6 LOGIC IN THE LATIN WEST IN THE FOURTEENTH CENTURY – STEPHEN READ

The main advances in logical investigations in the thirteenth century in the Latin West were concentrated at the Universities of Paris and Oxford. There were other universities and *studia generalia*, such as Cambridge, Erfurt and elsewhere, where logic was taught, and on which both Oxford and Paris depended for their students, and to which they despatched many of their masters after their studies in Arts. But the real originality in driving forward the *logica modernorum*, the real innovations in developing the theories of properties of terms, of consequence, of obligations theory and the treatment of insolubles, is found for the most part in the work of masters teaching at Paris and Oxford.

All this had changed by the end of the fourteenth century. By 1400, there were many more universities, particularly in northern Europe, starting with the German universities established at Prague, Vienna, Erfurt and Heidelberg, and in southern Europe there was a revival and extension of the study of logic in Italy and Spain. In the meantime, the Black Death, striking first from 1347–49, and again in 1361 and 1369 (and repeatedly for the next 300 years or so), although reducing the population by at least one-third, had surprisingly not reduced the output of logical treatises, even if it affected their vitality. Nor had the Papal schism (see Section 5, below) apparently affected the study of logic, but if anything served to disseminate it more broadly.

Returning to the start of the fourteenth century, all real interest in logic was arguably preserved by those working in Oxford. This is the thesis propounded by Ebbesen (1985). We are, of course, dependent for our understanding of historical developments on historical traces, in particular, what logical treatises have been preserved – and indeed, on which of those that have been preserved have been studied. Nonetheless, it does seem that interest in logic waned at Paris towards the end of the thirteenth century in the face of the rise of modism, with its fascination with grammar and the so-called "modes of signification".[48] Hitherto, univocation had united a term with a single signification throughout the different things for which it supposited: e.g., the signification of 'man' is the same though the term supposits for different classes of men in 'Some man is running' and 'Socrates was a man'. The *modistae* tried to describe the distinction purely grammatically, by reference to the different modes of signifying possessed by the term in its different uses. But this threatened to divorce meaning from truth. The doctrine was fiercely attacked in the early fourteenth century.[49] In the meantime, the study of logic had been preserved in Oxford and was re-introduced to Paris in the early years of the fourteenth century.

One figure stands out at the head of the logical traditions in both Oxford and Paris in the fourteenth century: Walter Burley. So first, we should look at Burley's career and his works on logic; then we will turn to logical developments in England through the rest of the century after him; next, survey logic in Paris during the same period; take a close look at one significant debate, that between nominalism and realism; and finally, consider the wider picture in Europe and the dissemination of logic towards the end of the century.

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[48] See, e.g., Pinborg (1982) and Ebbesen (1998a), 273-8.

[49] By, e.g., Burley in Brown (1974), 254; Ockham (1974) II-4 ch. 10.

6.1 WALTER BURLEY

Burley was born in Yorkshire in England around 1375, studied at Oxford (probably at Balliol) in the late 1290s, was teaching master at Merton during the first decade of the new century, then went to Paris before 1310 to study theology, becoming doctor of theology in 1322 or soon after.[50] In 1327, with the accession of the young Edward III to the throne of England, deposing Edward II and his court, Burley became the king's envoy to the Papal court at Avignon, and spent his remaining years often abroad and on diplomatic business, but also continuing to write further philosophical treatises. Around 1333, he joined the select intellectual circle of Richard de Bury, the Bishop of Durham, author of the *Philobiblon* (Bury's own neologism, meaning 'the love of books'), reportedly owner of the largest private library in England. Burley died in 1344 or soon after.

Burley's early writings are definitive of our knowledge of logic as it stood at the turn of the fourteenth century. In 1302 alone, he composed treatises on supposition theory, consequences, insolubles and obligations. De Rijk (1985, p. 23) suggests they may have constituted a whole course on logic, together with shorter treatises on exceptives and exclusives.

During the same period, Burley composed commentaries and questions on several of Aristotle's logical works: *On Interpretation*, *Posterior Analytics* and *Sophistical Refutations*. He wrote a further commentary on *On Interpretation* (the so-called 'Middle Commentary') in 1310, shortly after arriving in Paris. In this work, he spoke explicitly of a real proposition (*propositio in re*) as the ultimate significate of written and spoken propositions (Brown 1973, §1.24), though he had mooted the idea already in his earlier *Quaestiones* of 1301 (in Brown 1974, §3.553 p. 249): "concerning the mental utterance, it should be realised that it is composed of things which the mind asserts to be the same or different." Boethius (1877, p. 37) had interpreted Aristotle's remarks in the first chapter of *On Interpretation* (16a3-4) as distinguishing four levels of meaning: "for thing, concept, sound and letter are four: the concept conceives the things, spoken sounds are signs of the concept, and letters signify the sounds." In his Middle Commentary, Burley comes to distinguish explicitly between the proposition in the mind which is composed of concepts, and the real proposition composed by the mind of the things signified by those concepts, so that propositions too are four-fold: the written proposition, composed of letters, signifying the vocal proposition, made up of sounds, in turn signifying the mental proposition, which ultimately gets its meaning by signifying the real proposition. Nonetheless, the real proposition is a human construct, made true when the objects which it asserts to be the same or different really are the same or different (Burley 1973, §1.27).[51]

Burley's most substantial work on logic belongs to the end of his stay in Paris, possibly just after receiving his doctorate in theology. A shorter, incomplete version was composed no later than 1324, replaced by a longer version a few years later in which he responded to the radical nominalist claims in William Ockham's *Summa Logicae*, which we will consider shortly. Burley was not at all averse to rehashing parts of earlier works of his own (or even of others), as were his contemporaries, if not quite so blatantly. The shorter version of his new logic of the 1320s, *On the Essence of the Art of Logic*,[52] opens with material repeating arguments from his treatise on *Consequences* of 1302. The original plan of the shorter treatise is set out at the start, being conceived in four parts, of which not

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[50] See Vittorini (2013). Burley said that on 5 August 1337 he was in his sixty-second year.

[51] See the chapter on 'Propositions: Their meaning and their truth' for a somewhat different interpretation of Burley's theory of the real proposition.

[52] Burley (1955, 2000). For the translation of the title, see Spade and Menn (2003).

even the first was completed. That first part was to have three subparts (Burley 2000, p. 3): "first, general rules of inference will be established. The second will deal with the nature of syncategorematic words. The third will discuss certain matters concerning the supposition of terms." Only the first two subparts were completed, however. Nor were any of the other three parts, on sophistries (i.e., fallacies), on obligations and on demonstration.

Having abandoned this treatise, Burley started afresh, completing a work consisting of two treatises, the first on properties of terms (*viz* supposition, appellation and copulation), the second and much longer treatise on compound propositions: general rules of inference, enthymemes and hypothetical syllogisms; inferences involving other compound propositions, *viz* conjunctions, disjunctions, causal propositions (of the form '*p* because *q*'), temporal propositions (e.g., '*p* when *q*'), exclusives, exceptives and reduplicatives (e.g., 'Being *qua* being is the subject of metaphysics') and concluding with a discussion of sophisms about 'begins' and 'ceases'.[53] Whether Burley conceived the treatise as covering more is unclear. The plan for the shorter treatise reads like an update of the 1302 *Logic* (and as noted, it contains parts of that earlier work, and covers similar ground). The longer treatise omits much of that earlier work, namely, discussion of insolubles and obligations. It is also the work in which Burley confronted Ockham's logic for the first time, though its structure is very different from that of Ockham's logical treatise.

In the period after the longer treatise, when acting as "king's clerk", Burley continued at the very least to revise and update his many texts. The main work on logic from this period is the 1337 *Expositio super artem veterem*, a discussion of the "old logic", that is, a literal commentary on Porphyry's *Isagoge* ('On Universals'), and Aristotle's *Categories* and *On Interpretation*. We will come back to Burley's late work in Section 4.

6.2 ENGLAND

Burley's logic laid the basis for most of the logical developments in England, at least in the first half of the century. Despite their temperamental differences, much of Ockham's logic was drawn from Burley's.

Ockham's logic is itself not particularly radical. What was radical was his semantics, and the metaphysics which it underpinned. (See, e.g., Read 2007.) Ockham was born in about 1287 in Ockham in Surrey, and joined the Franciscan Order at an early age, spending much of the next twenty years or so at the Franciscan house in London. He was in Oxford in 1317–19, when he gave the lectures on Peter Lombard's *Sentences* which all bachelors of theology were required to do, but whether he spent much or any other time in Oxford is unclear. He was in London in the early 1320s, disputing with fellow Franciscans Walter Chatton and Adam Wodeham, and it was there that he composed his discussions of Aristotle's *Categories*, *On Interpretation* and *Sophistical Refutations*, and his mighty *Summa Logicae*, with its reductionist and iconoclastic metaphysics, in 1323. He travelled to the Papal court in Avignon in 1324, though whether that was simply to lecture at the Franciscan studium or whether he had already been called to answer charges of heresy in his theological views is a matter of dispute. (See Knysh 1986.) In any event, such charges came to a head in 1327–28, and for whatever reason, he left Avignon along with Michael Cesena, the head of the Franciscan Order, in a chaotic hurry in May 1328, excommunicated by Pope John XXII and bringing

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[53] See Spade's 'Introduction' to Burley (2000), x-xvii.

his own charges of heresy against the Pope for his views on apostolic poverty. He spent his final years at the court of the Holy Roman Emperor in Munich, writing on politics and theology. There is some suggestion two logical treatises of the 1340s are authentic. (See Buytaert 1964, 1965-66.) He died there in 1347 (or possibly 1348).

Burley and Ockham are often portrayed as embodying realism *versus* nominalism (see Section 4 below). Burley believed, with Aristotle, that there really are things outside the mind common to all things sharing that common nature, immanent in individuals. Ockham believed he was following Aristotle too, in holding that everything outside the mind was an individual, so those qualities must also be individuals (often nowadays termed "tropes"). Take Burley's real proposition, for example, 'The dog eats the bread'. Ockham jokes that if the subject and predicate of this proposition really were the dog and the bread (put together by the mind into the proposition), then the subject would eat the predicate; or in the real proposition, 'Robert persecutes John', the subject would persecute, slay and burn the predicate. "This is absurd," he protested. (Ockham 1980 III 12, p. 248.) Rather, he says, the subject and predicate of the mental proposition are concepts, which gain their signification not by signifying non-existent common natures but individuals. The signification of 'dog' is the class of all dogs: "the universal term 'man' signifies many things," he writes, "but since it does not signify many things which are not men, it must signify many men." (Loux 1974, p. 114; Ockham 1974, p. 96.)

Burley strikes back: near the start of the longer version of *De Puritate*, he argues that on Ockham's view "sounds would continually lose their significates, nor could someone move his finger without a word losing its significate, because when the finger was still the word 'still' would signify the finger, but when the finger moved the word would no longer signify the finger. That's absurd." (Burley 1955, p. 9; (2000), p. 90.) 'Man' doesn't signify individual men, like Socrates and Plato, for the hearer can understand the term without being acquainted with each and every man. (Burley 1955, p. 8; 2000, p. 88.) Rather, common nouns signify common natures. We will explore the realist–nominalist debate further in Section 4.

Despite their different accounts of signification, and the fact that much of Ockham's reductionist programme is articulated through his theory of supposition, Ockham took over a great deal of that supposition theory from Burley's 1302 treatise. Burley's other early treatises were also very influential. The doctrine found in his treatise on obligations became known as the *responsio antiqua*, the account to which later theories were opposed. (See the chapter on obligations.) Much the same is true of Burley's proposed solution to the insolubles (see the chapter on insolubles): it is his version of the restrictivist doctrine which is criticized at length by Thomas Bradwardine, whose novel proposal became the starting point for most theories put forward later.

The 1320s ushered in a golden age in the intellectual life of Oxford, centred around the so-called Oxford (or Merton) Calculators. The five leading figures were Bradwardine, Richard Kilvington, William Heytesbury, John Dumbleton and Richard Swineshead. Their main focus was mathematical physics, and their work in this area marks the first real advance in the subject since Aristotle, to some extent anticipating the scientific revolution of the seventeenth century. (See, e.g., Sylla 1982.) But the first four also made significant contributions to logic. Bradwardine's ideas about insolubles, false because they each signify their own truth as well as their own falsehood (and so are implicitly contradictory), have just been mentioned. Bradwardine composed his treatise on insolubles as a young regent master at Oxford. His style reveals his mathematical bent of mind: he expounds his theory by two definitions, six postulates and three theorems, each proved with care and in detail. He showed the same "geometrical precision" (Fleming 1964, p. 72) in his mathematical works, which inaugurated the two decades of work by the Calculators, and in his theological masterpiece, *De Causa Dei*, a blast against the Pelagians (such as Ockham), who believed one could earn one's way into heaven by good

works, reaffirming Augustine's doctrine (later revived by Calvin) that salvation is entirely due to God's grace. Bradwardine's character often reveals itself, as when at the start of the sixth chapter of the *Insolubles*, having argued against other views, he embarks on his own solution with the words, "Having rid ourselves of false and mistaken opinions …" He had previously closed his attacks with such phrases as "the aforesaid view is completely annihilated" (*penitus adnullata*) and "the view of the nullifiers (*cassantes*) is sufficiently nullified (*cassata*)". (Bradwardine 2010 §§ 4.2.8 and 5.6.) Bradwardine, too, joined the Bishop of Durham's circle, became confessor to Edward III, and was briefly Archbishop of Canterbury before succumbing to the Black Death in 1349.

Dumbleton also died in 1349, but the other Calculators survived (two out of five is close to the national death toll of one in three), though Kilvington died in 1361 when there was a second wave of the pestilence. Another significant figure at Oxford, though not a Calculator, was Roger Swyneshed. He challenged Bradwardine's account of insolubles, but is perhaps more famous for his challenge to Burley's rules for obligations. Robert Fland (or Eland: see Read, forthcoming), an author of treatises on obligations, insolubles and consequences whose identity is unknown, writing at Oxford some time between 1335 and 1370, described Swyneshed's revised rules for obligations as a "*nova responsio*". (Spade 1980a, p. 42.) Swyneshed seems to have liked to frame his theses in arresting ways, announcing, for example, that in an obligational disputation one could deny a conjunction both of whose conjuncts one had granted, where the explanation was rather more mundane, namely, that by his rules responses were determined only by the *obligatum*, not by previous responses (e.g., those where the conjuncts had been granted). (Spade 1977, p. 257.) A similar liking for jest is displayed in his treatise on insolubles, where he claims, for example, that two contradictories can both be false – e.g., the liar sentence, *L*, *viz* '*L* is false', and its (apparent) contradictory, '*L* is not false'. (Spade 1979, p. 189.)

Another Mertonian from the 1340s and 1350s whose logical writings had significant impact was Richard Billingham, with his *Speculum Puerorum*, often known by its *incipit*, '*Terminus est in quem*', a treatise on the "proofs of terms" (*probationes terminorum*). This sparked a genre of treatises on the truth and falsehood of propositions, by which terms and propositions might be expounded to exhibit their truth conditions. For example, 'Every man runs' is expounded or "proved" as 'A man runs and nothing is a man unless it runs', thus showing the existential import of universal affirmatives. Again, 'A man runs' is expounded as 'This runs and this is a man', from which 'A man runs' follows by an expository syllogism. Indeed, the expository syllogism is at the heart of the resolution of terms. Billingham's first rule says that "a consequence is valid from an inferior to a superior without distribution or any word with the force of negation," which he says is the basis of the expository syllogism in the third figure (and so of every affirmative syllogism), and the second rule that "a consequence holds from an inferior to its superior with an 'existence postulate' (*constantia*) regarding the subject and a word with the force of negation placed after the inferior and superior," which he says is the basis of the negative expository syllogism and so of every negative syllogism. (Billingham 1982, §§ 9 and 15.)

Two issues are being raised in the "proof" of a term. Recall that '*probatio*' means "testing", as did the English word 'proof' in earlier times (cf. the proverb "the proof of the pudding is in the eating"). These issues are, first, what is the significate of the (spoken) proposition; secondly, what makes it true? We've seen that Burley presented the real proposition as answer to the first question, and the real identity of the objects composed by the mind as what made it true (and so derivatively, the mental, spoken and written propositions). A third question is an epistemological one: what is the object of knowledge? It is often thought that a single thing will answer all three questions, and there is a vast gulf between those who, like Burley, think that there is something (the *propositio in re*, or the

complexly signifiable, which we will discuss shortly, or a state of affairs) in the world having propositional complexity and those, like Ockham, or Walter Chatton (and as we will see, John Buridan) or Richard Ferrybridge, who vehemently rejected such entities.

Billingham's work is a link to the second half of the century in Oxford. This period is still less well researched than the first half, but what is known about it suggests that it was largely a period of consolidation rather than one of significantly new ideas. For example, large parts of Ralph Strode's *Insolubles* (composed in the 1360s) repeat the texts of Bradwardine, Swyneshed and Heytesbury, translated into the third person. (See Bradwardine 2010, Appendix B.) Ferrybridge was at Oxford in the 1350s and 1360s, as was Richard Brinkley, a Franciscan whose *Summa Logicae* was written at Oxford in the 1360s. (See Gal and Wood 1980.) Although an elementary work, it is a diatribe against the nominalists. Probably the most original logician working in Oxford in the second half of the century was John Wyclif, strongly influenced by Burley and his realism. Two of his logical treatises (a simple logic textbook, *De Logica*, and a much more substantial and deeper work, *Logicae Continuatio*) were edited in the nineteenth century, but the editions have many errors and new editions are urgently needed. Born in Yorkshire around 1325, Wyclif was teaching master at Balliol by 1360, receiving his D.Th. in 1372–3. His views on the Eucharist led to charges of heresy in the late 1370s, while his logical works date from the 1360s. A further logical treatise, arguably by Wyclif himself, is entitled *Summa Insolubilium*, though some manuscripts attribute it to Wyclif's follower John Tarteys, writing at Oxford at the turn of the fifteenth century. Wyclif's view on insolubles (for it is also found in the *Logicae Continuatio*) distinguished three notions of truth: truth as being, as being as a proposition precisely signifies, and as being as it precisely signifies provided this primary significate (for Wyclif, a logical being or being of reason—neither a substance nor an accident) is not dependent on the proposition itself. (See Wyclif 1986, p. xxxi.) Talk of primary signification *versus* consequential signification (*ex consequente*) recalls Bradwardine's claim that a proposition signifies the consequences of anything it signifies. (Bradwardine 2010, §§ 6.3 and 7.2.5.) Wyclif's idea is that a liar sentence is false in the third sense but true in the second. But, as Spade and Wilson observe (Wyclif 1986, p. xxxiii), distinguishing these senses of 'true' risks a revenge paradox with the sentence 'This sentence is not true in the second sense', for if it is true (as Wyclif says) then its primary significate does not exist, and so it is (also) false (in the second sense). Nonetheless, Wyclif's ideas were taken up by Robert Alyngton, fellow of Queen's College in the 1380s, and Tarteys (fellow of Balliol around 1400) among others.

Henry Hopton was also in Oxford in the 1360s. In a short work *On the Truth and Falsehood of Propositions*, Hopton considers what propositions signify and what makes them true. He rejects Chatton's view that it is just the significate of the subject, Crathorn's claim that it is some *modus rei*, a way things are, and Ockham's theory that it is the mental proposition itself.[54] Nothing is needed to make it true, he says: "what the proposition signifies … is neither an *aliquid* nor an *aliqualiter*." (Cited in Ashworth and Spade 1992, p. 53.) Rather, "for it to be true it suffices and is required that it precisely signifies as it is assertively and directly." (Maierù 1993, p. 113.)

De Rijk observes that Johannes Venator (*aka* John Huntman) contrasts "signifying precisely" with "signifying assertively". (De Rijk 1982a, p. 176; cf. Maierù 1993, p. 114.) Huntman was at Oriel College from 1373–87, and denounced in 1382 for sympathizing with the heretical views of Wyclif. His *Logica* consists of four treatises, in Chapter 4 of the first of which he asks us to consider the proposition 'You are not': "it signifies you are, and it signifies that you are not. But from this it does

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[54] See Ashworth and Spade (1992), 51-3; Maierù (1993), 111-2.

not follow that it is impossible, because it does not signify assertively that you are and you are not." (De Rijk 1999, vol. I p. 216.) In the third treatise (Chapter 2) he spells out the truth and falsehood of propositions at length.

6.3 PARIS

We have little evidence of logical activity at Paris in the first quarter of the fourteenth century, apart from the presence of Burley. The earliest indigenous treatise on logic, as one might call it, is Gerard Odo's *Logica*, composed at Paris, probably in the 1320s. Born in the south of France, Odo replaced Michael of Cesena as Minister General of the Franciscans in 1329 after the latter's excommunication. He died of the plague in 1349. The *Logica* is in three books, 'On Syllogisms', 'On Supposition', and 'On Two Universal Principles of Knowledge' (*De duobus communissimis principiis scientiarum*), namely, the Laws of Excluded Middle and of Non-Contradiction ("*de quolibet esse vel non esse*" and "*de nullo simul esse et non esse*"). In one manuscript of the work, excerpts from Odo's *Sentences* commentary have been inserted, that following the first book being on the nature of contradictory opposition. Odo maintains that contradiction is the strongest form of opposition ("*maxima oppositio*"), citing Aristotle's *Metaphysics* X 4 (1055b1-2) in support. The annex is in fact a riposte to Burley, who had claimed in a treatise probably written in Paris shortly beforehand, that contradiction was in fact the weakest form of opposition. The crux of Burley's argument was that the contradictory opposite is entailed by any opposite, and so, being included in any opposite, is the weakest of the opposites. (De Rijk 1996, p. 184.) Odo tried to confute Burley by his own arguments, for one can infer greater opposition from less. (Odo 1997, p. 208.) But here they are arguing past one another, since Burley proves that the impossible entails anything whatever by the topic 'from the less', but concedes that "from the impossible there need not follow just anything whatever, for from the less impossible the more impossible does not follow."[55]

Odo's aim in Book 3 is not so much to prove the laws of Excluded Middle and Non-Contradiction, for he says that, being principles, they are indemonstrable; rather, the aim is to explore their range of validity, and to show that they satisfy the conditions for being principles of reasoning: namely, universal consensus and indispensability for disputation. In the course of the discussion (1997, 382-3), he considers the liar paradox in the form 'I say something false' (*ego dico falsum*), and also in the jazzed-up version, 'The miser says he will give you a talent if the first thing you say to him is true', to which you reply, 'You ought not to give me a talent'. He rejects any restrictivist suggestion that self-reference is impossible or unacceptable, and argues that the liar sentence has multiple meanings and is implicitly contradictory (and so false) for it both affirms the unity of the predicate with the subject (being affirmative) and denies it (since the predicate is 'false'). (Odo 1997, 395-8.)

This solution can be seen as an interesting precursor of the solution offered by the first major home-grown logician at Paris in the fourteenth century—indeed, arguably the greatest logician of the century, John Buridan. Unlike almost every other fourteenth-century philosopher of note, Buridan remained resolutely a teaching master in the Arts Faculty at Paris through a forty-year career there. Born in Picardy in the 1290s, he was rector (in charge of all teaching for a three-month period) from 1327–8. He died in 1360 or thereabouts. His writings are exclusively commentaries on Aristotle and works on logic. The former include *Questions* on all the books of the *Organon*, the latter a *Treatise on*

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[55] In the shorter treatise: Burley (2000), 61-2; Burley (1955), 248.

Consequences from the late 1330s or early 1340s, and a massive *Summulae de Dialectica*, composed in nine books and variously revised over a twenty-year period. It is ostensibly a commentary on the *Tractatus* of Peter of Spain from a hundred years earlier, though in places, e.g., the fourth book, on supposition theory, Buridan substitutes his own text on which to comment. The final book, the *Sophismata*, sometimes appearing separately, is a self-contained introduction to logic via a succession of sophisms.

In his longer treatise *On the Essence of the Art of Logic*, Burley wrote: "Formal consequence is of two kinds: one kind holds by reason of the form of the whole structure … another kind … holds by reason of the form of the incomplex terms, e.g., a consequence from an inferior to a superior affirmatively is formal, but holds by reason of the terms." (Burley 1955, p. 86; Burley 2000, p. 173.) Consequence holding by reason of the form of the terms is a distinctively English notion, often expressed by saying it holds if the consequent is "understood in" the antecedent.[56] In contrast, the structural account is typical of Buridan and others writing at Paris. Buridan wrote: "Consequence is called 'formal' if it is valid in all terms retaining a similar form." (Buridan 1976, 2014 I 4.) An inference from inferior to superior, such as 'A man is running, so an animal is running', is for him a material consequence, for it is not valid in all terms. Nonetheless, the latter inference is valid, he says, for the consequent has more causes of truth than the antecedent. (Buridan 1976, 2014 I 8, conclusion 8.) That does not mean that the consequent is true whenever the antecedent is, for Buridan's nominalism decrees that the consequent does not exist and so cannot be true if it is not uttered. Rather, he says, things cannot be as the antecedent signifies unless they are also as the consequent signifies. (Buridan 2001, *Sophismata* ch.8, p.955.) Take the consequence, 'Every proposition is affirmative, therefore, no proposition is negative'. This is valid, since things cannot be as the antecedent signifies without being as the consequent signifies. But the antecedent can be true without the consequent being true—indeed, if the antecedent is true the consequent does not even exist.

Yet even this criterion, in terms of signification, is not quite right, Buridan argues. Others, appearing to follow Aristotle, he says, claim that truth consists in the existence of the significate of the proposition.[57] But Buridan rejects this interpretation: "if we can explain everything by positing fewer, we should not, in the natural order of things, posit many, because it is pointless to do with many what can be done with fewer. Now everything can be easily explained without positing such *complexe significabilia* [see below], which are not substances, or accidents, or subsistent per se, or inherent in any other thing. Therefore, they should not be posited."[58] All that corresponds to a proposition are the significates of its terms. But they are the same whether the proposition is affirmative or negative. So truth cannot be defined simply in terms of the signification of a proposition. Rather, a particular affirmative is true if subject and predicate supposit for the same, a negative if they don't, and so on for all the various kinds of proposition. (Buridan 2001, *Sophismata* ch.2 conclusion 14, 858-9.)

There are two obscure figures who seem to have worked at the University of Paris in the 1320s, '30s or '40s. We know the name of one of them: Thomas Maulfelt, but we know nothing else about him; we do not even know the other's name. He is often referred to as 'Pseudo-Scotus', since the treatise of his which we know, *Questions on the Prior Analytics*, was printed in the seventeenth-century edition of the works of Duns Scotus, but is definitely not by Scotus. Nor is it by the author of the *Questions*

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[56] See, e.g., Ashworth and Spade (1992), 39, citing Billingham, Strode, Hopton, Fland (or Eland) and Lavenham.

[57] Buridan, *Questiones in Metaphysicen* Book 6 question 10, cited in Klima (2009), 219.

[58] *Op.cit.*, Book 5 question 7, cited in Zupko (2003), 128.

on the Posterior Analytics also included in that edition, also not by Scotus and attributed in one manuscript to John of Cornwall. Scotus died in 1308 and John of Cornwall in 1316. The *Questions on the Posterior Analytics* might plausibly be written before 1316, but the *Questions on the Prior Analytics* refers to the doctrine of the complexly signifiable (*complexe significabile*), first mooted by Adam Wodeham in his *Sentences* lectures at Oxford in 1331.[59] It was introduced to Paris either in the works of Gregory of Rimini in the early 1340s, or possibly in those of Nicholas of Autrecourt, whose works were condemned in 1340 and burned in 1346, when he confessed: "I once said in the rue de Fouarre [the location of the Arts schools in Paris] that … what is complexly signifiable by the proposition 'God and a creature are distinct' is nothing. False and scandalous." (Cited in Tachau 1988, p. 354.) Pseudo-Scotus considers the view "that [the *dici de omni*] is a complexly signifiable, because this proposition, '[the predicate] is said universally of the subject' signifies more than these two terms 'predicate' and 'subject'. Therefore, in addition to the significates of those terms some other significate corresponds to the said proposition, none other than what is complexly signifiable by the proposition."[60] He rejects the account on the grounds that such complexly signifiables would transcend God's power, and would lead to an infinite regress. (*ibid.*, p. 284 a-b)

Another indication of date and place comes from the fact that Pseudo-Scotus appears to refer to Buridan's *Questions on the Posterior Analytics* (probably composed in the late 1320s or 1330s: see Lagerlund (2000), ch. 6), and that in his *Treatise on Consequences* Buridan himself rejects a suggestion made by Pseudo-Scotus for the analysis of propositions of the form 'Every S can be P'.[61]

Maulfelt is an enigma. Many treatises on logic attributed to him are preserved in libraries in Eastern Europe. They identify Maulfelt as English; Lorenz claims that he summarised logical doctrines at Paris in the 1320s and 1330s, but by 1339 had left, possibly for Erfurt and/or Louvain. Van der Helm casts a sceptical eye on Lorenz's claims; the conclusion must be that we simply do not know.[62] Maulfelt's textbooks had a significant influence on spreading these logical doctrines throughout Europe in the fifteenth century. His most iconoclastic doctrine is found in his commentary on Aristotle's *Categories*: where others had reduced Aristotle's ten categories to three, and Ockham to two, Maulfelt reduced them to just one, namely, quality, denying the existence, or need for, substance, at least on rational grounds (though he concedes its admission may be founded on authority).[63] Another distinctive doctrine of Maulfelt's is the identification of a fourth mode of descent, conjunct descent, as permissible for terms with merely confused supposition. (See Read 1991a, p. 76.) For example, from 'Socrates differs from every man' one can descend to 'Socrates differs from this man and from that man and so on', since, he says, the occurrence of 'not' removes the distributive power of 'every'. Since 'man' has merely confused supposition, says Maulfelt, we must define such supposition as allowing disjunct or conjunct descent.

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[59] Wodeham mostly uses the phrase 'significabile per complexum'. For a case where he speaks of 'complexe significabile', see Tachau (1987), 181 n. 39.

[60] Pseudo-Scotus (1639) q.8, 283 b: "Tertio arguitur, quod sit significabile complexe; quia ista propositio, *Dici universaliter de subiecto*, plus significat quam isti duo termini, *predicatum*, et *subiectum*; igitur praeter significata illorum terminorum correspondet aliquod aliud significatum dictae propositioni, et non aliud quam significabile complexe per propositionem."

[61] See my 'Introduction' to Buridan (2014), 4-5.

[62] See Lorenz (1996); van der Helm (2014), ch. 2.

[63] See Andrews (2008) and van der Helm (2014).

If Maulfelt was at Paris, he will have been a member of the English Nation. However, he may have been called '*anglicus*' simply because he was a member of that Nation, which also included Saxons, the most famous of whom, at least among logicians, was Albert of Saxony, born in Rickmansdorf around 1316, who arrived in Paris in 1351. Author of many commentaries on Aristotle, his logical works include *A Really Useful Logic* (*Perutilis Logica*), a collection of *Sophismata*, and a set of *Twenty-Five Questions on Logic*. Charged with founding the University of Vienna in 1365 (see Section 5 below), he left straightaway to become bishop of Halberstadt, and died in 1390. In his *Perutilis Logica* , he disagreed with Maulfelt about the mode of supposition of 'man' in the above example: for one can licitly descend disjunctively on 'man'; however, he seems to have revised this judgment in his later *Sophismata*. (Read 1990, 79-82; Fitzgerald, 2015.) 'Socrates differs from every man' means Socrates is not every man, and so Socrates is not this man or Socrates is not that man and so on. Conversely, if Socrates is not this man, then Socrates is not every man. So 'man' satisfies the criterion for determinate supposition, and conjunct descent is not needed.

Thomas of Cleves, writing in Paris in the early 1370s, would not agree. His treatise on logic has not survived, but there are later references to his doctrines. He left Paris in 1376 to teach at St Stephens school in Vienna (the foundation of the University having failed after Albert's departure), was present at its refounding in 1383, taught later in Heidelberg, and died in 1412. He is credited with claiming not only a fourth mode of descent, but in fact a fourth mode of common personal supposition corresponding to it, e.g., in 'All the apostles of God are 12', from which one descends to 'Simon Peter and Matthew and John and so on are 12'. (See Read 1991b, 55-6.) Another example, of 'man' in 'Every animal differs from every man', is attributed to Thomas' student, Paul of Gelria, who remained at Paris until 1382, when he joined Thomas at Vienna, via a year's teaching in Prague. (See Read 1991b, p. 54.)

Thomas was a student of William Buser's (Bos and Read 2000, p. 15), the author of an influential treatise on obligations (Pozzi 1990), as also was Marsilius of Inghen, all members of the English Nation at Paris. Marsilius wrote several treatises on logic, some of which have been edited (Bos 1983). He remained at Paris before leaving for Heidelberg, serving as its first rector in 1386, and dying there in 1396.

Although Thomas' works on logic have not survived, treatises of his and Paul's on *Concepts* have, both written in Paris (though Paul's seems to have been revised after his visit to Prague). (Bos and Read 2000, p. 21.) A much more famous philosopher and theologian, Peter of Ailly, also wrote such a treatise, paired with another on *Insolubles*, composed in Paris in 1372, at much the same time as Thomas'. (See Spade 1980a.) Ailly came from the village of the same name in Picardy, so he was, like Buridan, a member of the Picardian Nation. He was later heavily involved in negotiating an end to the Papal Schism, rising to the rank of Cardinal and dying in 1420. His work on insolubles derives ultimately from Bradwardine, via adaptations by Gregory of Rimini and Marsilius of Inghen, and was itself influential in the fifteenth and sixteenth centuries. (See Spade 1980a, p. 6.) Indeed, possibly because of Ailly's eminence, Parisian logicans largely followed the *via Buridani*. (See the chapter on the post-medieval period.)

6.4 REALISM AND NOMINALISM

The challenge of Ockham's nominalism was countered in England by Burley in his later writings (see Conti (2013a), 'Introduction') and by Wyclif, so that Oxford philosophy became predominantly realist in the second half of the century. In contrast, although Paris also rejected Ockhamist

philosophy, it was won over by Buridan's nominalism, so that it became something of a hotbed of nominalism after 1350.

At the heart of the dispute between Burley and Ockham, as discussed in Section 2 above, lay the metaphysics of the categories—how many kinds of things are there? Aristotle appeared to have said there were ten such broad categories—but perhaps he just meant ten kinds of predication, not of things. Burley and Ockham agree that this is far too many: in his earlier writings, Burley expressed a modest realism, claiming that there are three such kinds (substance, quality and quantity), the other seven being mere aspects (*respectus*) of those three: "The first mode of being belongs to the three absolute categories, namely, substance, quality and quantity; but the mode of being in relation to something else belongs to the other seven categories."[64] Ockham wanted to reduce the number even further, to two, by rejecting quantity as real (and denying that the other eight had any reality at all, even as aspects).

Fabrizio Amerini contrasts what he describes as Ockham's horizontal reduction of the categories to two with a vertical elimination of genus, species and differentiae in favour of the individual. (Amerini 2005a, p. 189.) This eliminativist reduction took place in two stages: first, Ockham demoted universals to the status of mere *ficta*, fictive entities having only "objective being", that is, existing only as objects of thought, having no real existence, in particular, not falling under any of the categories. Subsequently, he eliminated the object of thought as universal completely in his *actus* (or *intellectus*) theory, so that abstractive thought had no single object, bur rather embraced the things which fall under the name. It is in this way that the theory deserves the title 'nominalism', albeit universals are mental names having subjective (i.e., categorial) being in the mind. This is far from the nominalism of the twelfth century, whereby universals were dismissed as mere *flatus vocis*, a breath of air. (See, e.g., Biard 2010, p. 667.)

Although in his later writings, Burley was reacting to Ockham, Ockham himself was reacting to the early Burley and to Duns Scotus' defence of moderate realism. Scotus was a fellow Franciscan who had studied in Oxford at the end of the thirteenth century, before heading for Paris in 1302, where he taught until 1307, and finally at the Franciscan studium in Cologne, where he died in 1308 in his early forties. His realism about universals was based on the claim that though not really distinct from the individual, they were formally distinct from it. In this way, he sought to explain how individual and universal can be partly the same yet partly different. Nonetheless, regarding the horizontal distinction, he held that elements of all ten categories are really distinct.

Ockham viewed Scotus' doctrine as incoherent. If the universal is really identical with the individual then it has contradictory properties in different individuals. For example, the universal is universal and common to many; the individual is not. So if universal and individual are identical, the universal is both common and not common to many, and similarly for the individual. (Loux 1974 Chapter 16, 82–3.) He inferred that individual and universal have to be distinct; and if the universal has to belong to the categories, it has to subsist in something, and that place is in the mind. Hence "the universal is an intention of the soul capable of being predicated of many." (Loux 1974 Chapter 15, p. 81.)

The later Burley could not fault Ockham's argument against moderate realism. "If the one is predicated of something of which the other is not predicated, they are not the same, but different; and if something is predicated of the one which is not predicated of the other, they are not the same."[65] His

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[64] Burley, *Tractatus super librum Predicamentorum*, cited in Dutilh Novaes (2013), 66 n. 64.

[65] Burley, *Expositio super Praedicamenta Aristotelis*, cited in Conti (1990), 131.

response was to embrace an extreme realism in which universals are really distinct from their subjects. Where Ockham sought to explain every linguistic distinction in terms of a simpler ontology, Burley maintained an isomorphism between language and the world.[66] Just as there is a *propositio in re* corresponding to written, spoken and mental propositions, distinct from the objects which compose it as the terms are distinct from the linguistic proposition, so too there is a real universal corresponding to each predicate distinct from the objects to which it is common and of which it can be truly and commonly predicated.

Ockham's arguments were challenged elsewhere, for example, by Francis of Prato, a Dominican who arrived at the convent of Santa Caterina in Pisa in 1332, shortly after Ockham's departure from Pisa, where he had gone after fleeing Avignon. (Amerini 2005b, p. 8.) Francis, in his *Logica* of 1344-5, probably written in Perugia (Amerini 2005b, p. 25), invoked Aquinas and the Thomist Hervaeus Natalis in affirming real universals but, unlike Scotus, denying their real unity. They are united and identical only in the mind. This blocks Ockham's argument appealing to their real identity, as proposed by Scotus and Burley. Moreover, Ockham's theory (whereby in a mental proposition, a concept is predicated of a concept) is impossible, for an individual (*res singularis*) cannot be predicated universally of anything, though it can be universal by representation, by causality (natural likeness) and by signification.[67]

Similar moderate realist doctrines were held in Oxford by Wyclif and his followers, such as John Sharpe (fellow of Queen's College in the 1390s). See Sharpe (1990), which also contains relevant excerpts from the works of Alyngton, Milverley, Tarteys, Whelpdale and Paul of Venice.

Ockham's, and Ockhamist, nominalism were specifically condemned at Paris in 1339 and 1340, rejecting such attempts to distinguish a literal sense of language and its nominalist interpretation. (Kaluza 1998, p. 438.) But Paris had its own nominalist, Buridan, whose doctrines were enthusiastically taken up by his successors.

Buridan's nominalism is not dissimilar to Ockham's, so it is surprising that it proved so acceptable and indeed, attractive in Paris where Ockham's did not.[68] Perhaps the reason is that Buridan was careful to restrict his metaphysical observations to strictly logical ones. For example, commenting on an apparent counterexample to expository syllogism, with true premises and heretical conclusion: 'God is the Father, God is the Son, so the Son is the Father', he writes: "whether … syllogisms in divine terms are formally valid and what that form is, I leave to the theologians … because it is not for me, an Arts man, to determine [such matters]." (Buridan 1976, 2014, III-1 4, first conclusion.)

6.5 THE DISSEMINATION OF LOGIC

We have seen that, although most advances in logic in the early fourteenth century were made in Oxford and Paris, work was being done elsewhere – e.g., Ockham's writing his *Summa Logicae* in London, and Francis of Prato's contesting Ockham's nominalism in Italy. Moreover, the logic from Oxford and Paris was carried all over Europe by scholars travelling south to Avignon (the papal

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[66] Conti (1990), 128; cf. Biard (2010), 671.

[67] Amerini (ed. 2005), Part I tract 4 article 1, 309.

[68] For a discussion of Buridan's nominalism, see Klima's 'Introduction' to Buridan (2001), liii-lxii.

residence from 1309) and elsewhere. With the rise of the universities in the latter half of the century, logic became even more widely disseminated. The Charles University was established in Prague in 1348, and Albert of Saxony studied there before becoming a teaching master at Paris in 1351. (See Biard 2011, §1.) But mostly the movement was the other way. As we noted, Paul of Gelria left Paris for Prague in 1382; Thomas of Cleves went from Paris to Vienna and thence to the University of Heidelberg, when it was founded in 1391. John of Holland, from Amsterdam, studied in Oxford, then taught at Prague from 1366. He authored treatises on supposition, fallacies, obligations, insolubles, consequences and a collection of sophisms.

Two external factors played a particular role in this dissemination. One was the start of the Hundred Years War between England and France. This led to a gradual reduction, and in the end almost complete absence of English students at the so-called English Nation at Paris, which had always included Saxons, Scandinavians and Germans, but by the end of the century was known as the Anglo-German or even German Nation. Coupled to the so-called "Avignon captivity" of the Pope, and from 1378 the existence of two popes during the Papal Schism, one in Avignon and one in Rome, this led to a divorce between Oxford and Paris, Italian students and masters coming to Oxford (and vice versa), Germans to Paris and back.

Not all Italian masters came to Oxford (or Paris). We saw that Francis of Prato learned his Ockham in Italy. Another major Italian logician was Peter of Mantua, in the next generation (Francis died in 1345, Peter in 1399). Peter studied in Padua, and taught in Bologna. Although he never came to England, his *Logica* is clearly heavily influenced by English logicians, Burley, Heytesbury, Billingham and Wyclif in particular, as well as by the Parisians, Buridan, Marsilius and Albert. (See Strobino 2009.) Further evidence of the presence of logic beyond Oxford and Paris is shown by Vincent Ferrer's *Treatise on Supposition* (Ferrer 1977), composed in his early twenties in Lerida in 1372.

The most famous of the Italian masters who did visit Oxford is Paul of Venice, who was there from 1390–93, so that his massive *Logica Magna*, composed in the mid-1390s, is one of our best witnesses to the development of logic at Oxford in the fourteenth century. For example, in his final treatise of Part II (as yet unedited), on insolubles, Paul enumerates fifteen different solutions (and adds an unnumbered sixteenth, due to Peter of Mantua), of which those of Kilvington, Scotus, Dumbleton, Bradwardine, Albert of Saxony, Heytesbury, Peter of Ailly and Walter Sexgrave have been identified. The fifteenth is Paul's own, an elaboration of Swyneshed's.

Finally, John Dorp, born near Leiden in the Low Countries, concluded the century in Paris by composing around 1393 a *Really Useful Compendium of all of John Buridan's Logic* (Dorp 1499), revising Buridan's *Summulae de Dialectica* and replacing Buridan's commentary with his own, which became highly popular throughout Europe in the fifteenth century.