

# History of Renaissance and Modern Logic from 1400 to Stuart Mill

## Selected bibliography on the History of Modern Logic

### INTRODUCTION: LOGIC IN CONTINENTAL EUROPE

"At the end of the fourteenth century there were roughly three categories of work available to those studying logic. The first category is that of commentaries on Aristotle's 'Organon'. The most comprehensive of these focussed either on the books of the *Logica Vetus*, which included Porphyry's *Isagoge* along with the *Categories* and *De Interpretatione*; or on the books of the *Logica Nova*, the remaining works of the 'Organon' which had become known to the West only during the twelfth century. In addition there were, of course, numerous commentaries on individual books of the 'Organon'. The second category is that of works on non-Aristotelian topics. These include the so-called *Parva logicalia*, or treatises on supposition, relative terms, ampliation, appellation, restriction and distribution. To these could be added tracts on *exponibles* and on syncategorematic terms. Peter of Spain is now the best-known author of *parva logicalia*, but such authors as Thomas Maulvelt and Marsilius of Inghen were almost as influential in the late fourteenth and fifteenth centuries. Another group of works belonging to the second category consists of the so-called 'tracts of the moderns', namely treatises on consequences, obligations and insolubles. A third group includes treatises on sophisms, on the composite and divided senses, and on proofs of terms, especially the well-known *Speculum puerorum* by Richard Billingham. The third and last category is that of comprehensive textbooks. The most famous example is the *Summulae logicales* of Peter of Spain, which gives a complete outline of Aristotelian logic, including categories, syllogisms, topics and fallacies; but others must be mentioned. John Buridan's *Summulae*, which was printed several times with a commentary by John Dorp, was a reworking of Peter of Spain, but integrated the topic of supposition by placing it in Book IV. It also added a new tract on definition, division and demonstration. Paul of Venice's *Logica parva*, which was to be very popular in Italy, presented the material of the *summulae* (except for topics and fallacies) in tract one, and then added a series of tracts dealing with the *parva logicalia* and with consequences, obligations and insolubles. All three categories of works had a role in the curriculum of the late medieval university, though the authors and tracts chosen varied from place to place. It is a mistake to think that Peter of Spain provided the only supplement to Aristotle, for in some places he was not read at all, and in other places only a part of his work was read. Moreover, when studied he was studied through the medium of later commentators.

The medieval traditions of logical writing survived well into the sixteenth century particularly at Paris and at the Spanish universities, though with considerable internal changes. Treatises on sophisms and on proofs of terms ceased to be written; whereas there was a sudden flurry of activity concerned with the various divisions of terms and with the opposition of propositions, i.e. the logical relations between different kinds of categorical proposition. These internal changes were not, however, sufficient to keep the tradition alive, and after about 1530 not only did new writing on the specifically medieval contributions to logic cease, but the publication of medieval logicians virtually ceased. The main exceptions were the logical commentaries by (or attributed to) such authors as Thomas Aquinas and John Duns Scotus, which found a place in their *Opera Omnia*, and which benefited from a revived interest in the great medieval metaphysicians.

The main changes in the teaching and writing of logic during the sixteenth century were due to the impact of humanism. First, commentaries on Aristotle came to display a totally new style of writing. One reason for this was the influence of new translations of Aristotle, and new attitudes to the Greek text. Another reason was the publication of the Greek commentators on Aristotle's logic, Alexander, Themistius, Ammonius, Philoponus and Simplicius. A third reason was the new emphasis on Averroes, which

expressed itself in the great Aristotle-Averroes edition of 1550-1552. (30) The effects of these new factors can be seen in the commentaries on individual works of the 'Organon' by such Italians as Agostino Nifo (1473-1546) and Jacopo Zabarella (1533-1589), the latter of whom offered a particularly influential account of scientific method. They can also be seen in the 'Organon' edition of Giulio Pace (1550/1635), which was first published in 1584 and contained the Greek text side-by-side with a new translation which was designed not only to read well but also to capture the philosophical significance of Aristotle's words. The culmination of the new style of writing on Aristotle is found in the *Conimbricenses*, the great series of commentaries produced by the Jesuits of Coimbra, especially (for our purposes) the *Commentarii in universam dialecticam Aristotelis* which appeared in 1606. This has aptly been described as presenting a fusion of two late sixteenth century approaches to Aristotle, the philosophical one of Zabarella and the philological one of Pace. (31) In addition it contains a wealth of material about different interpretations of Aristotle found in the Greek and Arab commentators, the medieval writers such as Aquinas, and more recent Thomists such as Cardinal Cajetan and Capreolus. One finds the occasional reference to Ockham or Marsilius of Inghen, but the perception of who constituted the important logical writers of the middle ages had clearly changed radically since the beginning of the sixteenth century.

Humanism can also be held at least partially responsible for the virtual disappearance of works on the specifically medieval contributions to logic, including the *parva logicalia*, and for the replacement of medieval textbooks by textbooks in a completely new style. The disgust that humanists expressed at the barbarous language and twisted latin of the scholastics was in itself a minor factor. More important were the philosophical ideals that lay behind the work of Lorenzo Valla (1407-1457) and his follower Rudolph Agricola (1444-1485). As Lisa Jardine has argued, both Valla and, to a lesser extent, Agricola were concerned to offer a logic which was linked with Cicero's Academic skepticism rather than with Aristotelian certainties.(32) They wished to present argumentative strategies for rendering plausible each of the two sides of an undecidable question, or for supporting one of them as, perhaps only marginally, more plausible than the other. They were thus drawn to consider a variety of non-deductive strategies in lieu of the formal techniques which had dominated a large part of medieval logic, especially in the treatises on consequences, and in lieu of Aristotle's own syllogistic. Their attention was focussed on the Topics which, especially as presented by Cicero and Quintilian, seemed to offer a method of classifying these strategies by their key terms rather than by their form. At the same time, much of Agricola's concern was with the art of discourse as such, that is, with the problem of presenting and organizing complete arguments and narrations, whether written or spoken. Logic, or as he preferred to call it, dialectic, was to be applied to all types of discourse, and hence to all areas of teaching. As a result of this interest both in persuasive techniques and in discourse as such, logic came to embrace much of what had traditionally been regarded as belonging to rhetoric; and rhetoric came to be seen as concerned not with the invention of topics but with the ornamentation of discourse.

These doctrines as presented in Agricola's *De inventione dialectica libri tres*, first published in 1515, turned out to be seductive. One of those who was considerably influenced by Agricola was Philip Melanchthon (1497-1560) whose logic text, first published in 1520 as *Compendiaria dialectices ratio*, but replaced by two later versions, became very popular. In it we see how the insights of Valla and Agricola were transmuted to serve the textbook tradition. Melanchthon enjoyed the Agricolan emphasis on clarity of style and the use of literary allusions; he accepted the importance of the Topics and that part of logic called invention; and some remarks on order in the first version of his text grew into a full section on logical method as a way of ordering discourse.(33) At the same time, Melanchthon was a convinced Aristotelian. The formal techniques he used were those of syllogistic, and his work included a discussion of the other standard Aristotelian subjects including the categories and the square of opposition for propositions. Indeed, the last version of his logic, the *Erotemata dialectices* of 1547, seems considerably less Agricolan in tune than the earlier versions, though it retains references to Cicero and Quintilian. (34)

Another writer who was influenced by Agricola is Petrus Ramus or Pierre de la Ramie (1515-1572), the most notorious logician of the sixteenth century. He is known both for his attacks on Aristotle and for the simplified logic presented in his *Dialectique* of 1555 (published in Latin in 1556 as *Dialecticae libri duo*), a work which enjoyed a remarkable publishing history. Ong lists 262 editions, 151 of which appeared in Germany. (35) The *Dialectique* had two parts. The first, on invention, covered the Topics; and the second,

on judgment, presented a deliberately simplified version of the syllogism followed by an account of method as a means of ordering in the arts and sciences. No reference was made to such standard material as the categories, the square of opposition, conversion, demonstration and fallacies. On the other hand, the work is rich with quotations from the poetry and prose of classical authors, which must have strengthened the impression among students that logic was both easy and fun. It is small wonder that (in Jardine's words), Ramus 'cornered the textbook market' despite the absence of genuine logical innovation.(36)

Whatever its attractions, the deficiencies of Ramus's book as a teaching tool became rapidly apparent to those seriously interested in logic at the university level. As a result, a new school of textbook writers known as the Philippo-Ramists appeared in Germany in the 1590s. These authors had the aim of combining what was best in Ramus with what was best in the more Aristotelian work of Philip Melanchthon. Thus they tended to restore all those parts of Aristotelian logic which Ramus had deliberately omitted. An important writer who can be seen as allied to the Philippo-Ramist school, though he is more frequently described as a Systematic, is Bartholomew Keckermann (c. 1572-1609). Keckermann was primarily concerned to defend Aristotle and such Aristotelians as Zabarella, but he paid careful attention to Ramist doctrines. He was particularly noteworthy for his theoretical discussion of the notion of a system, and the criteria for determining whether a body of doctrine, such as logic or ethics, could properly be called a system.(37) J. H. Alsted (1588-1638) was also an important Systematic, who displayed a good deal of sympathy toward Ramism.(38)

Another important group of textbooks from the latter half of the sixteenth century owed a smaller debt to the humanist logic of Rudolph Agricola and Petrus Ramus, and is noteworthy for an attempt to integrate certain parts of the specifically medieval contribution to logic into a generally Aristotelian framework. I shall mention three such texts. The earliest, and most medieval in tone, is the *Compendium logicae* by Chrysostomo Javelli (d. c. 1538) which was first published posthumously in 1551. Javelli retained discussion of such topics as the proofs of terms, and he also retained a number of sophisms and puzzle-cases from the medieval literature. He can therefore be described as a transitional author, representing an intermediate stage between the old medieval textbooks and the Counter- Reformation texts of the Jesuits Francisco de Toledo (1533-1596) and Pedro de Fonseca (1528-1599). Toledo's *Introductio in dialecticam* was first published in 1561 in Rome; and Fonseca's *Institutionum dialecticarum* was first published in 1564 in Lisbon. The Jesuit *Ratio Studiorum* of 1586 had recommended the *Summula* of Fonseca for its breadth, clarity, relevance to Aristotle and lack of sophistry; (39) and in the *Ratio Studiorum* of 1599, Toledo was recommended in addition to Fonseca.(40) The two books share important features. Their main objective is to present standard Aristotelian logic. This material is supplemented with an account of certain medieval doctrines, specifically supposition theory, exponible propositions, and consequences, but the presentation of these doctrines is new. There is a complete absence of the sophisms which had formed a prominent feature of late medieval texts. There is also little discussion of problems caused for such operations as conversion by the presence of different linguistic structures. The highly technical language which struck the humanist as barbaric has gone and, in Fonseca at least, there is a conscious attempt to use classical terminology. All three texts were widely disseminated in Europe and, interestingly enough, all seem to have disappeared at much the same time. The last editions that I know of are as follows: Toledo: Milan, 1621; Fonseca: Lyon, 1625; Javelli: Cologne, 1629."

(30) See C. B. Schmitt, "Renaissance Averroism studied through the Venetian Editions of Aristotle-Averroes", *Atti dei Convegni Lincei* 40 (1979), pp. 131-140.

(31) C. B. Schmitt, "Towards a Reassessment of Renaissance Aristotelianism", *History of Science* 11 (1973), p. 170.

(32) Lisa Jardine, "Lorenzo Valla and the Intellectual Origins of Humanist Dialectic", *Journal of the History of Philosophy* 15 (1977), 143-164. For further discussion and references see the chapter by Jardine in *The Cambridge History of Renaissance Philosophy* (forthcoming) [Cambridge, Cambridge University Press, 1988, *Humanistic logic* pp. 173-198]

(33) See Philip Melanchthon, *Compendiaria Dialectices Ratio in Opera* (Corpus Reformatorum XX,

Brunsvigae 1854: reprinted New York and Frankfurt am Main 1963) columns 724-726; and *Erotemata Dialectices in Opera* (Corpus Reformationum XIII, Halis Saxonum, 1846: reprinted New York and Frankfurt am Main 1963) columns 573-578.

(34) Wilhelm Risse, *Die Logik der Neuzeit*. 1 Band. 1500-1640 (Stuttgart- Bad Cannstatt: Friedrich Frommann, 1964), p. 89, wrote of the *Erotemata Dialectices*: "Melanchthon proklamiert hier eine reine, unverdebt aristotelische Logik.... Cicero and Agricola sind nicht mehr als Autoritäten genannt." Risse's judgment is perhaps too strong.

(35) W. J. Ong, *Ramus and Talon Inventory* (Cambridge, Mass., Harvard University Press, 1958). For a full discussion of Ramus, see W.J. Ong, *Ramus, Method and the Decay of Dialogue* (Cambridge, Mass., Harvard University Press, 1958).

(36) Jardine, *The Cambridge History of Renaissance Philosophy*.

(37) For some discussion of Keckermann, see Risse, *Die Logik der Neuzeit*, pp. 440-450; and N.W. Gilbert, *Renaissance Concepts of Method* (New York, Columbia University Press, 1960), pp. 214-220.

(38) For discussion, see Risse, *Die Logik der Neuzeit*, pp. 477-485.

(39) Karl Kehrbach, *Monumenta Germaniae Paedagogica* Band V. (Berlin, 1887) p. 131.

(40) Kehrbach, *ibid.*, p. 332.

From: Earline Jennifer Ashworth - *Editor's Introduction* to: Robert Sanderson - *Logicae Artis Compendium* [1618] - Bologna, Clueb 1985 pp. XVI-XXII

## THE TEACHING OF LOGIC IN THE UNIVERSITY CURRICULUM

"The period 1500 - 1650 is a distinctive one in the history of logic. It begins when the great works of fourteenth-century logic, embedded in university curricula all over Europe (1), are replaced by new and different texts; it ends when the 'new philosophies', first of Descartes and later of Locke, infiltrate the study of logic and lead logicians to embrace an '[e]xplicit consideration of the cognitive faculties and their operations' (2) at the expense of more formal concerns. Eyed within the 150 year period thus demarcated, there is an enormous variety of change and development to be taken into consideration. At the expense of over-generalization, four different streams can be isolated. First, there is the continuity of the medieval tradition, particularly exemplified by the publications of those working at Paris in the first three decades of the sixteenth century (3). Second, there is the new rhetorical humanism of such men as Rudolph Agricola, whose influential *De inventione dialectica libri tres* was first published posthumously in 1515 (4). Third, there is the Aristotelian humanism of those who, especially in Italy, were involved with the publication of the Greek Aristotle (5), with the publication and translation of the Greek commentators on Aristotle (6), and with the production of new commentaries on Aristotle (7). Finally, there is the investigation of demonstration and scientific method, culminating in the logical work of Jacopo Zabarella, the well-known Paduan Aristotelian (8).

So far as textbook production was concerned, all these four streams were to intermingle. Writings purely in the medieval tradition ceased abruptly after 1530, at least outside Spain; but some parts of the medieval contribution to logic continued to be included in at least some textbooks. The new interests of rhetorical humanism, the emphasis on the topics, on strategies for plausible argumentation, on methods of organizing discourse, on the use of literary examples, had a great impact on the classroom. However, teachers soon found that the works of Agricola himself or of the later Pierre de la Ramée contained insufficient formal material, and their writings were soon supplemented by Aristotelian syllogistic. Thus in Germany from

1520 on, Philip Melanchthon produced a series of textbooks combining humanist insights with Aristotelian logics; and in the 1590s, Germany gave rise to Philippo-Ramism, a school of textbook writers whose aim was to combine what was best in Pierre de la Ramée with what was best in the works of Philip Melanchthon (10). The study of the Greek Aristotle and the Greek commentators had a strong impact on the textbook writers of the second half of the sixteenth century; and, after Zabarella, sections on scientific method were also to find their way into logic textbooks." pp. 75-76

I shall begin my investigation by considering the types of logic text that would have been used at a fifteenth-century university. There are three groups. First, there is the 'Organon' of Aristotle, together with the commentaries so exhaustively enumerated by Charles Lohr (21). I shall not be concerned with this type of literature, except to note that it underwent considerable changes during the sixteenth century owing to the influence of humanism and to the recovery of the Greek commentators. Second, there is the textbook proper, such as the *Summulae logicales* of Peter of Spain, itself typically presented with a commentary by some later author. Third, there is the group of independent texts, each devoted to some aspect of the specifically medieval contribution to logic. If one is to understand later developments, this group must be investigated in some detail, and I shall start by analyzing its subdivisions (22).

The core of the first subdivision is provided by the so-called *parva logicalia*, or treatises dealing with the properties of terms, including their reference in various contexts. Here we find tracts on supposition, on relative terms, on ampliation, appellation, restriction and distribution. These core treatises were supplemented in three ways. Logicians wrote about syncategorematic terms, those logical particles such as 'all', 'some', and 'not', which determine the logical structure of a proposition; they wrote about exponible terms, those logical particles such as 'except' and 'only' whose presence requires the analysis of an apparently simple categorical proposition into several conjoined propositions; and they wrote about the proof of terms, or the way in which the truth-conditions of propositions are affected by the presence of exponible terms, of modal terms such as 'necessary' and 'possible' or of epistemic terms such as 'knows' and 'believes'. Obviously there was a good deal of overlap between writings on syncategorematic terms, on exposables and on the proof of terms, since one and the same logical particle could be treated in all three types of treatise.

The second subdivision contains the 'three tracts of the moderns', the treatises on consequences, obligations and insolubles. Treatises on consequences covered all types of argumentation, beginning with a good deal of what is now called propositional logic, and they often included the syllogism as a special example of one kind of argumentation. They were also noteworthy for lengthy discussions of the notion of consequence itself, and of the difference between formally valid and materially valid inferences. Treatises on obligations dealt with the rules to be followed in a certain kind of disputation which was specifically designed to test the logical skills of undergraduates, and which therefore deliberately confined itself to exploring the logical consequences of accepting an often bizarre falsehood. Treatises on insolubles dealt with semantic paradoxes, such as the standard liar: 'What I am now saying to you is false', and they explored in some depth the semantic presuppositions of language, including the truth-conditions for contradictory and synonymous propositions.

The third subdivision is formed by the treatises on sophisms in which problematic or puzzling statements were analyzed and tested against various logical rules. Since these rules were drawn from the areas of investigation already mentioned, including supposition theory and its ramifications, there was considerable overlap between the contents of these treatises and those belonging to the first and second subdivisions. Indeed, the latter treatises, as well as the commentaries on Aristotle and on Peter of Spain, themselves made heavy use of sophisms in order to test the rules they enunciated against possible counter-examples. Thus we get a two-way movement. A treatise on sophisms begins with the sophisms and proceeds to the rules; a treatise on, for instance, consequences begins with the rules and proceeds to the sophisms. Paul of Venice's *Logica magna* (written 1397 - 98) is a particularly noteworthy example of the use of sophisms as a testing device (23)". pp. 78-79

(1) For fuller details and references, see E. J. Ashworth, 'Traditional Logic' in *The Cambridge History of Renaissance Philosophy*, edited by C. B. Schmitt (Cambridge: Cambridge University Press, 1988), pp. 150

- 151.

(2 J. G. Buickerood, 'The Natural History of the Understanding: Locke and the Rise of Facultative Logic in the Eighteenth Century', *History and Philosophy of Logic* 6 (1985), p. 161.

(3) Ashworth, 'Traditional Logic', pp. 151 - 152.

(4) For discussion, see L. Jardine, 'Humanist Logic' in *The Cambridge History of Renaissance Philosophy*.

(5) The first printed edition of the Greek text of Aristotle was produced in Venice by Aldus Manutius from 1495 to 1498.

(6) See C. B. Schmitt, 'Alberto Pio and the Aristotelian Studies of his Time', Study VI in C. B. Schmitt, *The Aristotelian Tradition and Renaissance Universities* (London: Variorum Reprints, 1984), pp. 55 -

(7) For a complete listing of Renaissance Aristotle commentaries, see C. H. Lohr, 'Renaissance Latin Aristotle Commentaries: Authors A-B', *Studies in the Renaissance* 21 (1974), pp. 228 - 289; 'Authors C', *Renaissance Quarterly*, 28 (1975), pp. 689 - 741; 'Authors D-F', *ibid.*, 29 (1976), pp. 714 - 745; 'Authors G-K', *ibid.*, 30 (1977), pp. 681 - 741; 'Authors L-M', *ibid.*, 31 (1978), pp. 532 - 603; 'Authors N-Ph', *ibid.*, 32 (1979), pp. 529 - 580; 'Authors Pi-Sm', *ibid.*, 33 (1980), pp. 623 - 734; 'Authors So-Z', *ibid.*, 35 (1982), pp. 164 -256.

(8) See N. W. Gilbert, *Renaissance Concepts of Method* (New York: Columbia University Press, 1960).

(9) See E. J. Ashworth, *Language and Logic in the Post-Medieval Period* (Dordrecht, Boston: D. Reidel, 1974), pp. 13 - 14. His logic text was first published in 1520 as *Compendiaria dialectices ratio*, though in the place cited I mention only the first of the later versions, the *Dialectices libri IX* of 1527.

(10) Ashworth, *Language and Logic*, pp. 16 – 17.

(21) For a listing of medieval Aristotle commentaries, see C. H. Lohr, 'Medieval Latin Aristotle Commentaries: Authors A-F', *Traditio* 23 (1967), pp. 313 - 413; 'Authors G-I', *ibid.*, 24 (1968), pp. 149 - 245; 'Authors Jacobus-Johannes Juff', *ibid.*, 26 (1970), pp. 135 - 216; 'Authors Johannes de Kanthi-Myngodus', *ibid.*, 27 (1971), pp. 251 - 351; 'Authors Narcissus-Richardus', *ibid.*, 28 (1972), pp. 281 - 396; 'Authors Robertus-Wilgelmus', *ibid.*, 29 (1973), pp. 93 - 197; 'Supplementary Authors', *ibid.*, 30 (1974), pp. 119 - 144.

(22) For more details and references, see Ashworth, 'Traditional Logic', pp. 146 - 149.

(23) See Paul of Venice, *Logica magna* (Venice, 1499). An edition and translation of this work is being published under the auspices of the British Academy. The first volume to appear was: Paul of Venice, *Logica Magna. Part II Fascicule 6*, edited and translated by F. del Punta and M. M. Adams (published for the British Academy by the Oxford University Press, 1978). For the date of the work, see F. Bottin, 'Logica e filosofia naturale nelle opere di Paolo Veneto' in *Scienza e filosofia all'Universita' di Padova nel Quattrocento*, edited by A. Poppi (*Contributi alla Storia dell'Universita. di Padova* 15. Trieste: Lint, 1983), p. 88, pp. 91 - 92.

From: E. J. Ashworth - Changes in logic textbooks from 1500 to 1650: the new Aristotelianism. In: *Aristotelismus und Renaissance. In memoriam Charles B. Schmitt*. Edited by Kessler Eckhard, Lohr Charles, and Sparr Walter. Wiesbaden: Otto Harrassowitz 1988. pp. 75-87

## History of Renaissance and Modern Logic from 1400 to Stuart Mill

## • Logicians of the Fifteenth and Sixteenth Century

- George of Trebizond (1395 - 1472/3)
- Lorenzo Valla (1406 - 1457)
- Rodolphus Agricola (1443 - 1485)
- Jean Luis Vivés (1493 - 1540)
- Domingo de Soto (1494 - 1560)
- Petrus Ramus (1515 - 1572)
- Giacomo (Jacopo) Zabarella (1533 - 1589)

## • Logicians of the Seventeenth Century

- The Conimbricenses' *In universam dialectica Aristotelis* (1606)
- John Poincot (John of St. Thomas) (1589 - 1644)
- Joachim Jungius (1587 - 1657)
- Thomas Hobbes (1588 - 1679)
- Juan Caramuel y Lobkowitz (1606 - 1682)
- Johannes Clauberg (1622 - 1665)
- The Port-Royal *Logique ou l'art de penser* (1662)
- Arnold Geulincx (1624 - 1669)
- Gottfried Wilhelm Leibniz (1646 - 1716)

## • Logicians of the Eighteenth Century

- Christian Wolff (1679 - 1754)
- Johann Heinrich Lambert (1728 - 1777)
- Gottfried Ploucquet (1716 - 1790)
- Leonhard Euler (1707 - 1783)
- Immanuel Kant (1724 - 1804)

## • Logicians of the First Half of the Nineteenth Century

- Georg Wilhelm Friedrich Hegel (1770 - 1831)
- Jeremy Bentham (1748 - 1832)
- Samuel Taylor Coleridge (1772 - 1834)

- Richard Whateley (1787 - 1863)
- William Hamilton (1788 - 1856)
- William Whewell (1794 - 1866)
- Friedrich Adolf Trendelenburg (1802 - 1872)
- Augustus De Morgan (1806 - 1871)
- John Stuart Mill (1806 - 1873)

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