Swyneshed, Paradox and the Rule of Contradictory Pairs

Stephen Read

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Abstract

Roger Swyneshed, in his treatise on insolubles (logical paradoxes), dating from the early 1330s, drew three notorious corollaries of his solution. The third states that there is a contradictory pair of propositions both of which are false. This appears to contradict the Rule of Contradictory Pairs, which requires that in every such pair, one must be true and the other false. Looking back at Aristotle's treatise *De Interpretatione*, we find that Aristotle himself, immediately after defining the notion of a contradictory pair, gave counterexamples to the rule. Thus Swyneshed's solution to the logical paradoxes is not contrary to Aristotle's teaching, as many of Swyneshed's contemporaries claimed. Dialetheism, the contemporary claim that some propositions are both true and false, is wedded to the Rule, and in consequence divorces denial from the assertion of the contradictory negation.

Keywords: contradiction, signification, liar paradox, insolubles, truth; Aristotle, Swyneshed, Heytesbury, Eland, Strode, Paul of Venice.

1 The Rule of Contradictory Pairs

In his treatise on insolubles, written in the early 1330s, the Oxford Calculator Roger Swyneshed made three notorious iconoclastic claims:

1. There is a false proposition which principally signifies as things are

2. There is a formally valid inference with true premise and false conclusion

3. There is a pair of contradictory propositions both of which are false.

In this paper, I am concerned for the most part with the third thesis.[1] It is very natural to dismiss it out of hand, as I did myself in my 'Introduction' to my edition

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[1] I will also discuss the first. The second clearly demands attention too: it would seem to entail that Swyneshed's account of consequence is not the impossibility of true premises and false conclusion, in which case, what is his account? It is preservation of principally signfying as it is: see Spade (1979, §35) and Spade's comment in Heytesbury (1979, p. 76 n.31).

of Bradwardine's treatise on insolubles (Bradwardine, 2010, p. 24). I wrote: "No true logician would accept (3.) ... contradictories cannot both be false, by definition."

But this judgment is too hasty. We owe the introduction of the notion of contradictory pairs of propositions to Aristotle, or as he called them, *antiphases*. I quote at some length from *De Interpretatione*, ch.6:[2]

> "We mean by affirmation a statement affirming one thing of another; we mean by negation a statement denying one thing of another.
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> As men can affirm and deny the presence of that which is present and the presence of that which is absent and this they can do with reference to times that lie outside the present: whatever a man may affirm, it is possible as well to deny, and whatever a man may deny, it is possible as well to affirm. Thus, it follows, each affirmative statement will have its own opposite negative, just as each negative statement will have its affirmative opposite. Every such pair of propositions we, therefore, shall call contradictories, always assuming the predicates and subjects are really the same and the terms used without ambiguity. These and some other provisos are needed in view of the puzzles propounded by importunate sophists." (Aristotle, 1938, pp. 123-5, 17a27-34)

Contradictories are often nowadays defined as two propositions, or statements, that cannot both be true and cannot both be false. But that is not how Aristotle defines them. Rather, for him, in a pair of contradictories, one affirms of something what the other denies of it. As we will see, these definitions are not necessarily equivalent. One might call Aristotle's definition in terms of affirmation and denial the syntactic definition, and the modern one in terms of truth and falsehood, the semantic definition. Note that Aristotle's definition guarantees that every statement has a contradictory and says what it is, whereas the semantic definition does not.[3]

In his study of Aristotle's *De Interpretatione*, C.W.A. Whitaker argued that immediately after introducing the notion of contradictories in ch.6, Aristotle set out, in effect, to show the inequivalence of the two definitions. He did this by providing counterexamples to what Whitaker dubs "the Rule of Contradictory Pairs" (RCP); that in

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[2]This work of Aristotle's is variously known under the Greek title, *Peri Hermeneias*, the Latin, *De Interpretatione*, and the English, *On Interpretation*. I resist the last in being particularly unhelpful and misleading. De Rijk (2002, p. 191) takes from Gabriel Nuchelmans the neologism 'apophantics' to describe its content. A clearer term might be to call it 'On Utterances' or 'On the Expression of Thoughts'.

[3]Horn (2014, §1) claims that Aristotle "shift[ed] from a formal to a semantically based criterion of opposition" when setting out contradictories in the square of opposition. Not so: just as '*pale* is not said of Socrates' denies of Socrates what '*pale* is said of Socrates' affirms of him, so too '*pale* is not said of every man' denies of man (the universal) what '*pale* is not said of every man', or equivalently '*pale* is not said of some man', affirms of man, and '*pale* is said of no man' denies of man what '*pale* is said of some man' affirms of man: "Those contradictory opposites hav[e] universals for subjects." (17b27)

each contradictory pair, one member is true and the other false. In ch.7, Whitaker says, Aristotle gives examples of contradictory pairs each member of which is true; in ch.8, pairs each of which is false; and in the famous ch.9, concerning the future sea-battle, pairs each of which is true or false, but not determinately either.

Russell Jones (2010) echoes Whitaker's analysis, agreeing that Aristotle's target is (RCP), but disagreeing on the detail. In particular, he rejects Whitaker's claim that in ch.7, Aristotle shows that both members of a pair can be true, and the claim that in ch.9, Aristotle accepts that each member of the pair is true or false. To be clear, let us spell out five theses which are in play:

RCP (Rule of Contradictory Pairs) In a contradictory pair, one member is true and the other false

BV (Bivalence) Every proposition is either true or false

EM (Excluded Middle) Everything either holds or does not hold of any one thing at any one time

CV (Contravalence) No proposition is both true and false

NC (Non-Contradiction) Nothing both holds and does not hold of any one thing at any one time

Given that every proposition is one of a pair of contradictories, (RCP) entails (BV). Note that both (RCP) and (BV) have the cancellable (Gricean) implicature 'and not both'. (BV) and (EM) on the one hand, and (CV) and (NC) on the other are equivalent by Aristotle's account of truth and falsehood in the *Metaphysics*:

> "To say that that which is is not or that which is not is, is a falsehood; and to say that that which is is and that which is not is not, is true." (Aristotle, 1971, p. 23, 1011b26-28)

Whereas (RCP) is about pairs of propositions, (BV) and (CV) are about individual propositions, and (NC) and (EM) are about things.

Jones' objection to Whitaker's analysis of ch.7 turns on whether Aristotle really does deny (CV). He certainly asserts (NC) in the *Metaphysics*:

> "For the same thing to hold good and not to hold good simultaneously of the same thing and in the same respect is impossible," (Aristotle, 1971, p. 7, 1005b19-20)

which is equivalent to (CV) by the account of truth and falsehood just quoted. The focus of *De Interpretatione* ch.7 is on indeterminate propositions such as 'Man is pale'. Whitaker takes them to be non-universal statements about universals. As such, 'Man is pale' is true because some men are pale. But 'Man is not pale' is also true, because some men are not pale. So the contradictory pair, 'Man is pale' and 'Man is not pale',

one affirming of the universal man what the other denies, are both true. So there are true contradictions, pairs of contradictories both of which are true.

Whitaker (1996, ch.12) claims that this is not in fact a violation of the principle of Non-Contradiction, (NC). All that 'Man is pale' says is that some man is pale, so to affirm and deny paleness of man is not to claim that the same thing both holds and does not hold of the same thing in the same respect at the same time, only that "part of the universal might be pale and part not pale." (Whitaker, 1996, p. 157) Jones (2010, p. 41) rightly dismisses this as a fudge. On that reading, 'Man is pale' and 'Man is not pale' are no longer contradictories, pairs of propositions in which the same thing is affirmed and denied of the same thing. Since Aristotle seems to endorse (NC) without limitation not only in *Metaphysics* Γ 3 but also in *De Interpretatione* 12 (21b18-19), Jones proposes what he claims is a better understanding of Aristotle's counterexample to (RCP) in ch.7. There is no such single thing as an indeterminate proposition, he says. Rather, so-called "indeterminate propositions" are indeterminately universal and particular. 'Man is pale' can be understood either as the universal claim that all men are pale, or as the particular (better, partial) claim that some men are pale. This is true even if we express indeterminate propositions more explicitly in English as indefinite propositions: 'A man is a rational animal' is naturally taken as universal; 'A man is coming to fix the boiler' more naturally as particular.

Whitaker's (and Jones') interpretation of Aristotle's project in chs.7-9 is not uncontested. De Rijk (2002, pp. 252-3), for example, claims that Whitaker's mistake is to conflate contradictory pairs of assertibles, such as man's being pale, man's not being pale, with assertions, such as 'man is pale', 'man is not pale'. The former pair can appear both to be true, but are in fact neither, since, not being assertions, they are not apt to be true or false. De Rijk (2002, p. 265) thus categorically rejects the idea that Aristotle's aim in chs.7-9 is to argue against (RCP).

Moreover, if indeterminate propositions are ambiguous in the way Jones claims, it is hard to see how Aristotle can claim that "the denial corresponding to a single affirmative itself must be single as well." (*De Interpretatione* 7, 17b37-38) Aristotle continues: "The denial, that is, must deny just the thing the affirmative affirms of the selfsame, identical subject." Both interpretations, Whitaker's and Jones', strain credulity. After all, Jones' interpretation only yields a pair of contradictories both of which are true if one member is taken universally and the other partially. Yet Whitaker's seems to avoid clashing with (NC) only by denying that the two propositions affirm and deny the same thing of the same thing, namely, of the universal.

Nonetheless, Aristotle concludes the chapter by saying:

> "To sum up the foregoing statements, we showed that a single negation is opposed to a single affirmation in the manner we called contradictory ... We proved of two opposites that it is not the case always that one must be true and one false." (Aristotle, 1938, 7, 18a8-12)

So it is at least clear that Aristotle's aim in ch.7 is to question the universal correctness of (RCP), even if the examples he gives are unclear. In ch.8, Aristotle presents a further

counterexample to (RCP), this time one where the two contradictories are both false. It is a case of the fallacy of many questions, which he also discusses in *De Sophisticis Elenchis* 30. Suppose, he says, that 'cloak' applies to both man and horse, in the sense that 'Cloak is pale' means 'Man is pale and horse is pale'. Then its denial, 'Cloak is not pale', is equivalent to 'Man is not pale and horse is not pale'. If one is pale and other is not pale, then both are false. A less unnatural example might be to ask if humans give birth. Some do (women) and some don't (men). So one cannot agree that humans give birth, nor deny it. Both are false. There is, as Aristotle says, "not a single affirmation" since "one name is given to two things which do not make up one thing" (18a18). All he means by this, it seems, is that they do not make up one thing as regards the particular question at hand. As he remarks in *De Sophisticis Elenchis* 30, "a question must be single to which there is a single answer" (181a31). But if one is asked 'Are Coriscus and Callias at home or not at home?' (176a7), no single answer is possible, if one is and the other is not; and even if they both are (or are not), giving a single answer can be unclear. Again, by a contradictory pair, Aristotle is referring in *De Interpretatione* 8 to a single syntactic denial, and is showing that (RCP) is not universally true.

Jones also questions Whitaker's interpretation of Aristotle's reasoning in ch.9, though he again agrees with Whitaker that Aristotle's aim is to give further examples where (RCP) fails. This is obscured, they both say, by treating ch.9 in isolation, as so often happens. But seen in the context of chs.6-8 (and the chapters that follow) it becomes clear the (RCP) is the focus, even though (BV) is involved. Ch.8, offering further counterexamples to (RCP), closes with the words:

> "And accordingly not even here is one necessarily true and one false of two statements opposed contradictorily," (Aristotle, 1938, 18a27)

and ch.9 continues:

> "In regard to things present or past ... of those contradictorily opposed one, again, must be true and one false, when they have a universal for subject and are in themselves universal ... This need not, however, be so in the case of two such propositions as have universals for subjects but are not themselves universals." (Aristotle, 1938, 18a28-32)

(That was the upshot of ch.7.) Now comes the topic of ch.9:

> "When, however, we come to propositions whose subjects are singular terms, while their predicates refer to the future and not to the present or past, then we find that the case is quite changed." (Aristotle, 1938, 18a33-5)

Recall that (RCP) is about contradictory pairs of propositions, whereas (BV) is about single propositions. The argument of ch.9 is a *reductio ad absurdum*. Whitaker and Jones claim that the premise of the *reductio*, the claim to be rejected, is (RCP),

not (BV), that is, a claim about a contradictory pair, that one is true, the other false, not the claim that a single proposition is true or false. Aristotle writes:

> "These and other strange consequences follow provided we assume in the case of a pair of contradictory opposites ... that one must be true, the other false," (Aristotle, 1938, 18b26)

and he concludes:

> "There is evidently, then, no necessity that one should be true, the other false, in the case of affirmations and denials. For the case of those things which as yet are potential, not actually existent, is different from that of things actual." (Aristotle, 1938, 19a39-b3)

Aristotle clearly concludes that (RCP) fails for future contingents. Whitaker and Jones disagree, however, about his commitment to (BV) about future contingents. That is a claim about a single proposition, e.g., 'There will be a sea battle tomorrow'. If he denies (BV), as Jones claims, we have a simple explanation of the failure of (RCP), since as we noted, (RCP) entails (BV). However, Whitaker (1996, p. 125) claims that Aristotle is elsewhere committed to (BV), and never questions it in ch.9. He is left with the difficult task of explaining how each member of the contradictory pair is true or false, by (BV), but in such a way that (RCP) fails. His answer is that they are true or false, but not determinately either, so that the question of which cannot be answered in a dialectical dispute. No determinate answer can be given in advance.

Coming back to Swyneshed: at the end of his treatise on insolubles, he writes:

> "If in these remarks what is perfect or consonant with truth was found, it was gathered from the sayings of Aristotle and of other revered masters. If what was imperfect or dissonant with the truth is found, its insufficiency should be impugned only to me. So be it."[4]

Not all his contemporaries were convinced, however. Twenty years later, Ralph Strode wrote, concerning Roger's first thesis in particular:

> "It seems to be quite expressly contrary to age-old principles passed down by the most highly regarded philosophers and familiar to the whole community of moderns without any question or doubt and especially contrary to Aristotle's principles in the first book of *De Interpretatione*, the first book of the *Prior Analytics*, the first book of the *Topics* and the fourth book of the *Metaphysics*."[5]

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[4]Spade (1979, p. 220), reprinted in Spade (1988): *In istis autem si quid completum sive veritati consonum repertum fuerit, ex dictis Aristotelis et aliorum reverendorum magistrorum colligitur. Si quid diminutum aut veritati dissonum inveniatur, soli meae insufficientiae est impugnandum. Amen.* Translations from Spade (1979) are my own.

[5]Spade (1978, p. 76): *... videtur satis expresse esse contra antiqua principia a philosophis maxime approbatis tradita et a tota communitate modernorum sine aliqua inquisitione seu dubitatione vsitata, et precipue contra principia Aristotelis primo Peryerminias et primo Priorum et primo Topicorum et quarto Methaphisice.* Translations from Spade (1978) are my own.

But at least as regards exceptions to (RCP), Roger seems to be in agreement with Aristotle. Pairs of contradictories do not necessarily have opposite truth-values.

2   Swyneshed's Third Thesis

Let us now return to Roger's third thesis, and consider his argument for it. The thesis claims that there is a pair of contradictories both of which are false. His example is the simple Liar paradox: 'This is false', referring to itself. The usual argument to a paradox runs as follows. If it were true, assuming it signifies only that it is false, and that a proposition is true just when it signifies as it is, it would be false and so not true. So it is false. But if it is false, it signifies other than it is, by the usual account of falsehood, so it is not false but true. We have shown that it is true if and only if it is false, and so by *reductio ad absurdum*, it is both true and false.

Roger's solution to the paradox is to strengthen the condition for truth and correspondingly weaken that for falsehood. Some propositions, he notes, are relevant to inferring their own falsehood, and so they could be said to falsify themselves even if they otherwise signify as it is. So a proposition is false, he said, not only if it is not as it signifies, but also if it falsifies itself. Correspondingly, it is true only if it not only signifies as it is, but does not falsify itself. The simple Liar is, accordingly, simply false, since it falsifies itself. The first thesis records this: here is a false proposition, 'This is false', which signifies as it is. How does it falsify itself? By the simple fact that from what it signifies, namely that it is false, it directly follows that it is false. In general:

> "Some propositions falsify themselves indirectly, some directly. A proposition falsifying itself indirectly is a proposition signifying principally as it is or other than it is and that, so signifying, falsifies another proposition falsifying it ... A proposition falsifying itself directly is a proposition signifying principally as it is or other than it is, relevant to inferring itself to be false. And it is of two kinds. Some are relevant sufficiently, some are relevant insufficiently. Relevant sufficiently are propositions signifying principally as it is or other than it is from which, signifying in this way, it directly follows or is apt to follow that they are false. An example: let the proposition 'This is false' signify principally that this is false, referring to itself. Then it directly follows 'This is false, therefore, this is false'. And in this way it is relevant sufficiently to inferring itself to be false."[6]

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[6]Spade (1979, pp. 182-3): *Quaedam falsificat se mediate, quaedam immediate. Propositio falsificans se mediate est propositio significans principaliter sicut est vel aliter quam est et ipsa sic significando falsificat propositionem aliam a se falsificantem se ... Propositio falsificans se immediate est propositio significans princi-paliter sicut est velss aliter quam est pertinens ad inferendum se ipsam fore falsam. Et illa est duplex. Quaedam est pertinens sufficiens, quaedam est pertinens insufficiens. Pertinens sufficiens est propositio significans principaliter sicut est vel aliter quam est ex qua sic significando immediate sequitur vel est natum sequi ipsam fore falsam. Exemplum: Significet ilia propositio 'Hoc est falsum' principaliter quod hoc est falsum, ipsamet demonstrata. Tunc sequitur immediate 'Hoc est*

From here, the proof of Roger's third thesis is fairly immediate. 'This is false' signifies of itself that it is false. To contradict this, we take the proposition which denies of that first proposition that it is false, namely, 'That is not false', referring by 'that' to 'This is false'. Then clearly 'This is false' is false because it falsifies itself, and 'That is not false' is false because it signifies other than it is, namely, that the false proposition 'This is false' is not false. Two contradictories are at the same time false.

All Ralph Strode can find to say in response to this is to repeat his claim that this is contrary to Aristotle's teaching:

> "The opposite of [the conclusion that two contradictories mutually contradicting each other are at the same time false] is clear by Aristotle in the *Postpredicaments*, in the fourth book of the *Metaphysics* and in the first book of the *Perihermeneias*, where he quite expressly insists that it is impossible that two contradictories mutually contradicting one another are at the same time true or at the same time false."[7]

In a similar way, Robert Eland (Spade, 1978, p. 65) simply describes Roger's conclusion as "impossible" and splutters that "these conclusions are contrary to the opinion of many of the wise".[8] But William Heytesbury (1979, pp. 26-27) does try to provide an argument against Roger's position.[9] To do so, he takes the proposition 'This proposition signifies other than it is', call it A, assuming it to signify only that A signifies other than it is. Next, take another proposition, B, which signifies just as A does, namely, that A signifies other than it is. Now either A signifies wholly as it is, or not. William's idea is to derive a contradiction from each leg of this disjunction using only principles that Roger endorses. So first, suppose that it is not wholly as A signifies, that is, A signifies other than it is. Since B signifies that A signifies other than it is, and only that, it is as B signifies. Moreover, A signifies exactly as B does, so it is as A signifies, that is, A does not signify other than it is. Contradiction.

On the other hand, suppose it is wholly as A signifies. Let C be the contradictory of B, that is, let C deny of A whatever B affirms of A. So C signifies that A does not signify other than it is, that is, that A signifies as it is. Then C is true, for we have assumed that it is as A signifies, and C does not falsify itself. Moreover, B and C are contradictories, so B is false. (Here, William appears to assume that Roger does not think that a pair of contradictories can both be true, even if he believes that they can both be false.) Moreover, B does not falsify itself either, so B must signify other than it is. Since A signifies exactly as B does, and B signifies that A signifies other than it

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falsum; igitur, hoc est falsum'. Et sic illa est pertinens sufficiens ad inferendum se ipsam fore falsam.

[7]Spade (1978, pp. 76-7): *Oppositum ... patet per Aristotelem in Postpredicamentis et quarto Metaphisice et primo Peryermenias, ubi satis expresse vult quod impossibile est duo contradictoria sibi invicem contradicentia esse simul vera vel simul falsa.*

[8](Spade, 1978, p. 68): *Istae conclusiones sunt contra opinionem plurium sapientium.* On the identity of Robert Eland, called 'Fland' by Spade, see Read and Thakkar (2016).

[9]For the Latin text, see Pozzi (1987, p. 218).

is, it follows that A must signify other than it is. Once again, we have a contradiction. So either way, Roger's theory leads to contradiction.

In his treatise on 'Insolubles', the final treatise of his *Logica Magna*, Paul of Venice presents and defends a theory of insolubles in many ways similar to Roger's. He then considers a succession of arguments against the theory, rehearsing each of William's objections in turn, including that deriving a contradiction from supposing that 'This proposition signifies other than it is' either signifies other than it is or not. He offers two responses to the objection. His first is this:

> "To the second argument, I say, accepting the scenario, that it is not wholly as A signifies, and so consequently, I concede that A signifies other than it is. And then to the argument: 'A signifies other than it is, and B signifies only that A signifies other than it is, so it is wholly as B signifies': I grant the inference and the conclusion; and then to the argument: 'It is wholly as B signifies and proposition A wholly signifies like B and vice versa, therefore it is wholly as A signifies': I deny the inference, but it should be added in the premise that it is not inconsistent that A is true, and this I deny. For A falsifies itself, in that it asserts itself to signify other than it is, and this is why it is inconsistent for A to be true."[10]

Thus Paul believes that the proposition in question, A, is an insoluble, and so falsifies itself in signifying other than it is. We have a Moorean paradox: if I say 'This very proposition is false', or 'This proposition signifies other than it is', I may also immediately say correctly, 'and what I just said was false'.

Paul subsequently proposes a different solution to the first three objections (of William's) that he considers:

> "But one can respond to all these arguments in another way, admitting the scenario, by always denying each contradictory, namely, 'It is as Socrates says it is', 'It is not as Socrates says it is'; 'It is as A signifies', 'It is not as A signifies'; 'Some proposition signifies other than it is', 'No proposition signifies other than it is'. For just as it is not impossible for two contradictories to be false at the same time in the case of insolubles, so it is not impossible for the same thing to be denied at the same time in that sort of case, and

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[10]Paulus Venetus (1499, f. 196rb) corrected against manuscript Vat.lat.2132, f. 241ra: *Ad secundam rationem dico admisso casu quod non est ita totaliter sicut a significat, et ita consequenter concedo quod a significat aliter quam est. Et tunc ad argumentum: a propositio significat aliter quam est et b significat solummodo quod a significat aliter quam est, igitur ita est totaliter sicut b significat: concedo consequentiam et consequens; et tunc ad argumentum: ita est totaliter sicut b significat et a propositio totaliter significat sicut b et econtra, igitur ita est totaliter sicut a significat: nego consequentiam, sed deberet addi in antecedente quod non repugnat a esse verum et hoc negatur. Unde a falsificat se ex quo asserit se significare aliter quam est, quare repugnat a esse verum.* (Text and translation from Paul's treatise on 'Insolubles' are from an edition currently in preparation by Barbara Bartocci and myself.)

especially when insolubles principally reflect on their own signification, as experience has taught in the foregoing arguments."[11]

This is to deny both that A signifies as it is and that A signifies other than it is. It is a denial of (EM), and consequently of (BV).

This is in fact how Roger himself would deal with the paradox, as we will see. One might wonder, however, whether it is a coherent response from Paul. Does he really accept this alternative response, or is he simply including it in deference to Roger? The problem arises because Paul's account of truth, though obviously inspired by Roger's, is somewhat different. Paul writes:

> "A true proposition is one whose exact significate is true and for which it is not inconsistent that the proposition is true. This is clear from what has been said in the treatise 'On the truth and falsity of propositions'... [and] a false proposition is one which falsifies itself or whose falsity does not arise from its terms, but from its false exact significate."[12]

Talk of the "exact significate" (*significatum adequatum*) is found in many fourteenth-century authors, notably Gregory of Rimini, from whom Paul took it.[13] Gregory uses the term to denote the object of demonstrative knowledge, the famous *complexe significabile*, what is signified complexly, namely, by propositions. Paul adapts Gregory's theory in a radical way, claiming that the "exact significate" of a subject-predicate proposition is in reality the exact significate of its subject or predicate:

> "For any true affirmative present-tense proposition that has no ampliative verb or a term that is somehow distracting, the exact significate of the subject or the exact significate of the predicate is really identical with its principal significate."[14]

Thus, whereas for Gregory and others what is complexly significable has itself some real propositional complexity, for Paul it does not—rather, he claims that the exact

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[11]Paulus Venetus (1499, f. 196rb, Vat.lat.2132, f. 241ra): *Potest tamen ad hec omnia aliter responderi negando semper admisso casu utrumque contradictorium, videlicet: ita est sicut sortes dicit, non est ita sicut sortes dicit; ita est sicut a significat, non est ita sicut a significat; aliqua propositio significat aliter quam est, nulla propositio significat aliter quam est. Sicut enim non est inconveniens duo contraditoria esse simul falsa in materia insolubilium ita non est inconveniens eadem simul negari in eadem materia, et precipue quando insolubilia habent principaliter reflexionem ad significationem propriam, ut in predictis motivis experientia docuit.*

[12]Paulus Venetus (1499, f. 194vb, Vat.lat.2132, f. 239rb): *Propositio vera est illa cuius adequatum significatum est verum et non repugnat ipsam esse veram. Patet ex dictis in de veritate et falsitate propositionum ... propositio falsa dicitur esse illa que falsificat se, aut cuius falsitas non consurgit ex terminis sed ex adequato significato falso.* See also Paulus Venetus (1978, pp. 62).

[13]See Conti (2004, p. 474).

[14]Paulus Venetus (1978, p. 166): *Quarta conclusio ... cuiuslibet propositionis verae et affirmativae de praesenti sine verbo ampliativo aut termino distrahente aliqualiter, adaequatum significatum subiecti aut praedicati principali significato est communicabile identice realiter.* Translations from Paulus Venetus (1978) are my own.

significate of the proposition is really, though not formally, identical to that of the subject or predicate:

> "What is exactly and complexly signifiable by any proposition and has a place in reality, is somehow distinct from what is stateable and non-complexly signifiable by its subject or predicate. ... God is formally distinct from God existing. ... These notions are distinct, but not really distinct, therefore, formally distinct ... There is a formal distinction between those signifiable by a complex and those signifiable by a non-complex."[15]

3 Truth and Signification

Nonetheless, Paul's account of truth and falsity is puzzling: a proposition's truth was linked in the above passage to the truth of its exact significate, and the same for falsehood. But when is the exact significate true, and what does its truth consist in?

Conti (2004, p. 483) claims that Paul inverts the order of explanation, defining the truth of the exact significate as dependent on the truth of the proposition. This is shown, Conti claims, by his placing the treatise on truth and falsity in the *Logica Magna* before that on the significate of the proposition. The passage connecting the truth of the proposition with that of its exact significate occurs at the end of that earlier treatise leading into the subsequent discussion of its exact significate. Paul writes:

> "If the exact significate of a proposition is true and it is not inconsistent that the proposition, thus exactly signifying, should be true, then the proposition is true."[16]

The preceding discussion in this treatise, however, consists entirely of refutation of other accounts of truth. If Conti is right, then there is no account of truth in the the *Logica Magna*. There is no preceding account of the truth of propositions that is endorsed and accepted by Paul; and though he states, in his second thesis, that if a proposition is true, so too is its exact significate, he also believes that its exact significate can be true even if the proposition itself is false because its falsifies itself. In that case, however, the truth of the significate cannot be grounded on that of the proposition. Take 'This proposition is both true and false', for example. Its exact significate is false, whereas the exact significate of 'This proposition is false' is true, and they both falsify themselves. So the truth of the exact significate of a proposition cannot be defined in terms of the truth or falsity of the proposition itself. The order of

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[15]Paulus Venetus (1978, pp. 156-8): *Cuiuslibet propositionis adaequate complexe significabile quod in natura ponitur a suo incomplexe significabili per subiectum vel praedicatum enuntiabile aliqualiter distinguitur. ... formaliter distinguitur ... Deus a Deum esse. ... est distinctio formalis ... inter complexe et incomplexe significabilia.*

[16]Paulus Venetus (1978, p. 62): *Prima ⟨conclusio⟩ est si alicuius propositionis significatum adaequatum est verum, et non repugnat illam propositionem esse veram, sic significando adaequate, illa propositio est vera.*

the treatises can also be explained without Conti's proposed inversion: having found all other accounts of truth wanting, Paul proposes his own, which defines the truth of the proposition in terms of the truth of its significate (taking the first thesis at face value); that then serves to motivate the following treatise, on the significate of the proposition.

Such an account as Paul's is definitely realist, postulating a real correlate to every significant proposition. The consequence is that Paul appears to be committed to (BV) and (EM) where Roger is not.[17] Talk of the significate of the proposition does not occur in Roger, where instead he talks of "signifying principally". Maierù (1972, pp. 489-90) cites Strode's *Consequentiae* as saying:

> "A grammatical indicative utterance exactly significative of truth or falsity is called a proposition. And what results exactly from all the significations of its immediate verbal parts is said to be the exact or principal or total signification of the proposition."[18]

By the principal signification (Roger) and the exact signification (Paul) each means what the whole proposition signifies but ignoring any secondary or consequential signification.[19] In contrast to Paul's, Roger's account of truth and falsehood, though described in terms of how a proposition principally signifies, does not appeal to any corresponding true or false entity or significate:

> "There follow four definitions or descriptions. The first is this: a proposition is a congruent indicative utterance significative either naturally or by an imposition by which it was last imposed to signify complexly.
>
> The second is this: a true proposition is a proposition not falsifying itself signifying principally as it is either naturally or by an imposition by which it was last imposed to signify.
>
> Third definition: a false proposition is an utterance falsifying itself or an utterance not falsifying itself signifying principally other than it is either naturally or by an imposition by which it was last imposed to signify.
>
> The fourth is this: an insoluble as put forward is a proposition signifying principally as it is or other than it is which is relevant to inferring itself to be false or unknown or not believed, and so on."[20]

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[17]But see Hanke (2017), who elaborates a non-bivalent semantics for Paul's and Roger's theories.

[18]*Et oratio indicativa congrua veri vel falsi adaequate significativa dicitur propositio. Et dicitur adaequata vel principalis vel totalis significatio propositionis quae resultat adaequate ex omnibus significationibus suarum partium propinquarum quae sunt dicitones.* (My own translation.) Note, however, that although Paul's exact and Roger's principal signification may be the same, Paul believes that the total signification is greater than its exact signification. See Paulus Venetus (1978, 'On the Significatum of a Proposition', thesis 3: p. 192).

[19]See, e.g., Spade (1983, p. 106).

[20]Spade (1979, pp. 185-6): *Post illa sequuntur quattuor diffinitiones seu descriptiones. Prima est*

One might think that this rules out a proposition's being neither true nor false. However, Roger points out right at the start of his treatise that there is a third option:

> "A proposition neither signifying principally as it is nor other than it is, that is, which is neither true nor false, is a proposition signifying in some way and that so signifying is relevant to inferring itself not to signify principally as it is, for example, the proposition 'This proposition does not signify as it is', referring to itself, which principally signifies that it itself does not signify as it is. And this similarly, 'Every proposition signifies other than it is', which principally signifies that every proposition signifies other than it is."[21]

The equation of 'neither signifying as it is nor other than it is' with 'that is, is neither true nor false' occurs in only one manuscript.[22] But it is borne out by later remarks, in particular, an objection which Roger considers. It runs:

> "One argues against these proposals in many ways. First, like this: one of those proposals claims that some proposition is neither true nor false, which is contrary to Aristotle in the *Categories* where he says in one place: "Now it seems that every affirmation is true or false",[23] from which it follows that every affirmative is true or false. And if this is true of these affirmatives, for the same reason it will be true of negatives."[24]

Roger responds:

haec: *propositio est oratio indicativa congrua naturaliter, ex impositione, vel impositionibus qua vel quibus ultimo fuit imposita complexe ad significandum significativa. Secunda est haec: propositio vera est propositio non falsificans se principaliter sicut est significans naturaliter aut ex impositione vel impositionibus qua vel quibus ultimo fuit imposita ad significandum. Tertia definitio: propositio falsa est oratio falsificans se vel oratio non falsificans se principaliter aliterl quam est significans naturaliter, ex irnpositione, vel impositionibus qua vel quibus ultimo fuit imposita ad significandum. Quarta est haec: insolubile ad propositum est propositio significans principaliter sicut est vel aliter quam est pertinens ad inferendum se ipsam fore falsam vel nescitam vel ⟨non⟩creditam, et sic de singulis.* ('*non*' is added in that final clause at the suggestion of Pozzi (1987, p. 182).)

[21]Spade (1979, pp. 180-1): *Propositio nec principaliter significans sicut est nec aliter quam est, id est, quae nec est vera nec falsa, est propositio significans aliqualiter esse et ilia sic significando est pertinens ad inferendum se ipsam non significare principaliter sicut est, sicut haec propositio 'Haec propositio non significatso sicut est', demonstrata ilia eadem, quae principaliter significet quod ipsa non significat sicut est. Et haec similiter 'Omnis propositio significat aliter quam est' quae principaliter significet quod omnis propositio significat aliter quam est.*

[22]See Spade (1979, p. 180 n.27).

[23]Spade refers to *Categories* 4, 2a6-7.

[24]Spade (1979, p. 190): *Contra illas propositiones arguitur multipliciter. Primo sic: una illarum propositionum ponit aliquam propositionem fore nec veram nec falsam, quod est contra Aristotelem in Praedicamenlis ubi dicit in uno loco sic: "Videtur autem omnis affirmatio vera vel falsa". Ex qua sequitur quod omnis affirmativa est vera vel falsa. Et si hoc est verum de istis affirmativis, eadem ratione erit verum de negativis.*

"Where Aristotle claims authoritatively, "Now it seems" etc., he means to draw a distinction between propositions and the incomplex terms from which propositions are composed. Therefore, his point is that every truth or falsehood is an affirmative or negative proposition. And it follows that no incomplex term is true or false. Thus the first appeal to authority is accommodated. ...

It should be understood that every proposition signifying principally as it is or other than it is, whether it is of the present or the past or the future tense, whether of necessity or of contingency, whose truth depends on the present, is either true or false and no others. From this it is clear that there are many propositions which are neither true nor false, such as 'This signifies other than it is', referring to itself and principally signifying in that way, 'You will be dead tomorrow', and universally all propositions of future contingency whose truth does not depend on the present,"[25]

alluding specifically to Aristotle's apparent rejection of (BV) in *De Interpretatione* ch.9.

In fact, although 'This proposition signifies other than it is' is the first problematic example which Roger mentions in his 'Insolubles' (p. 181), he goes on to claim that it is in fact not an insoluble, for it does not falsify itself, and is not false:

"It remains to solve some sophisms which appear to be insolubles but are not, e.g., '*A* is known', 'This proposition signifies other than it is', 'That proposition does not signify other than it is', 'This proposition does not signify as it is', and similar ones."[26]

Take 'This proposition signifies other than it is'. This should be denied, Roger says. It doesn't signify other than it is, nor as it is. It doesn't signify as it is, for if it did, it wouldn't, and so by the usual *reductio* argument, it doesn't. But if it doesn't, it is tempting to argue for a contradiction as follows: if it doesn't signify other than it is, then it must signify as it is, since it does signify in a complex way. But if so, then it must signify other than it is, for that is what it signifies. That move is invalid, Roger says. For recall the discussion of signifying from the start of the treatise: some

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[25]Spade (1979, p. 191): *Ubi Aristoteles ponit illam auctoritatem, "Videtur autem," et cetera, intendit ponere differentiam inter propositiones et incomplexa ex quibus componuntur propositiones. Differentia igitur sua est quod omne verum vel falsum est propositio affirmativa vel negativa. Et sequitur quod nullum incomplexum est verum vel falsum. Et sic salvatur prima auctoritas ... Pro quo est sciendum quod omnis propositio significans principaliter sicut est vel aliter quam est sive sit de praesenti sive de praeterito sive de futuro, sive de necessaria sive de contingenti, cujus veritas dependet a praesenti est vera vel falsa et nulla alia. Ex quo patet quod multae sunt propositiones quae nec sunt verae nec falsae cujusmodi sunt illae 'Haec significat aliter quam est', eadem demonstrata sic principaliter significante, 'Tu eris mortuus cras', et universaliter omnes propositiones de futuro contingenti quarum veritas non dependet a praesenti.*

[26]Spade (1979, p. 215): *... superest solvere quaedam sophismata quae apparent insolubilia et non sunt, sicut sint 'a est scitum', 'Ista propositio significat aliter quam est', 'Illa propositio non significat aliter quam est', 'Ista propositio non significat sicut est', et his similes.*

propositions signify as it is, others other than it is, and yet others neither as it is nor other than it is. That last group consists of those that signify in some complex way but, signifying in that way, are relevant to inferring themselves not to signify as it is. That is the case with 'This proposition signifies other than it is', for we can immediately infer from the proposition's signifying other than it is that it doesn't signify as it is. So it does not follow from the fact that it doesn't signify other than it is that it signifies as it is, even though what it signifies is that it signifies other than it is.

Recall Heytesbury's argument. It was premised on the assumption that either a proposition signifies as it is or not (given that it signifies in some way). Roger simply denies that basic assumption of (EM) and the instance of (BV) that goes with it. However, one might question whether Roger's rejection of (EM) is really open to Paul, given his much more strongly realist account of truth.

Roger considers a final objection: his proposed solution means that "there are two mutually contradictory contradictories one of which signifies as it is while the other does not signify other than it is."[27] Take B: 'A does not signify other than it is', the contradictory of A: 'This proposition signifies other than it is'. Then B signifies as it is, while, as we have seen, A does not signify other than it is (or as it is, for that matter). For B is not relevant to inferring that it does not itself signify as it is whereas A is. So indeed, the opponent is right, and we have a further thesis, parallel to Roger's third thesis, and again contradicting (RCP).

In fact, B is true, so Roger is indeed committed to the thesis Eland (Spade, 1978, p. 65) levels at him as an objection, and as elaborated by Strode:

> "The sixth conclusion is this, that there are two contradictories of which one is true and the other neither signifies as it is nor other than it is, and in consequence, according to [Roger's] opinion, neither true nor false ... And that this thesis is unacceptable is clear enough according to Aristotle in the *Postpredicaments*, and the first book of *De Interpretatione*, where he quite expressly insists that if one of contradictories is true the other is false, and vice versa."[28]

But as we have seen, this is not contrary to Aristotle's account of contradictories in the *De Interpretatione*, but arguably very much in accord with it.

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[27]Spade (1979, p. 218): *aliqua sunt duo contradictoria sibi invicem contradicentia et unum illorum significat sicut est et aliud non significat aliter quam est.*

[28]Spade (1978, p. 78-9), corrected against manuscript Erfurt Q255: *Sexta conclusio est ista, quod aliqua sunt duo contradictoria, quorum unum est verum et reliquum nec significans sicud est nec aliter quam est, et per consequens secundum istam opinionem nec ⟨est⟩ verum nec falsum ... Et quod ista conclusio sit inconveniens satis patet per Aristotelem in Postpredicamentis et primo Peryerminias, ubi satis expresse vult ⟨quod⟩ si unum contradictoriorum sit ⟨verum⟩, reliquum est falsum, et e converso.*

4 Negation and Denial

What is the contemporary relevance of these reflections? On the semantic account of contradictories, whereby pairs of contradictories must have opposite truth-value, it is impossible for there to be true contradictions, pairs of contradictories both of which are true, or both false. Indeed, by (RCP), or even by a weak form of (RCP) which says that if one of the pair is true the other false and vice versa, if both are false then both are true. This weak form of (RCP) is compatible with their lacking truth-value altogether and with their both being both true and false. But it is not compatible with Swyneshed's third thesis, their both being false and not true, nor with Aristotle's counterexamples in chs.7-8, at least.

On the syntactic account, however, whereby one member of each contradictory pair denies what the other affirms, numerous counterexamples to (RCP) are to be found, notably among the logical paradoxes, according to some medieval responses to the insolubles. Indeed, there seem to be counterexamples even to (EM) and (BV).

Graham Priest is a Roger Swyneshed for our own times, with his own iconoclastic thesis:

> "Dialetheism is the view that some contradictions are true: there are sentences (statements, propositions, or whatever one takes truth-bearers to be), α, such that both α and $\neg\alpha$ are true, that is, such that α is both true and false."[29]

Here $\neg\alpha$ is the negation of α. Priest (2006b, p. 70) rejects the principle that the truth of $\neg\alpha$ excludes the truth of α.

But care is needed here in identifying $\neg\alpha$. Priest (2006a, p. 76 n.2) refers us to Priest (2007, §7.2), where he describes Aristotle's account of negation as being encapsulated in the square of opposition. As we have seen, that is only part of the story, Aristotle's account as applied specifically to the A, E, I and O forms of subject-predicate propositions. Even here, there are counterexamples. Suppose, to take a medieval example, God has annihilated all affirmative propositions apart from 'Some affirmative proposition is false'. Then that proposition, being the only affirmative proposition, falsifies itself, and so on Swyneshed's account is false (and also in many other accounts, e.g., Bradwardine's). But 'No affirmative proposition is false' is also false, for there is a false affirmative proposition, namely, 'Some affirmative proposition is false'. So they are both false, yet they are contradictories, in that one denies what the other affirms.

There are problems of translation here, since 'negation' and 'denial' are often run together by the translators, perhaps even by Aristotle himself, but we can take it that $\neg\alpha$ and α are intended by Priest and other modern authors to correspond to Aristotle's pairs of contradictories or opposites.[30] Priest (2006a, p. 77) writes:

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[29]Priest (2006a, p. 1).

[30]However, some commentators, e.g., Whitaker (1996, p. 81), claim that for Aristotle, negation

> "We have a grasp of negation ... and we can use this to determine when 'notting' negates ... [T]here appears to be a relationship of a certain kind between pairs such as 'Socrates is mortal' and 'Socrates is not mortal'; and 'Some man is mortal' and 'No man is mortal'. The traditional way of expressing the relationship is that the pairs are *contradictories*, and so we may say that the relationship is that of contradiction. Theories of negation are theories about this relation."

But recall that Aristotle described ¬α (that is, the opposite, or contradictory, of α) as denying what α affirmed, or asserted. However, Priest (2006a, p. 104) rejects an identification he attributes to Frege:

> "to deny α is simply to assert ¬α."

Rather, he says, we can deny something in many different ways:

> "I can shake my head, say 'no' or even stomp off in a rage. Perhaps more importantly, consider someone who supposes that some sentences are neither true nor false." (*loc.cit.*)

But none of these is incompatible with asserting ¬α, indeed, most of them entail it. That's certainly true of the head shake and saying 'no'. Stomping off suggests either implicit assertion of ¬α or the (badly named) metalinguistic rejection of α, as in 'I'm not the UK expert, I'm the world expert'.[31] That is not to deny you're the UK expert, it entails that you are. Lastly, if a sentence is neither true nor false, it's not true.[32] So denying α actually entails asserting ¬α.

However, Priest claims, we can assert ¬α without denying α. He is forced to do this by his definition of falsehood:

> "The definition of falsity assures us that ¬α is true iff α is false."[33]

That is the weak (RCP), that if one of a pair of contradictories is true, the other is false, and vice versa. Indeed, given his endorsement of (BV),[34] Priest is in fact committed to (RCP) in full, albeit without the cancellable implicature of (CV). Thus Priest retains (RCP) and rejects Frege's Aristotelian identification of the assertion of ¬α with the denial of α.

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was not an external operation, but rather, internal to the assertion, and so the notation ¬α is not appropriate in his case.

[31]See (Priest, 2006a, p. 77) and Horn and Wansing (2017, §1.10).

[32]Intuitionists reject (BV) in a more subtle way, by refusing to assert that every proposition is either true or false, but not by claiming that any given sentence is neither true nor false. Since they assert the double negation of (EM), it would be inconsistent either to deny (BV) or to assert its contradictory.

[33]Priest (2006a, p. 81).

[34]Priest (2007, p. 146) observes that in his logic of paradox (LP), "each sentence is either true or false or both."

By rejecting (RCP), Aristotle is able to square rejecting (BV) and (EM) with identifying negation and denial—and he could even reject (NC) and (CV), though he chooses not to. Aristotle claims that if β denies (of x) what γ affirms (of x), then β and γ are contradictories, that is, $\beta = \neg\gamma$. Faced with the counterexamples in chs.7-9 of *De Interpretatione*, Aristotle rejects (RCP), even in its weakened form.

5 Conclusion

To sum up: Swyneshed enunciated three notorious consequences of his proposed solution to the insolubles, the most famous of which is his claim that it is possible for both members of a contradictory pair to be false. This appears to run contrary to a basic principle, the Rule of Contradictory Pairs, that in each such pair, one member is true and the other false, a principle often attributed to Aristotle. But two recent authors who have looked closely at Aristotle's arguments in the central chapters of his treatise *De Interpretatione* claim that Aristotle rejects this principle, presenting a succession of counterexamples to it, culminating in his discussion of the future sea-battle in ch.9.

Swyneshed himself likens his approach to the insolubles to the problem of future contingents, citing them as counterexamples not only to the Rule of Contradictory Pairs, (RCP), but also to the Principle of Bivalence, (BV). Indeed, the paradoxes of signification, exemplified by the self-referential proposition 'This proposition signifies other than it is', are counterexamples also to the Law of Excluded Middle, (EM). Whatever may be wrong with Swyneshed's solution it is not that it is contrary to Aristotle's teaching, if Whitaker and Jones are right.

Graham Priest's dialetheism claims that some contradictions, that is, pairs of contradictories, are true, equivalently, that some propositions are both true and false. In fact, he endorses (RCP), equating the falsehood of α with the truth of $\neg\alpha$ (its negation). As a consequence, negation and denial come apart, and $\neg\alpha$ is no longer the (Aristotelian) contradictory of α. Aristotle and Swyneshed might appear to be in agreement with dialetheism, allowing contradictories to be true or false together. But in contrast, they reject (RCP), and at least in the case of the latter, (BV), and so this is only a superficial agreement.

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