



Vagueness

Bertrand Russell

1923

Reflection on philosophical problems has convinced me that a much larger number than I used to think, or than is generally thought, are connected with the principles of symbolism, that is to say, with the relation between what means and what is meant. In dealing with highly abstract matters it is much easier to grasp the symbols (usually words) than it is to grasp what they stand for. The result of this is that almost all thinking that purports to be philosophical or logical consists in attributing to the world the properties of language. Since language really occurs, it obviously has all the properties common to all occurrences, and to that extent the metaphysic based upon linguistic considerations may not be erroneous. But language has many properties which are not shared by things in general, and when these properties intrude into our metaphysic it becomes altogether misleading. I do not think that the study of the principles of symbolism will yield any *positive* results in metaphysics, but I do think it will yield a great many negative results by enabling us to avoid fallacious inferences from symbols to things. The influence of symbolism on philosophy is mainly unconscious; if it were conscious it would do less harm. By studying the principles of symbolism we can learn not to be unconsciously influenced by language, and in this way can escape a host of erroneous notions.

Vagueness, which is my topic tonight, illustrates these remarks. You will no doubt think that, in the words of the poet: "Who speaks of vagueness should himself be vague." I propose to prove that all language is vague, and that therefore my language is vague, but I do not wish this conclusion to be one that you could derive without the help of the symbolism. I shall be as little vague as I know how to be if I am to employ the English language. You all know that I invented a special language with a view to avoiding

vagueness, but unfortunately it is unsuited for public occasions. I shall, therefore, though regretfully, address you in English, and whatever vagueness is to be found in my words must be attributed to our ancestors for not having been predominantly interested in logic.

There is a certain tendency in those who have realized that words are vague to infer that things also are vague. We hear a great deal about the flux and the continuum and the unanalysability of the Universe, and it is often suggested that as our language becomes more precise, it becomes less adapted to represent the primitive chaos out of which man is supposed to have evolved the cosmos. This seems to me precisely a case of the fallacy of verbalism --- the fallacy that consists in mistaking the properties of words for the properties of things. Vagueness and precision alike are characteristics which can only belong to a representation, of which language is an example. They have to do with the relation between a representation and that which it represents. Apart from representation, whether cognitive or mechanical, there can be no such thing as vagueness or precision; things are what they are, and there is an end of it. Nothing is more or less what it is, or to a certain extent possessed of the properties which it possesses. Idealism has produced habits of confusion even in the minds of those who think that they have rejected it. Ever since Kant there has been a tendency in philosophy to confuse knowledge with what is known. It is thought that there must be some kind of identity between the knower and the known, and hence the knower infers that the known is also muddle-headed. All this identity of knower and known, and all this supposed intimacy of the relation of knowing, seems to me a delusion. Knowing is an occurrence having a certain relation to some other occurrence, or groups of occurrences, or characteristic of a group of occurrences, which constitutes what is said to be known. When knowledge is vague, this does not apply to the knowing as an occurrence; as an occurrence it is incapable of being either vague or precise, just as all other occurrences are. Vagueness in a cognitive occurrence is a characteristic of its relation to that which is known, not a characteristic of the occurrence in itself.

Let us consider the various ways in which common words are vague, and let us begin with such a word as "red". It is perfectly obvious, since colours form a continuum, that there are shades of colour concerning which we shall be in doubt whether to call them red or not, not because we are ignorant of the meaning of the word "red", but because it is a word the extent of whose application is essentially doubtful. This, of course, is the answer to the old puzzle about the man who went bald. It is supposed that at first he was not bald, that he lost his hairs one by one, and that in the end he was bald; therefore, it is argued, there must have been one hair the loss of which converted him into a bald man. This, of course, is absurd. Baldness is a vague conception; some men are certainly bald, some are certainly not bald, while between them there are men of whom it is not true to say they must be either bald or not bald. The law of excluded middle is true when precise symbols are employed, but it is not true when symbols are vague, as, in fact, all symbols are. All words denoting sensible qualities have the same kind of vagueness which belongs to the word "red". This vagueness exists also, though in a lesser degree, in the quantitative words which science has tried hardest to make precise, such as a metre or a second. I am not going to invoke Einstein for the purpose of making these words vague. The metre, for example, is defined as the distance between two marks on a certain rod in

Paris, when that rod is at a certain temperature. Now the marks are not points, but patches of a finite size, so that the distance between them is not a precise conception. Moreover, temperature cannot be measured with more than a certain degree of accuracy, and the temperature of a rod is never quite uniform. For all these reasons the conception of a metre is lacking in precision. The same applies to a second. The second is defined by relation to the rotation of the earth, but the earth is not a rigid body, and two parts of the earth's surface do not take exactly the same time to rotate; moreover all observations have a margin of error. There are some occurrences of which we can say that they take less than a second to happen, and others of which we can say that they take more, but between the two there will be a number of occurrences of which we believe that they do not all last equally long, but of none of which we can say whether they last more or less than a second. Therefore, when we say an occurrence lasts a second, all that it is worth while to mean is that no possible accuracy of observation will show whether it lasts more or less than a second.

Now let us take proper names. I pass by the irrelevant fact that the same proper name often belongs to many people. I once knew a man called Ebenezer Wilkes Smith, and I decline to believe that anybody else ever had this name. You might say, therefore, that here at last we have discovered an unambiguous symbol. This, however, would be a mistake. Mr. Ebenezer Wilkes Smith was born, and being born is a gradual process. It would seem natural to suppose that the name was not attributable before birth; if so, there was doubt, while birth was taking place, whether the name was attributable or not. If it be said that the name was attributable before birth, the ambiguity is even more obvious, since no one can decide how long before the name became attributable. Death is also a process: even when it is what is called instantaneous, death must occupy a finite time. If you continue to apply the name to the corpse, there must gradually come a stage in decomposition when the name ceases to be attributable, but no one can say precisely when this stage has been reached. The fact is that all words are attributable without doubt over a certain area, but become questionable within a penumbra, outside which they are again certainly not attributable. Someone might seek to obtain precision in the use of words by saying that no word is to be applied in the penumbra, but unfortunately the penumbra is itself not accurately definable, and all the vaguenesses which apply to the primary use of words apply also when we try to fix a limit to their indubitable applicability. This has a reason in our physiological constitution. Stimuli which for various reasons we believe to be different produce in us indistinguishable sensations. It is not clear whether the sensations themselves are sometimes identical in relevant respects even when the stimuli differ in relevant respects. This is a kind of question which the theory of quanta at some much later stage in its development may be able to answer, but for the present it may be left in doubt. For our purpose it is not the vital question. What is clear is that the knowledge that we can obtain through our sensations is not as fine-grained as the stimuli to those sensations. We cannot see with the naked eye the difference between two glasses of water of which one is wholesome while the other is full of typhoid bacilli. In this case a microscope enables us to see the difference, but in the absence of a microscope the difference is only inferred from the differing effects of things which are sensibly indistinguishable. It is this fact that things which our senses do not distinguish produce different effects --- as, for example, one glass of water gives you

typhoid while the other does not --- that has led us to regard the knowledge derived from the senses as vague. And the vagueness of the knowledge derived from the senses infects all words in the definition of which there is a sensible element. This includes all words which contain geographical or chronological constituents, such as "Julius Caesar", "the twentieth century", or "the solar system".

There remains a more abstract class of words: first, words which apply to all parts of time and space, such as "matter" or "causality"; secondly, the words of pure logic. I shall leave out of discussion the first class of words, since all of them raise great difficulties, and I can scarcely imagine a human being who would deny that they are all more or less vague. I come therefore to the words of pure logic, words such as "or" and "not". Are these words also vague or have they a precise meaning?

Words such as "or" and "not" might seem, at first sight, to have a perfectly precise meaning: " p or q " is true when p is true, when q is true, and false when both are false. But the trouble is that this involves the notions of "true" and "false"; and it will be found, I think, that all the concepts of logic involve these notions, directly or indirectly. Now "true" and "false" can only have a *precise* meaning when the symbols employed --- words, perceptions, images, or what not --- are themselves precise. We have seen that, in practice, this is not the case. It follows that every proposition that can be framed in practice has a certain degree of vagueness; that is to say, there is not one definite fact necessary and sufficient for its truth, but a certain region of possible facts, any one of which would make it true. And this region is itself ill-defined: we cannot assign to it a definite boundary. This is the difference between vagueness and generality. A proposition involving a general concept --- e.g. "This is a man" --- will be verified by a number of facts, such as "This" being Brown or Jones or Robinson. But if "man" were a precise idea, the set of possible facts that would verify "this is a man" would be quite definite. Since, however, the conception "man" is more or less vague, it is possible to discover prehistoric specimens concerning which there is no, even in theory, a definite answer to the question "Is this a man?" As applied to such specimens, the proposition "this is a man" is neither definitely true nor definitely false. Since all non-logical words have this kind of vagueness, it follows that the conceptions of truth and falsehood, as applied to propositions composed of or containing non-logical words, are themselves more or less vague. Since propositions containing non-logical words are the substructure on which logical propositions are built, it follows that logical propositions also, so far as we can know them, become vague through the vagueness of "truth" and "falsehood". We can see an ideal of precision, to which we can approximate indefinitely; but we cannot attain this ideal. Logical words, like the rest, when used by human beings, share the vagueness of all other words. There is, however, less vagueness about logical words than about the words of daily life, because logical words apply essentially to symbols, and may be conceived as applying rather to possible than to actual symbols. We are capable of imagining what a precise symbolism would be, though we cannot actually construct such a symbolism. Hence we are able to *imagine* a precise meaning for such words as "or" and "not". We can, in fact, see precisely what they would mean if our symbolism were precise. All traditional logic habitually assumes that precise symbols are being employed. It is therefore not applicable to this terrestrial life, but only to an imagined celestial

existence. Where, however, this celestial existence would differ from ours, so far as logic is concerned, would be not in the nature of what is known, but only in the accuracy of our knowledge. Therefore, if the hypothesis of a precise symbolism enables us to draw any inferences as to what is symbolized, there is no reason to distrust such inferences merely on the ground that our actual symbolism is not precise. We are able to conceive precision; indeed, if we could not do so, we could not conceive vagueness, which is merely the contrary of precision. This is one reason why logic takes us nearer to heaven than most other studies. On this point I agree with Plato. But those who dislike logic will, I fear, find my heaven disappointing.

It is now time to tackle the definition of vagueness. Vagueness, though it applies primarily to what is cognitive, is a conception applicable to every kind of representation -- for example, a photograph, or a barograph. But before defining vagueness it is necessary to define accuracy. One of the most easily intelligible definitions of accuracy is as follows: One structure is an accurate representation of another when the words describing the one will also describe the other by being given new meanings. For example, "Brutus killed Caesar" has the same structure as "Plato loved Socrates", because both can be represented by the symbol " xRy ", by giving suitable meanings to x and R and y . But this definition, though easy to understand, does not give the essence of the matter, since the introduction of words describing the two systems is irrelevant. The exact definition is as follows: One system of terms related in various ways is an accurate representation of another system of terms related in various other ways if there is a one-one relation of the terms of the one to the terms of the other, and likewise a one-one relation of the relations of the one to the relations of the other, such that, when two or more terms in the one system have a relation belonging to that system, the corresponding terms of the other system have the corresponding relation belonging to the other system. Maps, charts, photographs, catalogues, etc. all come within this definition in so far as they are accurate.

Per contra, a representation is *vague* when the relation of the representing system to the represented system is not one-one, but one-many. For example, a photograph which is so smudged that it might equally represent Brown or Jones or Robinson is vague. A small-scale map is usually vaguer than a large-scale map, because it does not show all the turns and twists of the roads, rivers, etc. so that various slightly different courses are compatible with the representation that it gives. Vagueness, clearly, is a matter of degree, depending upon the extent of the possible differences between different systems represented by the same representation. Accuracy, on the contrary, is an ideal limit.

Passing from representation in general to the kinds of representation that are specially interesting to the logician, the representing system will consist of words, perceptions, thoughts, or something of the kind, and the would-be one-one relation between the representing system and the represented system will be *meaning*. In an accurate language, meaning would be a one-one relation; no word would have two meanings, and no two words would have the same meaning. In actual languages, as we have seen, meaning is one-many. (It happens often that two words have the same meaning, but this is easily avoided, and can be assumed not to happen without injuring the argument.) That is to say,

there is not only one object that a word means, and not only one possible fact that will verify a proposition. The fact that meaning is a one-many relation is the precise statement of the fact that all language is more or less vague. There is, however, a complication about language as a method of representing a system, namely that words which mean relations are not themselves relations, but just as substantial or unsubstantial as other words. In this respect a map, for instance, is superior to language, since the fact that one place is to the west of another is represented by the fact that the corresponding place on the map is to the left of the other; that is to say, a relation is represented by a relation. But in language this is not the case. Certain relations of higher order are represented by relations, in accordance with the rules of syntax. For example, "A precedes B" and "B precedes A" have different meanings, because the order of the words is an essential part of the meaning of the sentence. But this does not hold of elementary relations; the word "precedes", though it means a relation, is not a relation. I believe that this simple fact is at the bottom of the hopeless muddle which has prevailed in *all* schools of philosophy as to the nature of relations. It would, however, take me too far from my present theme to pursue this line of thought.

It may be said: How do you know that all knowledge is vague, and what does it matter if it is? The case which I took before, of two glasses of water, one of which is wholesome while the other gives you typhoid, will illustrate both points. Without calling in the microscope, < it is obvious that you cannot distinguish the wholesome glass of water from the one that will give you typhoid, just as, without calling in the telescope, > it is obvious that what you see of a man who is 200 yards away is vague compared to what you see of a man who is 2 feet away; that is to say, many men who look quite different when seen close at hand look indistinguishable at a distance, while men who look different at a distance never look indistinguishable when seen close at hand. Therefore, according to the definition, there is less vagueness in the near appearance than in the distant one. There is still less vagueness about the appearance under the microscope. It is perfectly ordinary facts of this kind that prove the vagueness of most of our knowledge, and lead us to infer the vagueness of all of it.

It would be a great mistake to suppose that vague knowledge must be false. On the contrary, a vague belief has a much better chance of being true than a precise one, because there are more possible facts that would verify it. If I believe that so-and-so is tall, I am more likely to be right than if I believe that his height is between 6 ft. 2 in. and 6 ft. 3 in. In regard to beliefs and propositions, though not in regard to single words, we can distinguish between accuracy and precision. A belief is *precise* when only one fact would verify it; it is *accurate* when it is both precise and true. Precision diminishes the likelihood of truth, but often increases the pragmatic value of a belief if it is true --- for example, in the case of the water that contained the typhoid bacilli. Science is perpetually trying to substitute more precise beliefs for vague ones; this makes it harder for a scientific proposition to be true than for the vague beliefs of uneducated persons to be true, but it makes scientific truth better worth having if it can be obtained.

Vagueness in our knowledge is, I believe, merely a particular case of a general law of physics, namely that law that what may be called the appearances of a thing at different

places are less and less differentiated as we get further away from the thing. When I speak of "appearances" I am speaking of something purely physical --- the sort of thing, in fact, that, if it is visual, can be photographed. From a close-up photograph it is possible to infer a photograph of the same object at a distance, while the contrary inference is much more precarious. That is to say, there is a one-many relation between distant and close-up appearances. Therefore the distance appearance, regarded as a representation of the close-up appearance, is vague according to our definition. I think all vagueness in language and thought is essentially analogous to this vagueness which may exist in a photograph. My own belief is that most of the problems of epistemology, in so far as they are genuine, are really problems of physics and physiology; moreover, I believe that physiology is only a complicated branch of physics. The habit of treating knowledge as something mysterious and wonderful seems to me unfortunate. People do not say that a barometer "knows" when it is going to rain; but I doubt if there is any essential difference in this respect between the barometer and the meteorologist who observes it. There is only one philosophical theory which seems to me in a position to ignore physics, and this is solipsism. If you are willing to believe that nothing exists except what you directly experience, no other person can prove that you are wrong, and probably no valid arguments exist against your view. But if you are going to allow any inferences from what you directly experience to other entities, then physics supplies the safest form of such inferences. And I believe that (apart from illegitimate problems derived from misunderstood symbolism) physics, in its modern forms, supplies materials for answers to all philosophical problems that are capable of being answered, except the one problem raised by solipsism, namely: Is there any valid inference ever from an entity experienced to one inferred? On this problem, I see no refutation of the sceptical position. But the sceptical philosophy is so short as to be uninteresting; therefore it is natural for a person who has learnt to philosophize to work out other alternatives, even if there is no very good ground for regarding them as preferable.

