VI.—DISCUSSIONS.

SOME PHYSICAL CONCLUSIONS IN RESPECT TO SPACE.

THE apparent platitude of the ensuing paragraph may be excused, as a preface essential to the argument immediately following.

That which appeals to our senses directly can only do so by the agency of force; and the various forces exhibited determine the various properties of the object. Thus Matter exhibits resistance to disintegration through the force "cohesion"; elasticity is the concomitant of force-action. Colour cannot be impressed on consciousness without the action of force, neither can form (or shapes of objects) be evident without touch or sight—both involving the agency of force.

Some, it appears, express wonder why Space has no positive property or attribute (comparable to that Matter possesses). But how could Space have a positive property of this kind, unless it could act on consciousness by means of force? Now, in harmony with observation, Space (in the true sense of the term) that is Void or pure vacuity cannot possibly exert force on anything¹. This may serve to explain why the existence of Space can only be demonstrated indirectly, or by logical inference. Of course, by "Space" is here meant the Void that inferentially exists, when all material is supposed removed from any given locality.

But it seems that a notable error has been made in classing Space (and also Time) with material things; in putting in the same category the non-material,² upon which force cannot act, and the material, where forces are influential or active. This error (pointed out briefly in the author's article in *MIND* for April, 1900) has apparently led to some remarkable consequences. Space and Time are classed with masses, colours, sounds, odours. Dr. E. Mach (of Vienna) in an able work on psychological physics

¹ Another confirming indication of Space not being connected with force, is its permanent unchanging character. It is the property of force to produce change. Force *does* cause repeated changes in Matter (called "effects"); whereas there are no such corresponding effects connected with Space.

² Non-material existence, as here defined, is something which possesses immunity from force-action, in our experience; while (contrariwise), "material" existence is subject to force-action.

(*Beiträge zur Analyse der Empfindungen*, Jena, Gustav Fischer, 1881) expresses the following view :—

"The physiology of the senses indicates clearly that Spaces and Times may just as well be called sensations as colours and sounds" (p. 6—translation of passage).

Yet there is this profound difference, that while colours and sounds [Dr. Mach classes herewith forms or material objects] are connected with the action of force¹—Spaces and Times are not. For there is no means of applying forces to Space and Time, as one can to masses (for instance).

While (by way of illustration) one can suppose the appearance of a mass of matter to be a resultant of force-action—such as its colour—how can Spaces or Times be consistently viewed as resultants of force-action; in that they are not observed to be in any way amenable to forces?

Yet in his *Principles of Psychology* (vol. i., third edition, p. 227, etc.), Mr. Herbert Spencer ventures to suggest a particular theory, which makes Space and Time the resultants of a transformation passed through, where force is therefore (by implication) concerned, just as if it were a case of colour or sound; and the forms of material objects are supposed by Mr. Spencer to be as much the results of transformation as colour.²

But while (for elucidation here), it may be possible to deliver an impact against a material object—or to apply force—it is impossible to do the same with a Void or an absolute vacuum. In the first case, force is influential; in the second, it is completely powerless. Observe the profound and significant distinction: and it is only reasonable to infer that this distinction means something. It cannot mean that all these existences are to be classed together and treated in an analogous way.

A resultant of the action of force is of course capable of being acted on by force. If Spaces and Times were the resultants of force, why should it not be possible to apply or connect forces to them?

If Space and Time be not resultants of force-action; may not this constitute some reason for regarding them as absolutes, i.e., not as phenomena (which latter are recognised to be the resultants of the action of force on consciousness)?

In one peculiar hypothesis³ of the nature of Space, given in volume i., page 227, etc., of the *Principles of Psychology*, Mr.

¹ In the perception of colour, of sound, of temperature, of form, of pressures, it is known that consciousness is acted on by force. But there is (contrariwise) a total absence of indication of force-action in the perception of Space. Knowing the existence of Space, while no force is observed to be connected therewith (and so it is not directly perceived), the inference is that its presence is indirectly made evident by reasoning.

² For a critical commentary on this, see last article in *MIND*, for April, 1900.

³ Already briefly alluded to.

Spencer proposes that some absolute existence (so-called "ontological order") is transformed—by interaction between it and our consciousness—into Space. It would follow then that this entity ("ontological order") which by interaction on us is to generate Space as a resultant—must itself exist without Space. In other words (as a preliminary), Space, *previous* to its generation in this way, must be imagined absent from existence. Nevertheless, in the *First Principles*, Mr. Spencer says:—

"The non-existence of space cannot, however, by any mental effort be imagined" (p. 34).

Space *cannot* then (according to Mr. Spencer's own words) be imagined absent from existence. This is, however, precisely the condition indispensable for his peculiar theory of Space generated by assumed interaction between an "ontological order" and our consciousness.

If then Space cannot be supposed to be generated by the action of anything on consciousness, it can at least be *conceived* to be an absolute existence, present already, before mind was.

There would seem to be little profit in seeking to ascribe peculiar qualities to Space, such as "curvature," by doubting the axiom of parallels, or that the properties of a triangle are independent of its size: and it may seem even a question to some whether hypotheses of this kind may not tend somewhat to shake the stability of mathematical conceptions.

For it appears that assumptions of this character (even if they have some ulterior purpose¹) only become plausible by assigning to Space some specific "texture" or structure; i.e., by *not* viewing Space as pure Void or vacuity. How can the imagination seize a foothold to conceive curvature, unless some texture (structure) or specific quality be postulated for Space? Can a Void be imagined curved, it may be asked? The assumption of a structure for Space rejects (it may be noticed) the deepest or most abstract conception. For possibly Void may be said to be the most penetrating concept of the human mind. Directly structure [Prof. Clifford remarks on "the sharp points, edges and furrows of space"²] is attributed to Space, then the intellect can take a profounder step, and place this entity (with structure) in a Void, i.e., in Space itself. Can it not be said, therefore—Refrain from giving structure, in order that space may remain space.

Some might urge—A less abstract concept of Space is possible. But anything whatever possessing structure (to which forces could in conception be attached) can be imagined to exist *in* Space. This structural entity is, therefore, not Space itself. Moreover, a structural entity of any sort can easily be conceived

¹ Such as the tentative development of formulæ, etc., on the basis of particular hypotheses assumed.

² Prof. Clifford's *Lectures and Essays*, vol. i., p. 321. A criticism of the above view is ventured with every respect.

to be finite in extent: while this cannot be said of Space. Hence, these considerations seem to constitute a decisive obstacle in the way of any attempt to accord Space a structure (or any endeavour to elude the most abstract idea possible).

Prof. Clifford remarks additionally as follows:—

"But the question—Does space contain a finite number of cubic miles, or an infinite number?—is a perfectly intelligible and reasonable question which remains to be answered by experiment" (*Lectures and Essays*, vol. i., p. 153).

Whatever may be thought of this, it may at any rate be desirable to remember that Space itself has never been available for experiments directly—has never been laid bare, so to speak. It appears that Space has at no time been exhibited in sample form.

Supplement. On page 165 of the *First Principles* (fifth edition) is the following passage by Mr. Spencer, which seems to merit some critical comment:—

"That which we know as Space being thus shown, alike by its genesis and definition, to be purely relative, what are we to say of that which causes it? Is there an absolute Space which relative Space in some sort represents?" (p. 165).

As to the first sentence:—

"That which we know as Space being thus shown, alike by its genesis and definition, to be purely relative, what are we to say of that which causes it?" (p. 165).

Now, of course, Space is "relative" in the sense that all perceptions are *related* to the observer or reasoner. But as to the question:—

"What are we to say of that which causes it?" (p. 165).

This implies or might naturally lead a reader to infer that "that which causes" Space (the perception), is itself *not* Space, *i.e.*, that something different from Space, by acting on consciousness, produces the impression we call "Space".

Obviously, this is not demonstrable, even if it were imaginable. For Space relative (*i.e.*, Space to consciousness) and the absolute existence, whence results the impression, may possibly be identical, or one and the same in kind. For a relative and an absolute may conceivably be alike in some phase. For instance, a sphere, as perceived, may actually exist as a sphere absolutely (independently of any observer being there). This is something positive and definite. To fix the conception sharply on form or shape alone—the conception of the "thing—in itself" (or absolute entity) involves nothing more than a comparison, *i.e.*, the sphere as it appears, and the something which produces the impression called "a sphere" may be identical in shape, or the two be connected by the ratio unity (so to speak). This is quite intelligible; in fact it is impossible to imagine definitely what else could be¹.

¹ Author's first paper in *MIND* for April, 1900, may be fitly alluded to here.

Mr. Spencer inquires further :—

"Is there an absolute Space which relative Space in some sort represents?" (p. 165). The wording here seems somewhat less careful than usual. Clearness in philosophy is particularly refreshing; and essential, if a general agreement be aimed at. For one cannot ask: "Is there an absolute *Space*?"—without, (by the use of the same word "Space") implying that the absolute existence, whence the perception results, is itself Space: in other words, that the absolute and the relative are identical here or copies. Reasons for inferring this have been pointed out; but it is not what Mr. Spencer wishes to convey by his question. For the passage—"Is there an absolute Space which relative Space *in some sort*¹ represents?"—implies that the relative and absolute are *not* copies. It might be suggested that for clearness in wording, the question might preferably have been put somewhat so (query):—

"Is there an absolute something (an existence present absolutely) which relative Space in some sort represents?"

But in the absence of any transfiguration undergone in consciousness; it appears evident that this "existence present absolutely" must coincide with the Space we appreciate.

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¹ Observe the implication of the words here italicised.