

two of the most valuable traits of the modern scientific method as contrasted with the speculations of the medieval philosophers, and I think that these are features which might well be introduced in much larger measure into other realms of human thought.

E. H. KENNARD.

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Feb. 17.

MR. VAN MIERLO makes two assumptions, neither of which accords with fact—namely, (1) that physics is distinguished from other studies by the instruments employed; and (2) that reason is not an instrument employed by the physicist properly so-called. With regard to the second, I would point out that most of the things to which the physicist attaches significance (for example, the interiors of the earth and stars, the occurrence of unobserved eclipses, etc.) are not observed by the senses, but apprehended by reason. On the first point it is surely common knowledge that the distinguishing characteristic of physics (and that purely for convenience) is not its instruments but its subject-matter. The physiologist who uses a galvanometer does not thereupon become a physicist, and if a physicist used a stethoscope, or even logic, to attack a physical problem, his work would not on that account be refused publication by the Physical Society. The determination of the time of occurrence of a physical event is a physical problem, and if the times of occurrence of two events are identical, the events are simultaneous. If Mr. Van Mierlo could determine those times for two spatially separated events *by any means at all*, and get results which are independent of his velocity (such velocity being defined, of course, in terms consistent with the definitions of the times and distances of the events, or the process would be irrational), physicists would acknowledge the obligation to revise their theories accordingly.

Prof. Kennard wants to remain a realist, that is, to believe in a world existing independently of experience; to avoid the stigma of a profession of omniscience; and to approve the scientific rejection of absolute simultaneity. Notwithstanding his letter, I do not see how this is possible.

Let A be the world in question, and A' that part of it which we can now experience. Then, as a realist, Prof. Kennard must admit that there may be a part, $A-A'$, which is not experienced. As a non-professor of omniscience he must further admit that when he has discovered A'' , the portion of $A-A'$ which the complete exercise of known means of observation would allow him to discover, there may still remain a portion, $A-A'-A''$, which is beyond his knowledge. Now, absolute simultaneity does not belong to A' or A'' . Hence, either it belongs to $A-A'-A''$ or it does not exist. As a realist, Prof. Kennard must admit a significant distinction between these alternatives; and, as a non-professor of omniscience, he cannot decide between them. He can therefore make no pronouncement on the matter. But the principle of relativity says: "It is impossible to detect motion relative to the ether"; and this is equivalent to a denial of existence to absolute simultaneity. It therefore *does* make a pronouncement on the matter. Prof. Kennard must therefore reject it; or cease to be a realist; or profess omniscience.

It is not a mere matter of words. Relativity does not merely say that we cannot now detect absolute

simultaneity; we knew that before the theory was put forward. That is simply a statement of the *problem* aroused by the Michelson-Morley and other experiments, but relativity professes to be a *solution* of that problem. It proceeds to organize the experience we have in a way which would be invalid if absolute simultaneity were unobservable merely from temporary lack of knowledge.

I think that Prof. Kennard's reluctance to accept this conclusion arises from a mistaken notion of what idealism (in the sense implied in this discussion) means. He introduces the question of volition, but that has nothing to do with the matter. Certainly our observations are largely independent of our volition, but the question is simply whether we are to assign significance to "existence" independently of observation, voluntary or otherwise. When Prof. Kennard made the experiment of looking at NATURE of January 1, he saw marks which his rational mind interpreted in terms of a hypothesis called Dingle. The performance of his eyes did not depend on his volition—the marks which he saw had nothing to do with what he would have liked to see—and he could not make rational sense of his experience without the hypothesis referred to, however much he might have preferred to ascribe it to an illusion produced directly by the devil. All that holds good whether he is an idealist or a realist. The question is simply whether scientific progress is best described by saying that we start with experience and grant existence only to that which is necessary to correlate such experience rationally, or that we start with a hypothetical world independent of experience and proceed to find out all that we can about it.

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March 8.

The Advancement of Science and Society

WE are glad to read the letter in NATURE of March 19, under the above heading, from Dr. F. R. Moulton, Permanent Secretary of the American Association for the Advancement of Science. It need scarcely be said that the invitation from that body to the British Association to co-operate in forming the nucleus of a wider organization for this great object is engaging our earnest attention, and has already been brought to the notice of the Council of the British Association. We look forward to meeting Dr. Moulton and some of his colleagues this summer, to discussing the project with them, and to having them with us at our meeting in Cambridge. It may be added in regard to the last clause in Dr. Moulton's letter concerning the "planning of the necessary machinery", that a scheme in rough outline has already been forwarded to him for informal comment, in the hope that it may prove possible, whether on the basis of that scheme or of some other, to lay practical proposals before the governing bodies of both Associations at an early date.

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British Association for the
Advancement of Science,
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March 21.