COLOUR INCOMPATIBILITIES AND ANALYTICITY[1]

By Aaron Sloman

A.

THE debate about the possibility of synthetic necessary truths is an old and familiar one. The question may be discussed either in a general way, or with reference to specific examples. This essay is concerned with the specific controversy concerning the incompatibility of colours, or colour concepts, or colour words. The essay is mainly negative: I shall neither assume, nor try to prove, that colours are incompatible, or that their incompatibility is either analytic or synthetic, *but only that certain more or less familiar arguments intended to show that incompatibility relations between colours are analytic fail to do so.* It will follow from this that attempts to generalise these arguments to show that *no* necessary truths can be synthetic will be unsuccessful, unless they bring in quite new sorts of considerations. The essay does, however, have a positive purpose, namely the partial clarification of some of the concepts employed by philosophers who discuss this sort of question, concepts such as 'analytic' and 'true in virtue of linguistic rules'. Such clarification is desirable since it is often not at all clear what such philosophers think that they have established, since the usage of these terms by philosophers is often so loose and divergent that disagreements may be based on partial misunderstanding. The trouble has a three-fold source: the meaning of 'analytic' is unclear, the meaning of 'necessary' is unclear, and it is not always clear what these terms are supposed to be applied to. (E.g. are they sentences, statements, propositions, truths, knowledge, ways of knowing, or what?) Not all of these confusions can be eliminated here, but an attempt will be made to clear some of them away by giving a definition of 'analytic' which avoids some of the confused and confusing features of Kant's exposition without altering the spirit of his definition. This is the task of the next section.

B.1. In this section I shall try to explain how I intend to use the word 'analytic', though there is not space for a full account of it. The word is taken to describe propositions, the latter generally being identified in the following manner: ' . . . the proposition expressed by the sentence such and such, as understood by so and so' (or, 'as understood in the following way . . .'—compare section C, below). In order

to understand what makes a proposition analytic we require two notions, the notion of *a truth of logic* and the notion of *an identifying fact about meanings*. A truth of logic is a general truth about the things with which logic is concerned, such as meanings, words, sentences, propositions, truth, compatibility, logical forms, etc. It should not be confused with a *logically true proposition*, which is a proposition that is true in virtue of its logical form, and may be about anything at all. The latter are often called 'formal truths', and, following a suggestion made by Roger Montague, I shall refer to the former as 'metaformal truths', to avoid confusion. A metaformal truth of logic may state that if a proposition has certain logical features (i.e. features that can be described in topic-neutral terms), then it has certain other features, for example: 'A proposition which ascribes a certain property to all the members of a class consisting of things which have that property (e.g. a proposition of the form 'All P Q's are P'), must be true'. Examples of formal truths (logically true propositions) are those expressed by 'All red horses are red', or 'If all boxes are square, and all square things have lids, then all boxes have lids'. A metaformal truth of logic may be *about* forms of propositions, but it is not true simply in virtue of its own form, but, in some sense, in virtue of what it is about. Formal truths, however, are true in virtue of their logical form, and in order to see that a proposition is a formal truth it may be necessary to be, in some sense, aware of a metaformal truth of logic.

B.2. If a proposition can be shown to be true by referring to a metaformal truth of logic, then I shall say that its truth can be established by means of *logical considerations*. Such considerations will not take into account the specific content of the proposition, but only its logical form, i.e. its topic-neutral features, those of its features from which one cannot infer which specific kinds of things the proposition is about. (E.g. a topic-neutral feature might be the *form* common to the propositions expressed by 'No horses are yellow' and 'No liquids are rigid'.) Logical considerations about a proposition, then, are considerations of a very general kind, which do not depend on the content of the proposition, that is, on the particular things or properties to which it refers. I shall not discuss the nature of these logical considerations in any detail. Neither shall I try to explain how we can come to know a metaformal truth of logic, for that would take too long.

B.3. After the notion of a metaformal truth of logic, the second notion that is required is that of an identifying fact about meanings (or concepts, etc.). Many different sorts of statements can be made about any word, such as "The word 'square' describes only things which have straight edges" or "The word 'square' and the word 'red' have over-lapping extensions". Such a statement states an *identifying fact about*

meanings (or concepts) if and only if it states a fact which *must* be known (in a sense which requires, but will not here receive, further analysis) if those meanings are to be known (if it is to be known which concepts they are). Thus, if a word is intended to refer to a certain property P, and to function as an ordinary descriptive word, then the statement that that word describes only objects which have the property P will state an identifying fact about the meaning of the word. Or if a word 'W' is defined so as to be applicable to objects only if they do not have the property P, then the statement that 'W' and this other word are incompatible descriptions will state an identifying fact about the meanings of the two words. If it is possible fully to understand a word without knowing some fact about it, then that is not an identifying fact about its meaning. For example, it is possible to know the meaning of 'square' without knowing that its extension overlaps the extension of the word 'red', so this is not an identifying fact about its meaning. But, if 'square' means 'equilateral rectangle', then it is not possible to know its meaning without knowing that anything which it describes is rectangular. (There are many problems about this notion which I shall ignore in this essay.) It should be apparent, then, that identifying facts about meanings are often closely connected with definitions—often, but not always, for definitions always generate synonymy relations, whereas not all identifying facts about meanings are, or arise out of, synonymy relations, as will be illustrated later on. For example, there may be two words 'V' and 'W' whose meanings have to be explained partly by ostension, and partly by stating that they are to be used according to a rule which does not permit them to describe the same thing at the same time. In that case, they are incompatible descriptions, and the relation between them may be described as an *identifying relation* between their meanings. Further, it should be clear that there is a metaformal truth of logic which states that if two words stand in the relation just described, then if they occur in a sentence expressing a proposition of the form: 'Nothing which is V is W', that proposition must be true.[1]

B.4. This example illustrates the following definition of 'analytic':

> A sentence S expresses an analytic proposition if, and only if, its truth-value, if it has one, is determined by (a) identifying facts about the meanings of the words in S, and (b) a metaformal truth of logic.

So a sentence expresses an analytic proposition if identifying facts about the meanings of the words, and logical considerations, together suffice to rule out the possibility of the proposition's having one, or other,

---

[1] It is possible to construe metaformal truths of logic as statements of identifying facts about logical concepts. This would serve to explain why they are true and how they are known to be true.

truth-value.[1] If any considerations other than these are *necessary* for the discovery of its truth-value, then it is not analytic. (Of course, this definition of an analytic proposition does not rule out the possibility of discovering its truth-value by some other means, e.g. by asking someone. For one may know the meanings or functions of all the words and principles of construction employed in such a sentence without knowing that it expresses an analytic proposition, or what its truth-value is, if for instance, one is unaware of the relevant general truth of logic. One might then go on and discover its truth-value by the usual sorts of empirical enquiries without realising that they are not necessary.)

B.5. For those who object to "linguistic philosophy" on the ground that it pays too much attention to words and combination of words, the above definition could be reformulated so as to exclude mention of words or sentences, roughly as follows: a proposition is analytic if one or other truth-value is excluded from belonging to it by (a) identifying facts about the concepts occurring in it and (b) some of its purely logical (topic-neutral) features. The precise formulation would require some care, but the result would differ from the original definition only in appealing to philosophers of a different temperament.

B.6. This definition of 'analytic', whose exposition has been very much compressed, is wider than the more familiar one in terms of derivability from formal truths by means of substitution of synonyms, for it does not presuppose that every identifying fact about meanings involves some relation of synonymy, as already pointed out in B.3, above. The relation of incompatibility between two descriptions might be an identifying one despite the impossibility of an analysis of either term such as would expose a logical incompatibility like the incompatibility between 'three-sided, red and symmetrical' and 'three-sided, symmetrical and not red', for example. The definition therefore gives away as much as possible to those who would establish that all relations of incompatibility between colours are analytic, for they cannot be refuted by the common argument that since colour words cannot be analysed in such a way as to reveal 'Something is red and green' to be a formal contradiction, it follows that the statement 'Nothing is red and green' cannot be analytic. That is, showing that the descriptive terms cannot be eliminated by analysis does not show that the statement is not analytic, at least not in the sense of 'analytic' which I have defined. So this kind of refutation will not be applicable to the arguments that I

---

[1] Whether such a sentence expresses a proposition with a definite truth-value at all may depend on whether certain contingent conditions are realized. For example, it may depend on whether a definite description refers successfully, or it may depend on whether some concept has indeterminate borderline instances. But we may still be able to assert that such a proposition could not be false, that *if* it had a truth-value then it would be true, without discovering whether these contingent conditions are satisfied or not, that is, without making any empirical enquiries.

shall discuss below, which purport to prove that colour incompatibilities are analytic. More subtle refutations will be required. Much more could be said to clarify this sense of 'analytic', but that is not necessary for the purposes of this essay. It is hoped that the discussion which follows will provide all the further clarification which is needed.

C.1. Having given a rough indication of what is meant by 'analytic' in this essay, I must now indicate the range of propositions whose analyticity is in question. In order to decide whether some proposition is analytic or not, we must be sure that we know which proposition it is, which means being clear about the meanings of the words with which it is expressed. It may not be enough to understand the words sufficiently well for ordinary purposes of communication, for as ordinarily used they may involve subtle ambiguities which have to be eliminated before it can be decided whether a sentence containing them expresses an analytic proposition or not, even though the ambiguities do not matter for ordinary non-philosophical purposes. Examples of statements using scientific concepts which are not definitely analytic or not analytic are already familiar.

C.2. So, if we are to decide whether it is analytic that colours are incompatible, we must be sure that we know what sorts of colours we are talking about.[1] First of all there are *specific shades* of colour, to which we often refer when asking whether two objects are *exactly* alike in colour. Secondly there are *hues*, such as red, orange, yellow, etc., each of which covers a fairly wide band of the colour-spectrum, and so includes a whole range of different specific shades. So we must be clear whether we are talking about specific shades, or about hues like red. Moreover, we must distinguish between using the word 'red' to correspond simply to the immediately recognizable *hue* common to objects with different shades of red, and using the word to refer to a whole *collection of specific shades* picked out individually. In the first case, deciding whether the word describes some object merely involves seeing whether the object has the hue in question, whereas in the second case it involves looking to see whether the object has one of the many specific shades with which the word has been correlated. I shall take it, in what follows, that the words 'scarlet' and 'turquoise' each refer to exactly one specific shade of colour, which can be memorized, borne in mind, and recognized again in new instances.

C.3. Words like 'red' and 'yellow', which ordinarily cover a wide range of different specific shades, will not be discussed in detail, but it is

---

[1] In what follows, certain simplifying assumptions are made about colours, such as that they all occur on a one-dimensional spectrum, such as the ordinary white-light spectrum. The fact that these assumptions are false does not affect the logical points made.

worth while pausing over them for a moment to illustrate some of the above remarks. They can each be taken to refer simply to a *hue* (the recognizable feature common to objects with different specific shades). Secondly, they may be taken as referring (disjunctively) to a whole *range* of specific shades, in which case being yellow will, for example, involve simply having any one of the relevant specific shades of colour. Thirdly, such a word may be taken to refer to a range of specific shades picked out by some kind of *procedure*. For example, in using the word 'red' one might apply the following procedure. First of all, two specific shades (roughly at the boundaries of the red band) are memorized, and then an object is described as 'red' if it has any specific shade which can be seen to lie "between" the two memorized shades. It is clear that in these different cases different questions must be answered about the incompatibility of redness and yellowness. In the first case (correlation with hues) the truth of 'Nothing can be red and yellow at the same time' will depend on whether it is possible for an object to have a colour which is a shade of two hues, i.e. on whether it is possible for a shade to be a shade of red and a shade of yellow.[1] In the second case (correlation with ranges of shades), it will depend on whether it is possible for an object to have at the same time one of the specific shades correlated with 'red' and one of the specific shades correlated with 'yellow', i.e. on whether it is possible for one object to have two different specific shades at the same time. In the third case (correlation with procedures), it will depend on complicated questions about the ordering relation and the particular shades selected as end-points for the red and yellow ranges, in addition to questions about the compatibility of different specific shades.

So, depending on the sorts of meanings given to 'red' and 'yellow', different sorts of enquiry will be required to settle the question whether it is analytic or not that nothing can be red and yellow at the same time. Of course, for ordinary purposes it is not necessary to be quite precise as to which concept, or which property or range of properties, is correlated with a descriptive word. As a result, the meanings with which we ordinarily use our words are too indefinite for questions as to whether the propositions which they express are analytic always to have definite answers. So the analytic-synthetic distinction cannot be applied to every statement made in ordinary life. This has sometimes led philosophers mistakenly to assert that there is no clear distinction. They should, however, merely have concluded that not every sentence uttered in the making of a statement has a perfectly definite meaning, or that it is not always the case that one definite statement is made rather than another. (Compare: it may be impossible to tell whether an utterance is intended to be taken as a question or as a statement, or whether its

---

[1] This sort of question, which I shall not discuss, is dealt with by Mr. Colin Radford in ANALYSIS 23.3 (January 1963).

meaning is such as to make it true or false in certain circumstances. We do not therefore abandon the distinction between questions and statements, or the distinction between true and false statements.)

D.1. The preliminaries having been concluded, let us now consider one type of argument which might be used to defend the thesis that an analytic proposition is expressed by: 'Nothing is red and yellow'. (In what follows I shall omit the qualification '. . . all over, as seen by one person at the same time'.) This rather crude argument assumes, first of all, that each of the words 'red' and 'yellow' refers disjunctively to a range of specific shades of colour, and then points out that the incompatibility is due to the fact that these ranges do not overlap, which is alleged to be merely a matter of the way that we have chosen to use the words. For we might have used them in such a way that some shades were correlated with both words, in which case objects with one of these shades would be both red and yellow. This makes it look as if the incompatibility is merely a verbal matter, a matter of definition or linguistic convention. This seems to be one of the things which sometimes make people say that it is analytic that nothing can be two colours at once, and it seems also to lie behind the more general thesis that predicates are incompatible only because we choose to make them incompatible. But a little thought shows the argument to be fallacious, for the mere fact that two sets of properties do not overlap does not logically imply that the corresponding sets of objects with those properties are mutually exclusive. If it did, then we could prove it to be analytic that nothing was red and round at the same time simply by pointing out that the words 'red' and 'round' are intended to refer to different properties! The argument fails because it shows only that if 'red' and 'yellow' are incompatible descriptions then *one* of the factors responsible for this is our choice of non-overlapping ranges of shades to correspond to them. It fails to show in addition that nothing can have two different shades at the same time, one from each of the ranges, and that this is also *merely* a matter of linguistic conventions and their logical consequences. For it is not at all obvious that purely *logical* (topic-neutral) considerations suffice to establish that specific shades are incompatible.

D.2. It might be thought that it could be shown that the incompatibility of specific shades was itself analytic, that it could be established on the basis of (a) identifying facts about meanings, and (b) purely logical considerations, by some such argument as the following: "It is an identifying fact about the meanings of 'scarlet and 'turquoise' that they, unlike 'red' and 'round', refer to different properties in the *same* determinable range, since no one who did not know this could fully understand their meanings. But part of the point of saying that something has a certain property in a range of properties of a certain kind is to say

that it does not have one of the other properties in that range. Hence, part of the meaning of 'scarlet' must be 'not-turquoise', since part of the point of describing things as scarlet is to distinguish them from those things which have other shades of colour, such as turquoise." This could be amplified as follows: "One could not fully understand the meaning of 'scarlet' without being able to tell not only which objects could be described correctly by it, but, in addition, which objects were *not* correctly describable by it: namely the objects with other specific shades. That is to say, understanding the use of the word 'scarlet' involves knowing, for example, that things which are turquoise in colour are not scarlet. So part of the meaning of 'scarlet' is 'not-turquoise', and 'Nothing is scarlet and turquoise' must therefore be true on account of identifying facts about meanings together with these logical considerations."

D.3. Perhaps this argument is a little more seductive than the crude one presented in D.1. above. The main difference between them is that the new version makes use of the fact that the words 'scarlet' and 'turquoise' refer to properties of the same kind, that they refer not just to different properties, but to different properties in the same range: we discover that objects are scarlet and that they are not turquoise in the same way. We can see, however, that the argument does not work, by examining an analogous case.

D.4. We can hear and distinguish tone-qualities or timbres of different sounds. Thus, we can recognize a sound as the sound of a bassoon, or the sound of a flute, or the sound of an owl, etc. This is not a matter of being able to determine the *source* of the sound merely by listening, for a sound with the timbre of a flute might be produced electronically: it is a matter of being able to tell whether the sound has a timbre which is the same as that produced by a flute. Let us say that a sound is "one" sound if it comes from a fairly small object or from a small region of space. If sounds come from two distinct parts of a room, then they are "two" sounds. Now we can imagine someone who has learnt to talk about sounds and their timbres, and can recognize the timbres of the sounds produced by instruments of the woodwind family, but has never heard a gramophone, or a piano, or anything else which is capable of producing either simple chords, or the sound of two instruments at once, and neither has he listened through a hole in a wall to an orchestra rehearsing in the next room. Such a person might, on account of his limited experience, find it impossible to believe that two pitches or two timbres could be heard in the same sound (i.e. coming from the same place at the same time). He might therefore believe that nothing could be both middle C and also E-flat, or that no sound could have a flute-timbre and a bassoon-timbre at the same time, or that sounds with these

different properties could not come from the same place at the same time. Moreover, he might argue, in the manner of D.2, that this incompatibility was *analytic*, thus: "In describing a sound as 'having a flute-timbre' we intend to distinguish it from other sounds, in particular those with bassoon-timbres. In describing the sound in this way what we *mean* is to indicate which of the properties in a certain range it has, and this, logically, involves indicating which it does not have. So part of the meaning of 'having the sound of a flute' is 'not having the sound of a bassoon', since we discover that something has the sound of a flute, and that it does not have the sound of a bassoon, in the same way . . . (and so on)." (He might, in a similar way, argue that the incompatibility of *pitches* is a matter of identifying facts about meanings and purely logical considerations, so that 'No sound has two pitches at the same time' is analytic. Or the argument might be modified to establish that it is analytic that no two sounds with different timbres can come from the same place at the same time.)

D.5. If the argument of D.2 established the analyticity of colour-incompatibilities, then the argument of the previous paragraph would establish that 'No sound can have the timbre of a flute and the timbre of a bassoon at the same time', or 'The sound of a flute and the sound of a bassoon cannot come from the same place at the same time' expressed an analytically true proposition. For the arguments are exactly parallel in form. (The new example also uses different properties in the same determinable range.) We know, however, that the conclusion of the latter argument is false, as could be demonstrated to anyone who disagreed, simply by letting him hear a duet for flute and bassoon played on a gramophone record (not stereophonic, of course). Out of the gramophone loudspeaker would come a sound which might well be described as exhibiting two timbres at the same time, or at least as two different sounds with different timbres coming from the same place at the same time. Since this argument must therefore involve an invalid inference, the same applies to the original one, in D.2, even if its conclusion is true: but then the conclusion has not been established. Of course, the experiment with the gramophone may fail, for a person may simply be unable to hear the recording as a duet for flute and bassoon: he may hear it as a single complicated sound bearing no relation to either the sound of a solo flute or the sound of a solo bassoon. Some people are better able to hear the instruments of an ensemble separately than others. Those who are more fortunate know that the experience which I have described is a possible one, and know what it is like. (Another type of failure will be considered later on, in E.4.) So, whatever else they may prove, arguments of the sort I have been criticising cannot prove the experience to be impossible, let alone establish that the impossibility is analytic. Similarly the (analytic) impossibility of an

analogous experience with colours has not been established, namely the experience of seeing two shades of colour in the same surface at the same time. *This* is the impossibility which is supposed to illustrate the claims made by defenders of synthetic necessary truths, and this is therefore the impossibility which must be shown not to exist, or to be analytic, by people who wish to engage in that controversy.

D.6. All this shows that from the mere fact that two descriptive expressions refer to two properties of the same kind (in the same determinable range), we cannot *logically* infer that they are incompatible descriptions. From the mere fact that turquoise is not referred to by the word 'scarlet' we cannot infer that no turquoise things are correctly describable by the word 'scarlet' even though it refers to the same kind of property as 'turquoise'. In short, that 'turquoise' is not part of the meaning of 'scarlet' does not logically entail that 'not turquoise' is part of the meaning of 'scarlet'. Moreover, our example of the poor fellow with limited auditory experience shows that we must be careful about the conclusions we draw from the things people are inclined to say after they have been taught something ostensively: their denial that something is possible does not establish that there is, or that there must be, a linguistic convention which makes it impossible. Indeed, it does not even establish that it *is* impossible, and that such people are not soon going to receive a surprise!

E.1. We have seen that, in general, the fact that two words refer to different properties of the same sort does not imply that they are incompatible descriptions. It follows that any attempt to show that 'Nothing is scarlet and turquoise' expresses an analytic proposition must be based on some peculiarity of colour-words, or of the words 'scarlet' and 'turquoise'. Now it clearly should not be suggested that there must be a linguistic convention or identifying fact relating the meanings of just these two words and making them incompatible. For anything which supported this suggestion would also surely support a similar suggestion about *any* pair of colour words. In particular, it would support the suggestion that in order fully to understand the meaning of 'scarlet' and know to which property it referred, it is necessary to know that the expression 'not scarlet' is (disjunctively) correlated with indefinitely many specific shades, namely all those not referred to by 'scarlet'. But in that case, the process of learning to use colour words could never get started, for in order to be able to identify any one specific shade of colour one would already have to be able to identify all the others. In any case, it seems to be an empirical fact that one *can* learn to recognize a property, and to tell whether it is or is not exhibited by some object (at least in most cases), without being acquainted

with all the other features which may take its place. It is possible to be acquainted with some colours and then come across a colour which is quite new to one. So the suggestion that for every pair of colours (or colour-words) there is a specific incompatibility convention need not be taken seriously, though it is not clear that this is always realized by those who would assert that it is analytic that nothing is scarlet and turquoise at the same time.

E.2. But a slightly different suggestion might be made, as follows: "In order to know what a word like 'turquoise' means, one must have learnt what kind of feature it refers to, namely a specific shade of colour —this is therefore an identifying fact about its meaning. But knowing what kind of feature is referred to by a word, involves knowing the rôle of that word in the language, which, in turn, may involve knowing something about its compatibility and incompatibility relations. In particular, one cannot know what kind of word a word is which refers to a specific shade of colour without knowing that no two specific shades can occur in the same place at the same time. This does not require acquaintance with all features of that kind, so it does not mean that in order to understand the word 'turquoise' one must be acquainted with lots of other colours, and know that they are incompatible with turquoise. All we need know is that 'turquoise' is a word of a certain kind, and that to be a word of that kind is to be incompatible with other words of that kind. We have here what might be described as a *second-order* linguistic convention, or identifying fact about meanings. It is not a fact relating the meanings of individual words, but an identifying fact about a type of word, or a type of meaning. This fact, together with two more identifying facts about meanings, namely that the word 'turquoise' and the word 'scarlet' are of this type, logically entails that the two words are incompatible descriptions, and hence that an analytic-ally true proposition is expressed by 'Nothing is turquoise and scarlet at the same time'."

This suggestion, that there is a "higher level" linguistic convention generating incompatibilities between colour-words, is at least coherent, and is not open to the objection that one can be acquainted with one colour without being acquainted with all the others alleged to be incompatible with it. For it would be replied that one must nevertheless know that it is incompatible with all other properties of this same type, even if one has not yet made their acquaintance. It *could* be the case that our concept of colour worked like this. If it did, then learning the meaning of 'scarlet' would involve learning something which helped to guarantee its incompatibility with 'turquoise', even though one need not learn the meaning of the latter at the same time or earlier. Perhaps there *is* such a meaning-rule governing the use of the English words in question. Whether there is or not is something which has to be discovered by some

sort of empirical enquiry. There is nothing in any argument so far discussed which establishes that the concept of colour *must* work like this. If it does, then this may be a contingent fact about the English language. So anyone who wishes to establish that colours are incompatible on account of such a higher-level convention is faced with the awkward task of showing that people who use colour-words, including their philosophical opponents, actually do intend them to be governed by such a convention.

E.3. We can come to a clearer understanding of what the existence of such a convention would amount to, by noticing that almost any pair of concepts may be made analytically incompatible by the adoption of a convention like it. Thus, someone might decide to follow a convention according to which no two shape-words, or shape-concepts, were compatible, or according to which every colour-word referring to a shade within the red part of the spectrum was incompatible with every shape-word referring to a plane rectilinear shape. In the latter case, 'Nothing is scarlet and triangular' would express an analytic truth! Of course, in some cases the adoption of such convention could have awkward consequences, since there are things which could no longer be described unless new words were introduced, whereas the corresponding incompatibility convention for words referring to shades does not generate this sort of difficulty, since, in any case, not many objects are normally described as being both scarlet and turquoise all over at the same time! However, this may be just a matter of fact, for the adoption of the convention under discussion can no more guarantee that the two perceptible properties referred to will never occur together than the convention mentioned above could guarantee that the shade correlated with 'scarlet' and the shape correlated with 'triangular' would never be found in the same object. The most that could be guaranteed is the indescribability of such an occurrence, at least with a certain part of the vocabulary. The adoption of a convention making two *words* incompatible always leaves unresolved the question of the incompatibility of independently identifiable perceptible *properties*.

E.4. This may be illustrated by a possible response when the person described in D.4 is made to listen to a gramophone record of a duet for flute and bassoon. He might reply thus (cf. E.2): "This is certainly a new sound, unlike anything I have heard previously. But you cannot describe it as a sound with two timbres, for the word 'timbre' is governed by a convention according to which the things to which it is applied and not allowed to be compatible, and timbre-words (or expressions) are incompatible descriptions. I do not know how to describe this new sound, except, perhaps, by inventing new words. But the expressions 'flute-timbre' and 'bassoon-timbre', as I understand them, are governed

by rules which preclude the use of the expression 'sound with a flute-timbre and a bassoon-timbre' to describe anything. (And the same goes for 'sound of a flute and sound of a bassoon coming from the same place at the same time'.)"

A person who argued like this might even be right about the linguistic conventions followed in some society, or by himself alone. But *his* adoption of the arbitrary convention would not establish that some such convention *must* be followed: for it would leave open the residual question whether it is possible to use words to refer to the recognizable features of sounds without adopting additional incompatibility conventions, and, if so, whether these properties are compatible. We know that such features can be picked out independently of any convention relating them to one another, and we know that the features are not incompatible, since we can hear them both in the sound coming from a gramophone record.

E.5. In general, the assertion that a statement in some language is analytic on account of a linguistic convention employed in that language is philosophically uninteresting, except insofar as it draws our attention for the first time to the possibility of using just that sort of convention (or just that type of concept). But this could be done without proving that anyone actually does use the concept. Similarly, the logical point could be established that if such a convention were followed then a certain statement would be analytically true, but that too could be established independently of any empirical facts about conventions actually followed. What, then, can there be that is of philosophical interest in the assertion that some linguistic convention is actually followed by some people, or that a sentence in some language actually expresses an analytic proposition? None, as far as I can see (though it might be interesting from, say, a philological point of view). In any case, it would not be relevant to the point made by people who claimed that the incompatibility of colours demonstrated the existence of a synthetic necessary truth. For they could simply deny that *they* were using the convention in question, just as we can deny that *we* are using the convention ruling out the possibility of talking about two different timbres in the same sound. This move could be defeated only by showing that an incompatibility convention of the sort in question must be followed, that a certain type of statement *must* express an analytic proposition. This would be philosophically interesting, and relevant to the problem of synthetic necessary truth—only, it is hard to see how any such thing could be demonstrated. We have already seen that the mere fact that two words refer to properties which, so to speak, can take each other's place, or which, in Ayer's phrase (see *Philosophical Essays*, p. 57) "compete for the same part of the picture", does not logically entail their being incompatible descriptions. For different sound-features may

be compatible, even though they "compete for the same part of the picture".

The example of timbres shows that one may learn to recognize, and correlate a word with, some property P without learning that whenever one of the other properties capable of taking its place is present, then P must be absent. And, in general, it seems that we can learn to tell whether a property is present or absent without being given *specific* instructions as to what may take its place. We can certainly be sure that the colour we are looking for is *not* exhibited by some object without being at all sure *exactly* which colour it does have. For the light may be bad, or it may have an unfamiliar shade of colour which is difficult to "take in" immediately. A negative statement such as 'This is not scarlet' may be verified simply by observation that the shade in question is absent, without making sure that some more specific statement, such as 'This is prussian blue' is true. Indeed, as already remarked, the truth of the negative statement may be easier to discover than the truth of the affirmative one supposedly underlying it. Mr. Montague has pointed out to me that one might compare the object in question with a sample of something scarlet, and decide that there was no match, without making sure of its exact shade of colour. Similarly, I suggest that one could memorize the shade of colour of the sample, and then see that it was not exhibited by an object, without direct comparison, and without noticing what shade *was* exhibited. For the same reason I do not need first of all to make sure that something is the sound of a bassoon in order to discover that it is not the sound of a flute, and even if I did make sure that it had the timbre of a bassoon, this would not establish that the sound did not also have the timbre of a flute: for that would require my making sure that it was the sound of a bassoon only, and this would involve making sure that it was not, for instance, also the sound of a flute!

E.6. All this suggests that we can learn to use words referring to recognizable features, simply by learning to correlate each word with the appropriate feature (thereafter memorized), and without any special rules relating the word to other words, or to other features. Further, it is hard to see what could possibly establish that the case is different with shades of colour, that there *must* be a convention making the words which refer to them incompatible descriptions. Perhaps we do find it hard to imagine the possibility of two shades of colour occurring in the same surface, but how can we be sure that we are not in the same position with regard to colours as the person of limited auditory experience was with respect to timbres? How can we be sure that the unimaginability is not explicable simply in terms of our limited visual experience, just as limited auditory experience might explain the unimaginability of the sound of a flute and the sound of a bassoon coming from one place at the same time? Of course, if the incompatibility is due to some feature

of two-dimensional surfaces, then it is most likely to be synthetic, since consideration about surfaces are not *logical* considerations.

E.7. The following experiment is of some interest. Take a sheet of cardboard, one half of which is coloured scarlet, and the other half turquoise, with a straight dividing line. Then look down at it from a distance of about eight inches, so that the eyes focus on the surface, although diverging as if looking at something far behind it. The scarlet and turquoise portions of the surface will be seen to merge into each other. (Considerable muscular control is required for this, but the experiment is easier to perform if a pair of magnifying glasses are used as in a stereoscopic viewer.) The experience is very difficult to describe, but perhaps this is only on account of its unfamiliarity. Conceivably, if there commonly and naturally occurred something which gave out light rays which produced this sort of visual impression when it was looked at normally with both eyes, then people might describe their experience as that of "seeing two colours in the same surface at the same time". After all, people who had never heard a sound containing two pitches, or two characteristic timbres at the same time, might have difficulty in learning to hear a recorded duet for flute and bassoon as we do. Now if someone wishes to deny that there *could* be such an experience in the case of colours, analogous to hearing two sorts of sounds coming from a gramophone, then either he must admit that the incompatibility of colours is synthetic, or he must produce new arguments, quite unlike any considered so far, to show that there has to be some identifying fact about the meanings of colour words, which ensures their incompatibility. It seems unlikely that an argument could be found. Until it is found, the question whether colours are incompatible, and whether their incompatibility provides an illustration of a synthetic necessary truth, remains open.

F. I conclude that none of the arguments discussed in this essay establishes that it is analytic or that it must be analytic to say that nothing is scarlet and turquoise all over at the same time. It follows that these arguments cannot be generalised to prove that every necessary truth is or must be analytic. I have given what seems to me to be the only intelligible interpretation of the assertion that 'Nothing is scarlet and turquoise at the same time' expresses an analytic truth, in terms of 'second-order' incompatibility conventions. And it has been admitted that there might be such a convention in English, though this would have to be established by means of some empirical semantic enquiry as to how exactly people who talk English intend their words to be understood, and it is very doubtful that any definite answer would come out of such an inquiry: ordinary meanings are often too indefinite for such questions

to have clear answers. But even if such a convention is employed in English, and 'Nothing is scarlet and turquoise' does express an analytic truth, then this is not very interesting or important, since residual questions remain about the possibility of using words in other ways, and the possibility of certain sorts of experiences, questions about what would be the case if no such convention were followed. Would the sentence already mentioned then express a necessary but synthetic truth, or a merely contingent one? Or would it be false? None of the arguments put forward to show that there *must* be a linguistic convention or an identifying fact about meanings which guarantees the incompatibility of colour descriptions and make it analytic, seems to be successful. Perhaps some argument quite different from any mentioned so far could be used to show that there must be some such convention, but it seems that no one has thought of it yet.[1] Perhaps this is because no one has been quite clear as to what sort of argument is required, owing to the fact that philosophers who talk about incompatibilities as being due to "rules of grammar" or "linguistic conventions", or who assert that "it is we who choose whether predicates are to be compatible or incompatible" have not really been clear as to what exactly they mean by these expressions. What sort of thing is the rule of grammar or linguistic convention supposed to be? How and when do we choose to make predicates incompatible? Is it clear that we always have the right to make such choices, or that we need to? These questions, and many more, have not been given sufficient attention by people who talk about necessary truth and the analytic-synthetic distinction. This helps to explain why controversies have gone on for so long without being resolved.

[1] Putnam's article "Reds Greens and Logical Analysis" in *Phil. Rev.* 1956 contains an interesting attempt to establish the analyticity of colour incompatibilities, and is not immediately open to the objections described so far. However, his argument does involve a fallacy, or rather a circularity, and readers who have trouble in spotting it may try the exercise of applying a version of it to the example of sound-features to "prove" that no two sounds can come from the same place at the same time, and then seeing where it goes wrong. (Hint: consider the following question: How would the two-place predicate 'indistinguishable in timbre from' be applied to the following pair of sounds, namely (a) the sound of a flute alone, and (b) the sound of a duet for flute and bassoon coming from a loud speaker?)

It may be possible to produce an argument which cannot be refuted by the devices used in this essay if some account is taken of the fact that colours are seen in two dimensional surfaces. I have not tried in this essay to prove that *no* argument could establish the analyticity of colour incompatibilities.

University of Hull