HUME'S DOCTRINE OF SPACE

By C. D. BROAD

Fellow of the Academy

Read 3 May 1961

HUME devoted Part II of Book I of his *Treatise on Human Nature*[1] to what he calls 'The Ideas of Space and Time'. He added certain remarks in the Appendix to vol. III of the first edition of that work. These are incorporated in the text in the edition of Green and Grose. The whole doctrine is printed continuously in *T.H.N.* (I), pp. 334-71. It is very queer stuff indeed, and presumably Hume became dissatisfied with it, for it does not reappear in the *Enquiry*. He treats Space and Time together, and he professes to come to the same conclusions *mutatis mutandis* about both. But he goes into much greater detail about Space than about Time, and it is easier to see what his theory amounts to in the former case than in the latter. Here I shall consider only what he has to say about Space.

Hume gives a summary of his doctrine of Space in *Treatise*, bk. I, part II, sect. iv (*T.H.N.* (I), pp. 345-6). I shall, however, summarize it in my own way. But before doing so, I will make the following introductory remarks:

(1) Hume talks in this part of his work in a quite realistic common-sense way about bodies emitting or reflecting light to one's eyes and thus eventually giving rise to visual sensations. All this would, of course, need to be analysed in terms of his account of material-object propositions and of causal propositions, if his doctrine were to be made into a coherent whole. (2) What he here calls 'space' would be more accurately called 'extension'. For he confines his discussion to the notions of extension and of shape, and does not discuss in any detail the notion of the location of all physical things and events in a single three-dimensional physical space. (3) Much of the argument presupposes the following doctrine of ideas. To have

[1] All quotations and references are from Vol. I of the two-volume edition of Hume's *Treatise on Human Nature*, edited by Green and Grose, published by Longmans in 1890, and here denoted by *T.H.N.* (I).

an idea of something answering to the description '*X*' just consists in having a mental image which answers to that description. Thus, for example, to have an idea of a red circular surface just consists in having a mental image which is red and circular, in the sense in which such qualities can belong to mental images. Similarly, to have an idea of an empty spherical volume would be to have a mental image which was voluminous and spherical, but had no imaginal quality corresponding to colour or temperature or texture or any other sense-given quality.

All this being presumed, we may say that Hume is mainly concerned in his discussion of extension with two questions, viz. (I) the question of the *divisibility* of extended particulars, and (II) the question whether anyone has or could have an *idea* of a length or an area or a volume *without any sensal qualities*, such as colour, temperature, texture, &c. He describes this second question as the question whether there is or could be an *idea of a vacuum*.

As regards the first question, what he really discusses under that head could be more accurately described as follows. In the first place, he confines the question to certain *sense-data*, viz. visual and tactual ones. And what he asks about such sense-data is this. What are the ultimate constituents of which an ordinary finite extended visual or tactual sense-datum is composed? Are they themselves extended or are they literally punctiform? Is the number of such ultimate constituents in a finite visual or tactual sense-datum finite or infinite?

His answers to these questions are as follows. (1) There are *literally punctiform* visual sense-data, i.e. sense-given particulars which have colour, and position in the visual field, but no extension. Similarly, there are *literally punctiform* tactual sense-data, i.e. sense-given particulars which have sensible hotness or coldness or sensible textural qualities, and position in the tactual field, but no extension. (2) Any extended visual sense-datum consists of a *finite* number of *punctiform* coloured sense-data aggregated in a unique kind of way. We might call this relationship 'extension-generating aggregation'. Precisely similar remarks apply *mutatis mutandis* to any extended tactual sense-datum. (3) Just as we are presented in sensation with punctiform coloured sense-data, so we can imagine punctiform coloured visual images. These resemble, and are ultimately derived from, our earlier sensations of punctiform coloured sense-data. The same is true *mutatis mutandis* of tactual images.

So much for Hume's answers to Question I. His answer to Question II, viz. the question which he puts in the form: Can there be an idea of a vacuum?, is obvious on his own principles. For the question would come to this: Can there be an extended mental image, composed of punctiform mental images which have no imaginal quality corresponding to either sensible colour or sensible temperature or any other sensal quality? The answer seems pretty obviously to be: No!

I will now consider Hume's arguments for these conclusions, and will take in turn the two questions of Divisibility and of Idea of a Vacuum.

I. DIVISIBILITY.

Under the head of 'Divisibility' I shall consider first his argument for the existence of punctiform visual and tactual sense-data. Then I shall deal with his doctrine that ordinary finitely extended visual and tactual sense-data are aggregates of punctiform sense-data. It will be needless to discuss these questions separately for visual and for tactual sensation, and so I will confine myself in what follows to *visual* sensation.

(1) *The punctiform elements.* Hume holds that under suitable conditions one can actually sense a *single* punctiform coloured sensum, i.e. a sense-given particular which has colour, and location in the visual field, but no extension. He claims to establish this by the following experiment, which anyone can try for himself.

Suppose that you put a spot of ink on a bit of white paper; fix the paper on the wall at the level of your eyes; and then walk slowly backwards from the wall, keeping your eyes fixed on the spot. There is a certain limiting distance (different, no doubt, for different persons and perhaps for the same person on different occasions), such that, if you move any farther back, you simply cease to see the spot at all, i.e. there ceases to be any sense-datum in your visual field which can be counted as a visual appearance of the dot. Hume thinks it obvious that the sense-datum which you sense when you just reach this limiting distance must be *unextended*. And it is certainly *coloured*, for it is a blue-looking dot on a white-looking background. So it is a punctiform blue sense-datum.

In drawing this conclusion Hume tacitly assumes that there can be no *indiscriminable* sense-data in a visual field. On that assumption, the argument would run as follows. So long as you sense a sense-datum of *any* extension, the result of moving further away from the wall is simply to replace a larger sense-datum by a smaller one of the same colour and the same location in your visual field. Now a stage arrives at which the result of moving any further away is that such a sense-datum altogether ceases to be distinguishable in your visual field. Of course, if we admitted the possibility of indiscriminable sense-data in a visual field, we might say that after this stage there is still an extended blue sense-datum, but it is too small to be discriminated. But, if we reject the possibility of indiscriminable sense-data in a visual field, and accept Hume's account of the phenomenology of the experiment, we seem forced to draw Hume's conclusion. We seem obliged to say that, when the ink-spot is viewed from the limiting position for that particular observer at that particular moment, the sense-datum corresponding to it is quite literally a coloured *point*, with position but no extension.

Hume draws a corollary from this about the extension of *physical objects*, which I will now state in my own way. It is often said that there are physical objects, e.g. ultra-microscopic particles, which are smaller than anything that we can perceive with our senses. Now this is true on one interpretation. It is true, if one takes it to mean that, even when such a material thing is in the most favourable position for being seen, it fails to produce any visual impression at all. But, in another sense, it is misleading. If such a material thing has extension at all, it must be bigger than some particulars which we can *visually sense*. For we can and do sense visual sense-data which are literally punctiform. Therefore, even those material things which are too small for us to perceive by sight must be larger than some of our actual visual sense-data.

According to Hume's general account of ideas, to have an idea of a point would simply consist in having a mental image which resembles and is causally descended from a punctiform sense-impression. Since we have punctiform visual sense-data, there is no reason why we should not have punctiform visual images which resemble them and are ultimately derived from them. And, if we do so, we have ideas of points in the only sense in which, according to Hume, we have ideas of anything.

Hume concludes from this that it is a mistake to say, as some people have done, that there may be physical objects so small that we can have no adequate ideas of them. However small such a thing may be, it must, if it be extended at all, consist of a *plurality* of points. Now we have ideas of *individual* points, and therefore of something smaller than such a thing. Hume asserts that the only difficulty in forming clear ideas of extended things arises from their *bigness*, and not from their smallness. Even the smallest body must consist of a very large number of material points, and a very large body would consist of an enormous (though always finite) number of such points. Now, although we have perfectly clear ideas of individual points, i.e. have punctiform coloured visual images, it is impossible to have a clear idea of a collection of an enormous number of points. For, on Hume's view, such an idea would be an image composed of an enormous number of punctiform images, each of which was discriminated from all the rest. And we do not have such images.

(1.1) *Comments on the doctrine of punctiform elements.* Before passing on to consider how the punctiform elements are supposed to be aggregated to form objects of finite extension, I will make some critical comments on the part of Hume's theory which I have just expounded. For this purpose I shall divide my remarks into two sections, viz. (A) those concerned with the part of the theory which depends on Hume's general doctrine of ideas, and (B) those concerned with the part which is independent of this.

(A) The first section can be dismissed fairly briefly. I have no doubt that Hume's general account of what is involved in having an idea of so-and-so is, and can be shown to be, rubbish. But, for the present purpose, it is enough to say that, whatever may be the right analysis of the phrase 'to have an idea of a point', Hume's analysis is certainly wrong. To have an idea of a point certainly does not *consist in* having a punctiform visual or tactual mental image. To have such an image is neither a necessary nor a sufficient condition of having an idea of a point, in the sense in which that phrase is used by geometers. So the question whether we do or do not have such images is simply irrelevant. To this I will only add that, for my own part, I am pretty certain that I do not have punctiform visual or tactual images, and that I should feel somewhat sceptical if anyone were to tell me that *he* did.

(B) We can now pass to the question of punctiform sense-data. On this I would make the following comments:

(i) I am very doubtful whether the facts about the visual appearances of the ink-spot, on which the argument for punctiform visual sense-data is based, are correctly described. When I walk backwards from such a spot, keeping my eye on it all the while, it seems to me that there is a qualitative as well as a quantitative change in the successive sense-data. At the earlier stages there certainly is a noticeable decrease in size, whilst the intensity of the blue colour and the definiteness of the outline do not alter appreciably. But, as I approach the limiting position, from which there ceases to be any appearance of the dot in my visual field, what I find most prominent is the growing *faintness* of the blue colour and the *haziness* of the outline. The appearance of the dot finally vanishes through becoming indistinguishable from that of the background immediately surrounding it. But, so long as I am sure that I am seeing the spot at all, I am fairly sure that the sense-datum which is its visual appearance is *extended*, and not literally punctiform. So I very much doubt whether there are punctiform visual sense-data. The case for punctiform tactual sense-data would seem to be still weaker.

(ii) It is very commonly held that it is meaningless to suggest that a sense-datum could appear to the person who is sensing it to have any characteristic which it does not in fact have. This is taken as self-evident, e.g. by Berkeley. And Hume himself explicitly asserts the principle, as is shown by the following passage from the *Treatise*, bk. I, part IV, sect. ii: 'For, since all . . . sensations . . . are known to us by consciousness, they must necessarily appear in every particular what they are, and be what they appear.' For otherwise, he says, we should have 'to suppose that, even where we are most intimately conscious, we might be mistaken' (*T.H.N.* (I), p. 480). He evidently regards any such supposition as absurd.

Now, it seems to me that Hume's theory of extension commits him to this alleged absurdity. According to him, any extended visual sense-datum is in fact an aggregate of a *finite* number of literally *unextended* coloured elements. It must therefore be in fact *discontinuous*. But it certainly does appear on inspection to be *continuous*, and does not appear to be an aggregate of a finite number of punctiform elements. (One needs only to look at an ordinary sheet of smooth white writing-paper to convince oneself of this.) Therefore, if Hume be right, it both appears to have a property which it does not have, and has a property which it does not appear to have. Even if one accepted Hume's argument to show that, under certain very special circumstances, one is presented with an isolated punctiform visual sense-datum, this would not help him here. Of course, a precisely similar inconsistency arises in connexion with extended visual *images*. For, according to Hume, any such image must in fact be an aggregate of a finite number of punctiform images; whilst no such image appears to be so on inspection.

(iii) There is a certain kind of muddle which it is very easy to make here, and I think it is possible that Hume may have made it. It is a well-known fact that a discontinuous set of closely adjoined coloured dots on a white sheet of paper will appear as a continuously coloured area, if you view it from a great enough distance. Conversely, what appears as a continuously coloured area will often be found to be a discontinuous set of coloured dots, if you view it from near at hand or through a magnifying-glass. Now, if we use the word 'see' in its ordinary sense, it is quite proper to say that a person is seeing the *same* part of the *same* bit of paper, under one set of circumstances as strewn with a discontinuous collection of coloured dots, and, under another set of circumstances, as a continuously coloured area. It is also quite proper to say that in the former case he is seeing it 'as it really is', and that in the latter case he is to a certain extent 'misperceiving' it. Now plain men do not draw any clear distinction between seeing and what certain philosophers call 'visually sensing'. Nor do they draw any clear distinction between the surfaces of the bodies which they see and what certain philosophers call 'the sense-data which they visually sense in seeing those surfaces'.

Now every philosopher has been, and still is at most times, a plain man. It is therefore very easy for him to take for granted that the percipient in the case supposed is *sensing the same visual sense-datum throughout;* and that this sense-datum really consists of a discontinuous aggregate of coloured sense-data, even when it appears on the most careful inspection to be continuous. That, however, is a mere muddle. If you distinguish visually sensing from seeing, and if you distinguish the visual sense-datum sensed from the material surface seen in and through sensing that sense-datum, you will have to proceed as follows. You will have to say that the percipient, who sees the same part of the same material surface under the various conditions in question, is sensing a *different* sense-datum on each such different occasion. No two of these sense-data have any part or element in common. Those which appear discontinuous on inspection *are* discontinuous, and those which appear continuous on inspection *are* continuous. Each is exactly as it appears on inspection of it to be; but the discontinuous ones give more accurate information than do the continuous ones about the structure of that material surface of which all of them are visual appearances.

(iv) It seems to me that Hume has given no clear account of extension as applied to *material things*, e.g. sheets of paper or billiard-balls, as distinct from extension as applied to *sense-data* and to *images*. He has not even seen that it is obligatory on him to do so.

The fact of being a phenomenalist does not excuse one from this task. Let us grant, for the sake of argument, that all propositions about the extension of material things can be analysed completely into propositions about the extension of sense-data. The analysis has still to be made, and it will certainly be very complex. It is quite certain that one cannot just substitute for a proposition about the extension of a material thing, e.g. 'That thing is cubical', a *single* proposition with the *same* predicate about a *single* visual sense-datum. For no visual sense-datum is cubical. The very least that is needed is a complicated set of propositions about a whole family of suitably interrelated sense-data of various sensible shapes and sizes and in various visual fields.

(2) *The mode of aggregation.* I now leave these comments, and pass to the other factor in Hume's doctrine of divisibility. It is an essential feature in his theory that punctiform coloured sense-data can be aggregated together in such a way that the aggregate is an extended coloured sense-datum. And he quite explicitly maintains that a finite coloured line, or surface, or volume is an aggregate of a *finite* number of *punctiform* coloured elements. In discussing this we can, for the most part, confine our attention to the case of *lines*, straight or curved. For this is the simplest case, and any difficulties in applying the theory to lines will equally affect the application of it to areas or to volumes. Of course, there might well be additional difficulties in the latter cases.

Hume never considered the notion of such aggregation in detail, and it seems to me that one gets into insuperable difficulties as soon as one attempts to do so. I will now state some of them.

(i) It is plain that this aggregation of points to give lines must be something quite different from the adjunction of little straight lines end to end to give longer lines. Similarly, it must be something quite different from the adjunction of little areas along their edges to give larger areas, or of little volumes over their faces to give larger volumes. For a point has neither ends nor edges nor faces.

The only relevant remark which Hume makes on this topic is the following: 'A blue and a red point may surely lie contiguous without any penetration or annihilation.' Again, in the same paragraph he says: ' . . . from the union of these points there results an object, which is compounded and divisible, and consists of two parts, of which each preserves its existence distinct and separate, notwithstanding its contiguity to the other' (*Treatise*, bk. I, part II, sect. iv: *T.H.N.* (I), p. 347). It is plain from the context that Hume here takes the points to be of different colours only to help the reader's imagination. He would say exactly the same things *mutatis mutandis* of two red points or of two blue points. The question thus arises: What does Hume mean by 'contiguity' as applied to *points*?

(ii) It is plain that contiguity, in the case of points, cannot mean *contact*. Only *extended* objects could be in contact with each other. For contact consists in having one or more points in common, and in the remaining parts of the two objects being on opposite sides of these common points. The only way to make sense of the notion of contiguity, in the case of two points, is to suppose that there is an *intrinsic minimum distance*, such that two points cannot be nearer together than this. Two points which were at the intrinsically minimal distance apart might be said to be 'contiguous'.

(iii) Hume makes certain statements which seem to imply this view. In *T.H.N.* (I), p. 351, he discusses the notion of equality of lines, areas, &c. He says there that 'lines or surfaces are equal, when the number of points in each are equal; and as the proportion of the numbers varies, the proportion of the lines and surfaces is also varied'. It is true that he says that this does not provide a practical means of comparison, because we cannot count the points. But he says explicitly that it is 'just, as well as obvious'. Now all this plainly implies that there is a certain intrinsic minimal distance between two points. A pair of points at that distance apart would be 'contiguous', in the only sense in which points could be so. And any such pair of points would constitute the natural, though not practically available, unit of length. (Presumably, the intrinsically minimal *area* would be an equilateral triangle, whose corners were three points, each at the minimal distance from the other two. And, presumably, the intrinsically minimal *volume* would be a regular tetrahedron, whose corners were four points, each at the minimal distance from the other three.)

(iv) All this fits in with Hume's doctrine that the total number of points in any finite line is finite. For that implies that a line is a *discrete* sequence of points. It might be compared, for example, with the sequence of integers between (say) 1 and 10. It could *not* be compared, for example, as the orthodox mathematical theory would claim, with (say) the sequence of fractions greater than $\frac{1}{3}$ and less than $\frac{1}{2}$, arranged in order of magnitude. For in the latter case there is a fraction between any two fractions. On any such view as Hume's, if you take any point in a line there must be a point *next* to it on one side or the other or both; since the total number of points in it is finite. Now, on that assumption, there are only the following two possibilities. Either (*a*) there is an intrinsically minimal distance, such that no two points can be nearer to each other than this, and such that the distance between any two points is either this or some integral multiple of it. Or (*b*), whilst any two points must be at *some finite distance or other* apart, there is no one distance, however small, such that no two points could be nearer together than that. It is evident that Hume's statements about equality imply the first of these two alternatives.

(v) The theory which we have had to ascribe to Hume seems to me to be altogether untenable, for various reasons.

(*a*) In the first place, it seems plainly inconsistent with the notion of distance that there should be an intrinsically minimal distance.

(*b*) What would it mean, on Hume's general principles, to say that there is a certain distance such that no two points *can* be nearer together than this, and that any two points *must* be separated either by this distance or by some integral multiple of it? Plainly, the necessity would not be analytic. Therefore, on Hume's general principles, it could only be a belief generated and imbued in us by a certain invariable regularity in our past experiences. But, on Hume's own showing, we can seldom, if ever, discriminate the punctiform sense-data which make up an extended sense-datum. Therefore, we can seldom, if ever, have been distinctly aware of a natural unit line composed of two punctiform sense-data at the minimal distance apart. And the same remark would apply, *mutatis mutandis*, to intrinsically minimal areas or volumes.

(*c*) The doctrine in question would lead to geometrical consequences which are highly paradoxical. It is commonly regarded as self-evident, for example, that there are through any point lines in every conceivable direction. But, on the theory in question, there could be only as many lines through a point as there are points at the minimal distance from it and from each other. In a plane, for example, these would be the six points at the corners of a certain regular hexagon with the given point at its centre. So there would be only three co-planar straight lines through a given point, and each would make a minimal angle of 60° with the one next to it.

I think, then, that Hume's whole account of spatial divisibility can be fairly safely dismissed as rubbish.

II. THE ALLEGED IDEA OF A VACUUM.

We can now turn to Hume's second question, viz. whether any one has or could have an idea of a vacuum.

Hume defines the word 'vacuum' as 'a space where there is nothing visible or tangible' (*Treatise*, bk. I, part II, sect. v: *T.H.N.* (I), p. 358). He denies that we have any idea answering to that phrase. But many people have thought that they do have, and they have produced arguments to show that they must have, such an idea. Hume claims to refute these arguments, and he puts forward a theory to account for the fact that such people think they have an idea of a vacuum when really they do not and cannot.

On Hume's principles, and with his definition of 'vacuum', the statement that we have no idea of a vacuum is little more than a platitude. On his analysis of 'to have an idea of so-and-so', to say that we have an idea of a 'space where there is nothing visible or tangible' would come to the following. It would amount to saying that we have visual images which are extended but completely without colour (including under the word 'colour' black, white, grey, &c.), or that we have tactual images which are extended but completely lack imaginal hotness or coldness, roughness or smoothness, and every kind of imaginal analogue to sensible tactual qualities. It is plain to me on inspection that I have no such images, and I should be surprised if anyone else proved to be differently constituted in this respect.

Even if it were not obvious to everyone on inspection, Hume would claim to prove it in the following way. According to him every image is a faint copy of some earlier sense-impression had by the same person. Now it seems quite certain that one is never aware of an extended sense-datum which is just extended and figured but has neither visual nor tactual sense-qualities pervading its extension. Therefore, there are no impressions to give rise to the kind of image which an idea of a vacuum would have to be, if we accept Hume's definition of 'vacuum' and his analysis of the phrase 'to have an idea of so-and-so' and his general principle that all images are faint copies of previous impressions.

The conclusion seems to me to be completely uninteresting. Since no one in his senses would think of questioning it, we can be pretty sure that the quite intelligent persons who have claimed to have an idea of a vacuum either were *not* using the word 'vacuum' in the sense defined by Hume or were not accepting Hume's analysis of 'having an idea of so-and-so'. Probably they would have differed from him on both points.

It is plain from some remarks which Hume added in the Appendix to Book III of the *Treatise* (*T.H.N.* (I), p. 368, note) that he came to realize this himself. In these remarks he admits that he has been confining his attention to the visible and tangible *appearances* of physical objects, i.e. to visual and tactual sense-data. He says: 'If it be asked whether the invisible and intangible distance' between two visible or two tangible objects 'be always full of *body*, or of something that by an improvement of our senses might become visible or tangible, I must acknowledge that I find no very decisive arguments on either side, though I am inclined to the contrary opinion. . . .' Now this is the only question which was ever at issue in disputes about a vacuum. So we see that, when Hume faces the real issue, he takes the sensible view that it cannot be settled by philosophical arguments, and expresses a personal opinion *in favour* of the reality or the possibility of regions empty of matter.

How people come to think that they have an idea of a vacuum. We can now consider Hume's explanation of how people come to think that they have an idea of a vacuum, in the sense of an extension without any sensal qualities pervading it. He has an argument about visual extension and one about tactual extension. We will now take these in turn.

(1) *Visual extension.* The essence of the argument concerning visual extension is this. There are two different senses of 'distance'. In our visual fields we are directly aware of sense-data which are at a distance apart in one or another or both of these senses of 'distance'. Certain facts, which Hume enumerates, cause the ideas of these two kinds of distance to be very strongly associated with each other. When people think that they have an idea of extension without any sensal quality pervading it, they are in a muddled state due to a confused mixture of these two associated ideas.

We will now consider the details. I think that Hume's two senses of 'distance' can be expounded as follows. Consider any two points, *A* and *B*. Then there are two quite different, but closely interconnected facts or possibilities to be considered about them. (i) There is the direct *relation* of spatial separation between *A* and *B*. This, being a relation, is indivisible into parts, but it may be greater or less. It might be compared with the *ratio* between two numbers, e.g. between 13 and 2. (ii) There may be a *stretch* or sequence of points collinear with *A* and *B* and falling between them. This might be compared with the *sequence of integers* between 2 and 13. I think that Hume's two senses of 'distance' are just the *relation* of spatial separation, and the *stretch* or sequence of intermediate points which together make up the straight line joining two points.

Let us now consider the visual experiences which correspond to these two senses of 'distance'. Suppose you were to look up at the heavens on a pitch-dark night and to see two stars. You would then be aware of two nearly punctiform visual sense-data which *are* spatially separated, but are *not* joined by a stretch of intermediate visual sense-data. Here we have the visual experience of distance in the first sense, without distance in the second sense.

Suppose, on the other hand, that you were to see the same two stars in twilight against a background of blue sky. Then there would be a visible stretch of blue joining the two separated silvery sense-data. According to Hume, it would be composed of a sequence of punctiform blue sense-data. Their number would be finite, and it would correspond to the degree of separation between the two silvery terminal sense-data.

Now this latter kind of visual experience is very much commoner than the former. Therefore the idea of any degree of spatial separation between two very small or punctiform visual sense-data has become very strongly associated with the idea of a correspondingly long visual stretch of intermediate coloured sense-data, forming a coloured line joining them.

Suppose, now, that on some occasion you happen to sense two spatially separated coloured points, as in our first example, *without* sensing an intermediate stretch of coloured points. Through association, a *visual image* of a stretch of coloured points, joining the two, will tend to arise. But here there is no *sensation* of any such stretch. Hume holds that the result of this is that one gets into a confused state of mind, in which one is liable to say that one is thinking of the two separated visual sense-data as joined by a stretch of *colourless* points. Really, no one does or can think this; for to do so would, on Hume's general principles, be to have a colourless visual image. And this is impossible.

It is plain that Hume could deal in a similar way with the claim to have an idea of a vacuous *visual area*. Suppose that, on a pitch-dark night, you were to whirl a small glowing object round very fast at the end of a string. Then you would sense a single bright *circular line*; and between any pair of opposite points on it there would be distance, only in the sense of a certain degree of spatial separation. But this is a very unusual experience. Nearly always in your visual field circular coloured lines have been the contours of coloured areas, as, for example, when you have looked at a penny or at a silver salver in ordinary light. So an *image* of a coloured filling at once arises through association. But in the case supposed there is no *sensation* of any such filling. On Hume's view, a person in such circumstances is liable to say that he is thinking of an area composed of *colourless* points within a red circular contour.

(2) *Tactual extension*. The general principles of Hume's explanation are the same in the case of tactual experiences. It seems to me that, if we want a strict analogy, we should have to take examples where the tactual sense-data were *simultaneous*, as were the visual sense-data in the former case. An example would be touching two isolated projecting points, e.g. laying your hand on two pins, sticking up at a distance apart from a board, without touching the board itself. Hume, however, takes examples where one first touches a point, then moves the finger through the air, and then touches a second point. This is contrasted with the case where one moves the finger from the one point to the other, keeping continuous contact with, for example, an edge.

There are evidently complications here, which Hume does not notice. For here experiences which are *successive* are interpreted in terms of a spatial order among entities which are themselves *coexistent*. But, at any rate, the general principle is plain. Sensations of two spatially separated tactual sense-data nearly always occur in connexion with sensations of a stretch of tactual sense-data joining the two. So, when one has the former kind of tactual experience without the latter, there arises by association a tactual image of a stretch of hot or cold, rough or smooth, points joining the two isolated and spatially separated tactual sense-data. Since one is not actually sensing such a stretch, one is inclined to say that one has the thought of a stretch of points *without any tactual qualities* joining the two separated tactual sense-data. On Hume's view, however, any such statement is nonsensical, since it would amount to saying that one had a tactual image without any qualities corresponding to those given in tactual sensation.

Comments. I will conclude with some comments on this part of Hume's theory.

(i) I think it would be improved by the following addition, which is quite in line with his account of so-called 'abstract ideas' in *Treatise*, bk. I, part I, sect. vii. Suppose that on some occasion you are sensing two separated coloured points, without sensing a stretch of intermediate coloured points. As already explained, a visual image of a stretch of intermediate coloured points will tend to arise through association. The addition which I would recommend is this. In your past experiences you have on various occasions sensed stretches of points of *many different colours* joining pairs of outstanding separated visual sense-data. So there is a kind of competition between associated images of stretches of different colours. These fluctuate rapidly with each other, and you imagine the two separated sense-data as joined by rapidly alternating stretches, now of one colour and now of another. There is, thus, no *one* colour rather than any other which you think of as *the* colour of the intermediate points. And so you get into a muddled state, and talk of the two outstanding sense-data as joined by a stretch of *colourless* points. A similar addition, *mutatis mutandis*, could be made with advantage and consistently with his account of so-called abstract ideas, to Hume's account of *tactual* extension.

(ii) With this addition I think that Hume's theory becomes a quite plausible psychological speculation as to the kind of imagery which would accompany thinking about empty space in persons whose thinking is normally accompanied by imitative visual or tactual images. But it seems to me obvious that, in order to think of something answering to the description 'X', it is neither necessary nor sufficient to have an X-like image. So the whole theory would appear to be almost irrelevant to the question whether we can and do have an idea of a vacuum.

(iii) I suppose that what Hume must have had in mind in the whole of this polemic about the alleged idea of a vacuum is the Newtonian theory of absolute space, which would have been more or less orthodox among English mathematicians and physicists at the time. According to that doctrine, the region within a closed hollow material surface, e.g. the receiver of an air-pump, even if it contained no ordinary matter, such as air, and no odd kind of physical substance, such as the old-fashioned 'luminiferous ether', would still contain (or, more properly, *consist of*) absolute space. This was regarded as a very queer kind of *substance*, having neither sensible qualities nor physical properties. If Hume held, as many philosophers before and since have done, that no clear idea exists answering to the phrase 'absolute space', as used by Newton and his followers, he was very likely right. But the ground for this is not that we have no visual images of colourless points and no tactual images of points without hotness or coldness, roughness or smoothness, &c. It is that we can see on reflection that the description of 'absolute space' offered by the Newtonians involves a combination of features which are inconsistent with each other or with the notion of a possible existent.

To conclude, there seems to me to be nothing whatever in Hume's doctrine of Space except a great deal of ingenuity wasted in recommending and defending palpable nonsense. Not so long ago Hume was a kind of 'sacred cow' to many British philosophers. I do not know whether that is still the case. He has never been one of my fetishes. I would not, indeed, go so far as Prichard, who wrote of the *Treatise*: ' . . . Of course there is a great deal of cleverness in it, but the cleverness is only that of extreme ingenuity or perversity, and the ingenuity is only exceeded by the perversity' (Prichard, *Knowledge and Perception*, p. 174). But I cannot help sharing what A. E. Taylor described, in the concluding words of his Leslie Stephen Lecture on 'David Hume and the Miraculous', as 'a haunting uncertainty as to whether Hume was a really great philosopher or only a very clever man'.

Certainly an examination of Hume's doctrine of Space does nothing to incline me towards the more complimentary of Taylor's two alternatives. But it would be unjust and ungenerous to end on such a note. We must remember that the *Treatise* was the first work of a very young man. When we consider that Hume composed it between the ages of 23 and 26, we cannot but admit that, with all its faults (which Hume acknowledged and emphasized as he grew older), it was an astonishing *tour-de-force*, perhaps unequalled and certainly unsurpassed in the history of philosophy.