

CORRESPONDENCE

TO THE EDITOR OF *Philosophy*
SIR ARTHUR EDDINGTON'S THEORIES

DEAR SIR,

I am glad that Professor Reichenbach realizes that my polemic against Sir Arthur Eddington is not really personal. But since the personal element seems to have misled him (and therefore probably others) concerning the real issue, may I try to state it in strictly impersonal terms?

Can a distinction be made between the experimental and theoretical elements of physics? Professor Reichenbach will not deny that there is a difference between (say) measuring the spectrum of a substance and interpreting the measurements in terms of atomic structure; in practice the two elements are so distinct that they are often the work of quite different people. But he may deny that, as I assert, they are wholly separable. I admit fully that they are not actually separated by the prevailing use of the words "law" and "theory," and that therefore I may have been unwise to use those terms. I admit further that in all scientific propositions, as usually stated, the two elements are confused to some extent; in particular, theoretical terms are habitually used to describe experimental facts. But I maintain that the elements can be separated; that the experimental element can be isolated by stating all "laws" in the form that certain experiments, not necessarily describable in words, can be demonstrated; and that the part so isolated contains all of physics that has any practical "authority." I recognize that imaginary experiments (*Gedankenversuche*) present a difficulty, but I believe it can be overcome. I am not sure whether Professor Reichenbach would agree with me so far, but almost all physicists who have actual experimental experience would.

If the distinction is admitted, the question of the relation of the two elements arises. Sir Arthur Eddington would probably hold that they differ only in degree; that a theory concerns exactly the same "reality" as a law, but is a fuller, more profound, and truer account of it; that it differs from a law in somewhat the same way as an adult's account of some complicated event differs from a child's. (*Law* and *theory* are here used in my sense, of course.) On the other hand, I hold that they differ in kind, in somewhat the same way as the statement that Brutus killed Cæsar differs from the statement that Brutus was right to kill Cæsar, and that therefore they must be carefully distinguished in considering the philosophical implications of science. Which of the two views is right can be determined only by a careful study of the relation between the experimental and theoretical elements in some typical branch of actual physics. My own solution of this problem is contained in my *Physics: The Elements* (Camb. Univ. Press, 1919), though naturally now I should amend it slightly. My quarrel with Professor Reichenbach and most other philosophers of science is not that they have given a different solution, but that they have ignored the problem altogether.

Yours faithfully,
NORMAN R. CAMPBELL.

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SIR,

It is of much interest for me to hear from Dr. Campbell himself that my interpretation of his opinion was true, and that his article really was based on the conception of a precise disjunction between experimental and theoretical physics. Though this is only one point of my former letter, it seems to be the basis of the