The purpose of this paper is to restate Aristotle's theory of truth in terms of modern logic. I hope to examine critically some key passages from the *Metaphysics*, the *de Interpretatione*, and the *Categories*. I intend to provide with the exposition of these passages a somewhat detailed treatment of the special problem of future contingent truths as it appears in Chapter 9 of *de Interpretatione*. Medieval and modern versions of a three-valued logic and its application to theology will be mentioned in lesser detail.

Aristotle's theory of truth is usually called a *correspondence* theory, although correspondence, as Professor Prior points out ("The Correspondence Theory of Truth" in Edwards P. (ed.) *Encyclopedia of Philosophy*), is a modern term which takes its currency from the writings of Bertrand Russell. A clear formulation of Aristotle's theory is found in the *Metaphysics*. There he writes 'To say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, and of what is not that it is not, is true' (Book 4, Chapter 7, 1011b25). These correspondences can be shown in a simple table analogous to the truth-tables of modern logic or the operations tables of algebra.

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It will be remembered of course that an embryonic form of correspondence doctrine had already appeared in at least three places in Plato (*Euthydemus* 284a, *Cratylus* 385b, *Sophist* 263b). But one must also remember the difficulties 1. It has been pointed out to me that this enterprise is doomed *ab initio*. (In correspondence with Dr G.H. Duggan S.M.). According to some, among them Fr Duggan, Aristotle's theory of truth cannot be stated in terms of *any* logic. For Aristotle's theory of truth, i.e. his epistemology, is part of his metaphysics, its function being to establish that being, which he will discuss in his metaphysics, is knowable. So in epistemology he is concerned with *first intentions* i.e. judgements by which the mind is conformed to the real, e.g. that the whale is a mammal. In this act the mind apprehends what is. In logic the mind is concerned with *second intentions* — these are judgements regarding the relationships between the concepts which the mind forms in its apprehensions of the real; thus the relationship of the concept 'whale' to that of 'mammal' is that of species to genus.

While I admit the validity and importance of this distinction I do not think it kills my programme at birth. For truth is manifold and while in Aristotelian and Scholastic language it is anchored in being and not-being it is still possible to argue that the logical categories in terms of which truth is discussed (subject, predicate, combination, division, negation) need to be expounded and brought into sharp focus. That is what I am trying to do in this paper.
that arose in Greek philosophy over saying what is not. It is a salutary exercise to decide which of three possible senses of ‘is’ is applicable in any given case. In the present context of Aristotle’s *Metaphysics* ‘is’ could mean ‘exists’, ‘is so-and-so’, or ‘is the case’ (and ‘is not’ similarly). The last interpretation is the only one sufficiently broad to let the definition cover all cases of truths and falsehoods as Aristotle’s argument requires.

Another Platonic legacy bequeathed not just to the Philosopher but to philosophy was the problem of the conditions of significant discourse. The problem is at once logical, epistemological, and metaphysical, and any separation of the three aspects must be an ad hoc measure solely designed to facilitate discussion and subserve the function of illuminating the problem in toto. It must not be thought that meaning, truth and being are disparate pieces of the whole. With this proviso let us observe that Plato found the possibility of discourse (*logos*) in the ‘weaving together of forms with one another’ (*Sophist* 259e). A little earlier in the same dialogue (253b-c) the question of significant discourse is raised (a question of course quite distinct from the question of the possibility of discourse per se). Some science is needed which can point out which kinds (*gene*) are consonant and which are incompatible with one another and moreover whether there are certain kinds which pervade them all and connect them so that they can blend; and again, where there are divisions, whether there are certain others that traverse wholes and are responsible for the division. In this section Plato’s predominant interest seems to be logical: he is concerned with meanings, the significant and non-significant coupling of diverse kinds. Of course it is a metaphysical point, more precisely an ontological one, what are the kinds of which he speaks. For the present let us shelve this problem, as it will recur in the context of Aristotle’s logic. Hard upon the description of discourse as the weaving together of forms with one another, follows Plato’s bold attempt to meet the haunting wraith of Greek philosophy to which I drew attention above: how is falsity possible if falsity in thought and speech is construed as thinking or saying what is not. It would be at best arbitrary and in fact simplistic to single out logic, epistemology or metaphysics as the discipline best equipped to shed light on the all-encompassing darkness in which ‘not’ hides. To make the point just once more that there are no branches of philosophy but only philosophy let me quote the *Metaphysics* again (Book 6, Chapter 4, 1027b 18-20): ‘that which is in the sense of being true or is not in the sense of being false, depends on combination and separation, and truth and falsity together depend on the allocation of a pair of contradictory judgements’.

From this all too brief and summary survey of Greek attempts to grapple with problems of meaning, truth and being I must pass on to the separate but related topic of philosophy and grammar, more particularly, logic and grammar. Now it cannot be denied that a correct understanding of grammar is both eminently desirable in se and an indispensable aid to an intelligent appreciation
ARISTOTLE'S THEORY OF TRUTH

of philosophical problems. It was in no small measure the lack of clearly articulated grammatical categories in the Greek language during the first half of the fifth century\(^2\) that was responsible for the extreme metaphysical monism of Parmenides and his rejection as meaningless of language which attempted to make change and plurality features of reality. To take but a single instance: the locutions 'to be' and 'to be one' in a certain sense maintain the same thing. But unity under one aspect does not rule out diversity under another. A thing can be one and still have many things attributed to it. For example one man may be educated, tall, fair-headed and rich, all at the same time. He still remains 'one' man. To put the matter in comparatively modern terms Parmenides and his disciples confused statements of identity with statements making predications. Both Plato (Sophist, passim) and Aristotle (Physics 1.2-3) exposed at some length the grammatical fallacies which held up the progress of philosophy. Notwithstanding this signal service, it must be admitted that neither of the two achieved a proper understanding of the essential difference between grammatical and logical analysis. At the end of the Sophist (262) Plato gives an analysis of simple statements in terms of onomata and rhemata, i.e. such statements consist of a subject-expression which is the name of something and a predicate-expression which says something about the thing named. Admittedly Plato goes a little further than merely establishing the grammatical form of the statement; he specifies the function of both onomata and rhemata (describing onomata in terms of the definition of rhema) in detail sufficient to rule out the adequacy of mere lists of either to achieve the status of statement (logos). It is perhaps unfair to quibble at the extreme simplicity of Plato's examples since no doubt simplicity is subservient to clarity. But given a characterisation of rhemata as 'expression applied to actions' and of onoma as 'the spoken sign applied to what performs these actions' one must ask how Plato would analyse a statement such as 'a man understands geometry' as opposed to merely 'a man understands'. Where more than one onoma is involved does each onoma perform the same function? For that matter how should onoma be translated? Noun or name? Noun is perhaps more specific and appropriate in the case of 'a man understands geometry' than the more general term 'name'. But what if the example were 'Socrates understands geometry'? Clearly 'Socrates' and 'geometry' are not nouns of the same kind. Plato's analysis is acute and for the most part sound as far as it goes, but it does not go far enough.\(^3\)

Aristotle's approach to logic is also heavily grammatical. This is perfectly obvious, for example, from de Interpretatione. In particular I wish to consider the passage beginning at 16a12 where the issue is the logical status of names\(^4\)


\(^4\) 'This treatise of Aristotle's has as its subject logic, not grammar, and therefore he is treating here — and will define later (16a19) — the name, not the noun. One indication of
and verbs. (onomata and rhemata). Taken in isolation names and verbs such as ‘man’ and ‘white’ are like thoughts without combination or division. (‘White’ seems odd as an example of a verb but the anomaly can be removed if we remember that the basic meaning of rhema is what-is-said. Aristotle thinks of adjectives as saying something about something else.) And since truth and falsity have to do with combination and separation an isolated name or an isolated verb has no truth-value. To emphasize this point Aristotle takes the further case of a name which seems to be unequivocally false in se. Since ‘goat-stag’ applies to nothing it might be thought to be always false. But this is not so. Of itself ‘goat-stag’ makes no claims about reality which can be tested for truth or falsity. If ‘is’ or ‘is not’ is added the result is a statement capable of having a truth-value. (Even ‘goat-stag is’ is hardly an intelligible statement in English; but its equivalent would pass in Greek. The English would need an article — ‘A goat-stag exists’, ‘The goat-stag is no fiction’). Truth-value pertains to the whole statement, not to the subject or predicate alone.

Aristotle implies, but does not explicitly state, that a statement consists of a name and a verb (de Interpretatione 16a17, 16b28 and cf. Categories 1a18). This formula suggests that he has not clearly distinguished logic and grammar. We might speak of the grammar of a sentence where grammar deals with the order of words. But logic is concerned with meanings, with speech as expressing conceptions of the intellect.

A name, according to Aristotle, is a spoken sound signification by convention, without time, none of whose parts is significant in separation. A verb is what additionally signifies time, no part of it being significant separately; and it is a sign of things said of something else. How then would he analyse a statement such as ‘Cows eat grass’? If the statement consists solely of a name and a verb what is the verb? ‘Eat grass’? But both ‘eat’ and ‘grass’ are significant in separation. Moreover ‘eat’ carries a time-reference but ‘grass’ does not. On these scores Aristotle’s analysis of simple statements is defective.5

I want now to turn more directly to the question of truth and falsity. A passage in the Categories, of some sophistication, deals with the problem of truth-bearers. ‘It seems most distinctive of substance that what is numerically this is his use of “name” to cover both the noun and the adjective. Another is his statement (16b19) that verbs in themselves are names. To translate this as “verbs in themselves are nouns” confuses what he has said up to this point (for he does not mean the infinitive form of the verb). “Name” on the other hand clarifies what he is saying, for “name” is taken here as a genus which includes names (i.e. nouns and adjectives) and verbs (cf. St Thomas Lesson V n15). This reading is again confirmed at 19b20, where Aristotle speaks of “is” as a name or a verb. “Name” is therefore used generally at first to cover the substantive name, the adjectival name, and the verb; then it is taken more determinately (16a19) to include only the first two when it is defined as opposed to the verb, i.e. where the species of the genus name are defined.’ Jean T. Oesterle, Aristotle On Interpretation. Commentary by St Thomas and Cajetan, p.19, n.3.

5. More extensive treatment of this topic may be found in J.L. Ackrill’s edition of Aristotle’s Categories and de Interpretatione, Oxford 1963.
one and the same is able to receive contraries' (*Categories* 4a10). But are not
statements and beliefs like this in that numerically one and the same statement
or belief is true or false? If the statement 'Professor Carnap is flying to the
moon' is true, after he has reached the moon this statement will surely be false?
No it will not: it is not the same statement in every respect. 'Professor Carnap is
flying to the moon' is a sentence-type. The instances of this type uttered before
and after the moon-landing are sentence-tokens. The distinction between
sentence-type and sentence-token dates only from C.S. Peirce in the nineteenth
century but all the same a Greek philosopher knew that the same statement
could not be both true and false at the same time. Reflection on this point
should have led Aristotle to reject time-dependent entities such as statements as
the bearers of truth or falsity. He does not take this step but he does add the
qualification 'it is because of a change in the actual thing that the statement
comes to be true at one time and false at another.' The notion of
correspondence with fact is hinted at in the qualification and made more explicit
in the resolution of the problem towards the end of Chapter 5 of the *Categories*:
'it is because the actual thing exists or does not exist that the statement is said to
be true or false, not because it is able itself to receive contraries.'

Let us come back to combination and division. *Categories* la16-19 gives clear
examples of what is meant by combination. 'Man runs', 'man wins' are things
said involving combination, whereas 'man', 'ox', 'runs', 'wins' are things said
without combination. Chapter 4 of the same work adds that none of the
examples in the list of categories constitutes an affirmation when it is said just
by itself. It is by the combination of such terms with one another that an
affirmation is produced. For every assertion, it seems, is either true or false; but
of things said without combination none is either true or false.

Division is more difficult to illustrate. Take *Metaphysics* Book 6 Chapter 4
(1027b 20-22): '.. truth has the affirmation in the case of what is compounded
and the denial in the case of what is divided, while a falsehood has the opposite
of this apportionment'. (Kirwan's translation). This statement of Aristotle's can
be put in the form of rules for speaking truth and falsity.⁶ To speak the truth
where the subject and predicate are united, affirm the statement. To speak the
truth where the subject and predicate are divided, i.e. where the subject does not
have the predicate, deny the statement. For example, in the statement 'Mt
Everest is higher than Mt Cook' the subject and predicate are united. The
sentence is true as it stands. But if I say 'Mt Cook is higher than Mt Everest' the
predicate does not belong to the subject. In Aristotle's terminology subject and
predicate are divided. To form a true statement I must deny what I formerly
asserted, i.e. that Mt Cook is higher than Mt Everest. The rules for speaking
falsity are analogous. To speak falsity where the subject and predicate are united

⁶. In what follows I am indebted to a suggestion of Professor R.H Stoothoff for the
manner of expression.
deny the statement. To speak falsity where the subject and predicate are divided
affirm the statement. The former case is exemplified in the statement ‘It is not
the case that Dunedin is south of Christchurch’. An example of the latter is
‘Christchurch is south of Dunedin’.

I have said that Aristotle’s theory of truth is a correspondence theory, i.e.
truth consists in some form of correspondence between beliefs and facts. (This
way of expressing it is of course the modern way, derived from Russell. Aristotle
himself speaks of saying of what is that it is or is not). In some cases what the
belief is and what the fact is seem quite clear and the notion of correspondence
is accordingly straightforward. But difficulties arise ‘when in what is added some
opposite is contained from which a contradiction follows’ (de Interpretatione
21a21-22). It is not true but false to call a dead man a man: the existence of the
man X is the fact to which the belief or statement that X is a man must
correspond. A man is by definition an animal, that is, a kind of living thing. But
what of the statement ‘Homer is a poet’? Does ‘poet’ carry the same demand for
existence as ‘man’? Or as Aristotle puts it ‘does it follow that Homer is? It does
not follow: it is because he is a poet, not in its own right that the “is” is
predicated of Homer’. Only on this interpretation of ‘is’ can ‘Homer is a poet’ be
regarded as a true statement. But it must be admitted that it would be a difficult
matter to make precise the fact to which the statement that Homer is a poet
corresponds. It is not enough to say, as Cajetan does in his commentary to this
passage, that ‘Aristotle introduces that genus of enunciation in which one part of
the conjunction is something pertaining to an act of the mind (for we are
speaking only of Homer living in his poems in the minds of men)’. And it must
be further noted that what Aristotle says in de Interpretatione about the
non-existence of the subject at least appears to contradict his statement on this
issue in the Categories (13b12ff). In that passage he says of the contrary pairs
‘Socrates is sick’ and ‘Socrates is well’ that if Socrates exists one will be true and
one false but if he does not exist both will be false. This does not concur with
Homer’s non-existence in the case of ‘Homer is a poet’, which is a true
statement. In the case of contradictory statements on the other hand — ‘Socrates
is sick’, ‘Socrates is not sick’ — the existence of the subject implies that one is
true and the other false. Similarly for the non-existence of the subject. The
difference is that where the subject does not exist it is possible to allocate
truth-values to determinate statements: ‘Socrates is sick’ is false and ‘Socrates is
not sick’ is true. Aristotle is generous in allowing significance to statements in
which the subject does not exist. It is a fair inference from the opening chapter
of de Interpretatione that ‘goat-stag is’ is both significant and false and ‘goat-stag
is not’ is both significant and true. They conform to the definitions of truth and
falsity at Metaphysics 1011b25. ‘Goat-stag is’ says of what is not that it is and so
it is false. ‘Goat-stag is not’ says of what is not that it is not and so it is true.

A correspondence theory of truth must accommodate the problems of time.
One might begin with Augustine’s classic statement: qui est ergo tempus? si
nemo ex me quaerat, scio; si quaerenti explicare velim, nescio. The point of departure for many discussions of time and truth is *de Interpretatione* Chapter 9. There Aristotle tackles what has been called the problem of future contingents. Particular statements about the future, e.g. 'There will be a sea-battle tomorrow', do not conform to the same rules for truth and falsity as statements about the present or past. The philosopher must try to see in what sense, if any, such statements about the future can be called true or false. One decision on possible truth-values leads to determinism. For the theologian there is the question of how to reconcile an undetermined future with an omniscient God.

Chapter 9 of *de Interpretatione* divides into three parts. In Part 1 (18a28-34) Aristotle says that a certain thesis does not hold of contradictory statements about particulars in the future. (It will be convenient to call such statements 'future singulars') In Part 2 (18a34-19a6) he develops an argument to show that if that thesis did hold of future singulars then everything that happens would happen of necessity. This consequence may be labelled 'determinism'. In Part 3 (19a7-19b4) the Philosopher denies determinism and states his own view about future singulars. Determinism and its denial have theological repercussions of course and on these I shall touch briefly towards the end of the paper.

The opening section of the chapter (18a28-34) introduces the distinction between pairs of statements which consist of one true and one false, and statements about future singulars. Of these latter kind it can only be said that it is necessary for the affirmation and the negation of a contradictory pair to be either true or false. 'There will be a sea-battle tomorrow' is either true or false and the same holds for 'There will not be a sea-battle tomorrow'.

The second part of the discussion (18a34-19a6) sets out an argument for determinism. If every affirmation or negation is true or false it is necessary for everything either to hold or not to hold. If it is true to say that dogs have four legs or do not have four legs then it is necessary for dogs to have four legs or not to have four legs. From a premiss which is true a conclusion follows which is also true. The argument differs from an ordinary argument in that the truth of the conclusion is thought to be necessary, not just a matter of fact.

This argument for determinism is fallacious. Whether Aristotle realised it was fallacious or not is uncertain. If a conclusion follows from a premiss which is true all that can be asserted is that the conclusion is also true. It is quite incorrect to say that the conclusion is necessarily true. On the other hand if one knows what is meant by 2 and what is meant by 3 one sees that 2+3 = 5 is necessarily true. Medieval logic drew the distinction between *necessitas consequentis* and *necessitas consequentiae*. The first of these is shown in the opening sentence of this part of Aristotle's chapter: If every affirmation or negation is true or false it is necessary for everything either to be the case or not to be the case [(x): x∈A. N(x∈B)]. The conclusion is drawn invalidly from the premiss. *Necessitas consequentiae* on the other hand is seen in a statement like
'It is necessary that if something is a dog then it is a quadruped' \( [N: (x): x \in A \Rightarrow x \in B] \). Aristotle would hold that being a quadruped is a necessary element in being a dog and is not a contingent attribute like its colour.

The final part of *de Interpretatione* Chapter 9 (19a7-19b4) denies determinism and sets out Aristotle’s own views on future singulars. Determinism is refuted by appeals to deliberation in human affairs and to the distinction between the actual and the possible (it is possible for the Vice-Chancellor to be run over by a train but in fact he will fall out of a window). In trying to present his own views on future singulars Aristotle seems to be confused. He could have put his case more clearly with the help of an adequate symbolic notation. Let me illustrate this point from the sea-battle example. He wants to get out of the determinist boat by denying both the necessary occurrence of the sea-battle tomorrow and its necessary non-occurrence tomorrow. The way he escapes is by asserting the necessity of the whole disjunction: that is, he claims it is necessary only for a sea-battle to take place tomorrow or for one not to take place tomorrow. Prescinding for a moment from the status of the disjunction let us see how symbolism can help. We introduce the modal operator \( N \) to indicate necessity and we abbreviate ‘a sea-battle will occur tomorrow’ by the letter \( p \). The statement ‘it is necessary for there to be or not to be a sea-battle tomorrow’ can be written \( N(p \vee \neg p) \). Aristotle rules out as invalid the inference from this statement to ‘it is necessary for there to be a sea-battle tomorrow’ and to ‘it is necessary for there not to be a sea-battle tomorrow’ \( (Np \land \neg Np) \) respectively. What he probably thought he ruled out concomitantly is the inference from \( N(p \vee \neg p) \) to ‘it is necessary for there to be a sea-battle tomorrow or it is necessary for there not to be a sea-battle tomorrow’ \( (Np \lor \neg Np) \). In this latter formulation the necessity of both parts of the disjunction is clearly marked, whereas Aristotle’s expression ‘one cannot divide and say that one or the other is necessary’ is ambiguous. Interpreting \( N(p \vee \neg p) \) as \( Np \lor \neg Np \) is as serious a mistake as interpreting \( 5(6x2) \) to mean \( (5x6) \times (5x2) \).

Did Aristotle really think he had gained anything by uniting the two parts of the disjunction and asserting that both together were necessary? Wittgenstein remarked in the *Tractatus* (4.46) that both tautology and contradiction are not pictures of reality. It is tautologous to say ‘Either it is raining or it is not raining’. The statement tells you nothing about the weather because it is true no matter which of its parts expresses a fact. In general, any proposition of the form \( p \lor \neg p \) is true if either \( p \) is true or \( \neg p \) is true. Aristotle’s assertion of the necessity of the whole disjunction tells us nothing about the relation of tomorrow’s sea-battle to any actual state of affairs.

Could we look now at the theological repercussions of the admission of a third truth-value: neither true nor false but just potentially either. Spatio-temporal conditional statements demonstrate the need for a third value. Consider the propositions ‘A will occur’ and ‘God knows that A will occur’ where A is an undetermined future event. If God can is omniscient can we say
that 'If God knows that A will occur, A will occur'? One philosopher who thinks we can is the fourteenth-century writer William of Ockham. In his commentary on the *de Interpretatione* Ockham tries to work out what *consequentiae* or implications involving 'neuter' propositions Aristotle would have admitted and what he would have rejected. In ordinary two-valued logic the truth conditions for implication have four possibilities. The three-valued system admits these same four possibilities and another five. The extra five involve the value neuter for either antecedent or consequent or both. Consider the example with which I started: ‘If God knows that A will occur, A will occur’. Aristotle would say that the antecedent is simply false: nobody can know that an undetermined future event is going to occur. In that case the consequent is neuter: it is neither true nor false that A will occur. What then is the status of the implication as a whole if the antecedent is true and the consequent neuter? Ockham maintains, and so do modern logicians, that it is true: from a false proposition a neuter one truly follows.

A more troublesome case arises from the converse implication: ‘If A is going to occur, God knows that it is going to occur’. If the antecedent is true the consequent will be true. If the antecedent is false, the consequent will be false. In both cases the implication will be true. But if the antecedent is neuter the consequent will be false. If there is going to be a sea-battle tomorrow God knows there will be a sea-battle tomorrow. The antecedent of this proposition is neuter: tomorrow's sea-battle cannot be predicted truly or falsely today. But if this is so it is false that God knows there will be a sea battle tomorrow. What do we make of the implication? Ockham confessed he was stumped: *consequentia non valet*. There is a modern solution, derived from the Polish logician Lukasiewicz. The details, though intelligible, are very involved so let me say merely that the solution finds a neuter value for the inference from 'A is going to occur' to 'God knows that A is going to occur': that is, the implication is neither true nor false.

The more general problem of God’s omniscience also finds more penetrating and elaborated treatment now than medieval philosophy was able to give it. Once again we must eschew the finer details. We start from an assertion of omniscience in the form: For any p, if p, then God knows that p. If there are neuter propositions as well as propositions true and false, omniscience can be expressed as the conjunction of three conditional statements: if something is true God knows it is true and if something is false God knows it is false and if something is neither true nor false God knows it is neither true nor false. Theology tells us that God does know whatever is true. The first part of the formula remains intact. But the nature of knowledge is such that we can know only what is true: nobody can know what is neither true nor false or just false.

This condition vitiates the second and third parts of the conjunction asserting omniscience. We must say it is false that God knows either what is neither true nor false or what is simply false. It can be shown, in the mathematical symbolic notation favoured by Lukasiewicz, that the conjunction of three conditional propositions asserting God's omniscience reduces to a single neuter proposition. This last proposition is interpreted as saying that it is neither true nor false that God is omniscient.*

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