treaty called *Fruit-walls improved*[38] in which he used mathematics to improve gardening technics. In the year 1700-1701, he worked on his theory of the cause of gravity that he had started in 1690-1691[39]. He was convinced that he had found the real and unique cause, and shared it with Jacques Bernoulli, but at the same time excused the fact that he had not published anything yet in those terms:

[37] BGE ms. fr. 603 f° 34r.

[38] Nicolas Fatio de Duillier, *Fruit-walls improved, by inclining them to the horizon, or, A way to build walls for fruit-trees whereby they may receive more sun shine, and heat, than ordinary*, London, Printed by R. Everingham, 1699.

[39] On Fatio's work on the Cause of Gravity, see Bernard Gagnebin, "Introduction au Traité de la Cause de la Pesanteur par Nicolas Fatio de Duillier », *Notes and Records of the Royal Society of London*, vol. 6, n° 2, may 1949, pp. 105-124. See also Scott Mandelbrote, "The heterodox career of Nicolas Fatio de Duillier" in John Brooke and Ian MacLean (eds.) *Heterodoxy in Early Modern Science and Religion*, Oxford, Oxford University press, 2005, pp. 263-297.

> But by what right would I triumph upon all mathematicians [géomètres], by determining for them a time to find the same truths as those my mediations drove me to, otherwise I would consider them defeated. That would certainly be very unfair considering the extreme difficulty and the quite inexpressible sublimity [sublimité] of that theory, and that makes me believe that no mathematician could have possibly found it nowadays. It is far from the simple idea of that Cause of Gravity to the perfection to which I drove it[40].

The use of the term "sublimity" confers a very high and moral, almost sacred, dimension to his work and the precision "inexpressible" suggests that to such highness of refinement, only a mathematical language would fit. In that sense mathematics were tools to apprehend the majesty of God's work. It appears here that Fatio had then started to practice a form of natural theology (worshipping God through the marvels of his Creation). The same Bernoulli recognised Fatio's abilities and the quality of his discoveries in those words:

> Except for that difficulty which certainly is so only for me and which you will clear up easily, everything here is made of the finest geometry and I admire the skill for calculation you are using to dig up such hidden truths[41].

Digging up hidden truths appears to be one of Fatio's main goal, both in his alchemical and mathematical works. If Nature was filled with secret to unveil, the two ways to search for them were a critical approach of scriptures and the use of mathematics.

III. A RENEWED SCIENTIFIC PASSION THROUGH RELIGIOUS COMMITMENT

Fatio's religious life knew an important evolution in 1706, when he met a small group of French refugees just arriving from the Cevennes and who kept on prophesising once in London. A group quickly formed around Elie Marion, Durand Fage and Jean Cavalier who became known as the "French Prophets". Fatio who already had links with the French communities of London became very quickly interested in them, as soon as June 1706 and became their secretary. The French Prophets represented a new experience for Fatio, a collective and intense one. But soon enough the Prophets were considered as impostors and Fatio's friends and relatives tried to dissuade him to stay with them. Fatio had then to argue, mostly with his elder brother Jean-Christophe, about the truth he saw in the Prophets.

[40] BGE ms. fr. 610 f° 33 r.
[41] BGE ms. fr. 610 f° 40 r.

For a precise mind as Fatio's, what were the elements that determined the Truth of his French Prophets experience? One of the first elements was the sensory dimension of his experience. In several occasion, he talked about what he saw "with my own eyes", about the "eyes which have started to see miracles"[42]. Arguing with his brother, he wrote

> How much more surely we can judge than you even could, us who know well what is stopping you, but us who saw, felt and heard the things on which you can only judge boldly and without knowing[43].

That sensory dimension and especially the visual one was the basis of his arguments. Being himself a witness appeared to be a constitutive part of Fatio's conviction. Later, he wrote: "Knowing me and knowing how precise I can be, and how much I would have to lose if I plunged into mistake, you chose with pleasure to attack me (…)[44]?"

To give more weight to his argument, he used his personal credit of scientist to defend the Prophets' cause. The still growing number of miracles observed completed those arguments. The observation of recurrent and numerous miracles and the credit of the one talking were his main arguments. He also presented his certainty as the result of a careful study described in those words.

> I have examined it in depth. There is no supposition, nor any compound of supposition on it which might give a reason for all the uncountable facts that I know of, nor even of their 20th part, but this only one that it is the work of God. In this supposition everything is explained exactly and all the difficulties are vanishing, or can be solved by perfectly solid answers[45].

Finally, Fatio privileged the argument of the simplest and more global explanation. However the use of the word "supposition" reveals that this explanation cannot reach a definitive and unquestionable certainty. Miracles were a debated subject in the scientific and philosophical circles of the time because it was a phenomenon that questioned the limits between reason and faith and the strength of the laws of nature determined by reason. It was also a central matter in the religious circles, mostly in the critical circles which submitted the Bible to the analysis of the scientific reason. Except from the Spinozists who rejected the

[42] BGE ms. fr. 602 f° 114r.
[43] BGE ms. fr. 601 f° 152v.
[44] BGE ms. fr. 602 f° 114r.
[45] BGE ms. fr. 602 f° 115r.

existence of miracles, imputing those phenomena to a lack of human knowledge of the world, natural philosophers and scientists did recognise the existence of the miracles described in the Bible. It was a guarantee of God's unlimited power (and his superiority towards Nature itself) and the characteristic of the Biblical Revelation. Furthermore, the miracles were considered as the unambiguous proof of the authenticity of the divine inspiration received by those who claimed to be prophets[46]. However, according to the protestant tradition, miracles had only existed at the time of the Apostles and were collected in the Scriptures[47]. Fatio had then to prove the miraculous nature of the acts of those he considered as true prophets, and he developed a qualitative description of the miracles he was witnessing: speeches beyond the capacities of the inspired, conversion of sinners, healing of sick and disabled, inspiration and transmission of the Spirit by the laying of the hands. They all correspond to apostolic miracles and were then supposed to emphasize the direct link between the Apostles and the French Prophets, showing the latter accomplishing miracles generally recognised when done by the former. Fatio's arguments based on his personal experience as a witness and his reputation as a reasonable mind correspond to the idea that miracles could not be entirely rationalized. This idea was developed by John Locke for instance, in his *Discourse on miracles*, written around 1702 but which remained unpublished during his life[48]. For him no deep meditation was useful to determine what was a miracle, because it carried itself a strong sense of obviousness that could convince both learned and unlearned witnesses. The certainty expressed by Fatio could be of that kind when he wrote "That God is actively starting to spread His Spirit on the earth and to establish His reign, it is something I know like the things I know with the most certainty[49]", and also "The scientists can make mistakes and they do make mistakes: but every man knows for sure what is happening inside himself[50]". Fatio assumed the limits of his reason in front of God's power. The strength of his conviction and his acceptance of the failure of reason made any further debate impossible and after 1708 he stopped talking about the prophets with his brother. If reason could drive him to believe that what he saw could have only be done by God, at last it was faith which could have the last word.

[46] Michael Heyd, *Be sober and reasonable. The critique of enthusiasm in the seventeenth and early eighteenth centuries*, Leiden, New-York, Köln, Brill, 1995, p. 173.

[47] *Idem.*

[48] It was written as an answer to William Fleetwood, *An Essay on miracles* published in 1701. Patrick Thierry, "L'épreuve du miracle: quelques remarques sur la religion de Locke" in Stéphane Pujol and *alii* (eds.) *Lumières et religions*, Fontenay-aux-roses, Ecole normale supérieure Fontenay/ Saint-Cloud, 1993, pp. 37-68.

[49] BGE ms. fr. 602 f° 115r.

[50] BGE ms. fr. 602 f° 114.

If he was very preoccupied by the idea of defending himself against the attacks and by religious matters, Fatio never stopped his scientific activities, nor did he completely lose his scientific credit and network. In 1706, he gave the Royal Society a letter that his brother Jean-Christophe had sent to him, in which he described his observations of an eclipse. The same year, he worked for the election of his brother as a member of the Society. Around 1709, we know that he was teaching mathematics to the young Scottish gentleman Andrew Ramsay (later Chevalier Ramsay), who left a testimony of Fatio's activities during that time. He described Fatio's attachment to the prophets, and reveals that Fatio himself claimed he had been in some sort inspired to discover the cause of gravity. "I was yesterday at a meeting of the prophets, and whilst I was lost in thought, it struck into my mind, like a sudden gleam of light, all at once" are the words he put in Fatio's mouth in his journal[51].

The French Prophets experience seems to have been a new inspiration for the renewal of his works. Inspiration was seen as the possible origin of a scientific theory: it was God showing a path to discover the secrets of the world. Fatio's providential ideas grew more and more at the time of the French Prophets. His commitment with the prophets has also been an opportunity to practise sciences. We know that during the different travels they did to convert the people of Europe, between 1711 and 1714, Fatio made some calculations and astronomical observations. In 1714 for instance, as they were sailing back from Livourne to Falmouth in England after the death of Elie Marion, Fatio made observations in order to find a method to calculate the longitude. He used two watches but we know that he had travelled with six. Being the secretary and witness of the prophets' inspirations did not distract Fatio from his scientific interests. It stimulated them on the contrary.

IV. Sciences and God: a providential project.

After the death of Elie Marion in 1714, and their return in England, Nicolas Fatio settled himself in Worcester, in the English countryside where he lived with the prophet Jean Allut and his wife Henriette. He also had a close relationship with Charles Portalès, another secretary of the prophets since their early years. That little group was connected to other groups of inspired, and especially with the "brothers of Lyon", among which there was

[51] Joseph Spence, *Anecdotes, Observations and Characters of Books and Men*, London, London, W. H. Carpenter, 1820, p. 56.

Fatio's nephews Jean, Marthe and Marie Huber[52]. They exchanged books, warnings pronounced under divine inspiration, dreams considered as predictions. More than thirty years after the "French Prophets Case" in London, the Worcester group was still pretty active, in the European context of the development of pietism[53]. At that time, Fatio continued to practise sciences, as he had been doing since his twenties. Allut and Portalès seemed to have some scientific knowledge, as Fatio did talk a lot about his works with them. After ten years apart from the Royal Society, Nicolas Fatio went back to some meetings in 1717, when he read one of his brother's letter. In 1736, one of his own letters to Charles Portalès was also read. In 1716, Fatio had confessed to his brother

> It is true that I have abandoned Mathematics and that I fear them as a matter that had hold me too long in slavery. However times to times I make within it some easy researches for me, verily, but of considerable use or at least very curious[54].

If Fatio seemed critical towards mathematics, he did not stop his scientific activities. On the contrary from the beginning of the 1720s to at least the end of the 1740s, he worked a lot on different subjects. The idea of working on a useful science became central to him. In the 1720s, he worked mostly on navigation and in 1728 he published a treaty called *Navigation Improved, being chiefly the method for finding the Latitude at Sea as well as by Land*. Between 1730 et 1741, Fatio tried to write a Latin treaty on the cause of gravity, on the model of the Latin philosopher Lucretius and his *De Rerum Natura*. This was a very old project he had had around 1690. However, he never achieved it. At the end of the 1730s, he worked on a method to calculate the distance between the Earth and the Sun, and 14 letters concerning astronomical calculations were published in the *Gentleman's Magazine* by Edward Cave. His limitless curiosity also drove him to work on a translation of some Psalms and Old Testament parts from Hebrew into English, and he boasted of having found the real

[52] BGE ms. fr. 602 f° 116v & 117r with Fatio's handwriting "my Letters to my brothers of Lyon" of march 1716. On Marie Huber, who was to become quite famous for her theological writings, see Yves Krumenacker, « Marie Huber, une théologienne entre piétisme et Lumières », *Refuge et Désert. L'évolution théologique des huguenots de la Révocation à la Révolution française*, Actes du colloque de Montpellier, 18-19-20 janvier 2001, édités par H. Bost et Cl. Lauriol, Paris, H. Champion, 2003, p. 99-115 ; Maria-Cristina Pitassi, « Marie Huber genevoise et théologienne malgré elle », *Bulletin de la Société d'Histoire et d'Archéologie de Genève*, 1995, p. 83-96 ; idem « Etre femme et théologienne au XVIIIe siècle. Le cas de Marie Huber », in Ruth Whelan, Antony McKenna & alii (eds.), *De l'Humanisme aux Lumières, Bayle et le protestantisme, Mélanges en l'honneur d'Elisabeth Labrousse*, Oxford, Voltaire Foundation, 1996, pp. 395-409.

[53] Anne Lagny, *Les piétismes à l'âge classique: crise, conversion, institutions*, Villeneuve-d'Ascq, Presses universitaires du Septentrion, 2001.

[54] BGE ms. fr. 602 f° 120r.

Rules of the Hebraic Poetry, as they had been decided by the Holy Spirit[55]. This concern about practising a "useful" science was closely linked to a great need of recognition, a social as much as a financial one. For his treaty on the improvement of navigation, he tried to get some financial recognition. He sent many letters to the Navy Office, to the Admiralty, and even to the King and Queen. In 1732, he wrote a petition to King George II, reminding how he had saved William of Orange's life in 1686 by revealing a plot that he had heard of. He also tried to find some other scientists to defend his cause, such as Edmond Halley, but that lead to nothing and Fatio grew bitter and bitter. If he was that bitter, it is that Fatio was convinced that he had been chosen by the Providence to reveal many mysteries, but was not recognize as so by the society and the scientific community of his time.

Fatio's many allusions to the idea of being chosen by the Providence reveal that it was not a mere rhetorical process but a deep and strong certitude. Fatio thought that God was acting directly in the world and he regretted that no one of his time admitted that. On December the 22nd 1716, he wrote to his brother Jean-Christophe, talking about a treaty he had written on the aurora borealis:

> The heat is so strong in those extreme auroras when they got all their majesty that I think that the miraculous finger of the Almighty has something to do with it. But I'm afraid that this kind of treaty would do nothing but harden our infidel century, which even if it saw a flood, a cataclysm and the whole Christianity overthrown would see that as perfectly ordinary and natural rather than recognise God's finger[56].

That question of the presence of God in the world was in fact a question on which many scientists of the time had taken position, even more since Descartes's mechanism seemed to have excluded God from the understanding of the natural world. Both Leibniz and Newton for instance criticised Descartes's theory. Leibniz thought that the Creation, being perfect, contained all its further developments and did not involve any more the direct intervention of God, but that understanding God's will and wisdom was the basis to discover Nature principles[57] . Newton, on the contrary, thought that God was still acting in the world, sending comets for instance, in order to revitalize the movement of the stars which were

[55] BGE ms. fr. 602 f° 182v.
[56] BGE ms. fr. 602 f° 120r.
[57] André Charrak & Pierre-François Moreau, "Dieu" *in* Michel Blay & Robert Halleux, *La Science classique, XVIe-XVIIIe siècles. Dictionnaire historique et critique*, Paris, Flammarion, 1998, p. 467.

slowing down with time[58]. The question of the Providence was essential, because denying God's intervention in the world in the present might have driven to think that God had never acted in the world, and that the world was self-generating and eternal. That was leading to think that there had been no Creation. Scientists had then to defend themselves from the suspicion of heresy that might have floated over them. Unlike what he thought, Fatio was not the only one to believe that God acted in the world. However, it is on the form of God's intervention in the world that Fatio was different from most of the other scientists. The Providence was a strong justification of all his works, and a sense given to his whole life and this idea had been strengthen by his commitment with the French Prophets. In 1745, he wrote to his nephew:

> As for me, it [the Providence] has convinced me more and more that God shows himself nowadays by the immediate operation of his Spirit and by the Words He puts in the Mouth of the Organs he inspires[59].

In those years, Fatio still believed in the reality of the divine inspirations he had witnessed for forty years. Further in the same letter, he added:

> And it appears that people are waiting for my death to put on my remains, and that they are jealous of me. All the more since I am considered as a stranger, and that those who believe that God is showing himself nowadays do not tend to be favoured. (…) Nobody could be as surprised as me seeing the strange and abstruse Truths my demonstrations led me to. It is likely that time would have allow others to discover them, at least part of them. But it seems that the Providence had particular reasons to want that I was the one to see them first.

This idea of having been chosen by Providence, which was one of the ways God used to act in in the world, and not to be recognised for it, led him into bitterness towards the world and the scientists of his time. But Fatio had the satisfaction of seeing himself as the privileged witness of a great revolution that was happening. He expressed that idea in the letter to his nephew previously quoted:

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[58] David Kubrin, "Newton and the Cyclical Cosmos: Providence and the Mechanical Philosophy", *Journal of the History of Ideas*, vol. 28, n°3, 1967, pp. 325-346. John Henry, "Religion and the Scientific Revolution" *in* Peter Harrisson, *The Cambridge Companion to Science and religion*, Cambridge, Cambridge University Press, 2010, p. 49.

[59] BGE ms. fr. 602 f° 183r.

> While working in the Spiritual to a New World, [the Providence] is turning most of the foundations of the Scientists' Astronomical System upside down ; and makes us discover a whole new and more glorious Earth ; and a whole new Sky, of which It gives us a very accurate measurement with yards and feet.

Fatio was convinced that the world was submitted to a great revolution led by the Providence, both in the spiritual and the scientific world. This idea of a great change coming and of a spiritual transformation was essential for him from the moment he started following the French Prophets, and it appears that it never left him. However, in 1745, it seems that the sense of urgent millenarianism that was driving him at the beginning of the 18th century had made room to a much more calm feeling of contemplation. These words also reveal that Fatio considered the spiritual world and the scientific world as the two faces of the same whole. The spiritual and the mathematical world were linked, they both were submitted to the action of God and Providence and had started a major shift. This idea of a great change touching both the spiritual and the physical worlds was omnipresent in Newton's works[60] but it was a promise, whereas for Fatio it was a reality of which he was a privilege witness.

CONCLUSION

Nicolas Fatio de Duillier was not mad. He was a scientist of his time, concerned by the same problems and questions as other scientists who were also trying to give some sense to the world and to their work, and to combine it with their faith. As many others, Fatio wondered about the place of God in the world as it was discovered by the new experimental science, about the legitimacy of his own work, at a time when the scientific work was just starting to become a real career. His commitment with the French Prophets was an answer to those questions. Many of his contemporaries shared the same questions. Several works have shown that Newton was deeply concerned by those questions, and that had his religious works been publicly known, he would have been marginalized as a heretic[61]. Unlike Fatio, Newton kept his spiritual works for himself, and the main part of his papers on the subject of God was never published.

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[60] S. D. Snobelen talks about a "Dual Reformation" in all Newton's main works. Stephen D. Snobelen, "The True Frame of Nature: Isaac Newton, heresy and the reformation of Natural Philosophy" *in* John H. Brooke and Ian MacLean, *Heterodoxy in early modern science and religion op. cit.* pp. 223-257.

[61] David Kubrin ,"Newton and the Cyclical Cosmos: Providence and the Mechanical Philosophy", art. cit. p. 343; Scott Mandelbrote, "A Duty of the Greatest Moment: Isaac Newton and the writing of Biblical Criticism", art. cit. p. 299.

Other scientists of the time had the same kind of concerns and ideas as Fatio. Thomas Burnet in his *Sacred Theory of Earth* tried to articulate the scientific reason with the Biblical revelation, proposing a physical approach to cosmology[62]. Edmond Halley tried to apply the scientific reason to every kind of knowledge, including the Biblical texts[63]. Millenarianism was also widespread among scientists. Newton‘s idea that the world was declining was for him the promise of the coming of the Millennium[64]. For William Whiston, Newton’s principles discovery was the sign that mankind was getting close to perfection, and then that the Millennium was at hand[65].

The case of Nicolas Fatio de Duillier, in addition to others, then contributes to enrich the idea that not only did scientific interests and religious matters coexist at the time of the “scientific revolution”, but also that they could have enriched each other, and even stimulated each other. The discovery of new practises changed Fatio’s look on the universe and made him question the place of God in the world. His full commitment to the French Prophets became a source of inspiration for his scientific works. His main particularity compared with his contemporaries might lie in the shape of his religious commitment. Fatio did not write any theoretical treaty to defend his conception of the world. He never publicly exposed what were his conceptions of God and of His place in the world. He chose instead to commit himself publicly with the French Prophets, without ever defending the reason of his commitment, except in his personal correspondence. Fatio made life choices that revealed his beliefs, but never explained what appeared as an implicit theoretical background for his researches. Through a large rate of sciences and curiosities, he developed a conception of the world following the main trends of his time, but he expressed it through life choices.

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[62] Simon Schaffer, “Halley’s atheism and the end of the world”, *Notes and Records of the Royal Society of London,* vol. 32, n°1, 1977, p. 28.
[63] *Ibidem* p. 29.
[64] David Kubrin “Newton and the Cyclical Cosmos: Providence and the Mechanical Philosophy”, art. cit. p. 345.
[65] *Ibidem* p. 346.