# LEIBNIZ AS LEGAL SCHOLAR

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## 1. Introduction[1]

These days, Leibniz is very famous for his contributions to philosophy, especially in the field of metaphysics, and to mathematics, especially for the invention of calculus and the binary numeral system. However, attention has seldom been drawn to the fact that Leibniz was also, particularly at the beginning of his career, a legal scholar. Even legal historians have been reluctant to translate and analyse his complex works on the law. Luig was one of the first legal historians to consider these texts, but did so from a dogmatic point of view only.[2] When I wrote my book[3] about Leibniz' *Doctrina conditionum*[4] in the 1990s, no translation was available. Nowadays, French translations of some of his legal texts by the philosopher Boucher are available,[5] as well as English translations by the philosopher Dascal[6] and by Sartor and Artosi.[7] In addition, some of his texts on natural

1 I wish to thank my friend Laurens for his encouragement to return to Leibniz after a break of more than ten years. I had the opportunity to present part of this paper at the Erasmus University Rotterdam in January 2013.

2 Recently, Luig made a methodological contribution as well: Klaus Luig, Leibniz's concept of jus naturale and lex naturalis – defined "with geometric certainty", in: Daston/Stolleis (eds.), *Natural Law and Laws of Nature in Early Modern Europe*, Ashgate 2009, pp. 183ff.

3 Matthias Armgardt, Das rechtslogische System der "Doctrina conditionum" von G. W. Leibniz, Diss. Köln, Marburg 2001 (referred to as Armgardt, DC). The basis of my research was a very important paper by Heinrich Schepers, Leibniz' Disputationen "De conditionibus": Ansätze zu einer juristischen Aussagenlogik, in: Akten des II. Internationalen Leibnizkongresses in Hannover, Wiesbaden, 1975, Vol. VI, pp. 1-17.

4 A VI 1, pp. 365ff.

5 Pol Boucher, *G. W. Leibniz, Doctrina conditionum*, Duchemin, 1998, and *G. W. Leibniz, Des cas perplexes en droit*, Paris 2009.

6 Marcelo Dascal, *G. W. Leibniz, The Art of Controversies*, Springer 2008.

7 Alberto Artosi, Bernardo Pieri, Giovanni Sartor (Ed.), *Leibniz Logico-Philosophical Puzzles in the Law, Philosophical Questions and Perplexing Cases in the Law*, Springer 2013.

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law have been translated into German by the philosopher Busche.[8] The historians of philosophy do the work of the legal historians. This is probably because Leibniz always combined law and philosophy in a complex way, and more specifically law and formal logic. Unfortunately, not many legal historians have a background in logic. Thus, more than three hundred years after his death, we are not at the end but at the very beginning of research on Leibniz' works on law.

The first part of this paper will comprise a historical perspective. An outline will be given of the life of the young Leibniz with an emphasis on his early career as a legal scholar. I shall deal with Leibniz' main works on law and legal theory, and with his ambitious and unfortunately incomplete project undertaken during his time in Mainz, namely a revision of Roman law and an attempt to codify the civil law.

The second part of this paper will adopt a systematic perspective: it will show the link between law and philosophy in the legal theory of Leibniz. I shall deal with the combination of philosophy and Roman law as well as the role of logic in the *Doctrina conditionum* of Leibniz.

## 2. Historical perspective

Gottfried Wilhelm Leibniz was born in 1646 in Leipzig, two years before the end of the Thirty Years' War, which had utterly destroyed Germany. He died in 1716 in Hannover, where he spent the last four decades of his life.[9] Leibniz came from a family with a strong juridical tradition: his mother Katharina Schmuck was the daughter of a jurist and his father Friedrich Leibniz was a notary and professor of moral philosophy at the University of Leipzig.[10] I think it was very important to Leibniz, who lost his father at the early age of six, that his father was both a jurist and a philosopher. Anyway, the legal thinking of Gottfried Wilhelm Leibniz was always a combination of technical juridical thinking and moral philosophy. As a marginal note, it is regrettable that these two fields are so separated from each other in Germany nowadays.

After the early death of his father, Leibniz studied the books in his father's library as an autodidact. Mercer has recently shown how deeply he was influenced by ancient philosophy, and especially by Plato and Aristotle.[11] This influence obviously goes back to the studies undertaken during his youth.

As early as 1661, at the age of fifteen and while he was still in Leipzig, Leibniz started to study philosophy, mathematics and law. At first, Leibniz studied philosophy under Jacob Thomasius, who was also the mentor of his first scientific work: the *Disputatio metaphysica de principio individui*, published in 1663.[12] As is well known, the principle

8 Hubertus Busche, *Gottfried Wilhelm Leibniz, Frühe Schriften zum Naturrecht*, Meiner 2003.

9 Possibly the best biography is by Maria Rosa Antognazza, *Leibniz An Intellectual Biography*, Cambridge University Press 2008.

10 Antognazza, (n. 9), pp. 24ff.

11 Christia Mercer, *Leibniz's Metaphysics Its Origin and Development*, Cambridge University Press 2002.

12 Antognazza, (n. 9), pp. 56ff.

of individuality became a very important basic principle in the metaphysics of Leibniz, especially because of his concept of the monad.

In 1663 Leibniz obtained a Bachelor of Philosophy degree, and then continued his studies in Jena under Erhard Weigel in order to deepen his understanding of mathematics.[13] However, after the disaster of the Thirty Years' War, the intellectual life of Germany was almost completely destroyed and the lectures of Weigel were not very profound. For this reason, Leibniz obtained a Master of Mathematics degree only after he had gone to Paris at the age of twenty-six.

In the winter of the year 1663, Leibniz concentrated on the study of law. His second publication deals with a topic that straddles the borderline between law and philosophy: it is the *Specimen quaestionum philosophicarum ex jure collectarum*, published in 1664.[14] Leibniz shows that without philosophical reasoning, some important questions on law cannot be answered. The work's focus is on philosophy and the *Specimen* enabled Leibniz to obtain a Magister Philosophiae.

The first dissertation, which deals with a technical problem in Roman law, is the *Disputatio juridica de conditionibus*.[15] It has two parts, because Leibniz did not manage to finish the *Disputatio* in time. The text is extremely dense and almost unreadable. For this reason, Leibniz prepared a second and completely new edition in 1669 with a new title: *Specimen certitudinis seu demonstrationum in jure exhibitum in doctrinam conditionum*.[16] In my analysis of the *Specimen*, I offered a first translation of this text, followed by Boucher's French translation. Here Leibniz applies propositional logic, modal logic and probability logic to the law of conditions. I shall come back to this in the second part of this paper. Without any doubt, even his first book about the law is a masterpiece. This text allowed Leibniz to obtain the degree of iuris utriusque baccalaureus.

In 1666, he was able to publish three texts: The *Disputatio arithmetica de complexionibus*, dealing with combinatoric and logic; the very famous *Dissertatio de arte combinatoria*[17] – his habilitation in philosophy, and the PhD-thesis *Disputatio de casibus perplexis*,[18] which has been largely neglected up until now. It is almost incredible that the twenty-year-old Leibniz wrote so many very important books in such a short time. This would change: Leibniz subsequently went to the other extreme, and hardly published anything else during the rest of his life.

In order to become a doctor iuris utriusque, Leibniz had to leave Leipzig because in terms of its law faculty's strict rules, on account of his youth he would have had to wait several years to obtain his doctorate. Consequently, Leibniz moved to the University of Altdorf near Nürnberg where his already completed thesis was immediately accepted and greeted with applause.[19] The text deals with contradictory legal dispositions that feature

13 Antognazza, (n. 9), pp. 58f.

14 A VI 1, pp. 69ff.

15 A VI 1, pp. 97ff.

16 A VI 1, pp. 365ff.

17 A VI 1, pp. 163ff. An English translation is forthcoming.

18 A VI 1, pp. 231ff.

19 Antognazza, (n. 9), 65ff.

in Roman law in particular. Leibniz gives three rules for the solution of all possible cases. This demonstrates his technique of using simple rules to solve complex problems. When he invented calculus at the age of about thirty years, he adopted a similar approach to mathematics. Boucher recently translated the text into French, and Sartor and Artosi translated it into English, but legal historians have not yet taken much notice of this important text despite its high quality.

In 1666, Leibniz was offered a professorship of law in Altdorf, but he rejected the offer. He wished to complete his studies in the Netherlands, but things turned out differently. In 1667, Leibniz wrote a very famous text, the *Nova methodus discendae docendaeque jurisprudentiae*.[20] Busche translated part of the text into German,[21] but even now there is still no complete German translation. Recently, the whole of the *Nova methodus* was translated into Italian.[22] The text challenges the way law was studied at that time. Leibniz wanted to reduce the duration of legal studies from five to two years. He wanted to use the *Elementa iuris naturalis* as a philosophical basis for law as a science, and he wanted to revise the *Corpus iuris civilis*. According to the *Nova methodus*, theology forms part of jurisprudence. Antognazza has recently shown that Leibniz was very interested in theological issues, such as the miracles of trinity and incarnation.[23] On the one hand, Leibniz' concerns about these issues were without any doubt related to his deep interest in religion in general. On the other hand, he had been born during the Thirty Years' War, which devastated the economic and intellectual life of Germany, and in his early years in Mainz and later throughout his whole life he made innumerable attempts to reconcile the Protestants and the Catholics and to unify the Christian Church. This dimension has to be taken into account if one wishes to have a complete picture of the Leibnizian philosophy of law.

The *Nova methodus* opened the doors of the University of Mainz to him, and he stayed there from 1668 to 1672. During these four years, Leibniz worked assiduously in the field of law. His mentor, Baron Johann Christian von Boineburg, introduced the young scholar to the Elector Johann Philipp von Schönborn who appointed Leibniz as a judge. However, first and foremost, he had to work on a very important project, namely the revision of the *Corpus iuris civilis*. Leibniz had to help Hermann Andreas Lasser, a counsel of the court, bring this great idea to fruition.[24] Initially there had only been a plan to make a *Corpus iuris civilis reconcinnatum*,[25] simply a new arrangement of the sources collected in the *Corpus iuris*; but under the influence of Leibniz, the plan changed. In the end, the *Corpus iuris civilis reconcinnatum* consisted of four parts.[26]

20 A VI 1, pp. 259ff.

21 Busche, *Naturrecht*, pp. 27ff.

22 Carmelo Massimo de Iuliis, *G. W. Leibniz, Il nuovo metodo di apprendere ed insegnare la giurisprudenza*, Milano 2012.

23 Maria Rosa Antognazza, *Leibniz on the Trinity and the Incarnation. Reason and Revelation in the Seventeenth Century*, Yale University Press 2007.

24 Busche, *Naturrecht*, pp. XXXIIIff.

25 Cf. Klaus Luig, Die Rolle des deutschen Rechts in Leibniz' Kodifikationsplänen, in: Akten des II. Internationalen Leibnizkongresses in Hannover, 1973, p. 165 (168f) = Ius Commune V (1975), pp. 56ff.

26 Luig (n. 25), pp. 169ff.

The most important part is the first one: The *Elementa iuris naturalis*. Between 1669 and 1671, Leibniz wrote several unpublished drafts of the *Elementa*, which are now published in the Leibniz edition. Some texts have been translated into German by Busche. They contain moral philosophy and deontic logic.[27] I can show that the roots of this approach may already be found in the *Doctrina conditionum* (1665).[28]

The second part of the *Corpus iuris civilis reconcinnatum* was to have been the *Elementa iuris civilis communis hodierni* – a new codification of civil law in modern terms. The nucleus legum was to have contained a short version of the former. The last part, the *Corpus iuris civilis reconcinnatum*, was to have contained a collection of ancient Roman law as a historical basis of the new *Codex*. In the Leibniz Edition, we find several drafts of the *Elementa juris naturalis*[29] and some information about the *Elementa iuris civilis*,[30] but the other parts unfortunately remain hidden in darkness.

The year 1672 was a turning point in the life of Leibniz. He went to London and Paris to study mathematics under the great Dutch scholar Christiaan Huygens from Den Haag. Huygens became Leibniz's teacher, but we do not know if Leibniz invented the differential and integral calculus in 1676 without his generous help.[31]

After four great years in Paris, Leibniz had to come back to Germany nolens volens, and became juridical counsellor and librarian at the court of Hannover under the Guelf Dukes. In 1678 or 1679 Leibniz wrote a short paper about legal theory which, although unpublished, was very good: *De legum interpretatione, rationibus, applicatione, systemate*.[32] Dascal recently translated the text into English.[33] It is one of the best existing texts about legal theory.

Between 1677 and 1686, Leibniz wrote some minor papers about natural law. This is because he spent most of his time between 1680 and 1685 as an engineer in the Harz attempting to drain water from mines, by developing new pumps driven by windmills.[34]

It is remarkable that as early as 1678 Leibniz prepared a plan of a *Codex Leopoldinus* that should have been implemented by the Emperor in Vienna for the whole Holy Roman Empire of the German Nations. Although several drafts of a preface were written between 1680 and 1685 during the Harz project, it was never implemented.[35]

After 1686, Leibniz focused especially on history. He undertook to write a history of the Guelfs, a project in which he continued to invest considerable effort until his death, but which was left unfinished. During this time, Leibniz developed his mature philosophy

27 Georges Kalinowski/Jean-Louis Gardies, Un logicien deontique avant la lettre: G. W. Leibniz, ARSP 60 (1974), pp. 79ff.

28 Armgardt, DC, pp. 162ff.

29 A VI 1, pp. 431ff.

30 A VI 2, pp. 35ff.

31 Antognazza, (n. 9), pp. 139ff.

32 A VI 4 C 2782ff.

33 Marcelo Dascal, *The Art of Controversies*, pp. 77ff. I am glad that I had the opportunity to discuss this text with Marcelo during his stay in Konstanz.

34 Eric J. Aiton, *Gottfried Wilhelm Leibniz*, 1991, pp. 161ff.

35 Luig, *Ius Commune* V (1975), p. 56 (64ff).

and made further important discoveries in mathematics. A major achievement for him was the foundation of the Academy of Sciences in Berlin. He wrote only a few papers on law after 1686.

A famous exception is the *Codex iuris gentium diplomaticus*, published in 1693. It contains a collection of hitherto unpublished documents that were of importance in public law at that time.[36] Thus it has more of an historical than a juridical character, although in the preface to the *Codex*, Leibniz provides a very important definition of justice: "Iustitia est caritas sapientis".[37] Leibniz worked hard on this definition and tried to make it the foundation of the whole of the law. Again, moral philosophy was to be considered as the foundation of law.

After 1700, Leibniz wrote two famous books. First was the *Nouveaux Essais sur l'entendement humain*, a response to John Locke, only published after the death of Leibniz in 1765, allegedly because of the death of Locke. Second was the famous *Theodicee*, published in 1710 in Amsterdam. The *Theodicee* was Leibniz' last reply to the objections Pierre Bayle had raised since 1697 in several editions of his *Dictionnaire historique et critique*, published in Rotterdam, to the *Système nouveau* of Leibniz. In the *Nouveaux Essais* and in the *Theodicee*, there are several allusions to Roman and natural law, but the old Leibniz no longer goes into details.

To conclude the first part, let us look briefly at the relationship between Leibniz and the other legal scholars dealing with natural law.

The famous Hugo Grotius died in 1645, one year before Leibniz was born. Leibniz frequently cites his books as authority, especially in the *Nova methodus* and in the *Elementa juris naturalis*, and makes use of his concepts. However, he sometimes criticises Grotius sharply, especially when Grotius abandons basic principles of Roman law like the principle of tradition for the transfer of ownership of movables.[38]

Samuel Pufendorf (1632-1694), who was fourteen years older than Leibniz, became the leading authority in the field of natural law during the seventeenth century. His books *Elementorum jurisprudentiae universalis* (1660), *De jure naturae et gentium* (1672) and, especially, *De officio hominis et civis iuxta legem naturalem* (1673) (translated completely by Luig[39]) made him famous.

The relationship between Leibniz and Samuel Pufendorf was a difficult one. There were personal tensions between them but Leibniz also criticised Pufendorf's approach to natural law very harshly.[40] In his *Elementa juris naturalis*, Leibniz emphasised that

36 Antognazza, (n. 9), p. 330.

37 For more information, see Patrick Riley, *Leibniz' Universal Jurisprudence*, Harvard University Press 1996, pp. 141ff.

38 Letter of Leibniz to Conring, (13./23.01.1670), A II 1, pp. 28-33. See Busche, *Naturrecht*, pp. 322ff (332/333). Unfortunately, Busche does not provide adequate translations into German of the termini technici of Roman private law such as actio, exceptio, actiones bonae fidei et stricti juris.

39 Samuel von Pufendorf, *Über die Pflicht des Menschen und des Bürgers nach dem Gesetz*, edited and translated by Klaus Luig, Frankfurt/M. 1994.

40 Antognazza, (n. 9), p. 474.

to him, logic (as a part of his *scientia generalis*) was the basis of all legal thinking. The intuitive approach of Pufendorf, who obviously had no knowledge of formal logic, was therefore lacking in the eyes of Leibniz.[41] In a letter to Kaestner, written in 1709, he called Pufendorf a "vir parum jurisconsultus et minime philosophus".[42]

Christian Thomasius (1655-1728), the son of Jacob Thomasius, who had taught Leibniz philosophy, was nine years younger than Leibniz. Among legal historians, Christian Thomasius is known for advocating the abolishment of torture. The young Thomasius was very much under the influence of Pufendorf and it is thus not surprising that Leibniz often criticised his works.

It has often been said that the worst thing that happened to Leibniz' philosophy was that Christian Wolff (1697-1754), thirty-three years younger than himself, developed his philosophy along the lines of Leibniz' system, but with a completely different understanding of its foundation. The reception of Leibniz' philosophy in the eighteenth and early nineteenth centuries was really a reception of Leibnizian-Wolffian philosophy, even though the two systems were built on the basis of entirely incompatible fundamental notions, especially with regard to their entirely different understanding of the concept of monad.[43]

Leibniz nevertheless supported the young mathematician several times, and Wolff became a professor of mathematics because of Leibniz' recommendation.[44] Between 1740 and 1748, long after the death of Leibniz, Wolff wrote the *Jus naturae methodo scientifica pertractatum* in eight large volumes on the subject of natural law. I am quite sure that Leibniz would not have liked it. A comparison of the texts of Leibniz with those of Wolff shows their methods to be very different. In addition, Leibniz' style was concise and very dense, unlike that of Wolff. Most crucially, Wolff had no professional training in Roman law, so that the juridical quality of his work was inferior to that of Leibniz.

In concluding the first, historical part of this article, I wish to stress that between 1665 and 1672 the young Leibniz wrote juridical texts of the highest quality. These texts comprise a unique combination of highly technical Roman law, logic and moral philosophy. Concerning the plan for a *Corpus iuris civilis reconcinnatum*, it should be mentioned that the first new codex, the *Codex Maxmilianeus Bavaricus civilis*, was published in 1756, only forty years after Leibniz' death, which shows that Leibniz' plan was not totally unrealistic.

41 Similarly, Wolfgang Röd, *Geometrischer Geist und Naturrecht, Methodengeschichtliche Untersuchungen zur Staatsphilosophie im 17. und 18. Jahrhundert*, München 1970, p. 105. For more information about Leibniz' criticism, see Tim J. Hochstrasser, *Natural Law Theories in the Early Enlightenment*, 2000, pp. 72ff.

42 Dutens IV, 3, 261, letter to Kaestner, 21.8.1709. Cf. Hans Welzel, *Die Naturrechtslehre Pufendorfs ein Beitrag zur Ideengeschichte des 17. und 18. Jahrhunderts*, Nachdruck 1986, pp. 4ff.

43 Aiton, (n. 34), pp. 507f.

44 Aiton, (n. 34), pp. 425ff.

## 3. Systematic perspective: Connections between law and philosophy

Leibniz' initial work as a legal scholar is the philosophical text *Specimen quaestionum philosophicarum ex jure collectarum*, published in 1664.[45] In this very early text Leibniz already proclaimed the belief that he held throughout his life, namely that it is not only useful but also necessary to combine law and philosophy. Under the influence of Weigel in Jena, who wanted to apply mathematics to all fields, he argued that philosophy ought to be applied to law to find solutions that the law itself could not provide.

Let us now have a closer look at Leibniz' first masterpiece: the *Disputatio juridica de conditionibus* of 1665,[46] of which Leibniz produced a second version in 1669 with the title *Specimen certitudinis seu demonstrationum in jure exhibitum in doctrinam conditionum*.[47] The title contains the thesis: in the field of legal conditions, it will be shown that certainty and proof exist in law. Unfortunately, the printer of this work died suddenly and the manuscript was lost for years.[48]

Leibniz deals with the very subtle Roman law of conditions more geometric: He makes use of eighty definitions and seventy theorems. Leibniz always believed that definitions rather than axioms are the basis of everything. He proves the theorems by making use of the definitions and the rule of substitution. Leibniz does not develop a new theory of conditions independent of Roman law, but through his method shows that Roman law is rational. Leibniz repeatedly said that Roman jurists were the pupils of the Stoic logicians. Indeed, the late Spanish Romanist Juan Miquel was able to show that this is true[49] and I have been able to contribute to this topic as well.[50] For example, it can be proved that the Roman jurist Julian knew the rules reinvented by Augustus de Morgan.[51]

In the *Doctrina*, Leibniz deals with three types of logic: propositional logic,[52] modal logic[53] and probability logic.[54] In antiquity, the Stoics developed a propositional logic equivalent to our modern propositional logic, but they did not make use of truth-functions and symbols. In addition, Leibniz was probably acquainted with the logic of consequences of the scholastics. This kind of propositional logic is the starting point of the *Doctrina conditionum*. At the beginning, Leibniz develops a general theory of

45 A VI 1, pp. 69ff.

46 A VI 1, pp. 97ff and 125ff.

47 A VI 1, pp. 365ff.

48 For more information on the sad history of the *Doctrina conditionum*, see Armgardt, DC, pp. 5-9.

49 Juan Miquel, Stoische Logik und Römische Jurisprudenz, SZ Rom 87, 1970, pp. 85ff.

50 Matthias Armgardt, Zur Bedingungsdogmatik im klassischen römischen Recht und zu ihren Grundlagen in der stoischen Logik, TR 76 (2008), pp. 219-235, and Salvius Iulianus als Meister der stoischen Logik – zur Deutung von Iulian D. 34,5,13(14), 2-3, in: Matthias Armgardt/Fabian Klinck/Ingo Reichard (eds.): *Liber amicorum Christoph Krampe zum 70. Geburtstag*, Freiburger Rechtsgeschichtliche Abhandlungen Bd. 68, Berlin 2013, pp. 29-36.

51 Even a generalisation of the Laws of Augustus de Morgan may be found in a fragment of Julian: see Armgardt, *Liber amicorum Christoph Krampe*, p. 29 (33ff).

52 Armgardt, DC, pp. 128ff.

53 Armgardt, DC, pp. 157ff.

54 Armgardt, DC, pp. 188ff.

conditions.[55] Later on, he modifies this theory for moral or legal conditions.[56] According to Leibniz, a condition is a structure consisting of two parts (*propositiones partialibus*): the "if" part (*conditio*) and the "then" part (*conditionatum*).[57] His favourite example is the stipulation: "if the ship comes from Asia, you have to pay 100."

At the beginning, Leibniz distinguishes logical conditions and moral conditions by making use of the concepts of *illatio* (implication)[58] and *suspensio* (suspension).[59]

Leibniz starts to explain the logical condition. The first theorem of the *Doctrina conditionum* is "Conditio infert conditionatum" – the truth of the condition implies the truth of the conditionatum.

This is the well-known *modus ponens* of propositional logic:

$a \rightarrow b$

$a$

———

$b$

The second theorem is about the *suspensio*: "Conditionatum suspendit conditionem" – The conditionatum suspends the condition.

This is the *modus tollens*:

$a \rightarrow b$

$\neg b$

———

$\neg a$

Now things become more difficult. Leibniz explains how the *conditio moralis* or legal condition works:

> "Conditio moralis suspendit conditionatum" – "The legal condition suspends the conditionatum."

The problem is that this conclusion is not valid:

$a \rightarrow b$

$\neg a$

———

$\neg b$

To find an adequate solution within the field of classical propositional logic, I suggested making use of the bi-conditional:[60]

55 Theorems 1 – 4, A VI 1, pp. 372ff.

56 Theorems 5ff, A VI 1, pp. 374ff.

57 Definitions 1ff, A VI 1, pp. 371ff.

58 Definition 6.

59 Definition 7.

60 Armgardt, DC, pp. 143ff.

$a \leftrightarrow b$
$\neg a$

———————

$\neg b$

This is true and can easily be proven.

The bi-conditional stands for "if and only if". It means that the condition is necessary and sufficient. This is a characteristic of conditional legal acts. You arrange a legal disposition with the condition that if the event happens, the contract is valid and if it does not happen, the contract is not valid. Lawyers need both options. This is a very fundamental problem in law, applicable to all legal actions, at least in civil law. In German legal theory it is called "Gegenschlussproblem".[61]

My book was a starting point for further research, especially at the school of logic of the University of Lille in France. Rahman and his team have tried several non-classical interpretations of Leibniz' *Doctrina conditionum*.

Thiercelin was the first to make another suggestion. He made use of the connexive implication that is of a non-classical logic.[62] The connexive logic makes use of four assumptions:

(1) $(A \rightarrow B) \rightarrow (\neg B \rightarrow \neg A)$ Contraposition
(2) $(A \rightarrow B) \rightarrow [(B \rightarrow C) \rightarrow (A \rightarrow C)]$ Transitivity
(3) $(A \rightarrow B) \rightarrow \neg(A \rightarrow \neg B)$ Boethius
(4) $(A \rightarrow B) \rightarrow \neg(\neg A \rightarrow B)$ Aristotle

The advantage of the connexive approach is that conditio and conditionatum are not convertible within this logic. This is very interesting. However, this is not what Leibniz wanted to say, because he explicitly writes in Theorem 7 that *conditio* and *conditionatum* are convertible in law: "Si conditio infert et suspendit conditionatum, etiam vicissim conditionatum ipsam suspendet et inferet."

Within the connexive logic, the following conclusion is not allowed:

$(A \rightarrow B) \rightarrow (\neg A \rightarrow \neg B)$

For convertibility, we need the bi-conditional:

$(A \leftrightarrow B) \rightarrow (\neg A \rightarrow \neg B)$

Another problem concerning Thiercelin's approach is that if the event mentioned in the condition does not happen, we cannot conclude that the conditionatum is invalid. Yet this is exactly what is needed for an adequate legal theory. If the connexive implication is applied, it is only impossible for the conditionatum to become true if the event does not happen; but this is not enough for a theory containing a dismissal.

We need this aspect of the bi-conditional especially if we want to generalise the Leibnizian theory of conditions. I suggested a generalisation for the systems of civil law

61 Armgardt, DC, pp. 228ff.

62 Alexandre Thiercelin, Epistemic and Practial Aspects of Conditionals in Leibniz' Legal Theory of Conditions, in: Dov A. Gabbay et al. (Ed.), *Approaches to Legal Rationality*, Springer 2010, p. 203 (208).

in my book about the *Doctrina conditionum*.[63] According to this interpretation, legal conditions are nothing but a special case of a legal requirement for actions in this system.

Magnier, another pupil of Rahman, tried to make use of the public announcement operator in his PhD thesis.[64] However, his approach is defective in the same way as that of Thiercelin: if the condition is not fulfilled, we cannot conclude that the conditionatum is invalid.

Recently, Rahman himself developed some new ideas. He admitted that the theories of Thiercelin and Magnier are not adequate interpretations of Leibniz, because they do not contain his theorem of convertibility. Ultimately, he admitted that my bi-conditional-approach works, but as a non-classical logician, he wanted to develop a non-classical approach, so he made use of a conjunction of two implications without constructing a bi-conditional in the proper sense, because he made use of the concept of instances.[65] Further research will be done.[66]

In order to understand the *Doctrina conditionum*, we need more than propositional logic. Propositional logic is simple, because only two truth-values are used: true and false, 1 and 0. However, this is not enough, especially in legal contexts. Modal logic makes use of four logical notions: necessary, contingent, possible and impossible. We need these modalities, because there are necessary conditions, impossible conditions and contingent (or possible) conditions.

It is very interesting that Leibniz interpreted the four modalities by means of a probability calculus. We have to keep in mind that in 1669 he probably knew nothing of the works of Blaise Pascal or Pierre Fermat on probability. Nevertheless, in the *Doctrina conditionum*, he develops the idea of representing the modalities necessarium by 1, impossibile by 0 and contingent/possibile by a fraction between 1 and 0.[67] This idea was further developed by the logician Oskar Becker[68] although only in 1930, about three hundred years later. Unfortunately, Leibniz did not have a probability-calculus when he wrote the *Doctrina conditionum*. He only presents some inequations.[69]

Another problem is to show what happens if the condition becomes true.

Leibniz writes:

Th. 65: “Conditio incerta efficit jus conditionale.” (An uncertain condition effects a conditional right).

This is the ex-ante perspective.

63 Armgardt, DC, pp. 221ff.

64 Sébastien Magnier, *Approche dialogique de la dynamique épistémique et de la condition juridique*, London: College Publications, 2013.

65 Shahid Rahman, The Epistemic Role of Dependent-Evidence and the Notion of Conditional Right in Matthias Armgardt/Patrice Canivez et al. (eds.), *Legal Reasoning and Logic – Past and Present Interactions*, Springer (in print).

66 Shahid Rahman and I lead an interdisciplinary international German-French DFG/ANR-research project “Jurisprudence and Logic” (Lille/Konstanz).

67 *Doctrina conditionum*, Def. 76, A VI 1, p. 420. Armgardt, DC, pp. 188ff.

68 Armgardt, DC, pp. 192ff (n. 649).

69 Armgardt, DC, pp. 209ff.

Th. 70: “Si conditio existit, disposition purificatur.” (If the condition occurs, the legal act becomes valid).

Th. 71: “Si conditio defecit, disposition vitiatur.” (If the condition does not occur, the legal act becomes invalid).

To show through logic how the transition from uncertainty to certainty works, we need a logic with a temporal parameter. In my book, I made a first attempt to make use of a temporal logic.[70] At present, Rahman is developing a special temporal logic for his non-classical approach that might be more powerful.

To summarize, we can see that in the *Doctrina conditionum* the young Leibniz was already trying to develop a legal logic far beyond the logic of his time. Probably the young genius hoped to come to the notice of legal scholars by means of this work; otherwise, he would not have prepared a completely new second edition of the text. The reaction was, however, disappointingly weak.

The whole of the *Dissertatio de casibus perplexis* has recently been translated into English[71] and French.[72] In addition, translations of the *Nova methodus* into Italian[73] and of *De legum interpretatione* into English are now available.[74] There is accordingly the hope of a deeper understanding of these fundamental texts in the near future. A complete reconstruction of Leibniz’ legal theory cannot be attempted before these texts have been carefully analysed. In addition to these works, other parts of his legal theory, that have not been published in a single text, have to be analysed, for example his theory of presumptions and conjectures.[75] Thus, about three hundred years after the death of Leibniz we are not at the end, but at the beginning. There is still much research to be done before we can understand the legal thinking of this genius.

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## Abstract

Gottfried Wilhelm Leibniz (1646-1716) studied Roman law and philosophy in Leipzig from 1661, and became a doctor iuris in Altdorf in 1666. Between 1665 and 1672, as a very young man, he wrote juridical texts of the highest quality. These texts comprise a unique combination of highly technical Roman law, formal logic and moral philosophy. His logical theory of legal conditions has been the focus of major research by both legal historians and philosophers during the last decade. In the second part of this paper, the different logical approaches to his theory of conditions will be discussed.

70 Armgardt, DC, pp. 203ff.

71 By Artosi, Pieri and Sartor (see n. 7 above).

72 By Boucher (see n. 5 above).

73 By Massimo de Iuliis (see n. 22 above).

74 By Dascal (see n. 6 above).

75 Matthias Armgardt, Presumptions and Conjectures in the Legal Theory of Leibniz, in: Matthias Armgardt/Patrice Canivez et al. (Ed.), *Legal Reasoning and Logic – Past and Present Interactions*, Springer (in print).