

THE ISRAEL ACADEMY OF SCIENCES AND HUMANITIES

PROCEEDINGS · VOLUME II No.3

Neorealism vs. Neopositivism
A Neo-Pseudo Issue

by

YEHOSHUA BAR-HILLEL

Jerusalem 1964

**Published for the Israel Academy of Sciences and Humanities
by the Magnes Press, the Hebrew University, Jerusalem**

© The Israel Academy of Sciences and Humanities

**Printed in Israel
At the Central Press, Jerusalem**

NEOREALISM vs. NEOPOSITIVISM
A NEO-PSEUDO ISSUE

by

YEHOSHUA BAR-HILLEL

THAT THEORIES ARE NECESSARY to explain *phenomena* (or 'save' them, as the Greek philosophers used to say) became clear to many thinkers from the very infancy of science. In these theories we find expressions which denote entities of a special type whose mode of existence is radically different, at least *prima facie*, from that of the entities encountered in everyday life, such as tables, chairs, trees and stones, special entities that cannot be seen, heard or perceived by any of the senses. These theories also contain expressions and functions of a special type whose application to the ordinary and the special entities cannot be verified by our senses. An illustration that readily occurs to us is the ancient theory of atoms which goes back to the 5th century B.C. (I shall not here treat the much discussed connection between the assumed existence of invisible entities required for scientific explanation and the existence of entities required for purposes of magic or theology, such as gods, devils and ghosts, entities which are *in general* invisible, but which reveal themselves on appropriate occasions to the initiated. Nor shall I treat the entire question of the growth of scientific explanations from a magico-theological background.) The question of the exact nature of the existence of the particular type of entities, properties, relations and functions required by scientific theories has never ceased to interest philosophers. The problem is often formulated in terms of 'reality' (or its counterpart in Greek, Latin, Arabic and other languages) and thus it was often asked whether atoms are more real or less real than trees, or 'every bit as real' as trees, yet different from them in some other respect which cannot be clarified by the term 'reality'. It would lead us too far afield to discuss the long history of what is known today as 'the problem of the ontical status of the theoretical entities'. I shall only mention that in the first quarter of this century the *Realismstreit*, the battle of realism, broke out anew in the philosophical circles of

Germany and other countries. In 1927 an attempt was made by Rudolf Carnap¹ to put an end to this controversy by showing that the discussion between the idealists (or positivists) and realists was devoid of cognitive (or scientific) meaning. It must be admitted that Carnap and many of his followers were rather naive to believe that they had succeeded in laying the ghost of the *Realismusstreit*. It is, nevertheless, disconcerting to witness the revival of this venerable controversy in our days, except for some minor changes in the terminology, in such unexpected quarters as the Minnesota Center for the Philosophy of Science. The controversy is unexpected, despite the surprising confession of the head of the Center, Herbert Feigl, that he had always been a realist at heart, except for his brief lapse in the late Twenties when, under the influence of Schlick and Carnap in the Vienna Circle, his genuine belief was repressed and temporarily relegated to his subconscious whence it emerged after his emigration to the United States.²

I shall try to show that the new controversy between neorealism and instrumentalism (as neopositivism is sometimes called) is as devoid of scientific and methodological interest as the old one and that the ontological question whether *theoretical entities* (as we shall henceforth call the above-mentioned entities, properties, relations and special functions) are 'every bit as real' as tables and chairs or whether they are endowed with a lesser degree of 'physical reality' by being only 'computational devices', is a pseudo-question as were its forebearers forty years ago when 'fictitiousness' was used in place of 'computational device'. (The third possibility, namely that theoretical entities are more real than everyday entities, has not been discussed in those circles in whose views I am interested.)

Ernest Nagel has dedicated an entire chapter of his excellent book *The Structure of Science*³ to similar statements, although somewhat less radically formulated. The controversy between the realists and the instrumentalists is described by Nagel as 'a conflict over preferred modes of speech' and he concludes 'that the question as to which is the "correct position" has only terminological interest'.⁴ Many scholars, however, do

1 In the book *Scheinprobleme in der Philosophie* which, however, appeared only in 1928. In 1961, Felix Meiner in Hamburg published a second edition of this book, bound in one volume with the second edition of another book by CARNAP, *Der logische Aufbau der Welt*, the first edition of which also appeared separately in 1928; cf. the new introduction to the second edition.

2 HERBERT FEIGL, 'The Power of Positivist Thinking' *Proceedings and Addresses of the American Philosophical Assoc.*, 1962/1963, pp. 21-41.

3 ERNEST NAGEL, *The Structure of Science — Problems in the Logic of Scientific Explanation*, Routledge & Kegan Paul, London 1961.

4 *Ibid.*, Ch. 6.

not accept Nagel's evaluation and cannot be persuaded that the question has been disposed of. Thus, Grover Maxwell, a member of the Minnesota Center and one of the editors of the Minnesota Studies in the Philosophy of Science published by this institution, presented, in an article that appeared in 1962 in the third volume of this series,⁵ 'new constructive arguments for a radical realistic interpretation' of scientific theories. He published this article even though he continued to believe 'that the key to the solution of all serious problems in ontology is to be found in the classical paper by Carnap, "Empiricism, Semantics and Ontology",'⁶ which I innocently believed had conclusively demonstrated that traditional questions of ontology are devoid of all theoretical significance. Maxwell's questions concerning the ontic status of the theoretical entities are what Carnap calls in this paper 'external existence questions' whose ontic character is pseudo in contradistinction to 'internal existence questions' which mean what they say. One who asks whether there are prime numbers between 1,000,000 and 1,000,100 is concerned with a genuine problem, but one who asks whether natural numbers exist at all, seems rather to be nursing a grudge against the traditional theory of numbers in general. One who desires to know whether Abominable Snowmen exist in the Himalayas is asking an internal existence question and means what he says. He who asks whether human beings in general exist (excluding or including himself) or whether physical entities or the external world really exist, is at loggerheads with standard anthropology, with traditional physics or with tradition altogether and his question is, in all likelihood, only meant to serve as a prolegomenon to the presentation of some novel theory.

I dwell upon Maxwell's article not so much because of its assumed importance but because it is the clearest presentation of the neorealistic point of view that has come to my attention in recent years. Hence, my remarks are concerned exclusively with the opposition from the realist right to Nagel's position. I should have liked to criticize the views of the opposition from the instrumentalist left in this matter but refrain from doing so because of the limited time at my disposal. In spite of this omission, it will be clear from my remarks that my criticism of the neorealistic attitude is not made from an instrumentalistic position.

- 5 GROVER MAXWELL, 'The Ontological Status of Theoretical Entities', *Scientific Explanation, Space and Time* (edited by H. Feigl & G. Maxwell), Minnesota Studies in the Philosophy of Science, III, University of Minnesota Press, Minneapolis 1962, pp. 3-27.
- 6 *Ibid.*, p. 22. This article by Carnap, first published in 1950, has since been republished many times and has also been incorporated into the second edition of his book, *Meaning and Necessity*, University of Chicago Press, Chicago 1959.

I have, indeed, little sympathy with 'the instrumentalist views of outstanding physicists such as Bohr and Heisenberg' and I cannot seriously believe 'that the entities referred to by scientific theories are only convenient fictions, or that talk about such entities is translatable without remainder into talk about sense contents or everyday physical objects, or that such talk should be regarded as belonging to a mere calculating device and, thus, without cognitive content'.⁷ On the contrary, I am convinced that these formulations are utterly confusing, an opinion which, I feel certain, is at present also shared by Carnap and Nagel. It is, therefore, all the more surprising that Maxwell should associate the name of Nagel with that of Bohr and Heisenberg in the first paragraph of his article in order to justify his decision to deal anew with the problem, apparently adopting the celebrated principle that 'whoever is not with me is against me'.

What precisely is the fault that Maxwell finds in Nagel's formulation? I read Maxwell's article several times hoping to find an answer to this question but I am still not sure that I have fully understood the contents of what is ostensibly the clearest of the neorealist articles. An indication of Maxwell's intentions can perhaps be gleaned from the very title of his article, 'The Ontological Status of Theoretical Entities', which appears like a caricature, whether conscious or not, of the title of Carnap's article in the first volume of the Minnesota Studies called 'The Methodological Character of Theoretical Concepts'.⁸ It seems that Maxwell was dissatisfied with Carnap's clarification of the methodological character of theoretical terms for the following two reasons. In the first place, according to Maxwell, Carnap's ontological asceticism fails to explain *why* certain theories 'work' whereas the simple ontological assumption that the entities referred to by these theories actually exist does provide such an explanation.

I could hardly believe that Maxwell would present such a threadbare argument, which he sets forth in all seriousness, twice in the course of his article.⁹ Since the *only* valid reason for believing in the real existence of certain theoretical entities is, to use Maxwell's language, the fact that the theories referring to them are well-substantiated or 'work' (two expressions treated by Maxwell as synonymous) it is obviously arguing in a circle to look upon the existence of these entities as an

7 *Ibid.*, p. 3.

8 RUDOLF CARNAP, 'The Methodological Character of Theoretical Concepts', *The Foundations of Science and the Concepts of Psychology and Psychoanalysis* (edited by H. Feigl & M. Scriven), Minnesota Studies in the Philosophy of Science, 1, University of Minnesota Press, Minneapolis 1956, pp. 38-76.

9 *Ibid.*, pp. 20 and 22.

explanation for the fact that the theories 'work' as well as they do. I find it difficult to persuade myself that Maxwell was unaware of such an obvious flaw in his argument and that he is not hiding something up his sleeve. It is apparent from many passages in Maxwell's paper that he succumbed to the seductions of the *material mode of speech*, so brilliantly outlined by Carnap some thirty years ago.¹⁰

Maxwell's second reason is to be taken more seriously and I am prepared to accept it with reservations. Carnap's view of the methodological character of theoretical concepts is based on the existence of a dichotomy between *observational* and *theoretical*. As many thinkers before him, Maxwell doubts the validity of this dichotomy. It is, of course, legitimate to doubt the validity of any dichotomous polarization in a given conceptual continuum even though it can in many cases be justified, however difficult it may prove to be. It is not difficult, for example, to point out that there are goals for which it is worthwhile polarizing the concept of cleverness — in itself a multi-dimensional continuum — into the qualitative dichotomy Clever–Stupid. There are innumerable other goals for which it is preferable to work with the comparative concept More-Clever-Than, and finally, there are objectives to attain which it is necessary to deal with the quantitative concept Degree-Of-Cleverness (or Intelligence Quotient, as the psychologists call one of its measures). I agree with Maxwell that the dichotomy Observational–Theoretical is of little use, although for reasons other than those given by him and which in no way support his conclusions.

It seems to me that the dichotomy Observational–Theoretical is the result of confusing *two* different though somewhat related dichotomies — namely, the dichotomy between what I call the *observable* and the *unobservable* and the dichotomy between the *theoretical* and the *non-theoretical* (*atheoretical* or *pretheoretical*). The first dichotomy does not seem to me to be of any particular relevance for the types of meaning of the various concepts and here, as I intimated before, lies the area of my agreement with Maxwell. I fail to see the importance of distinguishing between an object that is visible to the naked eye and one that reveals itself only under the microscope, a distinction made by some authors in an effort to find a line of demarcation between the observable and the unobservable. What, then, shall we say of eyeglasses, magnifying glasses, electronic microscopes, etc? The distinction between a theoretical term that has a distinct meaning only within the framework of a definite theory, presented explicitly, implicitly or only in outline, and a non-

10 RUDOLF CARNAP, *The Logical Syntax of Language*, Kegan Paul, Trench, Trubner & Co., London 1937, § 78 ('Confusion in philosophy caused by the material mode of speech'). The German edition of the book appeared as early as 1934.

theoretical term whose meaning is clear and independent of theory, seems to me to be valid and fruitful, although this dichotomy is nothing but a slice in a continuum. (In an earlier article¹¹ I used the term 'immediately intelligible' instead of 'non-theoretical', but this gave rise to so many semantic difficulties that I decided to change the term.) This dichotomy makes for more instructive and edifying formulations in the methodology of science than can be obtained with the help of the corresponding comparative or quantitative concepts. It is precisely this dichotomy, non-theoretical vs. theoretical, which such authors as Carnap, Hempel,¹² Braithwaite¹³ and others must have had in mind even though, for definite historical reasons, they used the *Observational* vs. *Theoretical* terminology, and thereby prepared the way for the fusion (and confusion) with the sterile dichotomy between the *Observable* and *Unobservable*.

All such terms as 'observable' and 'unobservable', 'theoretical' and 'non-theoretical', are clearly theoretical terms (although Maxwell seems rather surprised at this fact¹⁴). I shall doubtlessly be asked what exactly I understand by the term 'non-theoretical', since the explanation I gave a moment ago will be found unsatisfactory in that it fails to provide a criterion by which to determine whether a given term is non-theoretical or not. An interesting dialectic movement, however, has been created here. Merely to ask a question of the type: 'What precisely do you mean by a certain term?' may almost by itself serve as a criterion for the theoretical nature of this term. Indeed, I would even go further and clarify the meaning of the term 'non-theoretical' by pointing out that it is meaningless to ask questions of this type regarding such a term, since it is immediately intelligible. I do not say that *whenever* it makes sense to ask 'What exactly do you mean by that term?' we have before us a theoretical expression, since the expression in question may well be ambiguous and yet non-theoretical in all its different meanings. In this case the question should not be interpreted as meaning: 'In the framework of which theory are we to understand the expression you just used?' but simply: 'Which of the many ordinary and non-theoretical senses of your expression are you using at this particular moment?'

11 YEHOSHUA BAR-HILLEL, 'A Prerequisite for Rational Philosophical Discussion', *Synthese*, 12, 1960, pp. 328-332.

12 CARL G. HEMPEL, 'The Theoretician's Dilemma — A Study in the Logic of Theory Construction', *Concepts, Theories and the Mind—Body Problem* (edited by H. Feigl, M. Scriven & G. Maxwell), Minnesota Studies in the Philosophy of Science, II, 1958, pp. 37-98.

13 RICHARD B. BRAITHWAITE, *Scientific Explanation — A Study in the Function of Theory, Probability and Law in Science*, Cambridge University Press, Cambridge 1953.

14 *Ibid.*, p. 2.

Neorealism vs. Neopositivism: A Neo-Pseudo Issue

This observation might serve as an additional clarification of the term 'non-theoretical', although it does not completely answer the question as to the meaning of the methodological terms under discussion. Such an answer would necessitate setting forth the entire theory to which these terms belong. It would be uncharitable to expect me to present my total methodological theory at this time, particularly since I am not in possession of such a complete theory. As in almost all discussions on theoretical matters, we shall probably fail to agree as to the exact nature of the subject we are discussing at this very moment. To reduce the area of such disagreement I shall repeat the above clarification more precisely: *An expression is non-theoretical for a given speech community if it is understood by all members of this community to such a degree that there is no point in asking questions as to its meaning.* (It would be a commendable exercise to refine this definition further and thus make it less vulnerable to ambiguous expressions with two or more non-theoretical meanings. It should also be borne in mind that in natural languages the same expression can be at the same time theoretical and non-theoretical, that is, some *tokens* of the same expression-*type* are theoretical, whereas other tokens are non-theoretical, usually depending on the context. We all recall what we were told at school by our physics teacher about terms such as 'force' or 'work'.)

For a theory to be intelligible to the members of a given speech community, then, its terms must be either immediately intelligible or reducible to such terms, using 'reducible' in the strict meaning given to it by Carnap¹⁵ and others. It is precisely this reduction which renders these terms significant, however incomplete and indirect it may turn out to be. I cannot imagine any other way which would convince me that I know what other people are talking about or even what I myself am talking about.

In accordance with our analysis, the degree of observability of a term does not directly determine the kind of *meaning* it has, although there can be no doubt that this degree is of paramount importance — and here I am in complete agreement with Maxwell — in whatever concerns *evidence* and *confirmation*. The morganatic marriage of the concepts Meaningful and Confirmable in the third decade of this century will deteriorate still further as a consequence of this analysis, but few will have cause to regret this development.

The terms 'table' and 'omega-minus particle' differ, then, with respect to their kind of intelligibility: the intelligibility of 'table' is direct, complete and free of theory, whereas the intelligibility of the term 'omega-minus

15 For instance, in the article mentioned in note 8.

particle' is indirect, incomplete and burdened by theory. He who would attempt to express this methodological difference as a difference in the ontic status of the entities denoted by these expressions by claiming, for instance, that tables are more real than omega-minus particles, spreads confusion, while he who says that omega-minus particles are as real as tables, is no less culpable, since such a formulation obliterates the decisive distinction between theory-dependent and theory-independent expressions. To say that the entity phlogiston was as real as iron in 1780 when the phlogiston theory was considered to be well established, and that it gradually became less real in the following years when this theory had lost its prestige sounds like a sorry jest.

How is the realistic philosopher to describe a situation in which two different but equally cogent theories contain the same term 'electron'? Should he say: 'Electrons were just as real as tables, and electrons were just as real as tables', or perhaps: 'Electrons (in the sense of theory A) were just as real as tables, and electrons (in the sense of theory B) were etc.'; and should he add that: 'Electrons (in the sense of theory C) were slightly less real than tables', since theory C was at that time not as well confirmed as the other theories? Is it not simpler to renounce the realistic mode of speech altogether and describe the facts as they are by simply stating that at such and such a time there existed two equally well-substantiated theories of electrons and a third theory not as well confirmed?

The realistic mode of speech, as already noted above, is not only unable to provide us with a non-circular explanation for the fact that certain theories 'work', but it also serves as an inexhaustible source for pseudo-problems. This mode of speech is superfluous from a methodological point of view and must therefore be eliminated from methodological discussions. It could be shown, if time permitted, that a similar critique applies *mutatis mutandis* to the instrumentalistic mode of speech. I therefore believe that Nagel's characterization of the controversy between the neorealists and the instrumentalists as a 'disagreement in preferred modes of speech' was far too mild. In my opinion both preferred modes of speech should be eliminated from methodological discussions. I trust that I have succeeded in proving the thesis I had set forth at the outset, namely, that the controversy between metaphysical neorealism and metaphysical neopositivism is as futile as the old quarrels between realism and idealism.

Two remarks should be made by way of conclusion. First, I believe that my argument would not suffer even if the qualitative dichotomy Theoretical vs. Non-theoretical should turn out to be of no methodological importance. In that case we would be obliged to say that the word

Neorealism vs. Neopositivism: A Neo-Pseudo Issue

'table' is highly non-theoretical and that its intelligibility is extremely direct and complete, whereas the term 'omega-minus particle' is very highly theoretical and its intelligibility extremely indirect and incomplete. From this point I could have continued my counter-argument without any essential change in the formulation I preferred to use.

Secondly, it is quite possible that there should be a difference in the degree of enthusiasm evinced by a researcher — whether he believes that a certain theory, which he himself was perhaps the first one to formulate, is an integral part of eternal and absolute Truth, whether he looks upon it as a device which produces certain observation sentences when it is fed other observation sentences or whether he entertains other feelings towards it which cannot be formulated in either of these two ways. It seems that these attitudes of the researchers have not been satisfactorily analysed, for which the psychologists, rather than the philosophers and methodologists, are to be held responsible. In the absence of authoritative findings, the prevalent view seems to be that the first attitude makes for greater sense of dedication and perseverance on the part of the researcher who would hence be more likely to achieve success so that such an attitude is to be encouraged in the interest of science and humanity. There may indeed have been cases in which a less fanatical belief in the truth of a certain theory ended in failure and obstinate perseverance resulted in success. I am quite certain, however, that there were just as many cases in which the researchers failed to develop adequate theories precisely because of their blind faith and the consequent lack of self-criticism. In the absence of reliable findings, I myself am inclined to believe that, on the whole, the harm done to research by the realistic beliefs of the researchers outweighed their benefits, but this opinion may well be the result of subjective impressions and personal temperament rather than an objective evaluation which, as I mentioned before, is non-existent. Be that as it may, I trust that I have made it plain that any inference from the usefulness of having certain beliefs to the truth of these beliefs, in the manner of William James, is fallacious. Even if it pays to be a neorealist — an hypothesis I am not as yet prepared to accept — and even if such reputable scholars as Maxwell are convinced that only neorealist beliefs will provide explanations for facts that will otherwise remain inexplicable, all this does not invalidate our conclusion that from a philosophical and methodological point of view neorealism (just as instrumentalism) is an indefensible attitude, even in Nagel's disguise of a preferred mode of speech.

Read 10 March 1964