# V.I. Lenin

## MATERIALISM and EMPIRIO-CRITICISM

### Critical Comments on a Reactionary Philosophy

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**( Chapter Five: The Recent Revolution in Natural Science and Philosophical Idealism )**

## 6. The Two Trends in Modern Physics and French Fideism

In France, idealist philosophy has seized upon the vacillations of Machian physics with no less determination. We have already seen how the neo-criticists greeted Mach's *Mechanik* and how they immediately discerned the idealist character of the principles of Mach's philosophy. The French Machian, Henri Poincaré, was even more successful in this respect. The most reactionary idealist philosophy, the implications of which were definitely fideistic, immediately seized upon his theory. An adherent of this philosophy, Le Roy, argued thus: the truths of science are conventional signs, symbols; you have abandoned the absurd, "metaphysical" claims to knowledge of objective reality—well then, be logical and agree with us that science has practical significance only for one sphere of human activity and that religion has *a no less real significance* for another sphere of activity; "symbolic," Machian science has no right to deny theology. H. Poincaré was abashed by these conclusions and in his book *La valeur de la science* made a special attack on them. But just see *what* epistemological position he was obliged to adopt in order to rid himself of allies of the type of Le Roy. He writes: "M. Le Roy regards the intellect as incurably impotent only in order to give greater place to other sources of knowledge, for instance, the heart, sentiment, instinct and faith" (pp. 214-15). "I do not go to the limit," he says. Scientific laws are conventions, symbols, but "if scientific 'recipes' have a value as rules of action, it is because we know that, in general at least, they are successful. But to know this is already to know something; and if so, how can you say that we can know nothing?" (p. 219).

H. Poincaré resorts to the criterion of practice. But he only shifts the question without settling it; for this criterion may be interpreted in a subjective as well as in an objective way. Le Roy also admits this criterion for science and industry; all he denies is that this criterion proves *objective* truth, for such a denial suffices him for admitting the subjective truth of religion along with the subjective truth of science *(i.e.,* as not existing apart from mankind). Poincaré realises that one cannot limit oneself to a reference to practice in arguing against Le Roy, and he

passes to the question of the objectivity of science. "What is the criterion of its objectivity? Well, it is exactly the same as the criterion of our belief in external objects. These objects are real in as much as the sensations they evoke in us *(qu'ils nous fontéprouver)* appear to be united by some sort of indestructible cement and not by an ephemeral accident" (pp. 269-70).

The author of such a remark may well be a great *physicist,* but it is absolutely indisputable that only the Voroshilov-Yushkeviches can take him seriously as a philosopher. Materialism is declared to have been destroyed by a "theory" which at the first onslaught of fideism *takes refuge under the wing of materialism* ! For it is the purest materialism to say that sensations are evoked in us by real objects and that "belief" in the objectivity of science is the same as "belief" in the objective existence of external objects.

". . . It can be said, for instance, that ether has no less reality than any external body" (p. 270).

What an outcry our Machians would have raised had a materialist said that! How many feeble witticisms would have been uttered at the expense of "ethereal materialism," and so forth. But five pages later the founder of recent empirio-symbolism declares: "Everything that is not thought is pure nothing, since we can think nothing but thought" (p. 276). You are mistaken, M. Poincaré your works prove that there are people who can only think what is entirely devoid of thought. To this class of people belongs the notorious muddler, Georges Sorel, who maintains that the "first two parts" of Poincaré's book on the value of science are written in the "spirit of Le Roy" and that therefore the two philosophers can be "reconciled" as follows: the attempt to establish an identity between science and the world is an illusion; there is no need to raise the question whether science can have knowledge of nature or not, for it is sufficient that science should correspond with the mechanisms created by us (Georges Sorel, *Les préoccupations metaphysiques des physiciens modernes [Metaphysical Preoccupations of the Modern Physicists],* Paris, 1907, pp. 77, 80, 81).

But while it is sufficient merely to mention the "philosophy" of Poincaré and pass on, it is imperative to dwell at some length on the work of A. Rey. We have already pointed out that the two basic trends in modern physics, which Rey calls the "conceptualist" and the "neo-mechanistic," reduce themselves to the difference between the idealist and the materialist epistemologies. We must now see how the positivist Rey solves a problem which is diametrically opposed to that broached by the spiritualist James Ward and the idealists Cohen and Hartmann, the problem, namely, not of seizing upon the philosophical mistakes of the new physics, its leanings towards idealism, but of rectifying these mistakes and of proving the illegitimacy of the idealist (and fideist) conclusions drawn from the new physics.

A thread that runs through the whole of Rey's work is the recognition of the fact

that the new physical theory of the "conceptualists" (Machians) has been seized upon by *fideism* (pp. 11, 17, 220, 362, etc.) and "*philosophical idealism*" (p. 200), scepticism as to the rights of the intellect and the rights of science (pp. 210, 220), subjectivism (p. 311), and so forth. Therefore, Rey quite rightly makes the analysis of the "opinions of the physicists on the objective validity of physics" (p. 3) the *centre* of his work.

And what are the results of this analysis?

Let us take the basic concept, the concept of experience. Rey assures us that Mach's subjectivist interpretation (for the sake of simplicity and brevity we shall take Mach as the representative of the school which Rey terms conceptualist) is a sheer misunderstanding. It is true that one of the "outstanding new features of the philosophy of the end of the nineteenth century" is that "empiricism, becoming ever subtler and richer in nuances, leads to fideism, to the supremacy of faith—this same empiricism that was once the great war engine of scepticism against the assertions of metaphysics. Has not at bottom the real meaning of the word 'experience' been distorted, little by little, by imperceptible nuances? Experience, when returned to the conditions of existence, to that experimental science which renders it exact and refined, leads us to necessity and to truth" (p. 398). There is no doubt that all Machism, in the broad sense of the term, is nothing but a distortion, by means of imperceptible nuances, of the real meaning of the word "experience"! But how does Rey, who accuses only the fideists of distortion, but not Mach himself, correct this distortion? Listen. "Experience is by definition a knowledge of the object. In physical science this definition is more in place than anywhere else. . . . Experience is that over which our mind has no command, that which our desires, our volition, cannot control, that which is given and which is not of our own making. Experience is the object that faces *(en face du)* the subject" (p. 314).

Here you have an example of how Rey defends Machism! What penetrating genius Engels revealed when he dubbed the latest type of adherents of philosophical agnosticism and phenomenalism "shamefaced materialists." The positivist and ardent phenomenalist, Rey, is a superb specimen of this type. If experience is "knowledge of the object," if "experience is the object that faces the subject," if experience means that "something external *(quelque chose du de hors)* exists and necessarily exists" *(se pose et en se posant s'impose*—p. 324), this obviously amounts to materialism! Rey's phenomenalism, his ardent and emphatic assertion that nothing exists save sensations, that the objective is that which is generally valid, etc., etc.—all this is only a fig-leaf, an empty verbal covering for materialism, since we are told:

"The objective is that which is given from without, that which is imposed *(imposé)* by experience; it is that which is not of our making, but which is made independently of us and which to a certain extent makes us" (p. 320). Rey defends "conceptualism" by destroying conceptualism! The refutation of the

idealist implications of Machism is achieved only by interpreting Machism after the manner of shame faced materialism. Having himself admitted the distinction between the two trends in modern physics, Rey toils in the sweat of his brow to obliterate all distinctions in the interests of the materialist trend. Rey says of the neo-mechanist school, for instance, that it does not admit the "least doubt, the least uncertainty" as to the objectivity of physics (p. 237): "Here [in regard to the doctrines of this school] one feels remote from the detours one was obliged to make from the standpoint of the other theories of physics in order to arrive at the assertion of this objectivity."

But it is such "detours" of Machism that Rey conceals by casting a veil over them in his exposition. The fundamental characteristic of materialism is that it *starts from* the objectivity of science, from the recognition of objective reality reflected by science, whereas idealism *needs* "detours" in order, in one way or another, to "deduce" objectivity from mind, consciousness, the "psychic." "The neo-mechanist *[i.e.,* the prevailing] school in physics," says Rey, "*believes in the reality* of the physical theory just as humanity *believes in the reality* of the external world" (p. 234, § 22: Thesis). For this school "theory aims at being a copy *(le décalque)* of the object" (p. 235).

True. And this fundamental trait of the "neo-mechanist" school is nothing but the basis of *materialist* epistemology. No attempts of Rey to dissociate himself from the materialists or to assure us that the neo-mechanists are also in essence phenomenalists, etc., can mitigate this basic fact. The essence of the difference between the neo-mechanists (materialists who are more or less shamefaced) and the Machians is that the latter *depart* from this theory of knowledge, and departing from it inevitably *fall* into fideism.

Take Rey's attitude to Mach's theory of causality and necessity in nature. Only at first glance, Rey assures us, does it appear that Mach is "approaching scepticism" and "subjectivism" (p. 76); this "ambiguity" *(équivoque,* p. 115) disappears if Mach's teaching is taken as a whole. And Rey takes it as a whole, quotes a series of passages from the *Wärmelehre* [112] and the *Analyse der Empfindungen,* and specially deals with the chapter on causality in the former book, but . . . *he takes care not to quote the decisive passage, Mach's declaration that there is no physical necessity, but only logical necessity* ! All that one can say of such a procedure is that it does not interpret Mach but adorns him, that it obliterates the differences between "neo-mechanism" and Machism. Rey's conclusion is that "Mach adopts the analysis and conclusions of Hume, Mill and all the phenomenalists, according to whom the causal relation has no *substantiality* and is only a habit of thought. He has also adopted the fundamental thesis of phenomenalism, of which the doctrine of causality is only a consequence, namely, that nothing exists save sensations. But he adds, along a purely objectivist line, that science, analysing sensations, discovers in them certain permanent and common elements which, although abstracted from these sensations, have the same reality as the sensations themselves, for they are taken

from sensations by means of perceptual observation. And these permanent and common elements, such as energy and its various forms, are the foundation for the systematisation of physics" (p. 117).

This means that Mach accepts Hume's subjective theory of causality and interprets it in an objectivist sense! Rey is shirking the issue when he defends Mach by referring to his inconsistency, and by maintaining that in the "real" interpretation of experience the latter leads to "necessity." Now, experience is what is given to us from without; and if the necessity of nature and its laws are also given to man from without, from an objectively real nature, then, of course, all difference between Machism and materialism vanishes. Rey defends Machism against the charge of "neo-mechanism" by capitulating to the latter all along the line, retaining the word phenomenalism but not the essence of that trend.

Poincaré, for instance, fully in the spirit of Mach, derives the laws of nature —including even the tri-dimensionality of space—from "convenience." But this does not at all mean "arbitrary," Rey hastens to "correct." Oh no, "convenient" here expresses "*adaptation to the object*" (Rey's italics, p. 196). What a superb differentiation between the two schools and what a superb "refutation" of materialism! "If Poincaré's theory is logically separated by an impassable gulf from the ontological interpretation of the mechanist school [*i.e.*, from the latter's acceptance of theory as a copy of the object] . . . if Poincaré's theory lends itself to the support of philosophical idealism, in the scientihc sphere, at least, it agrees very well with the general evolution of the ideas of classical physics and the tendency to regard physics as objective knowledge, as objective as experience, that is, as the sensations from which experience proceeds" (p. 200).

On the one hand, we cannot but admit; on the other hand, it must be confessed. On the one hand, an impassable gulf divides Poincaré from neo-mechanism, although Poincaré stands *in between* Mach's "conceptualism" and neo-mechanism, while Mach, it would appear, is not separated by any gulf from neo-mechanism; on the other hand, Poincaré is quite compatible with classical physics which, according to Rey himself, completely accepts the standpoint of "mechanism." On the one hand, Poincaré's theory lends itself to the support of philosophical idealism; on the other hand, it is compatible with the objective interpretation of the word "experience". On the one hand, these bad fideists have distorted the meaning of the word experience by imperceptible deviations, by departing from the correct view that "experience is the object"; on the other hand, the objectivity of experience means only that experience is sensation . . . with which both Berkeley and Fichte agree!

Rey got himself muddled because he had set himself the impossible task of "reconciling" the opposition between the materialist and the idealist schools in the new physics. He seeks to tone down the materialism of the neo-mechanist school, attributing to phenomenalism the views of physicists who regard their

theory as a copy of the object.[1] [1] The "conciliator," A. Rey, not only cast a veil over the formulation of the question at issue as made by philosophical materialism but also ignored the most clearly expressed materialistic declarations of the French physicists. He did not mention, for example, Alfred Cornu, who died in 1902. That physicist met the Ostwaldian "destruction [or conquest, *Ueberwindung*] of scientific materialism" with a contemptuous remark regarding pretentious journalistic treatment of the question (see *Revue générele des sciences,* 1895, pp. 1030-31). At the international congress of physicists held in Paris in 1900, Cornu said: " . . . The deeper we penetrate into the knowledge of natural phenomena, the more does the bold Cartesian conception of the mechanism of the universe unfold and define itself, namely, that in the physical world there is nothing save matter and motion. The problem of the unity of physical forces . . . has again come to the fore after the great discoveries which marked the end of this century. Also the constant concern of our modern leaders, Faraday, Maxwell, Hertz (to mention only the illustrious dead), was to define nature more accurately and to unravel the properties of this elusive matter *(matière subtile),* the receptacle of world energy. . . . The reversion to Cartesian ideas is obvious. . . ." (Rapports présentés au congrès international de physique *[Reports Made at the International Physics Congress],* Paris, 1900, t. 4-me, p. 7.) Lucien Poincaré, in his book *Modern Physics,* justly remarks that this Cartesian idea was taken up and developed by the Encyclopaedists of the eighteenth century *(La physique moderne,* Paris, 1906, p. 14). But neither this physicist nor A. Cornu knew that the dialectical materialists Marx and Engels had freed this fundamental premise of materialism from the one-sidedness of mechanistic materialism. —*Lenin* And he seeks to tone down the idealism of the conceptualist school by pruning away the more emphatic declarations of its adherents and interpreting the rest in the spirit of shamefaced materialism. How far-fetched and fictitious is Rey's disavowal of materialism is shown, for example, by his opinion of the theoretical significance of the differential equations of Maxwell and Hertz. In the opinion of the Machians, the fact that these physicists limit their theory to a system of equations refutes materialism: there are equations and nothing else—no matter, no objective reality, only symbols. Boltzmann refutes this view, fully aware that he is refuting phenomenalist physics. Rey refutes this view thinking he is defending phenomenalism! He says: "We could not refuse to class Maxwell and Hertz among the 'mechanists' because they limited themselves to equations similar to the differential equations of Lagrange's dynamics. This does not mean that in the opinion of Maxwell and Hertz we shall be unable to build a mechanical theory of electricity out of real elements. Quite the contrary, the fact that we represent electrical phenomena in a theory the form of which is identical with the general form of classical mechanics is proof of the possibility . . ." (p. 253). The indefiniteness of the present solution of the problem "will diminish in proportion as the *nature* of the quantities, *i.e.,* elements, that figure in the equations are more precisely determined." The fact that one or another form of material motion has not yet been investigated is not regarded by Rey as a reason for denying the materiality of motion. "The homogeneity of matter" (p. 262), not as a postulate,

but as a result of experience and of the development of science, “the homogeneity of the object of physics"—this is the condition that makes the application of measurement and mathematical calculations possible.

Here is Rey’s estimate of the criterion of practice in the theory of knowledge: “Contrary to the propositions of scepticism, it seems legitimate to say that the practical value of science is derived from its theoretical value” (p. 368). Rey prefers not to speak of the fact that these propositions of scepticism are unequivocally accepted by Mach, Poincaré and their entire school. “They [the practical value and theoretical value of science] are the two inseparable and strictly parallel aspects of its objective value. To say that a law of nature has practical value . . . is fundamentally the same as saying that this law of nature has objectivity. To act on the object implies to modify the object; it implies a reaction on the part of the object that conforms to the expectation or anticipation contained in the proposition in virtue of which we acted on the object. Hence, this expectation or anticipation contains elements *controlled* by the object and by the action it undergoes. . . . In these diverse theories there is thus a part of objectivity” (p. 368). This is a thoroughly materialist, and only materialist, theory of knowledge, for other points of view, and Machism in particular, deny that the criterion of practice has objective significance, *i.e.*, significance that does not depend upon man and mankind.

To sum up, Rey approached the question from an angle entirely different from that of Ward, Cohen, and Co., but he arrived at the same result, namely, the recognition that the materialist and idealist trends form the basis of the division between the two principal schools in modern physics.

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## Notes

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5. The Two Trends in Modern Physics, and German Idealism | 7. A Russian “Idealist Physicist”

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