



Karl Marx



F. Engels



W. H. Wood / (Mum)

Workers of All Countries, Unite!

Marx Engels Lenin

On Dialectical Materialism

PUBLISHERS' NOTE

The aim of the present collection is to acquaint the reader with the basic propositions of dialectical materialism by presenting original sources. The reader will find materials on the consistent materialist solution of the basic problem of philosophy enriched by a dialectical analysis of the development of matter and the interrelation of consciousness and being; on the recognition of the ability of human thought to give an accurate reflection of reality, and to cognise it. The collection by no means includes all the works by Marx, Engels and Lenin of interest from the point of view of dialectical materialism, for this would be beyond the scope of a single book. The compilers have confined themselves to the task of collecting the most important statements of the classics of Marxism-Leninism on dialectical materialism.

The collection has two sections, the first including works by Marx and Engels, and the second, the works of Lenin. The material in both sections has been arranged in chronological order. The book is supplied by notes and a name index.

The translations have been taken from various collections of Marx's and Engels' works and from Lenin's *Collected Works* put out by Progress Publishers, Moscow.

МАРКС. ЭНГЕЛЬС. ЛЕНИН

О ДИАЛЕКТИЧЕСКОМ МАТЕРИАЛИЗМЕ

На английском языке

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Contents

I. KARL MARX. FREDERICK ENGELS

Karl Marx and Frederick Engels. <i>From THE HOLY FAMILY, OR CRITIQUE OF CRITICAL CRITICISM</i>	17
Karl Marx. THESES ON FEUERBACH	29
Karl Marx. <i>From THE ECONOMIC MANUSCRIPTS OF 1857-59. The Method of Political Economy</i>	33
Karl Marx. <i>From PREFACE TO A CONTRIBUTION TO THE CRITIQUE OF POLITICAL ECONOMY</i>	43
Frederick Engels. <i>From Review of KARL MARX, A CONTRIBUTION TO THE CRITIQUE OF POLITICAL ECONOMY</i>	47
Karl Marx. <i>From AFTERWORD TO THE SECOND GERMAN EDITION OF THE FIRST VOLUME OF CAPITAL</i>	54
Frederick Engels. <i>From PREFACES TO THE THREE EDITIONS OF ANTI-DÜHRING</i>	58
Frederick Engels. <i>From ANTI-DÜHRING</i>	63
Frederick Engels. <i>From DIALECTICS OF NATURE</i>	94
Introduction	94
Old Preface to [Anti]-Dühring. On Dialectics	113
Dialectics	122
Basic Forms of Motion (<i>Excerpt</i>)	129
Omitted from <i>Feuerbach</i>	130
<i>From</i> [Dialectics]	135
Chance and Necessity	140
Causality	144
Reciprocal Action	145
On the "Mechanical" Conception of Nature (<i>Excerpt</i>)	147

<i>From</i> [Additions to <i>Anti-Dühring</i>]	151
Frederick Engels. <i>From</i> LUDWIG FEUERBACH AND THE END OF CLASSICAL GERMAN PHILOSOPHY	154
Frederick Engels. <i>From</i> SPECIAL INTRODUCTION TO THE ENGLISH EDITION OF 1892 OF SOCIALISM: UTOPIAN AND SCIENTIFIC	180

II. LENIN

<i>From</i> MATERIALISM AND EMPIRIO-CRITICISM	185
How Certain "Marxists" in 1908 and Certain Idealists in 1710 Refuted Materialism	185
<i>From</i> The Theory of Knowledge of Empirio-Criticism and of Dialectical Materialism. I	203
Sensations and Complexes of Sensations	203
Did Nature Exist Prior to Man?	215
Does Man Think with the Help of the Brain?	227
The Theory of Knowledge of Empirio-Criticism and of Dialectical Materialism. II	235
The "Thing-in-Itself", or V. Chernov Refutes Frederick Engels	235
"Transcendence", or V. Bazarov "Revises" Engels	243
L. Feuerbach and J. Dietzgen on the Thing-in-Itself	254
Does Objective Truth Exist?	259
Absolute and Relative Truth, or the Eclecticism of Engels as Discovered by A. Bogdanov	268
The Criterion of Practice in the Theory of Knowledge	274
<i>From</i> The Theory of Knowledge of Dialectical Materialism and of Empirio-Criticism. III	280
What is Matter? What is Experience?	280
Causality and Necessity in Nature	283
Space and Time	299
Freedom and Necessity	311
<i>From</i> The Recent Revolution in Natural Science, and Philosophi- cal Idealism	318
The Crisis in Modern Physics	320
Matter Has Disappeared	326

Is Motion Without Matter Conceivable?	333
The Essence and Significance of "Physical" Idealism	341
<i>From</i> Empirio-Criticism and Historical Materialism	353
Parties in Philosophy and Philosophical Blockheads	353
THE THREE SOURCES AND THREE COMPONENT PARTS OF MARXISM	364
<i>From</i> KARL MARX	370
The Marxist Doctrine	370
Philosophical Materialism	370
Dialectics	373
The Materialist Conception of History	375
<i>From</i> PHILOSOPHICAL NOTEBOOKS	378
<i>From</i> Conspectus of Hegel's Book <i>The Science of Logic</i>	378
ON THE QUESTION OF DIALECTICS	381
<i>From</i> ON THE SIGNIFICANCE OF MILITANT MATERIALISM	386
NOTES	389
NAME INDEX	405

I
Karl Marx
Frederick Engels

Karl Marx and Frederick Engels

From *The Holy Family*,
or *Critique of Critical Criticism*

If from real apples, pears, strawberries and almonds I form the general idea "*Fruit*", if I go further and *imagine* that my abstract idea "*Fruit*", derived from real fruit, is an entity existing outside me, is indeed the *true* essence of the pear, the apple, etc., then—in the *language of speculative philosophy*—I am declaring that "*Fruit*" is the "*Substance*" of the pear, the apple, the almond, etc. I am saying, therefore, that to be a pear is not essential to the pear, that to be an apple is not essential to the apple; that what is essential to these things is not their real existence, perceptible to the senses, but the essence that I have abstracted from them and then foisted on them, the essence of my idea—"Fruit". I therefore declare apples, pears, almonds, etc., to be mere forms of existence, *modi*, of "*Fruit*". My finite understanding supported by my senses does of course *distinguish* an apple from a pear and a pear from an almond, but my speculative reason declares these sensuous differences inessential and irrelevant. It sees in the apple *the same* as in the pear, and in the pear the same as in the almond, namely "*Fruit*". Particular real fruits are no more than *semblances* whose true essence is "*the substance*"—"Fruit".

By this method one attains no particular *wealth of definition*. The mineralogist whose whole science was limited to the statement that all minerals are really "*the Mineral*" would be a mineralogist only in *his imagination*. For every mineral the speculative mineralogist says "*the Mineral*", and his science is reduced to repeating this word as many times as there are real minerals.

Having reduced the different real fruits to the *one* "fruit" of abstraction—"the Fruit", speculation must, in order to attain some semblance of real content, try somehow to find its way back from "the Fruit", from the *Substance* to the *diverse*, ordinary real fruits, the pear, the apple, the almond, etc. It is as hard to produce real fruits from the abstract idea "the Fruit" as it is easy to produce this abstract idea from real fruits. Indeed, it is impossible to arrive at the *opposite* of an abstraction without *relinquishing* the abstraction.

The speculative philosopher therefore relinquishes the abstraction "the Fruit", but in a *speculative, mystical* fashion—with the appearance of *not* relinquishing it. Thus it is really only in appearance that he rises above his abstraction. He argues somewhat as follows:

If apples, pears, almonds and strawberries are really nothing but "the Substance", "the Fruit", the question arises: Why does "the Fruit" manifest itself to me sometimes as an apple, sometimes as a pear, sometimes as an almond? Why this *semblance of diversity* which so obviously contradicts my speculative conception of *Unity*, "the Substance", "the Fruit"?

This, answers the speculative philosopher, is because "the Fruit" is not dead, undifferentiated, motionless, but a living, self-differentiating, moving essence. The diversity of the ordinary fruits is significant not only for *my* sensuous understanding, but also for "the Fruit" itself and for speculative reason. The different ordinary fruits are different manifestations of the life of the "one Fruit"; they are crystallisations of "the Fruit" itself. Thus in the apple "the Fruit" gives itself an apple-like existence, in the pear a pear-like existence. We must therefore no longer say, as one might from the standpoint of the Substance: a pear is "the Fruit", an apple is "the Fruit", an almond is "the Fruit", but rather "the Fruit" presents itself as a pear, "the Fruit" presents itself as an apple, "the Fruit" presents itself as an almond; and the differences which distinguish apples, pears and almonds from one another are the self-differentiations of "the Fruit" and make the particular fruits different members of the life-process of "the Fruit". Thus "the Fruit" is no longer an empty undifferentiated unity; it is oneness as *allness*, as "*totality*" of fruits, which constitute an "*organically linked series of*

members". In every member of that series "*the Fruit*" gives itself a more developed, more explicit existence, until finally, as the "*summary*" of all fruits, it is at the same time the living *unity* which contains all those fruits dissolved in itself just as it produces them from within itself, just as, for instance, all the limbs of the body are constantly dissolved in and constantly produced out of the blood.

We see that if the Christian religion knows only *one* Incarnation of God, speculative philosophy has as many incarnations as there are things, just as it has here in every fruit an incarnation of the Substance, of the Absolute Fruit. The main interest for the speculative philosopher is therefore to produce the *existence* of the real ordinary fruits and to say in some mysterious way that there are apples, pears, almonds and raisins. But the apples, pears, almonds and raisins that we rediscover in the speculative world are nothing but *semblances* of apples, *semblances* of pears, *semblances* of almonds and *semblances* of raisins, for they are moments in the life of "*the Fruit*", this abstract *creation of the mind*, and therefore themselves abstract *creations of the mind*. Hence what is delightful in this speculation is to rediscover all the real fruits there, but as fruits which have a higher mystical significance, which have grown out of the ether of your brain and not out of the material earth, which are incarnations of "*the Fruit*", of the *Absolute Subject*. When you return from the abstraction, the *supernatural* creation of the mind, "*the Fruit*", to real *natural* fruits, you give on the contrary the natural fruits a supernatural significance and transform them into sheer abstractions. Your main interest is then to point out the *unity* of "*the Fruit*" in all the manifestations of its life—the apple, the pear, the almond, etc.—that is, to show the *mystical interconnection* between these fruits, how in each one of them "*the Fruit*" realises itself *by degrees* and *necessarily* progresses, for instance, from its existence as a raisin to its existence as an almond. Hence the value of the ordinary fruits *no longer* consists in their *natural* qualities, but in their *speculative* quality, which gives each of them a definite place in the life-process of "*the Absolute Fruit*".

The ordinary man does not think he is saying anything extraordinary when he states that there are apples and pears.

But when the philosopher expresses their existence in the speculative way he says something *extraordinary*. He performs a *miracle* by producing the real *natural objects*, the apple, the pear, etc., out of the unreal *creation of the mind* "*the Fruit*", i.e., by *creating* those fruits out of his own *abstract reason*, which he considers as an Absolute Subject outside himself, represented here as "*the Fruit*". And in regard to every object the existence of which he expresses, he accomplishes an act of creation.

It goes without saying that the speculative philosopher accomplishes this continuous creation only by presenting universally known qualities of the apple, the pear, etc., which exist in reality, as determining features *invented* by him, by giving the *names* of the real things to what abstract reason alone can create, to abstract formulas of reason, finally, by declaring his *own* activity, by which *he passes* from the idea of an apple to the idea of a pear, to be the *self-activity* of the Absolute Subject, "*the Fruit*".

In the speculative way of speaking, this operation is called comprehending *Substance* as *Subject*, as an *inner process*, as an *Absolute Person*, and this comprehension constitutes the essential character of *Hegel's* method....

The French Enlightenment of the eighteenth century, and in particular *French materialism*, was not only a struggle against the existing political institutions and the existing religion and theology; it was just as much an *open, clearly expressed* struggle against the *metaphysics of the seventeenth century*, and against *all metaphysics*, in particular that of *Descartes, Malebranche, Spinoza* and *Leibniz*. Philosophy was counterposed to *metaphysics*, just as *Feuerbach*, in his first resolute attack on *Hegel*, counterposed *sober philosophy* to *wild speculation*. Seventeenth century *metaphysics*, driven from the field by the French Enlightenment, notably, by *French materialism* of the eighteenth century, experienced a *victorious and substantial restoration* in *German philosophy*, particularly in the *speculative German philosophy* of the nineteenth century. After *Hegel* linked it in a masterly fashion with all subsequent metaphysics and with German idealism and founded a metaphysical universal kingdom, the

attack on theology again corresponded, as in the eighteenth century, to an attack on *speculative metaphysics* and *metaphysics in general*. It will be defeated for ever by *materialism*, which has now been perfected by the work of *speculation* itself and coincides with *humanism*. But just as *Feuerbach* is the representative of *materialism* coinciding with *humanism* in the *theoretical* domain, French and English *socialism* and *communism* represent *materialism* coinciding with *humanism* in the *practical* domain.

"Speaking *exactly* and in the *prosaic sense*", there are *two trends* in *French materialism*; one traces its origin to *Descartes*, the other to *Locke*. The latter is *mainly a French* development and leads directly to *socialism*. The former, *mechanical materialism*, merges with French *natural science* proper. The two trends intersect in the course of development. We have no need here to go more deeply into the French materialism that derives directly from *Descartes*, any more than into the French school of *Newton* and the development of French natural science in general.

We shall therefore merely say the following:

Descartes in his *physics* endowed *matter* with self-creative power and conceived *mechanical* motion as the manifestation of its life. He completely separated his *physics* from his *metaphysics*. Within his *physics*, *matter* is the sole *substance*, the sole basis of being and of knowledge.

Mechanical French materialism adopted *Descartes' physics* in opposition to his *metaphysics*. His followers were by profession *anti-metaphysicians*, i.e., *physicists*.

This school begins with the *physician* *Le Roy*, reaches its zenith with the *physician* *Cabanis*, and the *physician* *La Mettrie* is its centre. *Descartes* was still living when *Le Roy*, like *La Mettrie* in the eighteenth century, transposed the Cartesian structure of the *animal* to the human soul and declared that the soul is a *modus of the body* and *ideas* are *mechanical motions*. *Le Roy* even thought *Descartes* had kept his real opinion secret. *Descartes* protested. At the end of the eighteenth century *Cabanis* perfected Cartesian materialism in his treatise: *Rapports du physique et du moral de l'homme*.¹

Cartesian materialism still exists today in France. It has achieved great successes in *mechanical natural science* which,

"speaking *exactly* and in the *prosaic sense*", will be least of all reproached with *romanticism*.

The *metaphysics* of the seventeenth century, represented in France by *Descartes*, had *materialism* as its *antagonist* from its very birth. The latter's opposition to *Descartes* was personified by *Gassendi*, the restorer of *Epicurean* materialism. French and English materialism was always closely related to *Democritus* and *Epicurus*. Cartesian metaphysics had another opponent in the English materialist *Hobbes*. *Gassendi* and *Hobbes* triumphed over their opponent long after their death at the very time when metaphysics was already officially dominant in all French schools.

Voltaire pointed out that the indifference of the French of the eighteenth century to the disputes between the Jesuits and the Jansenists² was due less to philosophy than to *Law's* financial speculations. So the downfall of seventeenth-century metaphysics can be explained by the materialistic theory of the eighteenth century only in so far as this theoretical movement itself is explained by the practical nature of French life at that time. This life was turned to the immediate present, to worldly enjoyment and worldly interests, to the *earthly* world. Its anti-theological, anti-metaphysical, materialistic practice demanded corresponding anti-theological, anti-metaphysical, materialistic theories. Metaphysics had *in practice* lost all credit. Here we have only to indicate briefly the *theoretical* course of events.

In the seventeenth century metaphysics (cf. *Descartes*, *Leibniz*, and others) still contained a *positive*, secular element. It made discoveries in mathematics, physics and other exact sciences which seemed to come within its scope. This semblance was done away with as early as the beginning of the eighteenth century. The positive sciences broke away from metaphysics and marked out their independent fields. The whole wealth of metaphysics now consisted only of beings of thought and heavenly things, at the very time when real beings and earthly things began to be the centre of all interest. Metaphysics had become insipid. In the very year in which *Malebranche* and *Arnauld*, the last great French metaphysicians of the seventeenth century, died, *Helvétius* and *Condillac* were born.

The man who deprived seventeenth-century metaphysics and metaphysics in general of all *credit* in the domain of *theory* was *Pierre Bayle*. His weapon was *scepticism*, which he forged out of metaphysics' own magic formulas. He himself proceeded at first from Cartesian metaphysics. Just as *Feuerbach* by combating speculative theology was driven further to combat *speculative philosophy*, precisely because he recognised in speculation the last prop of theology, because he had to force theology to retreat from pseudo-science to *crude*, repulsive *faith*, so Bayle too was driven by religious doubt to doubt about the metaphysics which was the prop of that faith. He therefore critically investigated metaphysics in its entire historical development. He became its historian in order to write the history of its death. He refuted chiefly *Spinoza* and *Leibniz*.

Pierre Bayle not only prepared the reception of materialism and of the philosophy of common sense in France by shattering metaphysics with his scepticism. He heralded the *atheistic society* which was soon to come into existence by *proving* that a society consisting only of atheists is *possible*, that an atheist *can* be a man worthy of respect, and that it is not by atheism but by superstition and idolatry that man debases himself.

To quote a French writer, *Pierre Bayle* was "the last metaphysician in the sense of the seventeenth century and the first philosopher in the sense of the eighteenth century".

Besides the negative refutation of seventeenth-century theology and metaphysics, a *positive, anti-metaphysical* system was required. A book was needed which would systematise and theoretically substantiate the life practice of that time. *Locke's* treatise *An Essay Concerning Humane Understanding*³ came from across the Channel as if in answer to a call. It was welcomed enthusiastically like a long-awaited guest.

The question arises: Is *Locke* perhaps a disciple of *Spinoza*? "Profane" history can answer:

Materialism is the *natural-born* son of *Great Britain*. Already the British schoolman, *Duns Scotus*, asked, "whether it was impossible for matter to think?"

In order to effect this miracle, he took refuge in God's omnipotence, i.e., he made *theology* preach *materialism*.

Moreover, he was a *nominalist*.⁴ Nominalism, the first form of materialism, is chiefly found among the *English* schoolmen.

The real progenitor of *English materialism* and all *modern experimental science* is *Bacon*. To him natural philosophy is the only true philosophy, and *physics* based upon the experience of the senses is the chiefest part of natural philosophy. *Anaxagoras* and his *homoeomeriae*,⁵ *Democritus* and his atoms, he often quotes as his authorities. According to him the *senses* are infallible and the *source* of all knowledge. All science is based on *experience*, and consists in subjecting the data furnished by the senses to a *rational method* of investigation. Induction, analysis, comparison, observation, experiment, are the principal forms of such a rational method. Among the qualities inherent in *matter*, *motion* is the first and foremost, not only in the form of *mechanical* and *mathematical* motion, but chiefly in the form of an *impulse*, a *vital spirit*, a *tension*—or a “*Qual*”, to use a term of Jakob Böhme’s—of matter. The primary forms of matter are the living, individualising *forces of being* inherent in it and producing the distinctions between the species.

In *Bacon*, its first creator, materialism still holds back within itself in a naive way the germs of a many-sided development. On the one hand, matter, surrounded by a sensuous, poetic glamour, seems to attract man’s whole entity by winning smiles. On the other, the aphoristically formulated doctrine pullulates with inconsistencies imported from theology.

In its further evolution, materialism becomes *one-sided*. *Hobbes* is the man who *systematises Baconian* materialism. Knowledge based upon the senses loses its poetic blossom, it passes into the abstract experience of the *geometrician*. *Physical* motion is sacrificed to *mechanical* or *mathematical* motion; *geometry* is proclaimed as the queen of sciences. Materialism takes to *misanthropy*. If it is to overcome its opponent, *misanthropic*, *fleshless* spiritualism, and that on the latter’s own ground, materialism has to chastise its own flesh and turn *ascetic*. Thus it passes into an *intellectual entity*; but thus, too, it evolves all the consistency, regardless of consequences, characteristic of the intellect.

Hobbes, as Bacon’s continuator, argues thus: if all human knowledge is furnished by the senses, then our concepts, notions, and ideas are but the phantoms of the real world,

more or less divested of its sensual form. Philosophy can but give names to these phantoms. One name may be applied to more than one of them. There may even be names of names. But it would imply a contradiction if, on the one hand, we maintained that all ideas had their origin in the world of sensation, and, on the other, that a word was more than a word; that besides the beings known to us by our senses, beings which are one and all individuals, there existed also beings of a general, not individual, nature. An *unbodily substance* is the same absurdity as an *unbodily body*. *Body, being, substance* are but different terms for the same *reality*. It is impossible to separate thought from matter *that* thinks. This matter is the substratum of all changes going on in the world. The word *infinite* is *meaningless*, unless it states that our mind is capable of performing an endless process of addition. Only material things being perceptible, knowable to us, we cannot know *anything* about the existence of God. My own existence alone is certain. Every human passion is a mechanical movement which has a beginning and an end. The objects of impulse are what we call good. Man is subject to the same laws as nature. Power and freedom are identical.

Hobbes had systematised Bacon without, however, furnishing a proof for Bacon's fundamental principle, the origin of all human knowledge and ideas from the world of sensation.

It was *Locke* who, in his *Essay on the Humane Understanding*, supplied this proof.

Hobbes had shattered the *theistic* prejudices of Baconian materialism; Collins, Dodwell, Coward, Hartley, Priestley, similarly shattered the last theological bars that still hemmed in Locke's sensationalism.⁶ At all events, for materialists, deism⁷ is but an easy-going way of getting rid of religion.

We have already mentioned how opportune Locke's work was for the French. Locke founded the philosophy of *bon sens*, of common sense; i.e., he said indirectly that there cannot be any philosophy at variance with the healthy human senses and reason based on them.

Locke's *immediate* pupil, *Condillac*, who translated him into *French*, at once applied Locke's sensualism against seventeenth-century *metaphysics*. He proved that the French had rightly rejected this metaphysics as a mere botch work of fancy and

theological prejudice. He published a refutation of the systems of *Descartes*, *Spinoza*, *Leibniz* and *Malebranche*.⁸

In his *Essai sur l'origine des connaissances humaines*⁹ he expounded Locke's ideas and proved that not only the soul, but the senses too, not only the art of creating ideas, but also the art of sensuous perception, are matters of *experience* and *habit*. The whole development of man therefore depends on *education* and *external circumstances*. It was only by *eclectic* philosophy that Condillac was ousted from the French schools.

The difference between *French* and *English* materialism reflects the difference between the two nations. The French imparted to English materialism wit, flesh and blood, and eloquence. They gave it the temperament and grace that it lacked. They *civilised* it.

In *Helvétius*, who also based himself on Locke, materialism assumed a really French character. Helvétius conceived it immediately in its application to social life (Helvétius, *De l'homme*¹⁰). The sensory qualities and self-love, enjoyment and correctly understood personal interest are the basis of all morality. The natural equality of human intelligences, the unity of progress of reason and progress of industry, the natural goodness of man, and the omnipotence of education, are the main features in his system.

In *La Mettrie's* works we find a synthesis of Cartesian and English materialism. He makes use of Descartes' physics in detail. His *L'homme machine*¹¹ is a treatise after the model of Descartes' animal-machine. The physical part of Holbach's *Système de la nature*¹² is also a result of the combination of French and English materialism, while the moral part is based essentially on the morality of Helvétius. *Robinet* (*De la nature*¹³), the French materialist who had the most connection with metaphysics and was therefore praised by Hegel, refers explicitly to *Leibniz*.

We need not dwell on Volney, Dupuis, Diderot and others, any more than on the Physiocrats,¹⁴ after we have proved the dual origin of French materialism from Descartes' physics and English materialism, and the opposition of French materialism to seventeenth-century *metaphysics*, to the metaphysics of Descartes, Spinoza, Malebranche, and Leibniz. This opposition

only became evident to the Germans after they themselves had come into opposition to *speculative metaphysics*.

Just as *Cartesian* materialism passes into *natural science proper*, the other trend of French materialism leads directly to *socialism* and *communism*.

There is no need for any great penetration to see from the teaching of materialism on the original goodness and equal intellectual endowment of men, the omnipotence of experience, habit and education, and the influence of environment on man, the great significance of industry, the justification of enjoyment, etc., how necessarily materialism is connected with communism and socialism. If man draws all his knowledge, sensation, etc., from the world of the senses and the experience gained in it, then what has to be done is to arrange the empirical world in such a way that man experiences and becomes accustomed to what is truly human in it and that he becomes aware of himself as man. If correctly understood interest is the principle of all morality, man's private interest must be made to coincide with the interest of humanity. If man is unfree in the materialistic sense, i. e., is free not through the negative power to avoid this or that, but through the positive power to assert his true individuality, crime must not be punished in the individual, but the anti-social sources of crime must be destroyed, and each man must be given social scope for the vital manifestation of his being. If man is shaped by environment, his environment must be made human. If man is social by nature, he will develop his true nature only in society, and the power of his nature must be measured not by the power of the separate individual but by the power of society.

These and similar propositions are to be found almost literally even in the oldest French materialists. This is not the place to assess them. The apologia of vices by *Mandeville*, one of Locke's early English followers, is typical of the socialist tendencies of materialism. He proves that in *modern* society vice is *indispensable* and *useful*. This was by no means an apologia for modern society.

Fourier proceeds directly from the teaching of the French materialists. The *Babouvists*¹⁵ were crude, uncivilised materialists, but developed communism, too, derives *directly* from *French materialism*. The latter returned to its mother-country,

England, in the form *Helvétius* gave it. *Bentham* based his system of *correctly understood interest* on *Helvétius*' morality, and *Owen* proceeded from *Bentham*'s system to found English communism. Exiled to England, the Frenchman *Cabet* came under the influence of communist ideas there and on his return to France became the most popular, if the most superficial, representative of communism. Like *Owen*, the more scientific French Communists, *Dézamy*, *Gay* and others, developed the teaching of *materialism* as the teaching of *real humanism* and the *logical basis of communism*.

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Karl Marx

Theses on Feuerbach¹⁶

1

The chief defect of all previous materialism—that of Feuerbach included—is that things [*Gegenstand*], reality, sensuousness are conceived only in the form of the *object*, or of *contemplation*, but not as *human sensuous activity, practice*, not subjectively. Hence it happened that the *active* side, in contradistinction to materialism, was set forth by idealism—but only abstractly, since, of course, idealism does not know real, sensuous activity as such. Feuerbach wants sensuous objects, really distinct from conceptual objects, but he does not conceive human activity itself as *objective* activity. In *Das Wesen des Christentums*, he therefore regards the theoretical attitude as the only genuinely human attitude, while practice is conceived and defined only in its dirty-Jewish form of appearance. Hence he does not grasp the significance of “revolutionary”, of practical-critical, activity.

2

The question whether objective truth can be attributed to human thinking is not a question of theory but is a practical question. Man must prove the truth, i.e., the reality and power, the this-worldliness of his thinking in practice. The dispute over the reality or non-reality of thinking which isolates itself from practice is a purely scholastic question.

3

The materialist doctrine that men are products of circumstances and upbringing, and that, therefore, changed men are products of other circumstances and changed upbringing, forgets that it is men who change circumstances and that the educator must himself be educated. Hence, this doctrine is bound to divide society into two parts, one of which is superior to society (in Robert Owen, for example).

The coincidence of the changing of circumstances and of human activity can be conceived and rationally understood only as revolutionising practice.

4

Feuerbach starts out from the fact of religious self-estrangement, of the duplication of the world into a religious, imaginary world and a real one. His work consists in resolving the religious world into its secular basis. He overlooks the fact that after completing this work, the chief thing still remains to be done. For the fact that the secular basis lifts off from itself and establishes itself in the clouds as an independent realm can only be explained by the inner strife and intrinsic contradictoriness of this secular basis. The latter must itself, therefore, first be understood in its contradiction and then, by the removal of the contradiction, revolutionised in practice. Thus, for instance, once the earthly family is discovered to be the secret of the holy family, the former must then itself be criticised in theory and transformed in practice.

5

Feuerbach, not satisfied with *abstract thinking*, appeals to *sensuous contemplation*; but he does not conceive sensuousness as practical, human-sensuous activity.

6

Feuerbach resolves the essence of religion into the essence of man. But the essence of man is no abstraction inherent in each

single individual. In its reality it is the ensemble of the social relations.

Feuerbach, who does not enter upon a criticism of this real essence, is hence obliged:

1. To abstract from the historical process and to define the religious sentiment [*Gemüt*] regarded by itself, and to presuppose an abstract — *isolated* — human individual.

2. The essence of man, therefore, can with him be regarded only as "species", as an inner, mute, general character which unites the many individuals only *in a natural way*.

7

Feuerbach, consequently, does not see that the "religious sentiment" is itself a *social product*, and that the abstract individual which he analyses belongs in reality to a particular form of society.

8

Social life is essentially *practical*. All mysteries which mislead theory into mysticism find their rational solution in human practice and in the comprehension of this practice.

9

The highest point attained by *contemplative* materialism, that is, materialism which does not comprehend sensuousness as practical activity, is the contemplation of single individuals in "civil society".

10

The standpoint of the old materialism is "*civil*" society; the standpoint of the new is *human* society, or associated humanity.

11

The philosophers have only *interpreted* the world in various ways; the point, however, is to *change* it.

Written by Marx in the
spring of 1845

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der Ausgang der klassischen
deutschen Philosophie*,
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Vol. 5, Moscow,
1976, pp. 6-8

Karl Marx

From The Economic Manuscripts of 1857-59

The Method of Political Economy

When examining a given country from the standpoint of political economy, we begin with its population, the division of the population into classes, town and country, the sea, the different branches of production, export and import, annual production and consumption, prices, etc.

It would seem to be the proper thing to start with the real and concrete elements, with the actual pre-conditions, *e.g.*, to start in the sphere of economy with population, which forms the basis and the subject of the whole social process of production. Closer consideration shows, however, that this is wrong. Population is an abstraction if, for instance, one disregards the classes of which it is composed. These classes in turn remain empty terms if one does not know the factors on which they depend, *e.g.*, wage-labour, capital, and so on. These presuppose exchange, division of labour, prices, etc. For example, capital is nothing without wage-labour, without value, money, price, etc. If one were to take population as the point of departure, it would be a very vague notion of a complex whole and through closer definition one would arrive analytically at increasingly simple concepts; from imaginary concrete terms one would move to more and more tenuous abstractions until one reached the most simple definitions. From there it would be necessary to make the journey again in the opposite direction until one arrived once more at the concept of population, which is this time not a vague notion of a whole, but a totality comprising many determinations and relations. The first course is the historical one taken by political

economy at its inception. The seventeenth-century economists, for example, always took as their starting-point the living organism, the population, the nation, the state, several states, etc., but analysis led them always in the end to the discovery of a few decisive abstract, general relations, such as division of labour, money, and value. When these separate factors were more or less clearly deduced and established, economic systems were evolved which from simple concepts, such as labour, division of labour, demand, exchange-value, advanced to categories like state, international exchange and world market. The latter is obviously the correct scientific method. The concrete concept is concrete because it is a synthesis of many definitions, thus representing the unity of diverse aspects. It appears therefore in reasoning as a summing-up, a result, and not as the starting-point, although it is the real point of origin, and thus also the point of origin of perception and imagination. The first procedure attenuates meaningful images to abstract definitions, the second leads from abstract definitions by way of reasoning to the reproduction of the concrete situation. Hegel accordingly conceived the illusory idea that the real world is the result of thinking which causes its own synthesis, its own deepening and its own movement; whereas the method of advancing from the abstract to the concrete is simply the way in which thinking assimilates the concrete and reproduces it as a concrete mental category. This is, however, by no means the process of evolution of the concrete world itself. For example, the simplest economic category, *e.g.*, exchange-value, presupposes population, a population moreover which produces under definite conditions, as well as a distinct kind of family, or community, or state, etc. Exchange-value cannot exist except as an abstract, *unilateral* relation of an already existing concrete organic whole. But exchange-value as a category leads an antediluvian existence. Thus to consciousness—and this comprises philosophical consciousness—which regards the comprehending mind as the real man, and hence the comprehended world as such as the only real world; to consciousness, therefore, the evolution of categories appears as the actual process of production—which unfortunately is given an impulse from outside—whose result is the world; and this (which is however

again a tautological expression) is true in so far as the concrete totality regarded as a conceptual totality, as a mental fact, is indeed a product of thinking, of comprehension; but it is by no means a product of the idea which evolves spontaneously and whose thinking proceeds outside and above perception and imagination, but is the result of the assimilation and transformation of perceptions and images into concepts. The totality as a conceptual entity seen by the intellect is a product of the thinking intellect which assimilates the world in the only way open to it, a way which differs from the artistic, religious and practically intelligent assimilation of this world. The concrete subject remains outside the intellect and independent of it—that is so long as the intellect adopts a purely speculative, purely theoretical attitude. The subject, society, must always be envisaged therefore as the pre-condition of comprehension even when the theoretical method is employed.

But have not these simple categories also an independent historical or natural existence preceding that of the more concrete ones? This depends. Hegel, for example, correctly takes ownership, the simplest legal relation of the subject, as the point of departure of the philosophy of law. No ownership exists, however, before the family or the relations of master and servant are evolved, and these are much more concrete relations. It would, on the other hand, be correct to say that families and entire tribes exist which have as yet only *possessions* and not *property*. The simpler category appears thus as a relation of simple family or tribal communities to property. In societies which have reached a higher stage the category appears as a comparatively simple relation existing in a more advanced community. The concrete substratum underlying the relation of ownership is however always presupposed. One can conceive an individual savage who has possessions; possession in this case, however, is not a legal relation. It is incorrect that in the course of historical development possession gave rise to the family. On the contrary, possession always presupposes this “more concrete legal category”. One may, nevertheless, conclude that the simple categories represent relations or conditions which may reflect the immature concrete situation without as yet positing the more complex relation or condition which is conceptually expressed in the

more concrete category; on the other hand, the same category may be retained as a subordinate relation in more developed concrete circumstances. Money may exist and has existed in historical time before capital, banks, wage-labour, etc. came into being. In this respect it can be said, therefore, that the simpler category expresses relations predominating in an immature entity or subordinate relations in a more advanced entity; relations which already existed historically before the entity had developed the aspects expressed in a more concrete category. The procedure of abstract reasoning which advances from the simplest to more complex concepts to that extent conforms to actual historical development.

It is true, on the other hand, that there are certain highly developed, but nevertheless historically immature, social formations which employ some of the most advanced economic forms, *e.g.*, co-operation, developed division of labour, etc., without having developed any money at all, for instance Peru. In Slavonic communities too, money—and its pre-condition, exchange—is of little or no importance within the individual community, but is used on the borders, where commerce with other communities takes place; and it is altogether wrong to assume that exchange within the community is an original constituent element. On the contrary, in the beginning exchange tends to arise in the intercourse of different communities with one another, rather than among members of the same community. Moreover, although money begins to play a considerable role very early and in diverse ways, it is known to have been a dominant factor in antiquity only among nations developed in a particular direction, *i.e.*, merchant nations. Even among the Greeks and Romans, the most advanced nations of antiquity, money reaches its full development—which is presupposed in modern bourgeois society—only in the period of their disintegration. Thus the full potential of this quite simple category does not emerge historically in the most advanced phases of society, and it certainly does not penetrate into all economic relations. For example, taxes in kind and deliveries in kind remained the basis of the Roman empire even at the height of its development; indeed a completely evolved monetary system existed in Rome only in the army, and it never permeated the

whole complex of labour. Although the simpler category, therefore, may have existed historically before the more concrete category, its complete intensive and extensive development can nevertheless occur in a complex social formation, whereas the more concrete category may have been fully evolved in a more primitive social formation.

Labour seems to be a very simple category. The notion of labour in this universal form, as labour in general, is also extremely old. Nevertheless "labour" in this simplicity is, economically considered, just as modern a category as the relations which give rise to this simple abstraction. The Monetary System, for example, still regards wealth quite objectively as a thing existing independently in the shape of money. Compared with this standpoint, it was a substantial advance when the Manufacturing or Mercantile System transferred the source of wealth from the object to the subjective activity—mercantile or industrial labour—but it still considered that only this circumscribed activity itself produced money. In contrast to this system, the Physiocrats assume that a specific form of labour—agriculture—creates wealth, and they see the object no longer in the guise of money, but as a product in general, as the universal result of labour. In accordance with the still circumscribed activity, the product remains a naturally developed product, an agricultural product, a product of the land *par excellence*.

It was an immense advance when Adam Smith rejected all restrictions with regard to the activity that produces wealth—for him it was labour as such, neither manufacturing, nor commercial, nor agricultural labour, but all types of labour. The abstract universality which creates wealth implies also the universality of the objects defined as wealth: they are products as such, or once more labour as such, but in this case past, materialised labour. How difficult and immense a transition this was is demonstrated by the fact that Adam Smith himself occasionally relapses once more into the Physiocratic System. It might seem that in this way merely an abstract expression was found for the simplest and most ancient relation in which human beings act as producers—irrespective of the type of society they live in. This is true in one respect, but not in another.

The fact that the specific kind of labour is irrelevant presupposes a highly developed complex of actually existing kinds of labour, none of which is any more the all-important one. The most general abstractions arise on the whole only when concrete development is most profuse, so that a specific quality is seen to be common to many phenomena, or common to all. Then it is no longer perceived solely in a particular form. This abstraction of labour is, on the other hand, by no means simply the conceptual resultant of a variety of concrete types of labour. The fact that the particular kind of labour employed is immaterial applies to a form of society in which individuals easily pass from one type of labour to another, the particular type of labour being accidental to them and therefore irrelevant. Labour, not only as a category but in reality, has become a means to create wealth in general, and has ceased to be tied as an attribute to a particular individual. This state of affairs is most pronounced in the United States, the most modern form of bourgeois society. The abstract category "labour", "labour as such", labour *sans phrase*, the point of departure of modern economics, thus becomes a practical fact only there. The simplest abstraction, which plays a decisive role in modern political economy, an abstraction which expresses an ancient relation existing in all social formations, nevertheless appears to be actually true in this abstract form only as a category of the most modern society. It might be said that phenomena which are historical products in the United States—*e.g.*, the irrelevance of the particular type of labour—appear to be among the Russians, for instance, naturally developed predispositions. But in the first place, there is an enormous difference between barbarians having a predisposition which makes it possible to employ them in various tasks, and civilised people who apply themselves to various tasks. As regards the Russians, moreover, their indifference to the particular kind of labour performed is in practice matched by their traditional habit of clinging fast to a very definite kind of labour from which they are extricated only by external influences.

The example of labour strikingly demonstrates how even the most abstract categories, despite their validity in all epochs—precisely because they are abstractions—are equally

a product of historical conditions even in the specific form of abstractions, and they retain their full validity only for and within the framework of these conditions.

Bourgeois society is the most advanced and complex historical organisation of production. The categories which express its relations, and an understanding of its structure, therefore, provide an insight into the structure and the relations of production of all formerly existing social formations the ruins and component elements of which were used in the creation of bourgeois society. Some of these unassimilated remains are still carried on within bourgeois society, others, however, which previously existed only in rudimentary form, have been further developed and have attained their full significance, etc. The anatomy of man is a key to the anatomy of the ape. On the other hand, rudiments of more advanced forms in the lower species of animals can only be understood when the more advanced forms are already known. Bourgeois economy thus provides a key to the economy of antiquity, etc. But not in the manner of those economists who obliterate all historical differences and who see in all social phenomena only bourgeois phenomena. If one knows rent, it is possible to understand tribute, tithe, etc., but they do not have to be treated as identical.

Since bourgeois society is, moreover, only a contradictory form of development, it contains relations of earlier societies often merely in very stunted form or even in the form of travesties, e.g., communal ownership. Thus, although it is true that the categories of bourgeois economy are valid for all other social formations, this has to be taken *cum grano salis*, for they may contain them in an advanced, stunted, caricatured, etc., form, that is, always with substantial differences. What is called historical evolution depends in general on the fact that the latest form regards earlier ones as stages in the development of itself and conceives them always in a one-sided manner, since only rarely and under quite special conditions is a society able to adopt a critical attitude towards itself; in this context we are not of course discussing historical periods which themselves believe that they are periods of decline. The Christian religion was able to contribute to an objective understanding of earlier mythologies only when its self-criticism was to a certain extent

prepared, as it were potentially. Similarly, only when the self-criticism of bourgeois society had begun, was bourgeois political economy able to understand the feudal, ancient and oriental economies. In so far as bourgeois political economy did not simply identify itself with the past in a mythological manner, its criticism of earlier economies—especially of the feudal system against which it still had to wage a direct struggle—resembled the criticism that Christianity directed against heathenism, or which Protestantism directed against Catholicism.

Just as in general when examining any historical or social science, so also in the case of the development of economic categories is it always necessary to remember that the subject, in this context contemporary bourgeois society, is presupposed both in reality and in the mind, and that therefore categories express forms of existence and conditions of existence—and sometimes merely separate aspects—of this particular society, the subject; thus the category, *even from the scientific standpoint*, by no means begins at the moment when it is discussed *as such*. This has to be remembered because it provides important criteria for the arrangement of the material. For example, nothing seems more natural than to begin with rent, i.e., with landed property, since it is associated with the earth, the source of all production and all life, and with agriculture, the first form of production in all societies that have attained a measure of stability. But nothing would be more erroneous. There is in every social formation a particular branch of production which determines the position and importance of all the others, and the relations obtaining in this branch accordingly determine the relations of all other branches as well. It is as though light of a particular hue were cast upon everything, tingeing all other colours and modifying their specific features; or as if a special ether determined the specific gravity of everything found in it. Let us take as an example pastoral tribes. (Tribes living exclusively on hunting or fishing are beyond the boundary line from which real development begins.) A certain type of agricultural activity occurs among them sporadically and this determines landownership. It is communal ownership and retains this form in a larger or smaller measure, according to the degree to which these people maintain their traditions,

e.g., communal ownership among the Slavs. Among settled agricultural people — settled already to a large extent — where agriculture predominates as in the societies of antiquity and the feudal period, even manufacture, its structure and the forms of property corresponding thereto, have, in some measure, specifically agrarian features. Manufacture is either completely dependent on agriculture, as in the early Roman period, or, as in the Middle Ages, it copies in the town and in its conditions the organisation of the countryside. In the Middle Ages even capital — unless it was solely money capital — consisted of the traditional tools, etc., and retained a specifically agrarian character. The reverse takes place in bourgeois society. Agriculture to an increasing extent becomes just a branch of industry and is completely dominated by capital. The same applies to rent. In all forms in which landed property is the decisive factor, natural relations still predominate; in the forms in which the decisive factor is capital, social, historically evolved elements predominate. Rent cannot be understood without capital, but capital can be understood without rent. Capital is the economic power that dominates everything in bourgeois society. It must form both the point of departure and the conclusion and it has to be expounded before landed property. After analysing capital and landed property separately, their interconnection must be examined.

It would be inexpedient and wrong therefore to present the economic categories successively in the order in which they have played the dominant role in history. On the contrary, their order of succession is determined by their mutual relation in modern bourgeois society and this is quite the reverse of what appears to be natural to them or in accordance with the sequence of historical development. The point at issue is not the role that various economic relations have played in the succession of various social formations appearing in the course of history; even less is it their sequence "as concepts" (*Proudhon*)¹⁷ (a nebulous notion of the historical process), but their position within modern bourgeois society.

It is precisely the predominance of agricultural peoples in the ancient world which caused the merchant nations — Phoenicians, Carthaginians — to develop in such purity (abstract precision). For capital in the shape of merchant or

money capital appears in that abstract form where capital has not yet become the dominant factor in society. Lombards and Jews occupied the same position with regard to medieval agrarian societies.

Another example of the various roles which the same categories have played at different stages of society are joint-stock companies, one of the most recent features of bourgeois society; but they arise also in its early period in the form of large privileged commercial companies with rights of monopoly.

The concept of national wealth finds its way into the works of the economists of the seventeenth century as the notion that wealth is created for the State, whose power, on the other hand, is proportional to this wealth—a notion which to some extent still survives even among eighteenth-century economists. This is still an unintentionally hypocritical manner in which wealth and the production of wealth are proclaimed to be the goal of the modern State, which is regarded merely as a means for producing wealth.

The disposition of material has evidently to be made in such a way that [section] one comprises general abstract definitions, which therefore appertain in some measure to all social formations, but in the sense set forth earlier. Two, the categories which constitute the internal structure of bourgeois society and on which the principal classes are based. Capital, wage-labour, landed property and their relations to one another. Town and country. The three large social classes; exchange between them. Circulation. The (private) credit system. Three, the State as the epitome of bourgeois society. Analysis of its relations to itself. The “unproductive” classes. Taxes. National debt. Public credit. Population. Colonies. Emigration. Four, international conditions of production. International division of labour. International exchange. Export and import. Rate of exchange. Five, world market and crises.

Written late in August 1857

Karl Marx, *A Contribution to the Critique of Political Economy*, Moscow, 1970, pp. 205-14

Karl Marx

**From Preface to *A Contribution
to the Critique
of Political Economy***

My inquiry led me to the conclusion that neither legal relations nor political forms could be comprehended whether by themselves or on the basis of a so-called general development of the human mind, but that on the contrary they originate in the material conditions of life, the totality of which Hegel, following the example of English and French thinkers of the eighteenth century, embraces within the term "civil society"; that the anatomy of this civil society, however, has to be sought in political economy. The study of this, which I began in Paris, I continued in Brussels, where I moved owing to an expulsion order issued by M. Guizot. The general conclusion at which I arrived and which, once reached, became the guiding principle of my studies can be summarised as follows. In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness. At a certain stage of development, the material productive forces of society come into conflict with the existing relations of production or — this merely expresses the same thing in legal

terms—with the property relations within the framework of which they have operated hitherto. From forms of development of the productive forces these relations turn into their fetters. Then begins an era of social revolution. The changes in the economic foundation lead sooner or later to the transformation of the whole immense superstructure. In studying such transformations it is always necessary to distinguish between the material transformation of the economic conditions of production, which can be determined with the precision of natural science, and the legal, political, religious, artistic or philosophic—in short, ideological forms in which men become conscious of this conflict and fight it out. Just as one does not judge an individual by what he thinks about himself, so one cannot judge such a period of transformation by its consciousness, but, on the contrary, this consciousness must be explained from the contradictions of material life, from the conflict existing between the social forces of production and the relations of production. No social order is ever destroyed before all the productive forces for which it is sufficient have been developed, and new superior relations of production never replace older ones before the material conditions for their existence have matured within the framework of the old society. Mankind thus inevitably sets itself only such tasks as it is able to solve, since closer examination will always show, that the problem itself arises only when the material conditions for its solution are already present or at least in the course of formation. In broad outline, the Asiatic, ancient, feudal and modern bourgeois modes of production may be designated as epochs marking progress in the economic development of society. The bourgeois mode of production is the last antagonistic form of the social process of production—antagonistic not in the sense of individual antagonism but of an antagonism that emanates from the individuals' social conditions of existence—but the productive forces developing within bourgeois society create also the material conditions for a solution of this antagonism. The prehistory of human society accordingly closes with this social formation.

Frederick Engels, with whom I maintained a constant exchange of ideas by correspondence since the publication of his brilliant essay on the critique of economic categories¹⁸

(printed in the *Deutsch-Französische Jahrbücher*), arrived by another road (compare his *Lage der arbeitenden Klasse in England*) at the same result as I, and when in the spring of 1845 he too came to live in Brussels, we decided to set forth together our conception as opposed to the ideological one of German philosophy, in fact to settle accounts with our former philosophical conscience. The intention was carried out in the form of a critique of post-Hegelian philosophy. The manuscript, two large octavo volumes,¹⁹ had long ago reached the publishers in Westphalia when we were informed that owing to changed circumstances it could not be printed. We abandoned the manuscript to the gnawing criticism of the mice all the more willingly since we had achieved our main purpose — self-clarification. Of the scattered works in which at that time we presented one or another aspect of our views to the public, I shall mention only the *Manifesto of the Communist Party*, jointly written by Engels and myself, and a *Discours sur le libre échange*,²⁰ which I myself published. The salient points of our conception were first outlined in an academic, although polemical, form in my *Misère de la philosophie*,²¹ this book which was aimed at Proudhon appeared in 1847. The publication of an essay on *Wage-Labour*²² written in German in which I combined the lectures I had held on this subject at the German Workers' Association in Brussels,²³ was interrupted by the February Revolution and my forcible removal from Belgium in consequence.

The publication of the *Neue Rheinische Zeitung* in 1848 and 1849 and subsequent events cut short my economic studies, which I could only resume in London in 1850. The enormous amount of material relating to the history of political economy assembled in the British Museum, the fact that London is a convenient vantage point for the observation of bourgeois society, and finally the new stage of development which this society seemed to have entered with the discovery of gold in California and Australia, induced me to start again from the very beginning and to work carefully through the new material. These studies led partly of their own accord to apparently quite remote subjects on which I had to spend a certain amount of time. But it was in particular the imperative necessity of earning my living which reduced the time at my

disposal. My collaboration, continued now for eight years, with the *New York Tribune*,²⁴ the leading Anglo-American newspaper, necessitated an excessive fragmentation of my studies, for only in exceptional cases did I write newspaper correspondence in the strict sense. Since a considerable part of my contributions consisted of articles dealing with important economic events in Britain and on the Continent, I was compelled to become conversant with practical details which, strictly speaking, lie outside the sphere of political economy.

This sketch of the course of my studies in the domain of political economy is intended merely to show that my views — no matter how they may be judged and how little they conform to the interested prejudices of the ruling classes — are the outcome of conscientious research carried on over many years. At the entrance to science, as at the entrance to hell, the demand must be made:

*Qui si convien lasciare ogni sospetto
Ogni viltà convien che qui sia morta.^a*

Karl Marx

London, January 1859

Karl Marx, *A Contribution to the Critique of Political Economy*, Moscow, 1970, pp. 20-23

^a Dante, *Divina Commedia*.

Here must all distrust be left;

All cowardice must here be dead.

(The English translation is taken from Dante, *The Divine Comedy*, Illustrated Modern Library, Inc. 1944, p. 22).— *Ed.*

Frederick Engels

From a Review of **Karl Marx,**
*A Contribution to the Critique
of Political Economy*

The purpose of a work like the one under review cannot simply be desultory criticism of separate sections of political economy or the discussion of one or another economic issue in isolation. On the contrary, it is from the beginning designed to give a systematic résumé of the whole complex of political economy and a coherent elaboration of the laws governing bourgeois production and bourgeois exchange. This elaboration is at the same time a comprehensive critique of economic literature, for economists are nothing but interpreters of and apologists for these laws.

Hardly any attempt has been made since Hegel's death to set forth any branch of science in its specific inner coherence. The official Hegelian school had assimilated only the most simple devices of the master's dialectics and applied them to everything and anything, often moreover with ridiculous incompetence. Hegel's whole heritage was, so far as they were concerned, confined exclusively to a template, by means of which any subject could be knocked into shape, and a set of words and phrases whose only purpose was to turn up conveniently whenever they experienced a lack of ideas and of concrete knowledge. Thus it happened, as a professor at Bonn has said, that these Hegelians knew nothing but could write about everything. The results were, of course, accordingly. For all their conceit these gentlemen were, however, sufficiently conscious of their failings to avoid major problems as far as possible. The superannuated fossilised type of learning held its ground because of its superior factual knowledge, and after Feuerbach's renunciation of the speculative method, Hegelian-

ism gradually died away, and it seemed that science was once more dominated by antiquated metaphysics with its rigid categories.

For this there were quite natural reasons. The rule of the Hegelian Diadochi,²⁵ which ended in empty phrases, was naturally followed by a period in which the concrete content of science predominated once more over the formal aspect. Moreover, Germany at the same time applied itself with quite extraordinary energy to the natural sciences, in accordance with the immense bourgeois development setting in after 1848; with the coming into fashion of these sciences, in which the speculative trend had never achieved any real importance, the old metaphysical mode of thinking, even down to the extreme triviality of Wolff, gained ground rapidly. Hegel was forgotten and a new materialism arose in the natural sciences; it differed in principle very little from the materialism of the eighteenth century and its main advantage was merely a greater stock of data relating to the natural sciences, especially chemistry and physiology. The narrow-minded mode of thinking of the pre-Kantian period in its most banal form is reproduced by Büchner and Vogt, and even Moleschott, who swears by Feuerbach, frequently flounders in a highly diverting manner through the most simple categories. The jaded cart-horse of the commonplace bourgeois mind falters of course in confusion in front of the ditch separating substance from appearance, and cause from effect; but one should not ride cart-horses if one intends to go coursing over the very rough ground of abstract reasoning.

In this context, therefore, a question had to be solved which was not connected with political economy as such. Which scientific method should be used? There was, on the one hand, the Hegelian dialectics in the quite abstract "speculative" form in which Hegel had left it, and on the other hand the ordinary, mainly Wolffian, metaphysical method, which had come again into vogue, and which was also employed by the bourgeois economists to write their bulky rambling volumes. The second method had been theoretically demolished by Kant and particularly by Hegel so that its continued use in practice could only be rendered possible by inertia and the absence of an alternative *simple* method. The Hegelian

method, on the other hand, was in its *existing* form quite inapplicable. It was essentially idealist and the main point in this case was the elaboration of world outlook that was more materialist than any previous one. Hegel's method took as its point of departure pure thought, whereas here the starting-point was to be inexorable facts. A method which, according to its own avowal, "came from nothing through nothing to nothing"²⁶ was in this shape by no means suitable. It was, nevertheless, the only element in the entire available logical material which could at least serve as a point of origin. It had not been subjected to criticism, not been overthrown; none of the opponents of the great dialectician had been able to make a breach in the proud edifice. It had been forgotten because the Hegelian school did not know how to apply it. Hence, it was first of all essential to carry through a thorough critique of the Hegelian method.

It was the exceptional historical sense underlying Hegel's manner of reasoning which distinguished it from that of all other philosophers. However abstract and idealist the form employed, yet his evolution of ideas runs always parallel with the evolution of universal history, and the latter was indeed supposed to be only the proof of the former. Although this reversed the actual relation and stood it on its head, yet the real content was invariably incorporated in his philosophy, especially since Hegel—unlike his followers—did not rely on ignorance, but was one of the most erudite thinkers of all time. He was the first to try to demonstrate that there is an evolution, an intrinsic coherence in history, and however strange some things in his philosophy of history may seem to us now, the grandeur of the basic conception is still admirable today, compared both with his predecessors and with those who following him ventured to advance general historical observations. This monumental conception of history pervades the *Phänomenologie*, *Ästhetik* and *Geschichte der Philosophie*, and the material is everywhere set forth historically, in a definite historical context, even if in an abstract distorted manner.

This epoch-making conception of history was a direct theoretical pre-condition of the new materialist outlook, and already this constituted a connecting link with the logical method as well. Since, even from the standpoint of "pure

reasoning", this forgotten dialectics had led to such results, and had moreover with the greatest ease coped with the whole of the former logic and metaphysics, it must at all events comprise more than sophistry and hairsplitting. But the critique of this method, which the entire official philosophy had evaded and still evades, was no small matter.

Marx was and is the only one who could undertake the work of extracting from the Hegelian logic the nucleus containing Hegel's real discoveries in this field, and of establishing the dialectical method, divested of its idealist wrappings, in the simple form in which it becomes the only correct mode of conceptual evolution. The working out of the method which underlies Marx's critique of political economy is, we think, a result hardly less significant than the basic materialist conception.

Even after the determination of the method, the critique of economics could still be arranged in two ways—historically or logically. Since in the course of history, as in its literary reflection, the evolution proceeds by and large from the simplest to the more complex relations, the historical development of political economy constituted a natural clue, which the critique could take as a point of departure, and then the economic categories would appear on the whole in the same order as in the logical exposition. This form seems to have the advantage of greater lucidity, for it traces the *actual* development, but in fact it would thus become, at most, more popular. History moves often in leaps and bounds and in a zigzag line, and as this would have to be followed throughout, it would mean not only that a considerable amount of material of slight importance would have to be included, but also that the train of thought would frequently have to be interrupted; it would, moreover, be impossible to write the history of economy without that of bourgeois society, and the task would thus become immense, because of the absence of all preliminary studies. The logical method of approach was therefore the only suitable one. This, however, is indeed nothing but the historical method, only stripped of the historical form and diverting chance occurrences. The point where this history begins must also be the starting-point of the train of thought, and its further progress will be simply the reflection, in abstract

and theoretically consistent form, of the historical course. Though the reflection is corrected, it is corrected in accordance with laws provided by the actual historical course, since each factor can be examined at the stage of development where it reaches its full maturity, its classical form.

With this method we begin with the first and simplest relation which is historically, actually available, thus in this context with the first economic relation to be found. We analyse this relation. The fact that it is a *relation* already implies that it has two aspects which are *related to each other*. Each of these aspects is examined separately; this reveals the nature of their mutual behaviour, their reciprocal action. Contradictions will emerge demanding a solution. But since we are not examining an abstract mental process that takes place solely in our mind, but an actual event which really took place at some time or other, or which is still taking place, these contradictions will have arisen in practice and have probably been solved. We shall trace the mode of this solution and find that it has been effected by establishing a new relation, whose two contradictory aspects we shall then have to set forth, and so on.

Political economy begins with *commodities*, with the moment when products are exchanged, either by individuals or by primitive communities. The product being exchanged is a commodity. But it is a commodity merely by virtue of the *thing*, the product being linked with a *relation* between two persons or communities, the relation between producer and consumer, who at this stage are no longer united in the same person. Here is at once an example of a peculiar fact, which pervades the whole economy and has produced serious confusion in the minds of bourgeois economists—economics is not concerned with things but with relations between persons, and in the final analysis between classes; these relations however are always *bound to things* and *appear as things*. Although a few economists had an inkling of this connection in isolated instances, Marx was the first to reveal its significance for the entire economy thus making the most difficult problems so simple and clear that even bourgeois economists will now be able to grasp them.

If we examine the various aspects of the commodity, that is of the fully evolved commodity and not as it at first slowly

emerges in the spontaneous barter of two primitive communities, it presents itself to us from two angles, that of use-value and of exchange-value, and thus we come immediately to the province of economic debate. Anyone wishing to find a striking instance of the fact that the German dialectic method at its present stage of development is at least as superior to the old superficially glib metaphysical method as railways are to the medieval means of transport, should look up Adam Smith or any other authoritative economist of repute to see how much distress exchange-value and use-value caused these gentlemen, the difficulty they had in distinguishing the two properly and in expressing the determinate form peculiar to each, and then compare the clear, simple exposition given by Marx.

After use-value and exchange-value have been expounded, the commodity as a direct unity of the two is described as it enters the *exchange process*. The contradictions arising here may be found on pp. 20 and 21. We merely note that these contradictions are not only of interest for theoretical, abstract reasons, but that they also reflect the difficulties originating from the nature of direct interchange, i.e., simple barter, and the impossibilities inevitably confronting this first crude form of exchange. The solution of these impossibilities is achieved by investing a specific commodity — *money* — with the attribute of representing the exchange-value of all other commodities. Money or simple circulation is then analysed in the second chapter, namely (1) money as a *measure of value*, and, at the same time, value measured in terms of money, i.e., *price*, is more closely defined; (2) money as *means of circulation* and (3) the unity of the two aspects, *real money* which represents bourgeois material wealth as a whole. This concludes the first part, the conversion of money into capital is left for the second part.

One can see that with this method, the logical exposition need by no means be confined to the purely abstract sphere. On the contrary, it requires historical illustration and continuous contact with reality. A great variety of such evidence is therefore inserted, comprising references both to different stages in the actual historical course of social development and to economic works, in which the working out of lucid

definitions of economic relations is traced from the outset. The critique of particular, more or less one-sided or confused interpretations is thus substantially given already in the logical exposition and can be kept quite short.

Written between August 3
and 15, 1859

Karl Marx, *A Contribution to the Critique
of Political Economy*, Moscow,
1970, pp. 222-27

Karl Marx

From Afterword
to the Second German Edition
of the First Volume of *Capital*

That the method employed in *Das Kapital* has been little understood, is shown by the various conceptions, contradictory one to another, that have been formed of it.

Thus the Paris *Revue Positiviste*²⁷ reproaches me in that, on the one hand, I treat economics metaphysically, and on the other hand—imagine!—confine myself to the mere critical analysis of actual facts, instead of writing receipts (Comtist ones?) for the cook-shops of the future. In answer to the reproach *in re* metaphysics, Professor Sieber has it:

“In so far as it deals with actual theory, the method of Marx is the deductive method of the whole English school, a school whose failings and virtues are common to the best theoretic economists.”²⁸

M. Block—“Les Théoriciens du Socialisme en Allemagne. Extrait du *Journal des Économistes*, Juillet et Août 1872”—makes the discovery that my method is analytic and says:

“Par cet ouvrage M. Marx se classe parmi les esprits analytiques les plus éminents.”*

German reviews, of course, shriek out at “Hegelian sophistries”. The *European Messenger* of St. Petersburg in an article dealing exclusively with the method of *Das Kapital* (May

* “This work classes Mr. Marx among the most eminent analytical minds.”—*Ed.*

number, 1872, pp. 427-436),²⁹ finds my method of inquiry severely realistic, but my method of presentation, unfortunately, German-dialectical. It says:

"At first sight, if the judgement is based on the external form of the presentation of the subject, Marx is the most ideal of ideal philosophers, always in the German, *i.e.*, the bad sense of the word. But in point of fact he is infinitely more realistic than all his fore-runners in the work of economic criticism. He can in no sense be called an idealist."

I cannot answer the writer better than by aid of a few extracts from his own criticism, which may interest some of my readers to whom the Russian original is inaccessible.

After a quotation from the preface to my *Criticism of Political Economy*, Berlin, 1859, pp. IV-VII, where I discuss the materialistic basis of my method, the writer goes on:

"The one thing which is of moment to Marx, is to find the law of the phenomena with whose investigation he is concerned; and not only is that law of moment to him, which governs these phenomena, in so far as they have a definite form and mutual connexion within a given historical period. Of still greater moment to him is the law of their variation, of their development, *i.e.*, of their transition from one form into another, from one series of connexions into a different one. This law once discovered, he investigates in detail the effects in which it manifests itself in social life. Consequently, Marx only troubles himself about one thing: to show, by rigid scientific investigation, the necessity of successive determinate orders of social conditions, and to establish, as impartially as possible, the facts that serve him for fundamental starting-points. For this it is quite enough, if he proves, at the same time, both the necessity of the present order of things, and the necessity of another order into which the first must inevitably pass over; and this all the same, whether men believe or do not believe it, whether they are conscious or unconscious of it. Marx treats the social movement as a process of natural history, governed by laws not only independent of human will, consciousness and intelligence, but rather, on the contrary, determining that will, consciousness and intelligence.... If in the history of civilisation the conscious element plays a part so subordinate, then it is self-evident that a critical inquiry whose subject-matter is civilisation, can, less than anything else, have for its basis any form of, or any result of, consciousness. That is to say, that not the idea, but the material phenomenon alone can serve as its starting-point. Such an inquiry will confine itself to the confrontation and the comparison of a fact, not with ideas, but with another fact. For this inquiry, the one thing of moment is, that both facts be investigated as accurately as possible, and that they actually form, each with respect to the other, different momenta of an evolution; but most important of all is the rigid analysis of the series of successions, of the sequences and concatenations in which the different stages of such an evolution present themselves. But it will be said, the general laws of economic life are one and the

same, no matter whether they are applied to the present or the past. This Marx directly denies. According to him, such abstract laws do not exist. On the contrary, in his opinion every historical period has laws of its own.... As soon as society has outlived a given period of development, and is passing over from one given stage to another, it begins to be subject also to other laws. In a word, economic life offers us a phenomenon analogous to the history of evolution in other branches of biology. The old economists misunderstood the nature of economic laws when they likened them to the laws of physics and chemistry. A more thorough analysis of phenomena shows that social organisms differ among themselves as fundamentally as plants or animals. Nay, one and the same phenomenon falls under quite different laws in consequence of the different structure of those organisms as a whole, of the variations of their individual organs, of the different conditions in which those organs function, &c. Marx, *e.g.*, denies that the law of population is the same at all times and in all places. He asserts, on the contrary, that every stage of development has its own law of population.... With the varying degree of development of productive power, social conditions and the laws governing them vary too. Whilst Marx sets himself the task of following and explaining from this point of view the economic system established by the sway of capital, he is only formulating, in a strictly scientific manner, the aim that every accurate investigation into economic life must have. The scientific value of such an inquiry lies in the disclosing of the special laws that regulate the origin, existence, development, death of a given social organism and its replacement by another and higher one. And it is this value that, in point of fact, Marx's book has."

Whilst the writer pictures what he takes to be actually my method, in this striking and [as far as concerns my own application of it] generous way, what else is he picturing but the dialectic method?

Of course the method of presentation must differ in form from that of inquiry. The latter has to appropriate the material in detail, to analyse its different forms of development, to trace out their inner connexion. Only after this work is done, can the actual movement be adequately described. If this is done successfully, if the life of the subject-matter is ideally reflected as in a mirror, then it may appear as if we had before us a mere *a priori* construction.

My dialectic method is not only different from the Hegelian, but is its direct opposite. To Hegel, the life-process of the human brain, *i.e.*, the process of thinking, which, under the name of "the Idea", he even transforms into an independent subject, is the demiurgos of the real world, and the real world is only the external, phenomenal form of "the Idea". With me,

on the contrary, the ideal is nothing else than the material world reflected by the human mind, and translated into forms of thought.

The mystifying side of Hegelian dialectic I criticised nearly thirty years ago, at a time when it was still the fashion. But just as I was working at the first volume of *Das Kapital*, it was the good pleasure of the peevish, arrogant, mediocre * who now talk large in cultured Germany, to treat Hegel in the same way as the brave Moses Mendelssohn in Lessing's time treated Spinoza, i.e., as a "dead dog". I therefore openly avowed myself the pupil of that mighty thinker, and even here and there, in the chapter on the theory of value, coquetted with the modes of expression peculiar to him. The mystification which dialectic suffers in Hegel's hands, by no means prevents him from being the first to present its general form of working in a comprehensive and conscious manner. With him it is standing on its head. It must be turned right side up again, if you would discover the rational kernel within the mystical shell.

In its mystified form, dialectic became the fashion in Germany, because it seemed to transfigure and to glorify the existing state of things. In its rational form it is a scandal and abomination to bourgeoisdom and its doctrinaire professors, because it includes in its comprehension and affirmative recognition of the existing state of things, at the same time also, the recognition of the negation of that state, of its inevitable breaking up; because it regards every historically developed social form as in fluid movement, and therefore takes into account its transient nature not less than its momentary existence; because it lets nothing impose upon it, and is in its essence critical and revolutionary.

Written on January 24, 1873

Karl Marx, *Capital*, Vol. I, Moscow, 1972, pp. 26-29

* Epigoni.³⁰ — Ed.

Frederick Engels

From Prefaces to the Three Editions of *Anti-Dühring*

Marx and I were pretty well the only people to rescue conscious dialectics from German idealist philosophy and apply it in the materialist conception of nature and history. But a knowledge of mathematics and natural science is essential to a conception of nature which is dialectical and at the same time materialist. Marx was well versed in mathematics, but we could keep up with the natural sciences only piecemeal, intermittently and sporadically. For this reason, when I retired from business and transferred my home to London,³¹ thus enabling myself to give the necessary time to it, I went through as complete as possible a "moulting", as Liebig calls it, in mathematics and the natural sciences, and spent the best part of eight years on it. I was right in the middle of this "moulting" process when it happened that I had to occupy myself with Herr Dühring's so-called natural philosophy. It was therefore only too natural that in dealing with this subject I was sometimes unable to find the correct technical expression, and in general moved with considerable clumsiness in the field of theoretical natural science. On the other hand, my lack of assurance in this field, which I had not yet overcome, made me cautious, and I cannot be charged with real blunders in relation to the facts known at that time or with incorrect presentation of recognised theories. In this connection there was only one unrecognised genius of a mathematician who complained in a letter to Marx that I had made a wanton attack upon the honour of $\sqrt{-1}$.³²

It goes without saying that my recapitulation of mathematics and the natural sciences was undertaken in order to convince myself also in detail—of what in general I was not in

doubt—that in nature, amid the welter of innumerable changes, the same dialectical laws of motion force their way through as those which in history govern the apparent fortuitousness of events; the same laws which similarly form the thread running through the history of the development of human thought and gradually rise to consciousness in thinking man; the laws which Hegel first developed in all-embracing but mystic form, and which we made it one of our aims to strip of this mystic form and to bring clearly before the mind in their complete simplicity and universality. It goes without saying that the old natural philosophy—in spite of its real value and the many fruitful seeds it contained*—was unable to satisfy us.

* It is much easier, along with the unthinking mob *à la* Karl Vogt, to assail the old natural philosophy than to appreciate its historical significance. It contains a great deal of nonsense and fantasy, but not more than the unphilosophical theories of the empirical natural scientists contemporary with that philosophy, and that there was also in it much that was sensible and rational began to be perceived after the theory of evolution became widespread. Haeckel was therefore fully justified in recognising the merits of Treviranus and Oken. In his primordial slime and primordial vesicle Oken put forward as a biological postulate what was in fact subsequently discovered as protoplasm and cell. As far as Hegel is specifically concerned, he is in many respects head and shoulders above his empiricist contemporaries, who thought that they had explained all unexplained phenomena when they had endowed them with some force or power—the force of gravity, the power of buoyancy, the power of electrical contact, etc.—or where this would not do, with some unknown substance: the substance of light, of heat, of electricity, etc. The imaginary substances have now been pretty well discarded, but the power humbug against which Hegel fought still pops up gaily, for example, as late as 1869 in Helmholtz's Innsbruck lecture (Helmholtz, *Populäre Vorlesungen*, II. Heft, 1871, S. 190). In contrast to the deification of Newton which was handed down from the French of the eighteenth century, and the English heaping of honours and wealth on Newton, Hegel brought out the fact that Kepler, whom Germany allowed to starve, was the real founder of the modern mechanics of the celestial bodies, and that the Newtonian law of gravitation was already contained in all three of Kepler's laws, in the third law even explicitly. What Hegel proves by a few simple equations in his *Naturphilosophie*, § 270 and Addenda (Hegel's *Werke*, 1842, VII. Band, Seite 98 und 113 bis 115), appears again as the outcome of the most recent mathematical mechanics in Gustav Kirchhoff's *Vorlesungen über mathematische Physik*, 2. Auflage, Leipzig, 1877, S. 10, and in essentially the same simple mathematical form as had first been developed by Hegel. The natural philosophers stand in the same relation to consciously dialectical natural science as the utopians to modern communism. [Note by Engels.]

As is more fully brought out in this book, natural philosophy, particularly in the Hegelian form, erred because it did not concede to nature any development in time, any "succession", but only "co-existence". This was on the one hand grounded in the Hegelian system itself, which ascribed historical evolution only to the "spirit", but on the other hand was also due to the whole state of the natural sciences in that period. In this Hegel fell far behind Kant, whose nebular theory³³ had already indicated the origin of the solar system, and whose discovery of the retardation of the earth's rotation by the tides also had proclaimed the doom of that system. And finally, to me there could be no question of building the laws of dialectics into nature, but of discovering them in it and evolving them from it.

But to do this systematically and in each separate department, is a gigantic task. Not only is the domain to be mastered almost boundless; natural science in this entire domain is itself undergoing such a mighty process of being revolutionised that even people who can devote the whole of their spare time to it can hardly keep pace. Since Karl Marx's death, however, my time has been requisitioned for more urgent duties, and I have therefore been compelled to lay aside my work. For the present I must content myself with the indications given in this book, and must wait to find some later opportunity to put together and publish the results which I have arrived at, perhaps in conjunction with the extremely important mathematical manuscripts left by Marx.³⁴

Yet the advance of theoretical natural science may possibly make my work to a great extent or even altogether superfluous. For the revolution which is being forced on theoretical natural science by the mere need to set in order the purely empirical discoveries, great masses of which have been piled up, is of such a kind that it must bring the dialectical character of natural processes more and more to the consciousness even of those empiricists who are most opposed to it. The old rigid antagonisms, the sharp, impassable dividing lines are more and more disappearing. Since even the last "true" gases have been liquefied; and since it has been proved that a body can be brought into a condition in which the liquid and the gaseous forms are indistinguishable, the aggregate states have lost the last relics of their former absolute character.³⁵ With the thesis

of the kinetic theory of gases, that in perfect gases at equal temperatures the squares of the speeds with which the individual gas molecules move are in inverse ratio to their molecular weights, heat also takes its place directly among the forms of motion which can be immediately measured as such. Whereas only ten years ago the great basic law of motion, then recently discovered, was as yet conceived merely as a law of the *conservation* of energy, as the mere expression of the indestructibility and uncreatability of motion, that is, merely in its quantitative aspect, this narrow, negative conception is being more and more supplanted by the positive idea of the *transformation* of energy, in which for the first time the qualitative content of the process comes into its own, and the last vestige of an extramundane creator is obliterated. That the quantity of motion (so-called energy) remains unaltered when it is transformed from kinetic energy (so-called mechanical force) into electricity, heat, potential energy, etc., and vice versa, no longer needs to be preached as something new; it serves as the already secured basis for the now much more pregnant investigation into the very process of transformation, the great basic process, knowledge of which comprises all knowledge of nature. And since biology has been pursued in the light of the theory of evolution, one rigid boundary line of classification after another has been swept away in the domain of organic nature. The almost unclassifiable intermediate links are growing daily more numerous, closer investigation throws organisms out of one class into another, and distinguishing characteristics which almost became articles of faith are losing their absolute validity; we now have mammals that lay eggs, and, if the report is confirmed, also birds that walk on all fours.³⁶ Years ago Virchow was compelled, following on the discovery of the cell, to dissolve the unity of the individual animal being into a federation of cell-states — thus acting more progressively rather than scientifically and dialectically³⁷ — and now the conception of animal (therefore also human) individuality is becoming far more complex owing to the discovery of the white blood corpuscles which creep about amoeba-like within the bodies of the higher animals. It is however precisely the polar antagonisms put forward as irreconcilable and insoluble, the forcibly fixed lines of demarcation and class

distinctions, which have given modern theoretical natural science its restricted, metaphysical character. The recognition that these antagonisms and distinctions, though to be found in nature, are only of relative validity, and that on the other hand their imagined rigidity and absolute validity have been introduced into nature only by our reflective minds—this recognition is the kernel of the dialectical conception of nature. It is possible to arrive at this recognition because the accumulating facts of natural science compel us to do so; but one arrives at it more easily if one approaches the dialectical character of these facts equipped with an understanding of the laws of dialectical thought. In any case natural science has now advanced so far that it can no longer escape dialectical generalisation. However, it will make this process easier for itself if it does not lose sight of the fact that the results in which its experiences are summarised are concepts, that the art of working with concepts is not inborn and also is not given with ordinary everyday consciousness but requires real thought, and that this thought similarly has a long empirical history, not more and not less than empirical natural science. Only by learning to assimilate the results of the development of philosophy during the past two and a half thousand years will it rid itself on the one hand of any natural philosophy standing apart from it, outside it and above it, and on the other hand also of its own limited method of thought, which was its inheritance from English empiricism.

London, September 23, 1885

Frederick Engels, *Anti-Dühring*,
Moscow 1975, pp. 15-20

Frederick Engels

From *Anti-Dühring*

In the meantime, along with and after the French philosophy of the eighteenth century had arisen the new German philosophy, culminating in Hegel. Its greatest merit was the taking up again of dialectics as the highest form of reasoning. The old Greek philosophers were all born natural dialecticians, and Aristotle, the most encyclopaedic intellect of them, had already analysed the most essential forms of dialectic thought. The newer philosophy, on the other hand, although in it also dialectics had brilliant exponents (e.g., Descartes and Spinoza), had, especially through English influence, become more and more rigidly fixed in the so-called metaphysical mode of reasoning, by which also the French of the eighteenth century were almost wholly dominated, at all events in their special philosophical works. Outside philosophy in the restricted sense, the French nevertheless produced masterpieces of dialectic. We need only call to mind Diderot's *Le Neveu de Rameau* and Rousseau's *Discours sur l'origine et les fondements de l'inégalité parmi les hommes*. We give here, in brief, the essential character of these two modes of thought. We shall have to return to them later in greater detail.

When we consider and reflect upon nature at large or the history of mankind or our own intellectual activity, at first we see the picture of an endless entanglement of relations and reactions, in which nothing remains what, where and as it was,

but everything moves, changes, comes into being and passes away. This primitive, naive but intrinsically correct conception of the world is that of ancient Greek philosophy, and was first clearly formulated by Heraclitus: everything is and is not, for everything *is fluid*, is constantly changing, constantly coming into being and passing away.

But this conception, correctly as it expresses the general character of the picture of appearances as a whole, does not suffice to explain the details of which this picture is made up, and so long as we do not understand these, we have not a clear idea of the whole picture. In order to understand these details we must detach them from their natural or historical connection and examine each one separately, its nature, special causes, effects, etc. This is, primarily, the task of natural science and historical research: branches of science which the Greeks of classical times, on very good grounds, relegated to a subordinate position, because they had first of all to collect materials [for these sciences to work upon].

The foundations of the exact natural sciences were [therefore,] first worked out by the Greeks of the Alexandrian period,³⁸ and later on, in the Middle Ages, by the Arabs. Real natural science dates from the second half of the fifteenth century, and thence onward it has advanced with constantly increasing rapidity. The analysis of nature into its individual parts, the grouping of the different natural processes and objects in definite classes, the study of the internal anatomy of organic bodies in their manifold forms—these were the fundamental conditions of the gigantic strides in our knowledge of nature that have been made during the last four hundred years. But this method of work has also left us as legacy the habit of observing natural objects and processes in isolation, apart from their connection with the vast whole; of observing them in repose, not in motion; as constants, not as essentially variables; in their death, not in their life. And when this way of looking at things was transferred by Bacon and Locke from natural science to philosophy, it begot the narrow, metaphysical mode of thought peculiar to the last centuries.

To the metaphysician, things and their mental reflexes, ideas, are isolated, are to be considered one after the other and

apart from each other, are objects of investigation fixed, rigid, given once for all. He thinks in absolutely irreconcilable antitheses. "His communication is 'yea, yea; nay, nay'; for whatsoever is more than these cometh of evil."³⁹ For him a thing either exists or does not exist; a thing cannot at the same time be itself and something else. Positive and negative absolutely exclude one another; cause and effect stand in a rigid antithesis one to the other.

At first sight this mode of thinking seems to us very luminous, because it is that of so-called sound common sense. Only sound common sense, respectable fellow that he is, in the homely realm of his own four walls, has very wonderful adventures directly he ventures out into the wide world of research. And the metaphysical mode of thought, justifiable and necessary as it is in a number of domains whose extent varies according to the nature of the particular object of investigation, sooner or later reaches a limit, beyond which it becomes one-sided, restricted, abstract, lost in insoluble contradictions. In the contemplation of individual things, it forgets the connection between them; in the contemplation of their existence, it forgets the beginning and end of that existence; of their repose, it forgets their motion. It cannot see the wood for the trees. For everyday purposes we know and can say, e.g., whether an animal is alive or not. But, upon closer inquiry, we find that this is, in many cases, a very complex question, as the jurists know very well. They have cudgelled their brains in vain to discover a rational limit beyond which the killing of the child in its mother's womb is murder. It is just as impossible to determine absolutely the moment of death, for physiology proves that death is not an instantaneous, momentary phenomenon, but a very protracted process.

In like manner, every organic being is every moment the same and not the same; every moment it assimilates matter supplied from without, and gets rid of other matter; every moment some cells of its body die and others build themselves anew; in a longer or shorter time the matter of its body is completely renewed, and is replaced by other molecules of matter, so that every organic being is always itself, and yet something other than itself.

Further, we find upon closer investigation that the two poles of an antithesis, positive and negative, e. g., are as inseparable as they are opposed, and that despite all their opposition, they mutually interpenetrate. And we find, in like manner, that cause and effect are conceptions which only hold good in their application to individual cases; but as soon as we consider the individual cases in their general connection with the universe as a whole, they run into each other, and they become confounded when we contemplate that universal action and reaction in which causes and effects are eternally changing places, so that what is effect here and now will be cause there and then, and vice versa.

None of these processes and modes of thought enters into the framework of metaphysical reasoning. Dialectics, on the other hand, comprehends things and their representations, ideas, in their essential connection, concatenation, motion, origin, and ending. Such processes as those mentioned above are, therefore, so many corroborations of its own method of procedure.

Nature is the proof of dialectics, and it must be said for modern science that it has furnished this proof with very rich materials increasing daily, and thus has shown that, in the last resort, nature works dialectically and not metaphysically. But the naturalists who have learned to think dialectically are few and far between, and this conflict of the results of discovery with preconceived modes of thinking explains the endless confusion now reigning in theoretical natural science, the despair of teachers as well as learners, of authors and readers alike.

An exact representation of the universe, of its evolution, of the development of mankind, and of the reflection of this evolution in the minds of men, can therefore only be obtained by the methods of dialectics with its constant regard to the innumerable actions and reactions of life and death, of progressive or retrogressive changes. And in this spirit the new German philosophy has worked. Kant began his career by resolving the stable solar system of Newton and its eternal duration, after the famous initial impulse had once been given, into the result of a historic process, the formation of the sun and all the planets out of a rotating nebulous mass. From this

he at the same time drew the conclusion that, given this origin of the solar system, its future death followed of necessity. His theory half a century later was established mathematically by Laplace, and half a century after that the spectroscope proved the existence in space of such incandescent masses of gas in various stages of condensation.

This new German philosophy culminated in the Hegelian system. In this system — and herein is its great merit — for the first time the whole world, natural, historical, intellectual, is represented as a process, i.e., as in constant motion, change, transformation, development; and the attempt is made to trace out the internal connection that makes a continuous whole of all this movement and development. From this point of view the history of mankind no longer appeared as a wild whirl of senseless deeds of violence, all equally condemnable at the judgment-seat of mature philosophic reason and which are best forgotten as quickly as possible, but as the process of evolution of man himself. It was now the task of the intellect to follow the gradual march of this process through all its devious ways, and to trace out the inner law running through all its apparently accidental phenomena.

That [the] Hegel [ian system] did not solve the problem [it propounded] is here immaterial. Its epoch-making merit was that it propounded the problem. This problem is one that no single individual will ever be able to solve. Although Hegel was — with Saint-Simon — the most encyclopaedic mind of his time, yet he was limited, first, by the necessarily limited extent of his own knowledge and, second, by the limited extent and depth of the knowledge and conceptions of his age. To these limits a third must be added. Hegel was an idealist. To him the thoughts within his brain were not the more or less abstract pictures of actual things and processes, but, conversely, things and their evolution were only the realised pictures of the "Idea", existing somewhere from eternity before the world was. This way of thinking turned everything upside down, and completely reversed the actual connection of things in the world. Correctly and ingeniously as many individual groups of facts were grasped by Hegel, yet, for the reasons just given, there is much that is botched, artificial, laboured, in a word, wrong in point of detail. The Hegelian system, in itself, was a

colossal miscarriage—but it was also the last of its kind. It was suffering, in fact, from an internal and incurable contradiction. Upon the one hand, its essential proposition was the conception that human history is a process of evolution, which, by its very nature, cannot find its intellectual final term in the discovery of any so-called absolute truth. But, on the other hand, it laid claim to being the very essence of this absolute truth. A system of natural and historical knowledge, embracing everything, and final for all time, is a contradiction to the fundamental law of dialectic reasoning. This law, indeed, by no means excludes, but, on the contrary, includes the idea that the systematic knowledge of the external universe can make giant strides from age to age.

The perception of the fundamental contradiction in German idealism led necessarily back to materialism, but, *nota bene*, not to the simply metaphysical, exclusively mechanical materialism of the eighteenth century. In contrast to the naively revolutionary, simple rejection of all previous history, modern materialism sees in the latter the process of evolution of humanity, it being its task to discover the laws of motion thereof. With the French of the eighteenth century, and [even] with Hegel, the conception obtained of nature as a whole, moving in narrow circles, and [for ever] immutable, with its eternal celestial bodies, as Newton, and unalterable organic species, as Linnaeus, taught. Modern materialism embraces the more recent discoveries of natural science, according to which nature also has its history in time, the celestial bodies, like the organic species that, under favourable conditions, people them, being born and perishing. And even if nature, as a whole, must still be said to move in recurrent cycles, these cycles assume infinitely larger dimensions. In both cases modern materialism is essentially dialectic, and no longer needs any philosophy standing above the other sciences. As soon as each special science is bound to make clear its position in the great totality of things and of our knowledge of things, a special science dealing with this totality is superfluous [or unnecessary]. That which still survives, independently, of all earlier philosophy is the science of thought and its laws—formal logic and dialectics. Everything else is subsumed in the positive science of nature and history....

What he* is dealing with are therefore *principles*, formal tenets derived from *thought* and not from the external world, which are to be applied to nature and the realm of man, and to which therefore nature and man have to conform. But whence does thought obtain these principles? From itself? No, for Herr Dühring himself says: the realm of pure thought is limited to logical schemata and mathematical forms (the latter, moreover, as we shall see, is wrong). Logical schemata can only relate to *forms of thought*; but what we are dealing with here is solely forms of *being*, of the external world, and these forms can never be created and derived by thought out of itself, but only from the external world. But with this the whole relationship is inverted: the principles are not the starting-point of the investigation, but its final result; they are not applied to nature and human history, but abstracted from them; it is not nature and the realm of humanity which conform to these principles, but the principles are only valid in so far as they are in conformity with nature and history. That is the only materialistic conception of the matter, and Herr Dühring's contrary conception is idealistic, makes things stand completely on their heads, and fashions the real world out of ideas, out of schemata, schemes or categories existing somewhere before the world, from eternity—just like a *Hegel*.

In fact, let us compare Hegel's *Encyclopaedia* and all its delirious fantasies with Herr Dühring's final and ultimate truths. With Herr Dühring we have in the first place general world schematism, which Hegel calls *Logic*. Then with both of them we have the application of these schemata or logical categories to nature: the philosophy of nature; and finally their application to the realm of man, which Hegel calls the philosophy of mind. The "inner logical sequence" of the Dühring succession therefore leads us "quite naturally" back to Hegel's *Encyclopaedia*, from which it has been taken with a loyalty which would move that wandering Jew of the Hegelian school, Professor Michelet of Berlin, to tears.⁴⁰

* Dühring.—Ed.

That is what comes of accepting "consciousness", "thought", quite naturalistically, as something given, something opposed from the outset to being, to nature. If that were so, it must seem extremely strange that consciousness and nature, thinking and being, the laws of thought and the laws of nature, should correspond so closely. But if the further question is raised what thought and consciousness really are and where they come from, it becomes apparent that they are products of the human brain and that man himself is a product of nature, which has developed in and along with its environment; hence it is self-evident that the products of the human brain, being in the last analysis also products of nature, do not contradict the rest of nature's interconnections but are in correspondence with them....

The materialists before Herr Dühring spoke of matter and motion. He reduces motion to mechanical force as its supposed basic form, and thereby makes it impossible for himself to understand the real connection between matter and motion, which moreover was also unclear to all former materialists. And yet it is simple enough. *Motion is the mode of existence of matter.* Never anywhere has there been matter without motion, nor can there be. Motion in cosmic space, mechanical motion of smaller masses on the various celestial bodies, the vibration of molecules as heat or as electrical or magnetic currents, chemical disintegration and combination, organic life—at each given moment each individual atom of matter in the world is in one or other of these forms of motion, or in several forms at once. All rest, all equilibrium, is only relative, only has meaning in relation to one or other definite form of motion. On the earth, for example, a body may be in mechanical equilibrium, may be mechanically at rest; but this in no way prevents it from participating in the motion of the earth and in that of the whole solar system, just as little as it prevents its most minute physical particles from carrying out the vibrations determined by its temperature, or its atoms from passing through a chemical process. Matter without motion is just as inconceivable as motion without matter. Motion is therefore as uncreatable and indestructible as matter itself; as the older

philosophy (Descartes) expressed it, the quantity of motion existing in the world is always the same....

Is human thought sovereign? Before we can answer yes or no we must first enquire: what is human thought? Is it the thought of the individual man? No. But it exists only as the individual thought of many milliards of past, present and future men. If, then, I say that the total thought of all these human beings, including the future ones, which is embraced in my idea, is *sovereign*, able to know the world as it exists, if only mankind lasts long enough and in so far as no limits are imposed on its knowledge by its perceptive organs or the objects to be known, then I am saying something which is pretty banal and, in addition, pretty barren. For the most valuable result from it would be that it should make us extremely distrustful of our present knowledge, inasmuch as in all probability we are just about at the beginning of human history, and the generations which will put us right are likely to be far more numerous than those whose knowledge we—often enough with a considerable degree of contempt—have the opportunity to correct.

Herr Dühring himself proclaims it to be a necessity that consciousness, and therefore also thought and knowledge, can become manifest only in a series of individual beings. We can only ascribe sovereignty to the thought of each of these individuals in so far as we are not aware of any power which would be able to impose any idea forcibly on him, when he is of sound mind and wide awake. But as for the sovereign validity of the knowledge obtained by each individual thought, we all know that there can be no talk of such a thing, and that all previous experience shows that without exception such knowledge always contains much more that is capable of being improved upon than that which cannot be improved upon, or is correct.

In other words, the sovereignty of thought is realised in a series of extremely unsovereignly-thinking human beings; the knowledge which has an unconditional claim to truth is realised in a series of relative errors; neither the one nor the

other can be fully realised except through an unending duration of human existence.

Here once again we find the same contradiction as we found above, between the character of human thought, necessarily conceived as absolute, and its reality in individual human beings, all of whom think only limitedly. This is a contradiction which can be resolved only in the course of infinite progress, in what is — at least practically, for us — an endless succession of generations of mankind. In this sense human thought is just as much sovereign as not sovereign, and its capacity for knowledge just as much unlimited as limited. It is sovereign and unlimited in its disposition, its vocation, its possibilities and its historical ultimate goal; it is not sovereign and it is limited in its individual realisation and in reality at any particular moment.

It is just the same with eternal truths. If mankind ever reached the stage at which it should work only with eternal truths, with results of thought which possess sovereign validity and an unconditional claim to truth, it would then have reached the point where the infinity of the intellectual world both in its actuality and in its potentiality had been exhausted, and thus the famous miracle of the counted uncountable would have been performed.

But are there any truths which are so securely based that any doubt of them seems to us to be tantamount to insanity? That twice two makes four, that the three angles of a triangle are equal to two right angles, that Paris is in France, that a man who gets no food dies of hunger, and so forth? Are there then nevertheless *eternal* truths, final and ultimate truths?

Certainly there are. We can divide the whole realm of knowledge in the traditional way into three great departments. The first includes all sciences that deal with inanimate nature and are to a greater or lesser degree susceptible of mathematical treatment: mathematics, astronomy, mechanics, physics, chemistry. If it gives anyone any pleasure to use mighty words for very simple things, it can be asserted that *certain* results obtained by these sciences are eternal truths, final and ultimate truths; for which reason these sciences are known as the *exact* sciences. But very far from all their results have this validity.

With the introduction of variable magnitudes and the extension of their variability to the infinitely small and infinitely large, mathematics, usually so strictly ethical, fell from grace; it ate of the tree of knowledge, which opened up to it a career of most colossal achievements, but at the same time a path of error. The virgin state of absolute validity and irrefutable proof of everything mathematical was gone for ever; the realm of controversy was inaugurated, and we have reached the point where most people differentiate and integrate not because they understand what they are doing but from pure faith, because up to now it has always come out right. Things are even worse with astronomy and mechanics, and in physics and chemistry we are swamped by hypotheses as if attacked by a swarm of bees. And it must of necessity be so. In physics we are dealing with the motion of molecules, in chemistry with the formation of molecules out of atoms, and if the interference of light waves is not a myth, we have absolutely no prospect of ever seeing these interesting objects with our own eyes. As time goes on, final and ultimate truths become remarkably rare in this field.

We are even worse off in geology which, by its nature, has to deal chiefly with processes which took place not only in our absence but in the absence of any human being whatever. The gleaning here of final and ultimate truths is therefore a very troublesome business, and the crop is extremely scanty.

The second department of science is the one which covers the investigation of living organisms. In this field there is such a multiplicity of interrelationships and causalities that not only does the solution of each question give rise to a host of other questions, but each separate problem can in most cases only be solved piecemeal, through a series of investigations which often require centuries; and besides, the need for a systematic presentation of interconnections makes it necessary again and again to surround the final and ultimate truths with a luxuriant growth of hypotheses. What a long series of intermediaries from Galen to Malpighi was necessary for correctly establishing such a simple matter as the circulation of the blood in mammals, how slight is our knowledge of the origin of blood corpuscles, and how numerous are the missing links even today, for example, to be able to bring the symptoms of a

disease into some rational relationship with its cause! And often enough discoveries, such as that of the cell, are made which compel us to revise completely all formerly established final and ultimate truths in the realm of biology, and to put whole piles of them on the scrap-heap once and for all. Anyone who wants to establish really genuine and immutable truths here will therefore have to be content with such platitudes as: all men are mortal, all female mammals have lacteal glands, and the like; he will not even be able to assert that the higher animals digest with their stomachs and intestines and not with their heads, for the nervous activity, which is centralised in the head, is indispensable to digestion.

But eternal truths are in an even worse plight in the third, the historical group of sciences, which study in their historical sequence and in their present resultant state the conditions of human life, social relationships, forms of law and government, with their ideological superstructure in the shape of philosophy, religion, art, etc. In organic nature we are at least dealing with a succession of processes which, so far as our immediate observation is concerned, recur with fair regularity within very wide limits. Organic species have on the whole remained unchanged since the time of Aristotle. In social history, however, the repetition of conditions is the exception and not the rule, once we pass beyond the primitive state of man, the so-called Stone Age; and when such repetitions occur, they never arise under exactly similar circumstances. Such, for example, is the existence of an original common ownership of the land among all civilised peoples, or the way it was dissolved. In the sphere of human history our knowledge is therefore even more backward than in the realm of biology. Furthermore, when by way of exception the inner connection between the social and political forms of existence in any epoch comes to be known, this as a rule occurs only when these forms have already by half outlived themselves and are nearing extinction. Therefore, knowledge is here essentially relative, inasmuch as it is limited to the investigation of interconnections and consequences of certain social and state forms which exist only in a particular epoch and among particular peoples and are by their very nature transitory. Anyone therefore who here sets out to hunt down final and

ultimate truths, genuine, absolutely immutable truths, will bring home but little, apart from platitudes and commonplaces of the sorriest kind—for example, that, generally speaking, men cannot live except by labour; that up to the present they for the most part have been divided into rulers and ruled; that Napoleon died on May 5, 1821, and so on.

Now it is a remarkable thing that it is precisely in this sphere that we most frequently encounter truths which claim to be eternal, final and ultimate and all the rest of it. That twice two makes four, that birds have beaks, and similar statements, are proclaimed as eternal truths only by those who aim at deducing, from the existence of eternal truths in general, the conclusion that there are also eternal truths in the sphere of human history—eternal morality, eternal justice, and so on—which claim a validity and scope similar to those of the theorems and applications of mathematics. And then we can confidently rely on this same friend of humanity taking the first opportunity to assure us that all previous fabricators of eternal truths have been to a greater or lesser extent asses and charlatans, that they all fell into error and made mistakes; but that *their* error and *their* fallibility are in accordance with nature's laws, and prove the existence of truth and accuracy precisely in *his* case; and that he, the prophet who has now arisen, has in his bag, all ready-made, final and ultimate truth, eternal morality and eternal justice. This has all happened so many hundreds and thousands of times that we can only feel astonished that there should still be people credulous enough to believe this, not of others, oh no! but of themselves. Nevertheless we have here before us at least one more such prophet, who also, quite in the accustomed way, flies into highly moral indignation when other people deny that any individual whatsoever is in a position to deliver the final and ultimate truth. Such a denial, or indeed mere doubt of it, is weakness, hopeless confusion, nothingness, mordant scepticism, worse than pure nihilism, utter chaos and other such pleasantries. As with all prophets, instead of critical and scientific examination and judgment one encounters moral condemnation out of hand.

We might have made mention above also of the sciences which investigate the laws of human thought, i.e., logic and

dialectics. In these, however, eternal truths do not fare any better. Herr Dühring declares that dialectics proper is pure nonsense; and the many books which have been and are still being written on logic provide abundant proof that here, too, final and ultimate truths are much more sparsely sown than some people believe.

For that matter, there is absolutely no need to be alarmed at the fact that the stage of knowledge which we have now reached is as little final as all that have preceded it. It already embraces a vast mass of judgments and requires very great specialisation of study on the part of anyone who wants to become conversant with any particular science. But a man who applies the measure of genuine, immutable, final and ultimate truth to knowledge which, by its very nature, must either remain relative for many generations and be completed only step by step, or which, as in cosmogony, geology and the history of man, must always contain gaps and be incomplete because of the inadequacy of the historical material—such a man only proves thereby his own ignorance and perversity, even if the real thing behind it all is not, as in this case, the claim to personal infallibility. Truth and error, like all thought-concepts which move in polar opposites, have absolute validity only in an extremely limited field, as we have just seen, and as even Herr Dühring would realise if he had any acquaintance with the first elements of dialectics, which deal precisely with the inadequacy of all polar opposites. As soon as we apply the antithesis between truth and error outside of that narrow field which has been referred to above it becomes relative and therefore unserviceable for exact scientific modes of expression; and if we attempt to apply it as absolutely valid outside that field we really find ourselves altogether beaten: both poles of the antithesis become transformed into their opposites, truth becomes error and error truth. Let us take as an example the well-known Boyle's law. According to it, if the temperature remains constant, the volume of a gas varies inversely with the pressure to which it is subjected. Regnault found that this law does not hold good in certain cases. Had he been a philosopher of reality he would have had to say: Boyle's law is mutable, and is hence not a genuine truth, hence it is not a truth at all, hence it is an error. But had he done this he

would have committed an error far greater than the one that was contained in Boyle's law; his grain of truth would have been lost sight of in a sand-hill of error; he would have distorted his originally correct conclusion into an error compared with which Boyle's law, along with the little particle of error that clings to it, would have seemed like truth. But Regnault, being a man of science, did not indulge in such childishness, but continued his investigations and discovered that in general Boyle's law is only approximately true, and in particular loses its validity in the case of gases which can be liquefied by pressure, namely, as soon as the pressure approaches the point at which liquefaction begins. Boyle's law therefore was proved to be true only within definite limits. But is it absolutely and finally true within those limits? No physicist would assert that. He would maintain that it holds good within certain limits of pressure and temperature and for certain gases; and even within these more restricted limits he would not exclude the possibility of a still narrower limitation or altered formulation as the result of future investigations.* This is how things stand with final and ultimate truths in physics, for example. Really scientific works therefore, as a rule, avoid such dogmatically moral expressions as error and truth, while these expressions meet us everywhere in works such as the philosophy of reality, in which empty phrasemongering attempts to impose itself on us as the most sovereign result of sovereign thought....

* Since I wrote the above it would seem already to have been confirmed. According to the latest researches carried out with more exact apparatus by Mendeleyev and Bogusky, all true gases show a variable relation between pressure and volume; the coefficient of expansion for hydrogen, at all the pressures so far applied, has been positive (that is, the diminution of volume was slower than the increase of pressure); in the case of atmospheric air and the other gases examined, there is for each a zero point of pressure, so that with pressure below this point their coefficients are positive, and with pressure above this point their coefficients are negative. So Boyle's law, which has always hitherto been usable for practical purposes, will have to be supplemented by a whole series of special laws. (We also know now—in 1885—that there are no “true” gases at all. They have all been reduced to a liquid form.) [*Note by Engels.*]

Hegel was the first to state correctly the relation between freedom and necessity. To him, freedom is the appreciation of necessity. "Necessity is *blind* only in so far as it is not understood." *⁴¹ Freedom does not consist in the dream of independence from natural laws, but in the knowledge of these laws, and in the possibility this gives of systematically making them work towards definite ends. This holds good in relation both to the laws of external nature and to those which govern the bodily and mental existence of men themselves—two classes of laws which we can separate from each other at most only in thought but not in reality. Freedom of the will therefore means nothing but the capacity to make decisions with knowledge of the subject. Therefore the *freer* a man's judgment is in relation to a definite question, the greater is the *necessity* with which the content of this judgment will be determined; while the uncertainty, founded on ignorance, which seems to make an arbitrary choice among many different and conflicting possible decisions, shows precisely by this that it is not free, that it is controlled by the very object it should itself control. Freedom therefore consists in the control over ourselves and over external nature, a control founded on knowledge of natural necessity; it is therefore necessarily a product of historical development. The first men who separated themselves from the animal kingdom were in all essentials as unfree as the animals themselves, but each step forward in the field of culture was a step towards freedom. On the threshold of human history stands the discovery that mechanical motion can be transformed into heat: the production of fire by friction; at the close of the development so far gone through stands the discovery that heat can be transformed into mechanical motion: the steam-engine.

And, in spite of the gigantic liberating revolution in the social world which the steam-engine is carrying through—and which is not yet half completed—it is beyond all doubt that the generation of fire by friction has had an even greater effect on the liberation of mankind. For the generation of fire by friction gave man for the first time control over one of the forces of

* Engels' italics.—Ed.

nature, and thereby separated him for ever from the animal kingdom. The steam-engine will never bring about such a mighty leap forward in human development, however important it may seem in our eyes as representing all those immense productive forces dependent on it—forces which alone make possible a state of society in which there are no longer class distinctions or anxiety over the means of subsistence for the individual, and in which for the first time there can be talk of real human freedom, of an existence in harmony with the laws of nature that have become known....

True, so long as we consider things as at rest and lifeless, each one by itself, alongside and after each other, we do not run up against any contradictions in them. We find certain qualities which are partly common to, partly different from, and even contradictory to each other, but which in the last-mentioned case are distributed among different objects and therefore contain no contradiction within. Inside the limits of this sphere of observation we can get along on the basis of the usual, metaphysical mode of thought. But the position is quite different as soon as we consider things in their motion, their change, their life, their reciprocal influence on one another. Then we immediately become involved in contradictions. Motion itself is a contradiction: even simple mechanical change of position can only come about through a body being at one and the same moment of time both in one place and in another place, being in one and the same place and also not in it. And the continuous origination and simultaneous solution of this contradiction is precisely what motion is.

Here, therefore, we have a contradiction which "is objectively present in things and processes themselves and can be met with in so to speak corporeal form". And what has Herr Dühring to say about it? He asserts that

up to the present there is "no bridge" whatever "in rational mechanics from the strictly static to the dynamic".

The reader can now at last see what is hidden behind this favourite phrase of Herr Dühring's—it is nothing but this: the

mind which thinks metaphysically is absolutely unable to pass from the idea of rest to the idea of motion, because the contradiction pointed out above blocks its path. To it, motion is simply incomprehensible because it is a contradiction. And in asserting the incomprehensibility of motion, it admits against its will the existence of this contradiction, and thus admits the objective presence in things and processes themselves of a contradiction which is moreover an actual force.

If simple mechanical change of place contains a contradiction, this is even more true of the higher forms of motion of matter, and especially of organic life and its development. We saw above that life consists precisely and primarily in this—that a being is at each moment itself and yet something else. Life is therefore also a contradiction which is present in things and processes themselves, and which constantly originates and resolves itself; and as soon as the contradiction ceases, life, too, comes to an end, and death steps in. We likewise saw* that also in the sphere of thought we could not escape contradictions, and that for example the contradiction between man's inherently unlimited capacity for knowledge and its actual presence only in men who are externally limited and possess limited cognition finds its solution in what is—at least practically, for us—an endless succession of generations, in infinite progress.

We have already noted that one of the basic principles of higher mathematics is the contradiction that in certain circumstances straight lines and curves may be the same. It also gets up this other contradiction: that lines which intersect each other before our eyes nevertheless, only five or six centimetres from their point of intersection, can be shown to be parallel, that is, that they will never meet even if extended to infinity. And yet, working with these and with even far greater contradictions, it attains results which are not only correct but also quite unattainable for lower mathematics.

But even lower mathematics teems with contradictions. It is for example a contradiction that a root of A should be a power of A , and yet $A^{\frac{1}{2}} = \sqrt{A}$. It is a contradiction that a negative

* See present edition, p. 72.—*Ed.*

quantity should be the square of anything, for every negative quantity multiplied by itself gives a positive square. The square root of minus one is therefore not only a contradiction, but even an absurd contradiction, a real absurdity. And yet $\sqrt{-1}$ is in many cases a necessary result of correct mathematical operations. Furthermore, where would mathematics—lower or higher—be, if it were prohibited from operating with $\sqrt{-1}$?

In its operations with variable quantities mathematics itself enters the field of dialectics, and it is significant that it was a dialectical philosopher, Descartes, who introduced this advance. The relation between the mathematics of variable and the mathematics of constant quantities is in general the same as the relation of dialectical to metaphysical thought. But this does not prevent the great mass of mathematicians from recognising dialectics only in the sphere of mathematics, and a good many of them from continuing to work in the old, limited, metaphysical way with methods that were obtained dialectically....

We have already seen earlier, when discussing world schematism, that in connection with this Hegelian nodal line of measure relations—in which quantitative difference suddenly passes at certain points into qualitative change—Herr Dühring had a little accident: in a weak moment he himself recognised and made use of this line. We gave there one of the best-known examples—that of the change of the aggregate states of water, which under normal atmospheric pressure changes at 0°C . from the liquid into the solid state, and at 100°C . from the liquid into the gaseous state, so that at both these turning-points the merely quantitative change of temperature brings about a qualitative change in the condition of the water.

In proof of this law we might have cited hundreds of other similar facts from nature as well as from human society. Thus, for example, the whole of Part IV of Marx's *Capital*—production of relative surplus-value—deals, in the field of co-operation, division of labour and manufacture, machinery and modern industry, with innumerable cases in which quantitative

change alters the quality, and also qualitative change alters the quantity, of the things under consideration; in which therefore, to use the expression so hated by Herr Dühring, quantity is transformed into quality and vice versa. As for example the fact that the co-operation of a number of people, the fusion of many forces into one single force, creates, to use Marx's phrase, a "new power", which is essentially different from the sum of its separate forces.

Over and above this, in the passage which, in the interests of complete truth, Herr Dühring perverted into its opposite, Marx had added a footnote: "The molecular theory of modern chemistry first scientifically worked out by Laurent and Gerhardt rests on no other law." But what did that matter to Herr Dühring? He knew that:

"the eminently modern educative elements provided by the natural-scientific mode of thought are lacking precisely among those who, like Marx and his rival Lassalle, make half-science and a little philosophistics the meagre equipment with which to vamp up their learning"

—while with Herr Dühring "the main achievements of exact knowledge in mechanics, physics and chemistry" and so forth serve as the basis—we have seen how. However, in order to enable third persons, too, to reach a decision in the matter, we shall look a little more closely into the example cited in Marx's footnote.

What is referred to here is the homologous series of carbon compounds, of which a great many are already known and each of which has its own algebraic formula of composition. If for example, as is done in chemistry, we denote an atom of carbon by C, an atom of hydrogen by H, an atom of oxygen by O, and the number of atoms of carbon contained in each compound by n , the molecular formulas for some of these series can be expressed as follows:

C_nH_{2n+2} —the series of normal paraffins,
 $C_nH_{2n+2}O$ —the series of primary alcohols,
 $C_nH_{2n}O_2$ —the series of the monobasic fatty acids.

Let us take as an example the last of these series, and let us assume successively that $n=1$, $n=2$, $n=3$, etc. We then obtain the following results (omitting the isomers):

CH_2O_2 — formic acid	boiling	point	100° ,	melting	point	1
$\text{C}_2\text{H}_4\text{O}_2$ — acetic acid	"	"	118°	"	"	17°
$\text{C}_3\text{H}_6\text{O}_2$ — propionic acid	"	"	140°	"	"	—
$\text{C}_4\text{H}_8\text{O}_2$ — butyric acid	"	"	162°	"	"	—
$\text{C}_5\text{H}_{10}\text{O}_2$ — valerianic acid	"	"	175°	"	"	—

and so on to $\text{C}_{30}\text{H}_{60}\text{O}_2$, melissic acid, which melts only at 80° and has no boiling point at all, because it cannot evaporate without disintegrating.

Here therefore we have a whole series of qualitatively different bodies, formed by the simple quantitative addition of elements, and in fact always in the same proportion. This is most clearly evident in cases where the quantity of all the elements of the compound changes in the same proportion. Thus, in the normal paraffins $\text{C}_n\text{H}_{2n+2}$, the lowest is methane, CH_4 , a gas; the highest known, hexadecane, $\text{C}_{16}\text{H}_{34}$, is a solid body forming colourless crystals which melts at 21° and boils only at 278° . Each new member of both series comes into existence through the addition of CH_2 , one atom of carbon and two atoms of hydrogen, to the molecular formula of the preceding member, and this quantitative change in the molecular formula produces each time a qualitatively different body.

These series, however, are only one particularly obvious example; throughout practically the whole of chemistry, even in the various nitrogen oxides and oxygen acids of phosphorus or sulphur, one can see how "quantity changes into quality", and this allegedly confused, hazy Hegelian notion appears in so to speak corporeal form in things and processes—and no one but Herr Dühring is confused and befogged by it. And if Marx was the first to call attention to it, and if Herr Dühring read the reference without even understanding it (otherwise he would certainly not have allowed this unparalleled outrage to pass unchallenged), this is enough—even without looking back at the famous Dühringian philosophy of nature—to make it clear which of the two, Marx or Herr Dühring, is lacking in "the eminently modern educative elements provided by the natural-scientific mode of thought" and in acquaintance with the "main achievements of ... chemistry".

In conclusion we shall call one more witness for the transformation of quantity into quality, namely—Napoleon.

He describes the combat between the French cavalry, who were bad riders but disciplined, and the Mamelukes, who were undoubtedly the best horsemen of their time for single combat, but lacked discipline, as follows:

"Two Mamelukes were undoubtedly more than a match for three Frenchmen; 100 Mamelukes were equal to 100 Frenchmen; 300 Frenchmen could generally beat 300 Mamelukes, and 1,000 Frenchmen invariably defeated 1,500 Mamelukes."⁴²

Just as with Marx a definite, though varying, minimum sum of exchange-values was necessary to make possible its transformation into capital, so with Napoleon a detachment of cavalry had to be of a definite minimum number in order to make it possible for the force of discipline, embodied in closed order and planned utilisation, to manifest itself and rise superior even to greater numbers of irregular cavalry, in spite of the latter being better mounted, more dexterous horsemen and fighters, and at least as brave as the former....

But what role does the negation of the negation play in Marx? On page 791 and the following pages he sets out the final conclusions which he draws from the preceding fifty pages of economic and historical investigation into the so-called primitive accumulation of capital. Before the capitalist era, petty industry existed, at least in England, on the basis of the private property of the labourer in his means of production. The so-called primitive accumulation of capital consisted there in the expropriation of these immediate producers, that is, in the dissolution of private property based on the labour of its owner. This became possible because the petty industry referred to above is compatible only with narrow and primitive bounds of production and society and at a certain stage brings forth the material agencies for its own annihilation. This annihilation, the transformation of the individual and scattered means of production into socially concentrated ones, forms the prehistory of capital. As soon as the labourers are turned into proletarians, their means of labour into capital, as soon as the capitalist mode of production

stands on its own feet, the further socialisation of labour and further transformation of the land and other means of production, and therefore the further expropriation of private proprietors, takes a new form. "That which is now to be expropriated is no longer the labourer working for himself, but the capitalist exploiting many labourers. This expropriation is accomplished by the action of the immanent laws of capitalistic production itself, by the concentration of capital. One capitalist always kills many. Hand in hand with this concentration, or this expropriation of many capitalists by few, develop, on an ever extending scale, the co-operative form of the labour-process, the conscious technical application of science, the methodical collective cultivation of the soil, the transformation of the instruments of labour into instruments of labour only usable in common, the economising of all means of production by their use as the jointly owned means of production of combined, socialised labour. Along with the constantly diminishing number of the magnates of capital, who usurp and monopolise all advantages of this process of transformation, grows the mass of misery, oppression, slavery, degradation, exploitation; but with this too grows the revolt of the working class, a class always increasing in numbers, and disciplined, united, organised by the very mechanism of the process of capitalist production itself. Capital becomes a fetter upon the mode of production, which has sprung up and flourished along with, and under it. Concentration of the means of production and socialisation of labour at last reach a point where they become incompatible with their capitalist integument. This integument is burst asunder. The knell of capitalist private property sounds. The expropriators are expropriated."⁴³

And now I ask the reader: where are the dialectical frills and mazes and conceptual arabesques; where the mixed and misconceived ideas according to which everything is all one and the same thing in the end; where the dialectical miracles for his faithful followers; where the mysterious dialectical rubbish and the maze in accordance with the Hegelian Logos doctrine, without which Marx, according to Herr Dühring, is unable to put his exposition into shape? Marx merely shows from history, and here states in a summarised form, that just as

formerly petty industry by its very development necessarily created the conditions of its own annihilation, i.e., of the expropriation of the small proprietors, so now the capitalist mode of production has likewise itself created the material conditions from which it must perish. The process is a historical one, and if it is at the same time a dialectical process, this is not Marx's fault, however annoying it may be to Herr Dühring.

It is only at this point, after Marx has completed his proof on the basis of historical and economic facts, that he proceeds: "The capitalist mode of production and appropriation, hence the capitalist private property is the first negation of individual private property founded on the labour of the proprietor. Capitalist production begets, with the inexorability of a process of nature, its own negation. It is the negation of the negation"—and so on (as quoted above).⁴⁴

Thus, by characterising the process as the negation of the negation, Marx does not intend to prove that the process was historically necessary. On the contrary: only after he has proved from history that in fact the process has partially already occurred, and partially must occur in the future, he in addition characterises it as a process which develops in accordance with a definite dialectical law. That is all. It is therefore once again a pure distortion of the facts by Herr Dühring when he declares that the negation of the negation has to serve here as the midwife to deliver the future from the womb of the past, or that Marx wants anyone to be convinced of the necessity of the common ownership of land and capital (which is itself a Dühringian contradiction in corporeal form) on the basis of credence in the negation of the negation.

Herr Dühring's total lack of understanding of the nature of dialectics is shown by the very fact that he regards it as a mere proof-producing instrument, as a limited mind might look upon formal logic or elementary mathematics. Even formal logic is primarily a method of arriving at new results, of advancing from the known to the unknown—and dialectics is the same, only much more eminently so; moreover, since it forces its way beyond the narrow horizon of formal logic, it contains the germ of a more comprehensive view of the world. The same correlation exists in mathematics. Elementary

mathematics, the mathematics of constant quantities, moves within the confines of formal logic, at any rate on the whole; the mathematics of variables, whose most important part is the infinitesimal calculus, is in essence nothing other than the application of dialectics to mathematical relations. In it, the simple question of proof is definitely pushed into the background, as compared with the manifold application of the method to new spheres of research. But almost all the proofs of higher mathematics, from the first proofs of the differential calculus on, are, from the standpoint of elementary mathematics, strictly speaking, wrong. And this is necessarily so, when, as happens in this case, an attempt is made to prove by formal logic results obtained in the field of dialectics. To attempt to prove anything by means of dialectics alone to a crass metaphysician like Herr Dühring would be as much a waste of time as was the attempt made by Leibniz and his pupils to prove the principles of the infinitesimal calculus to the mathematicians of their time. The differential gave them the same cramps as Herr Dühring gets from the negation of the negation, in which, moreover, as we shall see, the differential also plays a certain role. Finally these gentlemen—or those of them who had not died in the interval—grudgingly gave way, not because they were convinced, but because it always came out right. Herr Dühring, as he himself tells us, is only in his forties, and if he attains old age, as we hope he may, perhaps his experience will be the same.

But what then is this fearful negation of the negation, which makes life so bitter for Herr Dühring and with him plays the same role of the unpardonable crime as the sin against the Holy Ghost does in Christianity?

A very simple process which is taking place everywhere and every day, which any child can understand as soon as it is stripped of the veil of mystery in which it was enveloped by the old idealist philosophy and in which it is to the advantage of helpless metaphysicians of Herr Dühring's calibre to keep it enveloped. Let us take a grain of barley. Billions of such grains of barley are milled, boiled and brewed and then consumed. But if such a grain of barley meets with conditions which are normal for it, if it falls on suitable soil, then under the influence of heat and moisture it undergoes a specific change,

it germinates; the grain as such ceases to exist, it is negated, and in its place appears the plant which has arisen from it, the negation of the grain. But what is the normal life-process of this plant? It grows, flowers, is fertilised and finally once more produces grains of barley, and as soon as these have ripened the stalk dies, is in its turn negated. As a result of this negation of the negation we have once again the original grain of barley, but not as a single unit, but ten-, twenty- or thirtyfold. Species of grain change extremely slowly, and so the barley of today is almost the same as it was a century ago. But if we take a plastic ornamental plant, for example a dahlia or an orchid, and treat the seed and the plant which grows from it according to the gardener's art, we get as a result of this negation of the negation not only more seeds, but also qualitatively improved seeds, which produce more beautiful flowers, and each repetition of this process, each fresh negation of the negation, enhances this process of perfection.

With most insects, this process follows the same lines as in the case of the grain of barley. Butterflies, for example, spring from the egg by a negation of the egg, pass through certain transformations until they reach sexual maturity, pair and are in turn negated, dying as soon as the pairing process has been completed and the female has laid its numerous eggs. We are not concerned at the moment with the fact that with other plants and animals the process does not take such a simple form, that before they die they produce seeds, eggs or offspring not once but many times; our purpose here is only to show that the negation of the negation *really does take place* in both kingdoms of the organic world. Furthermore, the whole of geology is a series of negated negations, a series of successive shatterings of old and deposits of new rock formations. First the original earth crust brought into existence by the cooling of the liquid mass was broken up by oceanic, meteorological and atmospherico-chemical action, and these fragmented masses were stratified on the ocean bed. Local upheavals of the ocean bed above the surface of the sea subject portions of these first strata once more to the action of rain, the changing temperature of the seasons and the oxygen and carbonic acid of the atmosphere. These same influences act on the molten masses of rock which issue from the interior of the earth, break

through the strata and subsequently cool off. In this way, in the course of millions of centuries, ever new strata are formed and in turn are for the most part destroyed, ever anew serving as material for the formation of new strata. But the result of this process has been a very positive one: the creation of a soil composed of the most varied chemical elements and mechanically fragmented, which makes possible the most abundant and diversified vegetation.

It is the same in mathematics. Let us take any algebraic quantity whatever: for example, a . If this is negated, we get $-a$ (minus a). If we negate that negation, by multiplying $-a$ by $-a$, we get $+a^2$, i.e., the original positive quantity, but at a higher degree, raised to its second power. In this case also it makes no difference that we can obtain the same a^2 by multiplying the positive a by itself, thus likewise getting a^2 . For the negated negation is so securely entrenched in a^2 that the latter always has two square roots, namely, a and $-a$. And the fact that it is impossible to get rid of the negated negation, the negative root of the square, acquires very obvious significance as soon as we come to quadratic equations.

The negation of the negation is even more strikingly obvious in higher analysis, in those "summations of indefinitely small magnitudes" which Herr Dühring himself declares are the highest operations of mathematics, and in ordinary language are known as the differential and integral calculus. How are these forms of calculus used? In a given problem, for example, I have two variables, x and y , neither of which can vary without the other also varying in a ratio determined by the facts of the case. I differentiate x and y , i.e., I take x and y as so infinitely small that in comparison with any real quantity, however small, they disappear, that nothing is left of x and y but their reciprocal relation without any, so to speak, material basis, a quantitative ratio in which there is no quantity. Therefore, $\frac{dy}{dx}$, the ratio between the differentials of x and y , is equal to $\frac{0}{0}$, but $\frac{0}{0}$ taken as the expression of $\frac{y}{x}$. I only mention in passing that this ratio between two quantities which have disappeared, caught at the moment of their disappearance, is a contradiction; however, it cannot disturb us any more than it has disturbed the whole of mathematics for almost two hundred years. And now, what have I done but negate x and y , though

not in such a way that I need not bother about them any more, not in the way that metaphysics negates, but in the way that corresponds with the facts of the case? In place of x and y , therefore, I have their negation, dx and dy , in the formulas or equations before me. I continue then to operate with these formulas, treating dx and dy as quantities which are real, though subject to certain exceptional laws, and at a certain point *I negate the negation*, i.e., I integrate the differential formula, and in place of dx and dy again get the real quantities x and y , and am then not where I was at the beginning, but by using this method I have solved the problem on which ordinary geometry and algebra might perhaps have broken their jaws in vain.

It is the same in history, as well. All civilised peoples begin with the common ownership of the land. With all peoples who have passed a certain primitive stage, this common ownership becomes in the course of the development of agriculture a fetter on production. It is abolished, negated, and after a longer or shorter series of intermediate stages is transformed into private property. But at a higher stage of agricultural development, brought about by private property in land itself, private property conversely becomes a fetter on production, as is the case today both with small and large landownership. The demand that it, too, should be negated, that it should once again be transformed into common property, necessarily arises. But this demand does not mean the restoration of the aboriginal common ownership, but the institution of a far higher and more developed form of possession in common which, far from being a hindrance to production, on the contrary for the first time will free production from all fetters and enable it to make full use of modern chemical discoveries and mechanical inventions.

Or let us take another example: the philosophy of antiquity was primitive, natural materialism. As such, it was incapable of clearing up the relation between mind and matter. But the need to get clarity on this question led to the doctrine of a soul separable from the body, then to the assertion of the immortality of this soul, and finally to monotheism. The old materialism was therefore negated by idealism. But in the course of the further development of philosophy, idealism,

too, became untenable and was negated by modern materialism. This modern materialism, the negation of the negation, is not the mere re-establishment of the old, but adds to the permanent foundations of this old materialism the whole thought-content of two thousand years of development of philosophy and natural science, as well as of the history of these two thousand years. It is no longer a philosophy at all, but simply a world outlook which has to establish its validity and be applied not in a science of sciences standing apart, but in the real sciences. Philosophy is therefore "sublated" here, that is, "both overcome and preserved"; overcome as regards its form, and preserved as regards its real content. Thus, where Herr Dühring sees only "verbal jugglery", closer inspection reveals an actual content....

And so, what is the negation of the negation? An extremely general—and for this reason extremely far-reaching and important—law of development of nature, history, and thought; a law which, as we have seen, holds good in the animal and plant kingdoms, in geology, in mathematics, in history and in philosophy—a law which even Herr Dühring, in spite of all his stubborn resistance, has unwittingly and in his own way to follow. It is obvious that I do not say anything concerning the *particular* process of development of, for example, a grain of barley from germination to the death of the fruit-bearing plant, if I say it is a negation of the negation. For, as the integral calculus is also a negation of the negation, if I said anything of the sort I should only be making the nonsensical statement that the life-process of a barley plant was integral calculus or for that matter that it was socialism. That, however, is precisely what the metaphysicians are constantly imputing to dialectics. When I say that all these processes are a negation of the negation, I bring them all together under this one law of motion, and for this very reason I leave out of account the specific peculiarities of each individual process. Dialectics, however, is nothing more than the science of the general laws of motion and development of nature, human society and thought.

But someone may object: the negation that has taken place in this case is not a real negation: I negate a grain of barley also when I grind it, an insect when I crush it underfoot, or the positive quantity *a* when I cancel it, and so on. Or I negate the sentence: the rose is a rose, when I say: the rose is not a rose; and what do I get if I then negate this negation and say: but after all the rose is a rose?

These objections are in fact the chief arguments put forward by the metaphysicians against dialectics, and they are wholly worthy of the narrow-mindedness of this mode of thought. Negation in dialectics does not mean simply saying no, or declaring that something does not exist, or destroying it in any way one likes. Long ago Spinoza said: *Omnis determinatio est negatio*—every limitation or determination is at the same time a negation.⁴⁵ And further: the kind of negation is here determined, firstly, by the general and, secondly, by the particular nature of the process. I must not only negate, but also sublate the negation. I must therefore so arrange the first negation that the second remains or becomes possible. How? This depends on the particular nature of each individual case. If I grind a grain of barley, or crush an insect, I have carried out the first part of the action, but have made the second part impossible. Every kind of thing therefore has a peculiar way of being negated in such a manner that it gives rise to a development, and it is just the same with every kind of conception or idea. The infinitesimal calculus involves a form of negation which is different from that used in the formation of positive powers from negative roots. This has to be learnt, like everything else. The bare knowledge that the barley plant and the infinitesimal calculus are both governed by negation of negation does not enable me either to grow barley successfully or to differentiate and integrate; just as little as the bare knowledge of the laws of the determination of sound by the dimensions of the strings enables me to play the violin.

But it is clear that from a negation of the negation which consists in the childish pastime of alternately writing and cancelling *a*, or in alternately declaring that a rose is a rose and that it is not a rose, nothing eventuates but the silliness of the person who adopts such a tedious procedure. And yet the metaphysicians try to make us believe that this is the right way

to carry out a negation of the negation, if we ever should want to do such a thing.

Once again, therefore, it is no one but Herr Dühring who is mystifying us when he asserts that the negation of the negation is a stupid analogy invented by Hegel, borrowed from the sphere of religion and based on the story of the fall of man and his redemption. Men thought dialectically long before they knew what dialectics was, just as they spoke prose long before the term prose existed.⁴⁶ The law of negation of the negation, which is unconsciously operative in nature and history and, until it has been recognised, also in our heads, was only first clearly formulated by Hegel. And if Herr Dühring wants to operate with it himself on the quiet and it is only that he cannot stand the name, then let him find a better name. But if his aim is to banish the process itself from thought, we must ask him to be so good as first to banish it from nature and history and to invent a mathematical system in which $-a \times -a$ is not $+a^2$ and in which differentiation and integration are prohibited under severe penalties.

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46, 72-73, 102-09, 132-33, 139-
41, 145-48, 152-59, 161-63

Frederick Engels

From *Dialectics of Nature*

Introduction

Modern research into nature, which alone has achieved a scientific, systematic, all-round development, in contrast to the brilliant natural-philosophical intuitions of antiquity and the extremely important but sporadic discoveries of the Arabs, which for the most part vanished without results—this modern research into nature dates, like all more recent history, from that mighty epoch which we Germans term the Reformation, from the national misfortune that overtook us at that time, and which the French term the Renaissance and the Italians the *Cinquecento*, although it is not fully expressed by any of these names. It is the epoch which had its rise in the latter half of the fifteenth century. Royalty, with the support of the burghers of the towns, broke the power of the feudal nobility and established the great monarchies, based essentially on nationality, within which the modern European nations and modern bourgeois society came to development. And while the burghers and nobles were still fighting one another, the German Peasant War pointed prophetically to future class struggles, by bringing on to the stage not only the peasants in revolt—that was no longer anything new—but behind them the beginnings of the modern proletariat, with the red flag in their hands and the demand for common ownership of goods on their lips. In the manuscripts saved from the fall of Byzantium, in the antique statues dug out of the ruins of Rome, a new world was revealed to the astonished West, that of ancient Greece; the ghosts of the Middle Ages vanished before its shining forms; Italy rose to an undreamt-of flowering of art, which was like a reflection of classical antiquity and was never

attained again. In Italy, France, and Germany a new literature arose, the first modern literature; shortly afterwards came the classical epochs of English and Spanish literature. The bounds of the old *orbis terrarum* were pierced, only now for the first time was the world really discovered and the basis laid for subsequent world trade and the transition from handicraft to manufacture, which in its turn formed the starting-point for modern large-scale industry. The dictatorship of the Church over men's minds was shattered; it was directly cast off by the majority of the Germanic peoples, who adopted Protestantism, while among the Latins a cheerful spirit of free thought, taken over from the Arabs and nourished by the newly-discovered Greek philosophy, took root more and more and prepared the way for the materialism of the eighteenth century.

It was the greatest progressive revolution that mankind had so far experienced, a time which called for giants and produced giants—giants in power of thought, passion and character, in universality and learning. The men who founded the modern rule of the bourgeoisie had anything but bourgeois limitations. On the contrary, the adventurous character of the time inspired them to a greater or lesser degree. There was hardly any man of importance then living who had not travelled extensively, who did not speak four or five languages, who did not shine in a number of fields. Leonardo da Vinci was not only a great painter but also a great mathematician, mechanic, and engineer, to whom the most diverse branches of physics are indebted for important discoveries. Albrecht Dürer was painter, engraver, sculptor, and architect, and in addition invented a system of fortification embodying many of the ideas that much later were again taken up by Montalembert and the modern German science of fortification. Machiavelli was statesman, historian, poet, and at the same time the first notable military author of modern times. Luther not only cleaned the Augean stable of the Church but also that of the German language; he created modern German prose and composed the text and melody of that triumphal hymn imbued with confidence in victory which became the Marseillaise of the sixteenth century.⁴⁷ The heroes of that time were not yet in thrall to the division of labour, the restricting effects of which, with its production of one-sidedness, we so

often notice in their successors. But what is especially characteristic of them is that they almost all live and pursue their activities in the midst of the contemporary movements, in the practical struggle; they take sides and join in the fight, one by speaking and writing, another with the sword, many with both. Hence the fullness and force of character that makes them complete men. Men of the study are the exception—either persons of second or third rank or cautious philistines who do not want to burn their fingers.

At that time natural science also developed in the midst of the general revolution and was itself thoroughly revolutionary; it had indeed to win in struggle its right of existence. Side by side with the great Italians from whom modern philosophy dates, it provided its martyrs for the stake and the dungeons of the Inquisition. And it is characteristic that Protestants outdid Catholics in persecuting the free investigation of nature. Calvin had Servetus burnt at the stake when the latter was on the point of discovering the circulation of the blood, and indeed he kept him roasting alive during two hours; for the Inquisition at least it sufficed to have Giordano Bruno simply burnt alive.

The revolutionary act by which natural science declared its independence and, as it were, repeated Luther's burning of the Papal Bull was the publication of the immortal work by which Copernicus, though timidly and, so to speak, only from his death-bed, threw down the gauntlet to ecclesiastical authority in the affairs of nature.⁴⁸ The emancipation of natural science from theology dates from this, although the fighting out of particular mutual claims has dragged on down to our day and in many minds is still far from completion. Thenceforward, however, the development of the sciences proceeded with giant strides, and, it might be said, gained in force in proportion to the square of the distance (in time) from its point of departure. It was as if the world were to be shown that henceforth, for the highest product of organic matter, the human mind, the law of motion holds good that is the reverse of that for inorganic matter.

The main work in the first period of natural science that now opened lay in mastering the material immediately at hand. In most fields a start had to be made from the very beginning. Antiquity had bequeathed Euclid and the Ptolemaic solar

system; the Arabs had left behind the decimal notation, the beginnings of algebra, the modern numerals, and alchemy; the Christian Middle Ages nothing at all. Of necessity, in this situation the most fundamental natural science, the mechanics of terrestrial and heavenly bodies, occupied first place, and alongside of it, as handmaiden to it, the discovery and perfecting of mathematical methods. Great things were achieved here. At the end of the period characterised by Newton and Linnaeus we find these branches of science brought to a certain perfection. The basic features of the most essential mathematical methods were established; analytical geometry by Descartes especially, logarithms by Napier, and the differential and integral calculus by Leibniz and perhaps Newton. The same holds good of the mechanics of rigid bodies, the main laws of which were made clear once for all. Finally in the astronomy of the solar system Kepler discovered the laws of planetary movement and Newton formulated them from the point of view of the general laws of motion of matter. The other branches of natural science were far removed even from this preliminary perfection. Only towards the end of the period did the mechanics of fluid and gaseous bodies receive further treatment. Physics proper had still not gone beyond its first beginnings, with the exception of optics, the exceptional progress of which was due to the practical needs of astronomy. By the phlogistic theory,⁴⁹ chemistry for the first time emancipated itself from alchemy. Geology had not yet gone beyond the embryonic stage of mineralogy; hence palaeontology could not yet exist at all. Finally, in the field of biology the essential preoccupation was still with the collection and first sifting of the immense material, not only botanical and zoological, but also anatomical and properly physiological. There could as yet be hardly any talk of the comparison of the various forms of life, of the investigation of their geographical distribution and their climatic, etc., conditions of existence. Here only botany and zoology arrived at an approximate completion owing to Linnaeus.

But what especially characterises this period is the elaboration of a peculiar general outlook, the central point of which is the view of *the absolute immutability of nature*. In whatever way nature itself might have come into being, once present it

remained as it was as long as it continued to exist. The planets and their satellites, once set in motion by the mysterious "first impulse", circled on and on in their predestined ellipses for all eternity, or at any rate until the end of all things. The stars remained for ever fixed and immovable in their places, keeping one another therein by "universal gravitation". The earth had remained the same without alteration from all eternity or, alternatively, from the first day of its creation. The "five continents" of the present day had always existed, and they had always had the same mountains, valleys, and rivers, the same climate, and the same flora and fauna, except in so far as change or transplantation had taken place at the hand of man. The species of plants and animals had been established once for all when they came into existence; like continually produced like, and it was already a good deal for Linnaeus to have conceded that possibly here and there new species could have arisen by crossing. In contrast to the history of mankind, which develops in time, there was ascribed to the history of nature only an unfolding in space. All change, all development in nature, was denied. Natural science, so revolutionary at the outset, suddenly found itself confronted by an out-and-out conservative nature, in which even today everything was as it had been from the beginning and in which—to the end of the world or for all eternity—everything would remain as it had been since the beginning.

High as the natural science of the first half of the eighteenth century stood above Greek antiquity in knowledge and even in the sifting of its material, it stood just as deeply below Greek antiquity in the theoretical mastery of this material, in the general outlook on nature. For the Greek philosophers the world was essentially something that had emerged from chaos, something that had developed, that had come into being. For the natural scientists of the period that we are dealing with it was something ossified, something immutable, and for most of them something that had been created at one stroke. Science was still deeply enmeshed in theology. Everywhere it sought and found the ultimate cause in an impulse from outside that was not to be explained from nature itself. Even if attraction, by Newton pompously baptised as "universal gravitation", was conceived as an essential property of matter, whence comes the

unexplained tangential force which first gives rise to the orbits of the planets? How did the innumerable varieties of animals and plants arise? And how, above all, did man arise, since after all it was certain that he was not present from all eternity? To such questions natural science only too frequently answered by making the creator of all things responsible. Copernicus, at the beginning of the period, shows theology the door; Newton closes the period with the postulate of a divine first impulse. The highest general idea to which this natural science attained was that of the purposiveness of the arrangements of nature, the shallow teleology of Wolff, according to which cats were created to eat mice, mice to be eaten by cats, and the whole of nature to testify to the wisdom of the creator. It is to the highest credit of the philosophy of the time that it did not let itself be led astray by the restricted state of contemporary natural knowledge, and that — from Spinoza down to the great French materialists — it insisted on explaining the world from the world itself and left the justification in detail to the natural sciences of the future.

I include the materialists of the eighteenth century in this period because no natural-scientific material was available to them other than that above described. Kant's epoch-making work remained a secret to them, and Laplace came long after them.⁵⁰ We should not forget that this obsolete outlook on nature, although riddled through and through by the progress of science, dominated the entire first half of the nineteenth century, and in substance is even now still taught in all schools.*

* How tenaciously even in 1861 this view could be held by a man whose scientific achievements had provided highly important material for abolishing it is shown by the following classic words:

"All the arrangements of our solar system, so far as we are capable of comprehending them, aim at preservation of what exists and at unchanging continuance. Just as since the most ancient times no animal and no plant on the earth has become more perfect or in any way different, just as we find in all organisms only stages *alongside of* one another and not *following* one another, just as our own race has always remained the same in corporeal respects — so even the greatest diversity in the coexisting heavenly bodies does not justify us in assuming that these forms are merely different stages of development; it is rather that everything created is *equally* perfect in itself." (Mädler, *Populäre Astronomie*, Berlin, 1861, 5th edition, p. 316.) [Note by Engels.]

The first breach in this petrified outlook on nature was made not by a natural scientist but by a philosopher. In 1755 appeared Kant's *Allgemeine Naturgeschichte und Theorie des Himmels*. The question of the first impulse was done away with; the earth and the whole solar system appeared as something that had *come into being* in the course of time. If the great majority of the natural scientists had had a little less of the repugnance to thinking that Newton expressed in the warning: Physics, beware of metaphysics!, they would have been compelled from this single brilliant discovery of Kant's to draw conclusions that would have spared them endless deviations and immeasurable amounts of time and labour wasted in false directions. For Kant's discovery contained the point of departure for all further progress. If the earth was something that had come into being, then its present geological, geographical, and climatic state, and its plants and animals likewise, must be something that had come into being; it must have had a history not only of coexistence in space but also of succession in time. If at once further investigations had been resolutely pursued in this direction, natural science would now be considerably further advanced than it is. But what good could come of philosophy? Kant's work remained without immediate results, until many years later Laplace and Herschel expounded its contents and gave them a deeper foundation, thereby gradually bringing the "nebular hypothesis" into favour. Further discoveries finally brought it victory; the most important of these were: the discovery of proper motion of the fixed stars, the demonstration of a resistant medium in universal space, the proof furnished by spectral analysis of the chemical identity of the matter of the universe and of the existence of such glowing nebular masses as Kant had postulated.

It is, however, permissible to doubt whether the majority of natural scientists would so soon have become conscious of the contradiction of a changing earth that bore immutable organisms, had not the dawning conception that nature does not just *exist*, but *comes into being* and *passes away*, derived support from another quarter. Geology arose and pointed out not only the terrestrial strata formed one after another and deposited one upon another, but also the shells and skeletons

of extinct animals and the trunks, leaves, and fruits of no longer existing plants contained in these strata. The decision had to be taken to acknowledge that not only the earth as a whole but also its present surface and the plants and animals living on it possessed a history in time. At first the acknowledgement occurred reluctantly enough. Cuvier's theory of the revolutions of the earth was revolutionary in phrase and reactionary in substance. In place of a single divine creation, he put a whole series of repeated acts of creation, making the miracle an essential natural agent. Lyell first brought sense into geology by substituting for the sudden revolutions due to the moods of the creator the gradual effects of a slow transformation of the earth.*

Lyell's theory was even more incompatible than any of its predecessors with the assumption of constant organic species. Gradual transformation of the earth's surface and of all conditions of life led directly to gradual transformation of the organisms and their adaptation to the changing environment, to the mutability of species. But tradition is a power not only in the Catholic Church but also in natural science. For years, Lyell himself did not see the contradiction, and his pupils still less. This can only be explained by the division of labour that had meanwhile become dominant in natural science, which more or less restricted each person to his special sphere, there being only a few whom it did not rob of a comprehensive view.

Meanwhile physics had made mighty advances, the results of which were summed up almost simultaneously by three different persons in the year 1842, an epoch-making year for this branch of natural science. Mayer in Heilbronn and Joule in Manchester demonstrated the transformation of heat into mechanical force and of mechanical force into heat. The determination of the mechanical equivalent of heat put this result beyond question. Simultaneously, by simply working up the separate results of physics already arrived at, Grove⁵¹ — not

* The defect of Lyell's view — at least in its first form — lay in conceiving the forces at work on the earth as constant, both in quality and quantity. The cooling of the earth does not exist for him; the earth does not develop in a definite direction but merely changes in an inconsequent fortuitous manner. [Note by Engels.]

a natural scientist by profession, but an English lawyer — proved that all so-called physical forces, mechanical force, heat, light, electricity, magnetism, indeed even so-called chemical force, become transformed into one another under definite conditions without any loss of force occurring, and so proved additionally along physical lines Descartes' principle that the quantity of motion present in the world is constant. With that the special physical forces, the as it were immutable "species" of physics, were resolved into variously differentiated forms of the motion of matter, passing into one another according to definite laws. The fortuitousness of the existence of such and such a number of physical forces was abolished from science by the proof of their inter-connections and transitions. Physics, like astronomy before it, had arrived at a result that necessarily pointed to the eternal cycle of matter in motion as the ultimate conclusion.

The wonderfully rapid development of chemistry, since Lavoisier and especially since Dalton, attacked the old ideas about nature from another aspect. The preparation by inorganic means of compounds that hitherto had been produced only in the living organism proved that the laws of chemistry have the same validity for organic as for inorganic bodies, and to a large extent bridged the gulf between inorganic and organic nature, a gulf that even Kant regarded as for ever impassable.

Finally, in the sphere of biological research also the scientific journeys and expeditions that had been systematically organised since the middle of the previous [i. e., 18th] century, the more thorough exploration of the European colonies in all parts of the world by specialists living there, and further the progress of palaeontology, anatomy, and physiology in general, particularly since the systematic use of the microscope and the discovery of the cell, had accumulated so much material that the application of the comparative method became possible and at the same time indispensable. On the one hand the conditions of life of the various floras and faunas were established by means of comparative physical geography; on the other hand the various organisms were compared with one another according to their homologous organs, and this not only in the adult condition but at all stages of their

development. The more deeply and exactly this research was carried on, the more did the rigid system of an immutably fixed organic nature crumble away at its touch. Not only did the separate species of plants and animals become more and more inextricably intermingled, but animals turned up, such as *Amphioxus* and *Lepidosiren*,⁵² that made a mockery of all previous classification,* and finally organisms were encountered of which it was not possible to say whether they belonged to the plant or animal kingdom. More and more the gaps in the palaeontological record were filled up, compelling even the most reluctant to acknowledge the striking parallelism between the history of the development of the organic world as a whole and that of the individual organism, the Ariadne's thread that was to lead the way out of the labyrinth in which botany and zoology appeared to have become more and more deeply lost. It was characteristic that, almost simultaneously with Kant's attack on the eternity of the solar system, C. F. Wolff in 1759 launched the first attack on the fixity of species and proclaimed the theory of descent.⁵⁴ But what in his case was still only a brilliant anticipation took firm shape in the hands of Oken, Lamarck, Baer, and was victoriously carried through by Darwin in 1859, exactly a hundred years later.⁵⁵ Almost simultaneously it was established that protoplasm and the cell, which had already been shown to be the ultimate morphological constituents of all organisms, occurred independently, existing as the lowest forms of organic life. This not only reduced the gulf between inorganic and organic nature to a minimum but removed one of the most essential difficulties that had previously stood in the way of the theory of descent of organisms. The new outlook on nature was complete in its main features: all rigidity was dissolved, all fixity dissipated, all particularity that had been regarded as eternal became transient, the whole of nature was shown as moving in eternal flux and cyclical course.

* In the margin of the manuscript Engels noted: "*Ceratodus*. Ditto *Archaeopteryx*, etc."⁵³ — Ed.

Thus we have once again returned to the mode of outlook of the great founders of Greek philosophy, the view that the whole of nature, from the smallest element to the greatest, from grains of sand to suns, from Protista⁵⁶ to man, has its existence in eternal coming into being and passing away, in ceaseless flux, in unresting motion and change. Only with the essential difference that what in the case of the Greeks was a brilliant intuition, is in our case the result of strictly scientific research in accordance with experience, and hence also it emerges in a much more definite and clear form. It is true that the empirical proof of this cyclical course is not wholly free from gaps, but these are insignificant in comparison with what has already been firmly established, and with each year they become more and more filled up. And how could the proof in detail be other than one containing gaps when one bears in mind that the most important branches of science—trans-planetary astronomy, chemistry, geology—have a scientific existence of barely a century, and the comparative method in physiology, one of barely fifty years, and that the basic form of almost all organic development, the cell, is a discovery not yet forty years old?

The innumerable suns and solar systems of our island universe, bounded by the outermost stellar rings of the Milky Way, developed by contraction and cooling from swirling, glowing masses of vapour, the laws of motion of which will perhaps be disclosed after the observations of some centuries have given us an insight into the proper motion of the stars. Obviously, this development did not proceed everywhere at the same rate. Astronomy is more and more being forced to recognise the existence of dark bodies, not merely planetary in nature, hence extinct suns in our stellar system (Mädler); on the other hand (according to Secchi) a part of the vaporous nebular patches belong to our stellar system as suns not yet fully formed, which does not exclude the possibility that other nebulae are, as Mädler maintains, distant independent island universes, the relative stage of development of which must be determined by the spectroscope.

How a solar system develops from an individual nebular mass has been shown in detail by Laplace in a manner still unsurpassed; subsequent science has more and more confirmed him.

On the separate bodies so formed—suns as well as planets and satellites—the form of motion of matter at first prevailing is that which we call heat. There can be no question of chemical compounds of the elements even at a temperature like that still possessed by the sun; the extent to which heat is transformed into electricity or magnetism under such conditions, continued solar observations will show; it is already as good as proved that the mechanical motion taking place in the sun arises solely from the conflict of heat with gravity.

The smaller the individual bodies, the quicker they cool down, the satellites, asteroids, and meteors first of all, just as our moon has long been extinct. The planets cool more slowly, the central body slowest of all.

With progressive cooling the interplay of the physical forms of motion which become transformed into one another comes more and more to the forefront until finally a point is reached from when on chemical affinity begins to make itself felt, the previously chemically indifferent elements become differentiated chemically one after another, acquire chemical properties, and enter into combination with one another. These compounds change continually with the decreasing temperature, which affects differently not only each element but also each separate compound of the elements, changing also with the consequent passage of part of the gaseous matter first to the liquid and then the solid state, and with the new conditions thus created.

The time when the planet acquires a firm shell and accumulations of water on its surface coincides with that from when on its intrinsic heat diminishes more and more compared with the heat emitted to it from the central body. Its atmosphere becomes the arena of meteorological phenomena in the sense in which we now understand the term; its surface becomes the arena of geological changes in which the deposits resulting from atmospheric precipitation become of ever greater importance compared with the slowly decreasing external effects of the hot fluid interior.

If, finally, the temperature becomes so far equalised that over a considerable portion of the surface at least it no longer exceeds the limits within which protein is capable of life, then, if other chemical pre-conditions are favourable, living protoplasm is formed. What these pre-conditions are, we do not yet know, which is not to be wondered at since so far not even the chemical formula of protein has been established — we do not even know how many chemically different protein bodies there are — and since it is only about ten years ago that the fact became known that completely structureless protein exercises all the essential functions of life: digestion, excretion, movement, contraction, reaction to stimuli, and reproduction.

Thousands of years may have passed before the conditions arose in which the next advance could take place and this shapeless protein produce the first cell by formation of nucleus and cell membrane. But this first cell also provided the foundation for the morphological development of the whole organic world; the first to develop, as it is permissible to assume from the whole analogy of the palaeontological record, were innumerable species of non-cellular and cellular Protista, of which *Eozoon canadense*⁵⁷ alone has come down to us, and of which some were gradually differentiated into the first plants and others into the first animals. And from the first animals were developed, essentially by further differentiation, the numerous classes, orders, families, genera, and species of animals; and finally vertebrates, the form in which the nervous system attains its fullest development; and among these again finally that vertebrate in which nature attains consciousness of itself — man.

Man, too, arises by differentiation. Not only individually — by development from a single egg-cell to the most complicated organism that nature produces — but also historically. When after thousands of years of struggle the differentiation of hand from foot, and erect gait, were finally established, man became distinct from the ape and the basis was laid for the development of articulate speech and the mighty development of the brain that has since made the gulf between man and the ape an unbridgeable one. The specialisation of the hand — this implies the *tool*, and the tool implies specific human activity, the transforming reaction of man on

nature, production. Animals in the narrower sense also have tools, but only as limbs of their bodies: the ant, the bee, the beaver; animals also produce, but their productive effect on surrounding nature, in relation to nature, amounts to nothing at all. Man alone has succeeded in impressing his stamp on nature, not only by shifting plant and animal species from one place to another, but also by so altering the aspect and climate of his dwelling-place, and even the plants and animals themselves, that the consequences of his activity can disappear only with the general extinction of the terrestrial globe. And he has accomplished this primarily and essentially by means of *the hand*. Even the steam-engine, so far his most powerful tool for the transformation of nature, depends, because it is a tool, in the last resort on the hand. But step by step with the development of the hand went that of the brain; first of all came consciousness of the conditions for separate practically useful actions, and later, among the more favoured peoples and arising from that consciousness, insight into the natural laws governing them. And with the rapidly growing knowledge of the laws of nature the means for reacting on nature also grew; the hand alone would never have achieved the steam-engine if, along with and parallel to the hand, and partly owing to it, the brain of man had not correspondingly developed.

With man we enter *history*. Animals also have a history, that of their descent and gradual evolution to their present position. This history, however, is made for them, and in so far as they themselves take part in it, this occurs without their knowledge and desire. On the other hand, the more human beings become removed from animals in the narrower sense of the word, the more they make their history themselves, consciously, the less becomes the influence of unforeseen effects and uncontrolled forces on this history, and the more accurately does the historical result correspond to the aim laid down in advance. If, however, we apply this measure to human history, to that of even the most developed peoples of the present day, we find that there still exists here a colossal disproportion between the proposed aims and the results arrived at, that unforeseen effects predominate, and that the uncontrolled forces are far more powerful than those set into

motion according to plan. And this cannot be otherwise as long as the most essential historical activity of men, the one which has raised them from the animal to the human state and which forms the material foundation of all their other activities, namely the production of their requirements of life, i.e., in our day social production, is above all subject to the interplay of unintended effects from uncontrolled forces and achieves its desired end only by way of exception, but much more frequently the exact opposite. In the most advanced industrial countries we have subdued the forces of nature and pressed them into the service of mankind; we have thereby infinitely multiplied production, so that a child now produces more than a hundred adults previously did. And what is the result? Increasing overwork and increasing misery of the masses, and every ten years a great collapse. Darwin did not know what a bitter satire he wrote on mankind, and especially on his countrymen, when he showed that free competition, the struggle for existence, which the economists celebrate as the highest historical achievement, is the normal state of the *animal kingdom*. Only conscious organisation of social production, in which production and distribution are carried on in a planned way, can lift mankind above the rest of the animal world as regards the social aspect, in the same way that production in general has done this for mankind in the specifically biological aspect. Historical evolution makes such an organisation daily more indispensable, but also with every day more possible. From it will date a new epoch of history, in which mankind itself, and with mankind all branches of its activity, and particularly natural science, will experience an advance that will put everything preceding it in the deepest shade.

Nevertheless, "all that comes into being deserves to perish"⁵⁸. Millions of years may elapse, hundreds of thousands of generations be born and die, but inexorably the time will come when the declining warmth of the sun will no longer suffice to melt the ice thrusting itself forward from the poles; when the human race, crowding more and more about the equator, will finally no longer find even there enough heat for life; when gradually even the last trace of organic life will vanish; and the earth, an extinct frozen globe like the moon, will circle in deepest darkness and in an ever narrower orbit about the

equally extinct sun, and at last fall into it. Other planets will have preceded it, others will follow it; instead of the bright, warm solar system with its harmonious arrangement of members, only a cold, dead sphere will still pursue its lonely path through universal space. And what will happen to our solar system will happen sooner or later to all the other systems of our island universe; it will happen to all the other innumerable island universes, even to those the light of which will never reach the earth while there is a living human eye to receive it.

And when such a solar system has completed its life history and succumbs to the fate of all that is finite, death, what then? Will the sun's corpse roll on for all eternity through infinite space, and all the once infinitely diversely differentiated natural forces pass for ever into one single form of motion, attraction?

"Or"—as Secchi asks (p. 810)—"are there forces in nature which can reconvert the dead system into its original state of glowing nebula and re-awaken it to new life? We do not know."

Of course, we do not know it in the sense that we know that $2 \times 2 = 4$, or that the attraction of matter increases and decreases according to the square of the distance. In theoretical natural science, however, which as far as possible builds up its outlook on nature into a harmonious whole, and without which nowadays even the most unthinking empiricist cannot get anywhere, we have very often to calculate with incompletely known magnitudes, and consistency of thought must at all times help to get over defective knowledge. Modern natural science has had to take over from philosophy the principle of the indestructibility of motion; it cannot any longer exist without this principle. But the motion of matter is not merely crude mechanical motion, mere change of place, it is heat and light, electric and magnetic tension, chemical combination and dissociation, life and, finally, consciousness. To say that matter during the whole unlimited time of its existence has only once, and for what is an infinitesimally short period in comparison to its eternity, found itself able to differentiate its motion and thereby to unfold the whole wealth of this motion, and that before and after this it remains restricted for eternity to mere

change of place — this is equivalent to maintaining that matter is mortal and motion transient. The indestructibility of motion cannot be conceived merely quantitatively, it must also be conceived qualitatively; matter whose purely mechanical change of place includes indeed the possibility under favourable conditions of being transformed into heat, electricity, chemical action, life, but which is not capable of producing these conditions from out of itself, such matter has *forfeited motion*; motion which has lost the capacity of being transformed into the various forms appropriate to it may indeed still have *dynamis** but no longer *energeia*,** and so has become partially destroyed. Both, however, are unthinkable.

This much is certain: there was a time when the matter of our island universe had transformed into heat such an amount of motion — of what kind we do not yet know — that there could be developed from it the solar systems appertaining to (according to Mädler) at least twenty million stars, the gradual extinction of which is likewise certain. How did this transformation take place? We know just as little as Father Secchi knows whether the future *caput mortuum* of our solar system will once again be converted into the raw material of new solar systems. But here either we must have recourse to a creator, or we are forced to the conclusion that the incandescent raw material for the solar systems of our island universe was produced in a natural way by transformations of motion which are *by nature inherent* in moving matter, and the conditions for which, therefore, must also be reproduced by matter, even if only after millions and millions of years and more or less by chance, but with the necessity that is also inherent in chance.

The possibility of such a transformation is more and more being conceded. The view is being arrived at that the heavenly bodies are ultimately destined to fall into one another, and calculations are even made of the amount of heat which must be developed on such collisions. The sudden flaring up of new stars, and the equally sudden increase in brightness of familiar ones, of which we are informed by astronomy, are most easily explained by such collisions. Moreover, not only does our

* Power.— *Ed.*

** Activity.— *Ed.*

group of planets move about the sun, and our sun within our island universe, but our whole island universe also moves in space in temporary, relative equilibrium with the other island universes, for even the relative equilibrium of freely floating bodies can only exist where the motion is reciprocally determined; and it is assumed by many that the temperature in space is not everywhere the same. Finally, we know that, with the exception of an infinitesimal portion, the heat of the innumerable suns of our island universe vanishes into space and fails to raise the temperature of space even by a millionth of a degree Centigrade. What becomes of all this enormous quantity of heat? Is it for ever dissipated in the attempt to heat universal space, has it ceased to exist practically, and does it only continue to exist theoretically, in the fact that universal space has become warmer by a decimal fraction of a degree beginning with ten or more noughts? Such an assumption denies the indestructibility of motion; it concedes the possibility that by the successive falling into one another of the heavenly bodies all existing mechanical motion will be converted into heat and the latter radiated into space, so that in spite of all "indestructibility of force" all motion in general would have ceased. (Incidentally, it is seen here how inaccurate is the term "indestructibility of force" instead of "indestructibility of motion".) Hence we arrive at the conclusion that in some way, which it will later be the task of scientific research to demonstrate, it must be possible for the heat radiated into space to be transformed into another form of motion, in which it can once more be stored up and become active. Thereby the chief difficulty in the way of the reconversion of extinct suns into incandescent vapour disappears.

For the rest, the eternally repeated succession of worlds in infinite time is only the logical complement to the coexistence of innumerable worlds in infinite space—a principle the necessity of which has forced itself even on the anti-theoretical Yankee brain of Draper.*

* "The multiplicity of worlds in infinite space leads to the conception of a succession of worlds in infinite time." (J. W. Draper, *History of the Intellectual Development of Europe*, Vol. 2, [p. 325].) [Note by Engels.]

It is an eternal cycle in which matter moves, a cycle that certainly only completes its orbit in periods of time for which our terrestrial year is no adequate measure, a cycle in which the time of highest development, the time of organic life and still more that of the life of beings conscious of nature and of themselves, is just as narrowly restricted as the space in which life and self-consciousness come into operation; a cycle in which every finite mode of existence of matter, whether it be sun or nebular vapour, single animal or genus of animals, chemical combination or dissociation, is equally transient, and wherein nothing is eternal but eternally changing, eternally moving matter and the laws according to which it moves and changes. But however often, and however relentlessly, this cycle is completed in time and space; however many millions of suns and earths may arise and pass away; however long it may last before, in one solar system and only on one planet, the conditions for organic life develop; however innumerable the organic beings, too, that have to arise and to pass away before animals with a brain capable of thought are developed from their midst, and for a short span of time find conditions suitable for life, only to be exterminated later without mercy—we have the certainty that matter remains eternally the same in all its transformations, that none of its attributes can ever be lost, and therefore, also, that with the same iron necessity that it will exterminate on the earth its highest creation, the thinking mind, it must somewhere else and at another time again produce it.

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 20-39

Old Preface to [*Anti*]-Dühring. On Dialectics

The following work does not by any means owe its origin to an "inner urge". On the contrary, my friend Liebknecht can testify to the great effort it cost him to persuade me to turn the light of criticism on Herr Dühring's newest socialist theory. Once I made up my mind to do so I had no choice but to investigate this theory, which claims to be the latest practical fruit of a new philosophical system, in its connection with this system, and thus to examine the system itself. I was therefore compelled to follow Herr Dühring into that vast domain in which he speaks of all possible things and of some others as well. That was the origin of a series of articles which appeared in the Leipzig *Vorwärts* from the beginning of 1877 onwards and are here presented as a connected whole.

When, because of the nature of the subject, the critique of a system, so extremely insignificant despite all self-praise, is presented in such great detail, two circumstances may be cited in excuse. On the one hand this criticism afforded me the opportunity of setting forth in positive form in various fields my outlook on controversial issues that today are of quite general scientific or practical interest. And while it does not occur to me in the least to present another system as an alternative to Herr Dühring's, it is to be hoped that, notwithstanding the variety of material examined by me, the reader will not fail to observe the inter-connection inherent also in the views which I have advanced.

On the other hand the "system-creating" Herr Dühring is by no means an isolated phenomenon in contemporary Germany. For some time now in that country philosophical, especially natural-philosophical, systems have been springing up by the

dozen overnight, like mushrooms, not to mention the countless new systems of politics, economics, etc. Just as in the modern state it is presumed that every citizen is competent to pass judgment on all the issues on which he is called to vote; and just as in economics it is assumed that every buyer is a connoisseur of all the commodities which he has occasion to purchase for his maintenance—so similar assumptions are now to be made in science. Everybody can write about everything and “freedom of science” consists precisely in people deliberately writing about things they have not studied and putting this forward as the only strictly scientific method. Herr Dühring, however, is one of the most characteristic types of this bumptious pseudo-science which in Germany nowadays is forcing its way to the front everywhere and is drowning everything with its resounding sublime nonsense. Sublime nonsense in poetry, in philosophy, in economics, in historiography; sublime nonsense in the lecture room and on the platform, sublime nonsense everywhere; sublime nonsense which lays claim to a superiority and depth of thought distinguishing it from the simple, commonplace nonsense of other nations; sublime nonsense, the most characteristic mass product of Germany’s intellectual industry—cheap but bad—just like other German-made goods, only that unfortunately it was not exhibited along with them at Philadelphia.⁵⁹ Even German socialism has lately, particularly since Herr Dühring’s good example, gone in for a considerable amount of sublime nonsense; the fact that the practical Social-Democratic movement so little allows itself to be led astray by this sublime nonsense is one more proof of the remarkably healthy condition of our working class in a country where otherwise, with the exception of natural science, at the present moment almost everything goes ill.

When Nägeli, in his speech at the Munich meeting of natural scientists, voiced the idea that human knowledge would never acquire the character of omniscience, he must obviously have been ignorant of Herr Dühring’s achievements. These achievements have compelled me to follow him into a number of spheres in which I can move at best only in the capacity of a dilettante. This applies particularly to the various branches of natural science, where hitherto it was frequently considered

more than presumptuous for a "layman" to want to have any say. I am encouraged somewhat, however, by a dictum uttered, likewise in Munich, by Herr Virchow and elsewhere discussed more in detail, that outside of his own speciality every natural scientist is only a semi-initiate, *vulgo*: layman. Just as such a specialist may and must take the liberty of encroaching from time to time on neighbouring fields, and is granted indulgence there by the specialists concerned in respect of minor inexactitudes and clumsiness of expression, so I have taken the liberty of citing natural processes and laws of nature as examples in proof of my general theoretical views, and I hope that I can count on the same indulgence. The results obtained by modern natural science force themselves upon everyone who is occupied with theoretical matters with the same irresistibility with which the natural scientist today is willy-nilly driven to general theoretical conclusions. And here a certain compensation occurs. If theoreticians are semi-initiates in the sphere of natural science, then natural scientists today are actually just as much so in the sphere of theory, in the sphere of what hitherto was called philosophy.

Empirical natural science has accumulated such a tremendous mass of positive material for knowledge that the necessity of classifying it in each separate field of investigation systematically and in accordance with its inner inter-connection has become absolutely imperative. It is becoming equally imperative to bring the individual spheres of knowledge into the correct connection with one another. In doing so, however, natural science enters the field of theory and here the methods of empiricism will not work, here only theoretical thinking can be of assistance. But theoretical thinking is an innate quality only as regards natural capacity. This natural capacity must be developed, improved, and for its improvement there is as yet no other means than the study of previous philosophy.

In every epoch, and therefore also in ours, theoretical thought is a historical product, which at different times assumes very different forms and, therewith, very different contents. The science of thought is therefore, like every other, a historical science, the science of the historical development of human thought. And this is of importance also for the practical

application of thought in empirical fields. Because in the first place the theory of the laws of thought is by no means an "eternal truth" established once and for all, as philistine reasoning imagines to be the case with the word "logic". Formal logic itself has been the arena of violent controversy from the time of Aristotle to the present day. And dialectics has so far been fairly closely investigated by only two thinkers, Aristotle and Hegel. But it is precisely dialectics that constitutes the most important form of thinking for present-day natural science, for it alone offers the analogue for, and thereby the method of explaining, the evolutionary processes occurring in nature, inter-connections in general, and transitions from one field of investigation to another.

Secondly, an acquaintance with the historical course of evolution of human thought, with the views on the general inter-connections in the external world expressed at various times, is required by theoretical natural science for the additional reason that it furnishes a criterion of the theories propounded by this science itself. Here, however, lack of acquaintance with the history of philosophy is fairly frequently and glaringly displayed. Propositions which were advanced in philosophy centuries ago, which often enough have long been disposed of philosophically, are frequently put forward by theorising natural scientists as brand-new wisdom and even become fashionable for a while. It is certainly a great achievement of the mechanical theory of heat that it strengthened the principle of the conservation of energy by means of fresh proofs and put it once more in the forefront; but could this principle have appeared on the scene as something so absolutely new if the worthy physicists had remembered that it had already been formulated by Descartes? Since physics and chemistry once more operate almost exclusively with molecules and atoms, the atomic philosophy of ancient Greece has of necessity come to the fore again. But how superficially it is treated even by the best of natural scientists! Thus Kekulé tells us (*Ziele und Leistungen der Chemie*) that Democritus, instead of Leucippus, originated it, and he maintains that Dalton was the first to assume the existence of qualitatively different elementary atoms and was the first to ascribe to them different weights characteristic of the different

elements. Yet anyone can read in Diogenes Laertius (X, §§ 43-44 and 61) that already Epicurus had ascribed to atoms differences not only of magnitude and form but also of *weight*, that is, he was already acquainted in his own way with atomic weight and atomic volume.

The year 1848, which otherwise brought nothing to a conclusion in Germany, accomplished a complete revolution there only in the sphere of philosophy. By throwing itself into the field of the practical, here setting up the beginnings of modern industry and swindling, there initiating the mighty advance which natural science has since experienced in Germany and which was inaugurated by the caricature-like itinerant preachers Vogt, Büchner, etc., the nation resolutely turned its back on classical German philosophy that had lost itself in the sands of Berlin Old-Hegelianism. Berlin Old-Hegelianism had richly deserved that. But a nation that wants to climb the pinnacles of science cannot possibly manage without theoretical thought. Not only Hegelianism but dialectics too was thrown overboard—and that just at the moment when the dialectical character of natural processes irresistibly forced itself upon the mind, when therefore only dialectics could be of assistance to natural science in negotiating the mountain of theory—and so there was a helpless relapse into the old metaphysics. What prevailed among the public since then were, on the one hand, the vapid reflections of Schopenhauer, which were fashioned to fit the philistines, and later even those of Hartmann; and, on the other hand, the vulgar itinerant-preacher materialism of a Vogt and a Büchner. At the universities the most diverse varieties of eclecticism competed with one another and had only one thing in common, namely, that they were concocted from nothing but remnants of old philosophies and were all equally metaphysical. All that was saved from the remnants of classical philosophy was a certain neo-Kantianism, whose last word was the eternally unknowable thing-in-itself, that is, the bit of Kant that least merited preservation. The final result was the incoherence and confusion of theoretical thought now prevalent.

One can scarcely pick up a theoretical book on natural science without getting the impression that natural scientists

themselves feel how much they are dominated by this incoherence and confusion, and that the so-called philosophy now current offers them absolutely no way out. And here there really is no other way out, no possibility of achieving clarity, than by a return, in one form or another, from metaphysical to dialectical thinking.

This return can take place in various ways. It can come about spontaneously, by the sheer force of the natural-scientific discoveries themselves, which refuse any longer to allow themselves to be forced into the old Procrustean bed of metaphysics. But that is a protracted, laborious process during which a tremendous amount of unnecessary friction has to be overcome. To a large extent that process is already going on, particularly in biology. It could be greatly shortened if the theoreticians in the field of natural science were to acquaint themselves more closely with dialectical philosophy in its historically existing forms. Among these forms there are two which may prove especially fruitful for modern natural science.

The first of these is Greek philosophy. Here dialectical thought still appears in its pristine simplicity, still undisturbed by the charming obstacles which the metaphysics of the seventeenth and eighteenth centuries—Bacon and Locke in England, Wolff in Germany—put in its own way, and with which it blocked its own progress, from an understanding of the part to an understanding of the whole, to an insight into the general inter-connection of things. Among the Greeks—just because they were not yet advanced enough to dissect, analyse nature—nature is still viewed as a whole, in general. The universal connection of natural phenomena is not proved in regard to particulars; to the Greeks it is the result of direct contemplation. Herein lies the inadequacy of Greek philosophy, on account of which it had to yield later to other modes of outlook on the world. But herein also lies its superiority over all its subsequent metaphysical opponents. If in regard to the Greeks metaphysics was right in particulars, in regard to metaphysics the Greeks were right in general. That is the first reason why we are compelled in philosophy as in so many other spheres to return again and again to the achievements of that small people whose universal talents and

activity assured it a place in the history of human development that no other people can ever claim. The other reason, however, is that the manifold forms of Greek philosophy contain in embryo, in the nascent state, almost all later modes of outlook on the world. Theoretical natural science is therefore likewise forced to go back to the Greeks if it desires to trace the history of the origin and development of the general principles it holds today. And this insight is forcing its way more and more to the fore. Instances are becoming increasingly rare of natural scientists who, while themselves operating with fragments of Greek philosophy, for example atomistics, as with eternal truths, look down upon the Greeks with Baconian superciliousness because the Greeks had no empirical natural science. It would be desirable only for this insight to advance to a real familiarity with Greek philosophy.

The second form of dialectics, which is the one that comes closest to the German naturalists, is classical German philosophy, from Kant to Hegel. Here a start has already been made in that it has again become fashionable to return to Kant, even apart from the neo-Kantianism mentioned above. Since the discovery that Kant was the author of two brilliant hypotheses, without which theoretical natural science today simply cannot make progress—the theory, formerly credited to Laplace, of the origin of the solar system and the theory of the retardation of the earth's rotation by the tides—Kant is again held in honour among natural scientists, as he deserves to be. But to study dialectics in the works of Kant would be a uselessly laborious and little-remunerative task, as there is now available, in *Hegel's* works, a comprehensive compendium of dialectics, developed though it be from an utterly erroneous point of departure.

After, on the one hand, the reaction against the "philosophy of nature" had run its course and had degenerated into mere abuse—a reaction that was largely justified by this erroneous point of departure and the helpless degeneration of Berlin Hegelianism; and after, on the other hand, natural science had been so conspicuously left in the lurch by current eclectic metaphysics in regard to its theoretical requirements, it will perhaps be possible to pronounce once more the name of Hegel in the presence of natural scientists without provoking

that St. Vitus's dance which Herr Dühring so entertainingly performs.

First of all it must be established that here it is not at all a question of defending Hegel's point of departure: that spirit, mind, the idea, is primary and that the real world is only a copy of the idea. Already Feuerbach abandoned that. We all agree that in every field of science, in natural as in historical science, one must proceed from the given *facts*, in natural science therefore from the various material forms and the various forms of motion of matter; that therefore in theoretical natural science too the inter-connections are not to be built into the facts but to be discovered in them, and when discovered to be verified as far as possible by experiment.

Just as little can it be a question of maintaining the dogmatic content of the Hegelian system as it was preached by the Berlin Hegelians of the older and younger line. Hence, with the fall of the idealist point of departure, the system built upon it, in particular Hegelian philosophy of nature, also falls. It must however be recalled that the natural scientists' polemic against Hegel, in so far as they at all correctly understood him, was directed solely against these two points: viz., the idealist point of departure and the arbitrary, fact-defying construction of the system.

After allowance has been made for all this, there still remains Hegelian dialectics. It is the merit of Marx that, in contrast to the "peevisish, arrogant, mediocre *Επίγονοι* who now talk large in Germany",⁶⁰ he was the first to have brought to the fore again the forgotten dialectical method, its connection with Hegelian dialectics and its distinction from the latter, and at the same time to have applied this method in *Capital* to the facts of an empirical science, political economy. And he did it so successfully that even in Germany the newer economic school rises above the vulgar free-trade system only by copying from Marx (often enough incorrectly), on pretence of criticising him.

In Hegel's dialectics there prevails the same inversion of all real inter-connection as in all other ramifications of his system. But, as Marx says: "The mystification which dialectics suffers in Hegel's hands by no means prevents him from being the first to present its general form of working in a comprehensive

and conscious manner. With him it is standing on its head. It must be turned right side up again, if you would discover the rational kernel within the mystical shell."⁶¹

In natural science itself, however, we often enough encounter theories in which the real relation is stood on its head, the reflection is taken for the original form, and which consequently need to be turned right side up again. Such theories quite often dominate for a considerable time. When for almost two centuries heat was considered a special mysterious substance instead of a form of motion of ordinary matter, that was precisely such a case and the mechanical theory of heat carried out the inverting. Nevertheless physics dominated by the caloric theory discovered a series of highly important laws of heat and cleared the way, particularly through Fourier and Sadi Carnot,⁶² for the correct conception, which now for its part had to put right side up the laws discovered by its predecessor, to translate them into its own language.* Similarly, in chemistry the phlogistic theory first supplied the material, by a hundred years of experimental work, with the aid of which Lavoisier was able to discover in the oxygen obtained by Priestley the real antipode of the fantastic phlogiston and thus could throw overboard the entire phlogistic theory. But this did not in the least do away with the experimental results of phlogistics. On the contrary. They persisted, only their formulation was inverted, was translated from the phlogistic into the now valid chemical language and thus they retained their validity.

The relation of Hegelian dialectics to rational dialectics is the same as that of the caloric theory to the mechanical theory of heat and that of the phlogistic theory to the theory of Lavoisier.

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 40-49

* Carnot's function C literally inverted: $\frac{1}{C} =$ absolute temperature. Without this inversion nothing can be done with it. [Note by Engels.]

Dialectics

(The general nature of dialectics to be developed as the science of inter-connections, in contrast to metaphysics.)

It is, therefore, from the history of nature and human society that the laws of dialectics are abstracted. For they are nothing but the most general laws of these two aspects of historical development, as well as of thought itself. And indeed they can be reduced in the main to three:

The law of the transformation of quantity into quality and vice versa;

The law of the interpenetration of opposites;

The law of the negation of the negation.

All three are developed by Hegel in his idealist fashion as mere laws of *thought*: the first, in the first part of his *Logic*, in the Doctrine of Being; the second fills the whole of the second and by far the most important part of his *Logic*, the Doctrine of Essence; finally the third figures as the fundamental law for the construction of the whole system. The mistake lies in the fact that these laws are foisted on nature and history as laws of thought, and not deduced from them. This is the source of the whole forced and often outrageous treatment; the universe, willy-nilly, has to conform to a system of thought which itself is only the product of a definite stage of evolution of human thought. If we turn the thing round, then everything becomes simple, and the dialectical laws that look so extremely mysterious in idealist philosophy at once become simple and clear as noonday.

Moreover, anyone who is even only slightly acquainted with Hegel will be aware that in hundreds of passages Hegel is capable of giving the most striking individual illustrations of the dialectical laws from nature and history.

We are not concerned here with writing a handbook of dialectics, but only with showing that the dialectical laws are real laws of development of nature, and therefore are valid also for theoretical natural science. Hence we cannot go into the inner inter-connection of these laws with one another.

1. The law of the transformation of quantity into quality and vice versa. For our purpose, we can express this by saying that in nature, in a manner exactly fixed for each individual case, qualitative changes can only occur by the quantitative addition or quantitative subtraction of matter or motion (so-called energy).

All qualitative differences in nature rest on differences of chemical composition or on different quantities or forms of motion (energy) or, as is almost always the case, on both. Hence it is impossible to alter the quality of a body without addition or subtraction of matter or motion, i.e., without quantitative alteration of the body concerned. In this form, therefore, Hegel's mysterious principle appears not only quite rational but even rather obvious.

It is surely hardly necessary to point out that the various allotropic and aggregational states of bodies, because they depend on various groupings of the molecules, depend on greater or lesser amounts [Mengen] of motion communicated to the bodies.

But what about change of form of motion, or so-called energy? If we change heat into mechanical motion or vice versa, is not the quality altered while the quantity remains the same? Quite correct. But it is with change of form of motion as with Heine's vices; anyone can be virtuous by himself, for vices too are always necessary. Change of form of motion is always a process that takes place between at least two bodies, of which one loses a definite amount of motion of one quality (e.g., heat), while the other gains a corresponding quantity of motion of another quality (mechanical motion, electricity, chemical decomposition). Here, therefore, quantity and quality mutual-

ly correspond to each other. So far it has not been found possible to convert motion from one form to another inside a single isolated body.

We are concerned here in the first place with non-living bodies; the same law holds for living bodies, but it operates under very complex conditions and at present quantitative measurement is still often impossible for us.

If we imagine any non-living body cut up into smaller and smaller portions, at first no qualitative change occurs. But this has a limit: if we succeed, as by evaporation, in obtaining the separate molecules in the free state, then it is true that we can usually divide these still further, yet only with a complete change of quality. The molecule is decomposed into its separate atoms, which have quite different properties from those of the molecule. In the case of molecules composed of different chemical elements, atoms or molecules of these elements themselves make their appearance in the place of the compound molecule; in the case of molecules of elements, the free atoms appear, which exert quite distinct qualitative effects: the free atoms of nascent oxygen are easily able to effect what the atoms of atmospheric oxygen, bound together in the molecule, can never achieve.

But the molecule is also qualitatively different from the mass of the body to which it belongs. It can carry out movements independently of this mass and while the latter remains apparently at rest, e.g., heat vibrations; by means of a change of position and of connection with neighbouring molecules it can change the body into an allotrope or a different state of aggregation.

Thus we see that the purely quantitative operation of division has a limit at which it becomes transformed into a qualitative difference: the mass consists solely of molecules, but it is something essentially different from the molecule, just as the latter is different from the atom. It is this difference that is the basis for the separation of mechanics, as the science of heavenly and terrestrial masses, from physics, as the mechanics of molecules, and from chemistry, as the physics of atoms.

In mechanics, no qualities occur; at most, states such as equilibrium, motion, potential energy, which all depend on measurable transference of motion and are themselves capable

of quantitative expression. Hence, in so far as qualitative change takes place here, it is determined by a corresponding quantitative change.

In physics, bodies are treated as chemically unalterable or indifferent; we have to do with changes of their molecular states and with the change of form of motion, which in all cases, at least on one of the two sides, brings the molecule into action. Here every change is a transformation of quantity into quality, a consequence of the quantitative change of the amount of motion of one form or another that is inherent in the body or communicated to it.

"Thus the temperature of water is, in the first place, a point of no consequence in respect to its liquidity; still with the increase or diminution of the temperature of liquid water, there comes a point where this state of cohesion alters and the water is converted into steam or ice." (Hegel, *Enzyklopädie, Gesamtausgabe*, Bd. VI. S. 217.)⁶³

Similarly, a definite minimum current strength is required to cause the platinum wire of an electric incandescent lamp to glow; and every metal has its temperature of incandescence and fusion, every liquid its definite freezing and boiling point at a given pressure—in so far as our means allow us to produce the temperature required; finally also every gas has its critical point at which it can be liquefied by pressure and cooling. In short, the so-called physical constants are for the most part nothing but designations of the nodal points at which quantitative addition or subtraction of motion produces qualitative change in the state of the body concerned, at which, therefore, quantity is transformed into quality.

The sphere, however, in which the law of nature discovered by Hegel celebrates its most important triumphs is that of chemistry. Chemistry can be termed the science of the qualitative changes of bodies as a result of changed quantitative composition. That was already known to Hegel himself. (*Logik, Gesamtausgabe*, III, S. 433.)⁶⁴ As in the case of oxygen: if three atoms unite into a molecule, instead of the usual two, we get ozone, a body which is very considerably different from ordinary oxygen in its odour and reactions. And indeed the various proportions in which oxygen combines with nitrogen or sulphur, each of which produces a substance qualitatively different from any of the others! How different is laughing gas

(nitrogen monoxide N_2O) from nitric anhydride (nitrogen pentoxide, N_2O_5)! The first is a gas, the second at ordinary temperatures a solid crystalline substance. And yet the whole difference in composition is that the second contains five times as much oxygen as the first, and between the two of them are three more oxides of nitrogen (NO , N_2O_3 , NO_2), each of which is qualitatively different from the first two and from one another.

This is seen still more strikingly in the homologous series of carbon compounds, especially of the simpler hydrocarbons. Of the normal paraffins, the lowest is methane, CH_4 ; here the four linkages of the carbon atom are saturated by four atoms of hydrogen. The second, ethane, C_2H_6 , has two atoms of carbon joined together and the six free linkages are saturated by six atoms of hydrogen. And so it goes on, with C_3H_8 , C_4H_{10} , etc., according to the algebraic formula $\text{C}_n\text{H}_{2n+2}$, so that by each addition of CH_2 a body is formed that is qualitatively distinct from the preceding one. The three lowest members of the series are gases, the highest known, hexadecane, $\text{C}_{16}\text{H}_{34}$, is a solid body with a boiling point of 278°C . Exactly the same holds good for the series of primary alcohols with the formula $\text{C}_n\text{H}_{2n+2}\text{O}$, derived (theoretically) from the paraffins and the series of monobasic fatty acids (formula $\text{C}_n\text{H}_{2n}\text{O}_2$). What qualitative difference can be caused by the quantitative addition of C_3H_6 is taught by experience, if we consume ethyl alcohol, $\text{C}_2\text{H}_5\text{O}$, in any drinkable form without addition of other alcohols, and on another occasion take the same ethyl alcohol but with a slight addition of amyl alcohol, $\text{C}_5\text{H}_{12}\text{O}$, which forms the main constituent of the abominable fusel oil. One's head will certainly be aware of it the next morning, much to its detriment; so that one could even say that the intoxication, and subsequent "morning after" feeling, is also quantity transformed into quality, on the one hand of ethyl alcohol and on the other hand of this added C_3H_6 .

In these series we encounter the Hegelian law in yet another form. The lower members permit only of a single mutual arrangement of the atoms. If, however, the number of atoms united into a molecule attains a size definitely fixed for each series, the grouping of the atoms in the molecule can take place in more than one way; so that two or more isomeric substances

can be formed, having equal numbers of C, H, and O atoms in the molecule but nevertheless qualitatively distinct from one another. We can even calculate how many such isomers are possible for each member of the series. Thus, in the paraffin series, for C_4H_{10} there are two, for C_5H_{12} there are three; among the higher members the number of possible isomers mounts very rapidly. Hence once again it is the quantitative number of atoms in the molecule that determines the possibility and, in so far as it has been proved, also the actual existence of such qualitatively distinct isomers.

Still more. From the analogy of the substances with which we are acquainted in each of these series, we can draw conclusions as to the physical properties of the still unknown members of the series and, at least for the members immediately following the known ones, predict their properties, boiling point, etc., with fair certainty.

Finally, the Hegelian law is valid not only for compound substances but also for the chemical elements themselves. We now know that

"the chemical properties of the elements are a periodic function of their atomic weights" (Roscoe-Schorlemmer, *Ausführliches Lehrbuch der Chemie*, Bd. II, S. 823),⁶⁵

and that, therefore, their quality is determined by the quantity of their atomic weight. And the test of this has been brilliantly carried out. Mendeleev proved that various gaps occur in the series of related elements arranged according to atomic weights indicating that here new elements remain to be discovered. He described in advance the general chemical properties of one of these unknown elements, which he termed eka-aluminium, because it follows after aluminium in the series beginning with the latter, and he predicted its approximate specific and atomic weight as well as its atomic volume. A few years later, Lecoq de Boisbaudran actually discovered this element, and Mendeleev's predictions fitted with only very slight discrepancies. Eka-aluminium was realised in gallium (*ibid.*, p. 828).⁶⁶ By means of the — unconscious — application of Hegel's law of the transformation of quantity into quality, Mendeleev achieved a scientific feat which it is not too bold to

put on a par with that of Leverrier in calculating the orbit of the until then unknown planet Neptune.

In biology, as in the history of human society, the same law holds good at every step, but we prefer to dwell here on examples from the exact sciences, since here the quantities are accurately measurable and traceable.

Probably the same gentlemen who up to now have decried the transformation of quantity into quality as mysticism and incomprehensible transcendentalism will now declare that it is indeed something quite self-evident, trivial, and commonplace, which they have long employed, and so they have been taught nothing new. But to have formulated for the first time in its universally valid form a general law of development of nature, society, and thought, will always remain an act of historic importance. And if these gentlemen have for years caused quantity and quality to be transformed into each other, without knowing what they did, then they will have to console themselves with Molière's Monsieur Jourdain who had spoken prose all his life without having the slightest inkling of it.⁶⁷

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 62-68

Basic Forms of Motion

(Excerpt)

Motion in the most general sense, conceived as the mode of existence, the inherent attribute, of matter, comprehends all changes and processes occurring in the universe, from mere change of place right up to thinking. The investigation of the nature of motion had as a matter of course to start from the lowest, simplest forms of this motion and to learn to grasp these before it could achieve anything in the way of explanation of the higher and more complicated forms. Hence, in the historical evolution of the natural sciences we see how first of all the theory of simplest change of place, the mechanics of heavenly bodies and terrestrial masses, was developed; it was followed by the theory of molecular motion, physics, and immediately afterwards, almost alongside of it and in some places in advance of it, the science of the motion of atoms, chemistry. Only after these different branches of the knowledge of the forms of motion governing non-living nature had attained a high degree of development could the explanation of the processes of motion representing the life process be successfully tackled. This advanced in proportion with the progress of mechanics, physics, and chemistry. Consequently, while mechanics has for a fairly long time already been able adequately to refer the effects in the animal body of the bony levers set into motion by muscular contraction to the laws that are valid also in non-living nature, the physico-chemical substantiation of the other phenomena of life is still pretty much at the beginning of its course. Hence, in investigating here the nature of motion, we are compelled to leave the organic forms of motion out of account. We are compelled to restrict ourselves—in accordance with the state of science—to the forms of motion of non-living nature.

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, p. 69

Omitted from *Feuerbach*

[The vulgarising peddlers who dealt in materialism in the Germany of the fifties in no wise went beyond these limits of their teachers.* All the advances made by natural science since then served them merely] as fresh arguments against the belief in a creator of the universe; and in fact the further development of theory was quite outside their line of business. Idealism was hard hit owing to 1848 but materialism in this renovated form of it sank still lower. Feuerbach was absolutely right in repudiating responsibility for *this* materialism; only he had no right to confuse the doctrine of the itinerant preachers with materialism in general.

At about the same time, however, empirical natural science made such an advance and arrived at such brilliant results that not only did it become possible to overcome completely the mechanical one-sidedness of the eighteenth century, but also natural science itself, owing to the proof of the interconnections existing in nature itself between the various fields of investigation (mechanics, physics, chemistry, biology, etc.), was transformed from an empirical into a theoretical science and, by generalising the results achieved, into a system of the materialist knowledge of nature. The mechanics of gases; newly-created organic chemistry, which stripped the last remnants of incomprehensibility from one so-called organic compound after another by preparing them from inorganic substances; scientific embryology dating from 1818; geology

* i. e., the French materialists of the eighteenth century.—*Ed.*

and palaentology; comparative anatomy of plants and animals—all these furnished new material in an unprecedented measure. Three great discoveries, however, were of decisive importance.

The first was the proof of the transformation of energy arising out of the discovery of the mechanical equivalent of heat (by Robert Mayer, Joule and Colding). All the innumerable acting causes in nature, which had hitherto led a mysterious, inexplicable existence as so-called forces—mechanical force, heat, radiation (light and radiant heat), electricity, magnetism, chemical force of association and dissociation—have now been proved to be special forms, modes of existence of one and the same energy, i.e., motion. We can not only demonstrate its conversion from one form into another, which continually takes place in nature, but we can carry out this conversion in the laboratory and in industry, and indeed in such a way that a given quantity of energy in one form always corresponds to a given quantity of energy in some other form. Thus we can express the unit of heat in kilogram-metres and the units of any quantity of electrical or chemical energy once more in heat-units and vice versa; we can likewise measure the energy consumption and energy intake of a living organism and express it in any desired unit, e.g., in heat-units. The unity of all motion in nature is no longer a philosophical assertion, but a natural-scientific fact.

The second discovery—earlier in point of time—was that of the organic cell by Schwann and Schleiden, as being the unit out of which, by its multiplication and differentiation, all organisms with the exception of the lowest are formed and develop. This discovery for the first time gave a firm basis to the investigation of the organic, living products of nature—both comparative anatomy and physiology, and embryology. The origin, growth and structure of organisms were deprived of their mysterious character; the hitherto incomprehensible miracle was merged in a process which takes place according to a law that is essentially identical for all multicellular organisms.

But an essential gap still remained. If all multicellular organisms—both plants and animals, including man—in each case grow out of a single cell according to the law of cell

division, what then is the source of the infinite diversity of these organisms? This question was answered by the third great discovery, the theory of evolution, which for the first time was comprehensively worked out and substantiated by Darwin. However many transformations this theory will still undergo as regards details, in the main it has already solved the problem in a more than adequate manner. The evolutionary series of organisms from a few simple forms to increasingly multifarious and complicated ones, as it confronts us today, and extending right up to man, has been established as far as its main features are concerned. Thanks to this, not only has it become possible to explain the existing stock of organic products of nature but the basis has also been provided for the pre-history of the human mind, for tracing the various stages of its development, from the simple protoplasm—structureless but sensitive to stimuli—of the lowest organisms right up to the thinking human brain. Without this pre-history, however, the existence of the thinking human brain remains a miracle.

By means of these three great discoveries, the main processes of nature were explained and referred to natural causes. One thing still remains to be done here: to explain the origin of life from inorganic nature. At the present stage of science that implies nothing less than the preparation of protein bodies from inorganic substances. Chemistry is approaching closer and closer to the solution of this task, but it is still a long way from it. If, however, we bear in mind that it was only in 1828 that Wöhler prepared the first organic body, urea, from inorganic materials, and what an innumerable number of so-called organic compounds are now artificially prepared without any organic materials, we shall not be inclined to bid chemistry halt when confronted by protein. So far chemistry has been able to prepare every organic substance, the composition of which is accurately known. As soon as the composition of the protein bodies becomes known, chemistry will be able to set about the preparation of living protein. But to demand that it should achieve overnight what nature itself succeeds in doing only under very favourable circumstances on a few cosmic bodies after millions of years, would be to demand a miracle.

Thus the materialist outlook on nature rests today on a much firmer foundation than it did in the previous century. At that time only the motion of the heavenly bodies and that of terrestrial solid bodies under the influence of gravity was at all exhaustively understood; almost the entire field of chemistry and the whole of organic nature remained mysterious and not understood. Today the whole of nature lies spread out before us as a system of inter-connections and processes that, at least in its main features, has been explained and understood. At all events, the materialist outlook on nature means nothing more than the simple conception of nature just as it is, without alien addition, and hence among the Greek philosophers it was originally understood in this way as a matter of course. But between those ancient Greeks and us lie more than two thousand years of an essentially idealist outlook on the world, and so the return to self-evident understanding is more difficult than it appears to be at first sight. For it is by no means a matter of simply throwing overboard the entire thought-content of those two thousand years, but of a criticism of it, of extracting the results—that had been won within a form that was false and idealistic but which was inevitable for its time and for the course of evolution itself—from this transitory form. And how difficult that is, is proved for us by those numerous natural scientists who are inexorable materialists within their science but outside it are not merely idealists, but even pious and indeed orthodox Christians.

All these epoch-making advances of natural science passed Feuerbach by without affecting him in any essential respect. This was not so much his fault as that of the miserable German conditions, owing to which the university chairs were occupied by empty-headed, eclectic hair-splitters, while Feuerbach, who towered high above them, was compelled almost to rusticate in lonely village isolation. That is why, on the subject of nature, he wastes so much labour—except for a few brilliant generalisations—on empty belletristic writing. Thus he says:

"Life is, of course, not the product of a chemical process, nor in general is it the product of an isolated natural force or phenomenon, to which the metaphysical materialist reduces it; it is a result of the whole of nature."⁶⁸

That life is a result of the whole of nature in no way contradicts the fact that protein, which is the exclusive independent bearer of life, arises under definite conditions determined by the whole inter-connection of nature, but arises precisely as the product of a chemical process. <Had Feuerbach lived in conditions which permitted him to follow even superficially the development of natural science, it would never have happened that he would speak of a chemical process as the effect of an isolated force of nature.> * To the same solitariness must be ascribed the fact that Feuerbach loses himself in a circle of barren speculations on the relation of thought to the thinking organ, the brain — a sphere in which Starcke follows him willingly.

Enough, Feuerbach revolts against the name materialism.⁶⁹ And not entirely without reason; for he never completely ceases to be an idealist. In the field of nature he is a materialist; but in the field of human [...].**

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 195-99

* This sentence was crossed out by Engels.— *Ed.*

** Page 19 of the original manuscript of *L. Feuerbach* ends here. The end of this sentence occurs on the following page, which has not come down to us. On the basis of the printed text of *L. Feuerbach* it may be supposed that this sentence read approximately as follows: "but in the field of human history he is an idealist." — *Ed.*

From [Dialectics]

* * *

Dialectics, so-called *objective* dialectics, prevails throughout nature, and so-called subjective dialectics, dialectical thought, is only the reflection of the motion through opposites which asserts itself everywhere in nature, and which by the continual conflict of the opposites and their final passage into one another, or into higher forms, determines the life of nature. Attraction and repulsion. Polarity begins with magnetism, it is exhibited in one and the same body; in the case of electricity it distributes itself over two or more bodies which become oppositely charged. All chemical processes reduce themselves to processes of chemical attraction and repulsion. Finally, in organic life the formation of the cell nucleus is likewise to be regarded as a polarisation of the living protein material, and from the simple cell onwards the theory of evolution demonstrates how each advance up to the most complicated plant on the one side, and up to man on the other, is effected by the continual conflict between heredity and adaptation. In this connection it becomes evident how little applicable to such forms of evolution are categories like "positive" and "negative". One can conceive of heredity as the positive, conservative side, adaptation as the negative side that continually destroys what has been inherited, but one can just as well take adaptation as the creative, active, positive activity, and heredity as the resisting, passive, negative activity. But just as in history progress makes its appearance as the negation of the existing state of things, so here also—on purely *practical*

grounds—adaptation is better conceived as negative activity. In history, motion through opposites is most markedly exhibited in all critical epochs of the foremost peoples. At such moments a people has only the choice between the two horns of a dilemma: “either—or!” and indeed the question is always put in a way quite different from that in which the philistines, who dabble in politics in every age, would have liked it put. Even the liberal German philistine of 1848 found himself in 1849 suddenly, unexpectedly, and against his will confronted by the question: a return to the old reaction in an intensified form, or continuance of the revolution up to the republic, perhaps even the one and indivisible republic with a socialist background. He did not spend long in reflection and helped to create the Manteuffel reaction as the flower of German liberalism. Similarly, in 1851, the French bourgeois when faced with the dilemma which he certainly did not expect: a caricature of the empire, pretorian rule, and the exploitation of France by a gang of scoundrels, or a social-democratic republic—and he bowed down before the gang of scoundrels so as to be able, under their protection, to go on exploiting the workers.

* * *

Hard and fast lines are incompatible with the theory of evolution. Even the border-line between vertebrates and invertebrates is now no longer rigid, just as little is that between fishes and amphibians, while that between birds and reptiles dwindles more and more every day. Between *Compsognathus* and *Archaeopteryx*⁷⁰ only a few intermediate links are wanting, and birds’ beaks with teeth crop up in both hemispheres. “Either—or” becomes more and more inadequate. Among lower animals the concept of the individual cannot be established at all sharply. Not only as to whether a particular animal is an individual or a colony, but also where in development one individual ceases and the other begins (nurses).⁷¹ For a stage in the outlook on nature where all differences become merged in intermediate steps, and all opposites pass into one another through intermediate links, the old metaphysical method of thought no longer suffices.

Dialectics, which likewise knows no hard and fast lines, no unconditional, universally valid "either—or" and which bridges the fixed metaphysical differences, and besides "either—or" recognises also in the right place "both this—and that" and reconciles the opposites, is the sole method of thought appropriate in the highest degree to this stage. Of course, for everyday use, for the small change of science, the metaphysical categories retain their validity.

* * *

The transformation of quantity into quality="mechanical" world outlook, quantitative change alters quality. The gentlemen never suspected that!

* * *

The character of mutual opposites belonging to the thought determinations of reason: *polarisation*. Just as electricity, magnetism, etc., become polarised and move in opposites, so do thoughts. Just as in the former it is not possible to maintain any one-sidedness, and no natural scientist would think of doing so, so also in the latter.

* * *

The true nature of the determinations of "essence" is expressed by Hegel himself (*Enzyklopädie*, I, paragraph 111, Addendum): "In essence everything is *relative*"* (e.g., positive and negative, which have meaning only in their relation, not each for itself).

* * *

Part and whole, for instance, are already categories which become inadequate in organic nature. The ejection of seeds—the embryo—and the new-born animal are not to be conceived as a "part" that is separated from the "whole"; that

* Italics by Engels.—Ed.

would give a distorted treatment. It becomes a part only in a dead body. (*Enzyklopädie*, I, p. 268.)⁷²

* * *

Simple and compound. Categories which even in organic nature likewise lose their meaning and become inapplicable. An animal is expressed neither by its mechanical composition from bones, blood, gristle, muscles, tissues, etc., nor by its chemical composition from the elements. Hegel (*Enzyklopädie*, I, p. 256).⁷³ The organism is *neither simple nor compound*, however complex it may be.

* * *

Abstract identity ($a=a$; and negatively, a cannot be simultaneously equal and unequal to a) is likewise inapplicable in organic nature. The plant, the animal, every cell is at every moment of its life identical with itself and yet becoming distinct from itself, by absorption and excretion of substances, by respiration, by cell formation and death of cells, by the process of circulation taking place, in short, by a sum of incessant molecular changes which make up life and the sum-total of whose results is evident to our eyes in the phases of life—embryonic life, youth, sexual maturity, process of reproduction, old age, death. The further physiology develops, the more important for it become these incessant, infinitely small changes, and hence the more important for it also the consideration of difference *within* identity, and the old abstract standpoint of formal identity, that an organic being is to be treated as something simply identical with itself; as something constant, becomes out of date.* Nevertheless, the mode of thought based thereon, together with its categories, persists. But even in inorganic nature identity as such is in reality non-existent. Every body is continually exposed to mechanical, physical, and chemical influences, which are always changing it and modifying its identity. Abstract identity, with its opposition to difference, is

* In the margin of the manuscript occurs the remark: "Apart, moreover, from the evolution of species." — Ed.

in place only in mathematics—an abstract science which is concerned with creations of thought, even though they are reflections of reality—and even there it is continually being sublated. Hegel, *Enzyklopädie*, I, p. 235.⁷⁴ The fact that identity contains difference within itself is expressed in *every sentence*, where the predicate is necessarily different from the subject; the *lily* is a *plant*, the *rose* is *red*, where, either in the subject or in the predicate, there is something that is not covered by the predicate or the subject. Hegel, p. 231.⁷⁵ That from the outset *identity with itself* requires *difference from everything else* as its complement, is self-evident.

Continual change, i.e., sublation of abstract identity with itself, is also found in so-called inorganic nature. Geology is its history. On the surface, mechanical changes (denudation, frost), chemical changes (weathering); internally, mechanical changes (pressure), heat (volcanic), chemical (water, acids, binding substances); on a large scale—upheavals, earthquakes, etc. The slate of today is fundamentally different from the ooze from which it is formed, the chalk from the loose microscopic shells that compose it, even more so limestone, which indeed according to some is of purely organic origin, and sandstone from the loose sea sand, which again is derived from disintegrated granite, etc., not to speak of coal.

* * *

The law of identity in the old metaphysical sense is the fundamental law of the old outlook: $a=a$. Each thing is equal to itself. Everything was permanent, the solar system, stars, organisms. This law has been refuted by natural science bit by bit in each separate case, but theoretically it still prevails and is still put forward by the supporters of the old in opposition to the new: a thing cannot simultaneously be itself and something else. And yet the fact that true, concrete identity includes difference, change, has recently been shown in detail by natural science (see above).—Abstract identity, like all metaphysical categories, suffices for *everyday* use, where small dimensions or brief periods of time are in question; the limits within which it is usable differ in almost every case and are determined by the nature of the object; for a planetary system,

where in ordinary astronomical calculation the ellipse can be taken as the basic form for practical purposes without error, they are much wider than for an insect that completes its metamorphosis in a few weeks. (Give other examples, e.g., alteration of species, which is reckoned in periods of thousands of years.) For natural science in its comprehensive role, however, even in each single branch, abstract identity is totally inadequate, and although on the whole it has now been abolished in practice, theoretically it still dominates people's minds, and most natural scientists imagine that identity and difference are irreconcilable opposites, instead of one-sided poles which represent the truth only in their reciprocal action, in the inclusion of difference *within* identity.

* * *

Identity and difference — necessity and chance — cause and effect — the two main opposites which, treated separately, become transformed into one another.

And then "first principles" must help.

* * *

Chance and Necessity

Another opposition in which metaphysics is entangled is that of chance and necessity. What can be more sharply contradictory than these two thought determinations? How is it possible that both are identical, that the accidental is necessary, and the necessary is also accidental? Common sense, and with it the majority of natural scientists, treats necessity and chance as determinations that exclude each other once for all. A thing, a circumstance, a process is either accidental or necessary, but not both. Hence both exist side by side in nature; nature contains all sorts of objects and processes, of which some are accidental, the others necessary, and it is only a matter of not confusing the two sorts with each other. Thus, for instance, one assumes the decisive specific characters to be necessary, other difference between individuals of the same species being

termed accidental, and this holds good of crystals as it does for plants and animals. Then again the lower group becomes accidental in relation to the higher, so that it is declared to be a matter of chance how many different species are included in the genus *felis* or *equus*, or how many genera and orders there are in a class, and how many individuals of each of these species exist, or how many different species of animals occur in a given region, or what in general the fauna and flora are like. And then it is declared that the necessary is the sole thing of scientific interest and that the accidental is a matter of indifference to science. That is to say: what can be brought under laws, hence what one *knows*, is interesting; what cannot be brought under laws, and therefore what one does not know, is a matter of indifference and can be ignored. Thereby all science comes to an end, for it has to investigate precisely that which we do *not* know. That is to say: what can be brought under general laws is regarded as necessary, and what cannot be so brought as accidental. Anyone can see that this is the same sort of science as that which proclaims natural what it can explain, and ascribes what it cannot explain to supernatural causes; whether I term the cause of the inexplicable chance, or whether I term it God, is a matter of complete indifference as far as the thing itself is concerned. Both are only equivalents for: I do not know, and therefore do not belong to science. The latter ceases where the requisite connection is wanting.

In opposition to this view there is determinism, which passed from French materialism into natural science, and which tries to dispose of chance by denying it altogether. According to this conception only simple, direct necessity prevails in nature. That a particular pea-pod contains five peas and not four or six, that a particular dog's tail is five inches long and not a whit longer or shorter, that this year a particular clover flower was fertilised by a bee and another not, and indeed by precisely one particular bee and at a particular time, that a particular windblown dandelion seed has sprouted and another not, that last night I was bitten by a flea at four o'clock in the morning, and not at three or five o'clock, and on the right shoulder and not on the left calf—these are all facts which have been produced by an irrevocable concatenation of cause and effect, by an unshatterable necessity of such a nature indeed that the

gaseous sphere, from which the solar system was derived, was already so constituted that these events had to happen thus and not otherwise. With this kind of necessity we likewise do not get away from the theological conception of nature. Whether with Augustine and Calvin we call it the eternal decree of God, or Kismet⁷⁶ as the Turks do, or whether we call it necessity, is all pretty much the same for science. There is no question of tracing the chain of causation in any of these cases; so we are just as wise in one as in another, the so-called necessity remains an empty phrase, and with it — chance also remains what it was before. As long as we are not able to show on what the number of peas in the pod depends, it remains just a matter of chance, and the assertion that the case was foreseen already in the primordial constitution of the solar system does not get us a step further. Still more. A science which was to set about the task of following back the *casus* of this individual pea-pod in its causal concatenation would be no longer science but pure trifling; for this same pea-pod alone has in addition innumerable other individual, accidentally appearing qualities: shade of colour, thickness and hardness of the pod, size of the peas, not to speak of the individual peculiarities revealed by the microscope. The one pea-pod, therefore, would already provide more causal connections for following up than all the botanists in the world could solve.

Hence chance is not here explained by necessity, but rather necessity is degraded to the production of what is merely accidental. If the fact that a particular pea-pod contains six peas, and not five or seven, is of the same order as the law of motion of the solar system, or the law of the transformation of energy, then as a matter of fact chance is not elevated into necessity, but rather necessity degraded into chance. Furthermore, however much the diversity of the organic and inorganic species and individuals existing side by side in a given area may be asserted to be based on irrefragable necessity, for the separate species and individuals it remains what it was before, a matter of chance. For the individual animal it is a matter of chance, where it happens to be born, what environment it finds for living, what enemies and how many of them threaten it. For the mother plant it is a matter of chance whither the wind scatters its seeds, and, for the daughter plant, where the seed

finds soil for germination; and to assure us that here also everything rests on irrefragable necessity is a poor consolation. The jumbling together of natural objects in a given region, still more in the whole world, for all the primordial determination from eternity, remains what it was before — a matter of chance.

In contrast to both conceptions, Hegel came forward with the hitherto quite unheard-of propositions that the accidental has a cause because it is accidental, and just as much also has no cause because it is accidental; that the accidental is necessary, that necessity determines itself as chance, and, on the other hand, this chance is rather absolute necessity. (*Logik*, II, Book III, 2: *Reality*.) Natural science has simply ignored these propositions as paradoxical trifling, as self-contradictory nonsense, and, as regards theory, has persisted on the one hand in the barrenness of thought of Wolffian metaphysics, according to which a thing is *either* accidental *or* necessary, but not both at once; or, on the other hand, in the hardly less thoughtless mechanical determinism which in words denies chance in general only to recognise it in practice in each particular case.

While natural science continued to think in this way, what *did it do* in the person of Darwin?

Darwin, in his epoch-making work,⁷⁷ set out from the widest existing basis of chance. Precisely the infinite, accidental differences between individuals within a single species, differences which become accentuated until they break through the character of the species, and whose immediate causes even can be demonstrated only in extremely few cases, compelled him to question the previous basis of all regularity in biology, viz., the concept of species in its previous metaphysical rigidity and unchangeability. Without the concept of species, however, all science was nothing. All its branches needed the concept of species as basis: human anatomy and comparative anatomy — embryology, zoology, palaeontology, botany, etc., what were they without the concept of species? All their results were not only put in question but directly set aside. Chance overthrows necessity, as conceived hitherto. The previous idea of necessity breaks down. To retain it means dictatorially to impose on nature as a law a human arbitrary determination that is in contradiction to itself and to reality, it means to deny

thereby all inner necessity in living nature, it means generally to proclaim the chaotic kingdom of chance to be the sole law of living nature.

* * *

Causality. The first thing that strikes us in considering matter in motion is the inter-connection of the individual motions of separate bodies, their *being determined* by one another. But not only do we find that a particular motion is followed by another, we find also that we can evoke a particular motion by setting up the conditions in which it takes place in nature, that we can even produce motions which do not occur at all in nature (industry), at least not in this way, and that we can give these motions a predetermined direction and extent. *In this way*, by the *activity of human beings*, the idea of *causality* becomes established, the idea that one motion is the *cause* of another. True, the regular sequence of certain natural phenomena can by itself give rise to the idea of causality: the heat and light that come with the sun; but this affords no proof, and to that extent Hume's scepticism was correct in saying that a regular *post hoc* can never establish a *propter hoc*. But the activity of human beings *forms the test* of causality. If we bring the sun's rays to a focus by means of a concave mirror and make them act like the rays of an ordinary fire, we thereby prove that heat comes from the sun. If we bring together in a rifle the priming, the explosive charge, and the bullet and then fire it, we count upon the effect known in advance from previous experience, because we can follow in all its details the whole process of ignition, combustion, explosion by the sudden conversion into gas and pressure of the gas on the bullet. And here the sceptic cannot even say that because of previous experience it does not follow that it will be the same next time. For, as a matter of fact, it does sometimes happen that it is *not* the same, that the priming or the gunpowder fails to work, that the barrel bursts, etc. But it is precisely this which *proves* causality instead of refuting it, because we can find out the cause of each such deviation from the rule by appropriate investigation: chemical decomposition of the priming, dampness, etc., of the gunpowder, defect in the barrel, etc., etc., so that here the test of causality is so to say a *double* one.

Natural science, like philosophy, has hitherto entirely neglected the influence of men's activity on their thought; both know only nature on the one hand and thought on the other. But it is precisely *the alteration of nature by men*, not solely nature as such, which is the most essential and immediate basis of human thought, and it is in the measure that man has learned to change nature that his intelligence has increased. The naturalistic conception of history, as found, for instance, to a greater or lesser extent in Draper and other scientists, as if nature exclusively reacts on man, and natural conditions everywhere exclusively determined his historical development, is therefore one-sided and forgets that man also reacts on nature, changing it and creating new conditions of existence for himself. There is devilishly little left of "nature" as it was in Germany at the time when the Germanic peoples immigrated into it. The earth's surface, climate, vegetation, fauna, and the human beings themselves have infinitely changed, and all this owing to human activity, while the changes of nature in Germany which have occurred in this period of time without human interference are incalculably small.

* * *

Reciprocal action is the first thing that we encounter when we consider matter in motion as a whole from the standpoint of modern natural science. We see a series of forms of motion, mechanical motion, heat, light, electricity, magnetism, chemical union and decomposition, transitions of states of aggregation, organic life, all of which, if *at present we still* make an exception of organic life, pass into one another, mutually determine one another, are in one place cause and in another effect, the sum-total of the motion in all its changing forms remaining the same (Spinoza: *substance is causa sui* strikingly expresses the reciprocal action).⁷⁸ Mechanical motion becomes transformed into heat, electricity, magnetism, light, etc., and vice versa. Thus natural science confirms what Hegel has said (where?), that reciprocal action is the true *causa finalis* of things. We cannot go back further than to knowledge of this reciprocal action, for the very reason that there is nothing behind to know. If we know the forms of motion of matter (for

which it is true there is still very much lacking, in view of the short time that natural science has existed), then we know matter itself, and therewith our knowledge is complete. (Grove's whole misunderstanding about causality rests on the fact that he does not succeed in arriving at the category of reciprocal action; he has the thing, but not the abstract thought, and hence the confusion—pp. 10-14.⁷⁹) Only from this universal reciprocal action do we arrive at the real causal relation. In order to understand the separate phenomena, we have to tear them out of the general inter-connection and consider them in isolation, and *then* the changing motions appear, one as cause and the other as effect.

* * *

For one who denies causality every natural law is a hypothesis, among others also the chemical analysis of heavenly bodies by means of the prismatic spectrum. What shallowness of thought to remain at such a viewpoint!

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 211-21, 230-32

On the "Mechanical" Conception of Nature

(Excerpt)

If I term physics the mechanics of molecules, chemistry the physics of atoms, and furthermore biology the chemistry of proteins, I wish thereby to express the passing of each of these sciences into another, hence both the connection, the continuity, and the distinction, the discrete separation, between the two of them. To go further and to define chemistry as likewise a kind of mechanics seems to me inadmissible. Mechanics—in the wider or narrower sense—knows only quantities, it calculates with velocities and masses, and at most with volumes. Where the quality of bodies comes across its path, as in hydrostatics and aerostatics, it cannot achieve anything without going into molecular states and molecular motions, it is itself only an auxiliary science, the prerequisite for physics. In physics, however, and still more in chemistry, not only does continual qualitative change take place in consequence of quantitative change, the transformation of quantity into quality, but there are also many qualitative changes to be taken into account whose dependence on quantitative change is by no means proven. That the present tendency of science goes in this direction can be readily granted, but does not prove that this direction is the exclusively correct one, that the pursuit of this tendency will *exhaust* the whole of physics and chemistry. All motion includes mechanical motion, change of place of the largest or smallest portions of matter, and the *first* task of science, but only the *first*, is to obtain knowledge of this motion. But this mechanical motion does not exhaust motion as a whole. Motion is not merely change of place, in fields higher than mechanics it is also change of quality. The discovery that

heat is a molecular motion was epoch-making. But if I have nothing more to say of heat than that it is a certain displacement of molecules, I should best be silent. Chemistry seems to be well on the way to explaining a number of chemical and physical properties of elements from the ratio of the atomic volumes to the atomic weights. But no chemist would assert that all the properties of an element are exhaustively expressed by its position in the Lothar Meyer curve,⁸⁰ that it will ever be possible by this alone to explain, for instance, the peculiar constitution of carbon that makes it the essential bearer of organic life, or the necessity for phosphorus in the brain. Yet the "mechanical" conception amounts to nothing else. It explains all change from change of place, all qualitative differences from quantitative ones, and overlooks that the relation of quality and quantity is reciprocal, that quality can become transformed into quantity just as much as quantity into quality, that, in fact, reciprocal action takes place. If all differences and changes of quality are to be reduced to quantitative differences and changes, to mechanical displacement, then we inevitably arrive at the proposition that all matter consists of *identical* smallest particles, and that all qualitative differences of the chemical elements of matter are caused by quantitative differences in number and by the spatial grouping of those smallest particles to form atoms. But we have not got so far yet.

It is our modern natural scientists' lack of acquaintance with any other philosophy than the most mediocre vulgar philosophy, like that now rampant in the German universities, which allows them to use expressions like "mechanical" in this way, without taking into account, or even suspecting, the consequences with which they thereby necessarily burden themselves. The theory of the absolute qualitative identity of matter has its supporters—empirically it is equally impossible to refute it or to prove it. But if one asks these people who want to explain everything "mechanically" whether they are conscious of this consequence and accept the identity of matter, what a variety of answers will be heard!

The most comical part about it is that to make "materialist" equivalent to "mechanical" derives from *Hegel*, who wanted to throw contempt on materialism by the addition "mechanical".

Now the materialism criticised by Hegel—the French materialism of the eighteenth century—was in fact exclusively *mechanical*, and indeed for the very natural reason that at that time physics, chemistry, and biology were still in their infancy, and were very far from being able to offer the basis for a general outlook on nature. Similarly Haeckel takes from Hegel the translation: *causae efficientes*=“mechanically acting causes”, and *causae finales*=“purposively acting causes”; where Hegel, therefore, puts “mechanical” as equivalent to blindly acting, unconsciously acting, and not as equivalent to mechanical in Haeckel’s sense of the word. But this whole antithesis is for Hegel himself so much a superseded standpoint that he *does not even mention* it in either of his two expositions of causality in his *Logic*—but only in his *History of Philosophy*, in the place where it comes historically (hence a sheer misunderstanding on Haeckel’s part due to superficiality!) and quite incidentally in dealing with teleology (*Logic*, III, II, 3) where he mentions it as the form in which the *old metaphysics* conceived the antithesis of mechanism and teleology, but otherwise treating it as a long superseded standpoint. Hence Haeckel copied incorrectly in his joy at finding a confirmation of his “mechanical” conception and so arrived at the beautiful result that if a particular change is produced in an animal or plant by natural selection it has been effected by a *causa efficiens*, but if the same change arises by *artificial* selection then it has been effected by a *causa finalis*! The breeder a *causa finalis*! Of course a dialectician of Hegel’s calibre could not be caught in the vicious circle of the narrow antithesis of *causa efficiens* and *causa finalis*. And for the modern standpoint the whole hopeless rubbish about this antithesis is put an end to because we *know* from experience and from theory that both matter and its mode of existence, motion, are uncreatable and are, therefore, their own final cause; while to give the name *effective* causes to the individual causes which momentarily and locally become isolated in the mutual interaction of the motion of the universe, or which are isolated by our reflecting mind, adds absolutely no new determination but only a confusing element. A cause that is not effective is no cause.

NB. Matter as such is a pure creation of thought and an abstraction. We leave out of account the qualitative differences

of things in lumping them together as corporeally existing things under the concept matter. Hence matter as such, as distinct from definite existing pieces of matter, is not anything sensuously existing. When natural science directs its efforts to seeking out uniform matter as such, to reducing qualitative differences to merely quantitative differences in combining identical smallest particles, it is doing the same thing as demanding to see fruit as such instead of cherries, pears, apples, or the mammal as such instead of cats, dogs, sheep, etc., gas as such, metal, stone, chemical compound as such, motion as such. The Darwinian theory demands such a primordial mammal, Haeckel's pro-mammal,⁸¹ but, at the same time, it has to admit that if this pro-mammal contained within itself in *germ* all future and existing mammals, it was in reality lower in rank than all existing mammals and primitively crude, hence more transitory than any of them. As Hegel has already shown (*Enzyklopädie*, I, S. 199), this view, this "one-sided mathematical view", according to which matter must be looked upon as having only quantitative determination, but, qualitatively, as identical originally, is "no other standpoint than that" of the French materialism of the eighteenth century. It is even a retreat to Pythagoras, who regarded number, quantitative determination as the essence of things.

Frederick Engels, *Dialectics of Nature*,
Moscow, 1974, pp. 252-55

From [Additions to *Anti-Dühring*]

The fact that our subjective thought and the objective world are subject to the same laws, and hence, too, that in the final analysis they cannot contradict each other in their results, but must coincide, governs absolutely our whole theoretical thought. It is the unconscious and unconditional premise for theoretical thought. Eighteenth-century materialism, owing to its essentially metaphysical character, investigated this premise only as regards content. It restricted itself to the proof that the content of all thought and knowledge must derive from sensuous experience, and revived the principle: *nihil est in intellectu, quod non fuerit in sensu*.⁸² It was modern idealistic, but at the same time dialectical, philosophy, and especially Hegel, which for the first time investigated it also as regards *form*. In spite of all the innumerable arbitrary constructions and fantasies that we encounter here, in spite of the idealist, topsy-turvy form of its result—the unity of thought and being—it is undeniable that this philosophy proved the analogy of the processes of thought to those of nature and history and vice versa, and the validity of similar laws for all these processes, in numerous cases and in the most diverse fields. On the other hand, modern natural science has extended the principle of the origin of all thought content from experience in a way that breaks down its old metaphysical limitation and formulation. By recognising the inheritance of acquired characters, it extends the subject of experience from the individual to the genus; the single individual that must have experience is no longer necessary, its individual experience can be replaced to a certain extent by the results of the

experiences of a number of its ancestors. If, for instance, among us the mathematical axioms seem self-evident to every eight-year-old child, and in no need of proof from experience, this is solely the result of "accumulated inheritance". It would be difficult to teach them by a proof to a bushman or Australian Negro.

In the present work* dialectics is conceived as the science of the most general laws of *all* motion. This implies that its laws must be valid just as much for motion in nature and human history as for the motion of thought. Such a law can be recognised in two of these three spheres, indeed even in all three, without the metaphysical philistine being clearly aware that it is one and the same law that he has come to know.

Let us take an example. Of all theoretical advances there is surely none that ranks so high as a triumph of the human mind as the discovery of the infinitesimal calculus in the last half of the seventeenth century. If anywhere, it is here that we have a pure and exclusive feat of human intelligence. The mystery which even today surrounds the magnitudes employed in the infinitesimal calculus, the differentials and infinites of various degrees, is the best proof that it is still imagined that what are dealt with here are pure "free creations and imaginations"** of the human mind, to which there is nothing corresponding in the objective world. Yet the contrary is the case. Nature offers prototypes for all these imaginary magnitudes.

Our geometry takes as its starting-point space relations, and our arithmetic and algebra numerical magnitudes, which correspond to our terrestrial conditions, which therefore correspond to the magnitude of bodies that mechanics terms masses—masses such as occur on earth and are moved by men. In comparison with these masses, the mass of the earth seems infinitely large and indeed terrestrial mechanics treats it as infinitely large. The radius of the earth= ∞ , this is the basic principle of all mechanics in the law of falling. But not merely the earth but the whole solar system and the distances occurring in the latter in their turn appear infinitely small as soon as we have to deal with the distances reckoned in light

* i.e., in *Anti-Dühring* (see *Anti-Dühring*, Moscow, 1975, p. 194).— Ed.

** Ibid., p. 57.— Ed.

years in the stellar system visible to us through the telescope. We have here, therefore, already an infinity, not only of the first but of the second degree, and we can leave it to the imagination of our readers to construct further infinities of a higher degree in infinite space, if they feel inclined to do so.

According to the view prevailing in physics and chemistry today, however, the terrestrial masses, the bodies with which mechanics operates, consist of molecules, of smallest particles which cannot be further divided without abolishing the physical and chemical identity of the body concerned. According to W. Thomson's calculations, the diameter of the smallest of these molecules cannot be smaller than a fifty-millionth of a millimetre. But even if we assume that the largest molecule itself attains a diameter of a twenty-five-millionth of a millimetre, it still remains an infinitesimally small magnitude compared with the smallest mass dealt with by mechanics, physics, or even chemistry. Nevertheless it is endowed with all the properties peculiar to the mass in question, it can represent the mass physically and chemically, and does actually represent it in all chemical equations. In short, it has the same properties in relation to the corresponding mass as the mathematical differential has in relation to its variables. The only difference is that what seems mysterious and inexplicable to us in the case of the differential, in the mathematical abstraction, here seems a matter of course and as it were obvious.

The bulk of the work was
written between 1873 and
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From Ludwig Feuerbach and the End of Classical German Philosophy

I

The volume* before us carries us back to a period which, although in time no more than a generation behind us, has become as foreign to the present generation in Germany as if it were already a hundred years old. Yet it was the period of Germany's preparation for the Revolution of 1848; and all that has happened since then in our country has been merely a continuation of 1848, merely the execution of the last will and testament of the revolution.

Just as in France in the eighteenth century, so in Germany in the nineteenth, a philosophical revolution ushered in the political collapse. But how different the two looked! The French were in open combat against all official science, against the church and often also against the state; their writings were printed across the frontier, in Holland or England, while they themselves were often in jeopardy of imprisonment in the Bastille. On the other hand, the Germans were professors, state-appointed instructors of youth; their writings were recognised textbooks, and the terminating system of the whole development—the Hegelian system—was even raised, as it were, to the rank of a royal Prussian philosophy of state! Was it possible that a revolution could hide behind these professors, behind their obscure, pedantic phrases, their ponderous, wearisome sentences? Were not precisely those people who

* *Ludwig Feuerbach*, by C. N. Starcke, Ph.D., Stuttgart, Ferd. Encke, 1855. [Note by Engels].

were then regarded as the representatives of the revolution, the liberals, the bitterest opponents of this brain-confusing philosophy? But what neither the governments nor the liberals saw was seen at least by one man as early as 1833, and this man was indeed none other than Heinrich Heine.⁸³

Let us take an example. No philosophical proposition has earned more gratitude from narrow-minded governments and wrath from equally narrow-minded liberals than Hegel's famous statement:

"All that is real is rational; and all that is rational is real."⁸⁴

That was tangibly a sanctification of things that be, a philosophical benediction bestowed upon despotism, police government, Star Chamber proceedings and censorship. That is how Frederick William III and how his subjects understood it. But according to Hegel certainly not everything that exists is also real, without further qualification. For Hegel the attribute of reality belongs only to that which at the same time is necessary:

"In the course of its development reality proves to be necessity."

A particular governmental measure—Hegel himself cites the example of "a certain tax regulation"—is therefore for him by no means real without qualification.⁸⁵ That which is necessary, however, proves itself in the last resort to be also rational; and, applied to the Prussian state of that time, the Hegelian proposition, therefore, merely means: this state is rational, corresponds to reason, in so far as it is necessary; and if it nevertheless appears to us to be evil, but still, in spite of its evil character, continues to exist, then the evil character of the government is justified and explained by the corresponding evil character of its subjects. The Prussians of that day had the government that they deserved.

Now, according to Hegel, reality is, however, in no way an attribute predicable of any given state of affairs, social or political, in all circumstances and at all times. On the contrary. The Roman Republic was real, but so was the Roman Empire, which superseded it. In 1789 the French monarchy had become so unreal, that is to say, so robbed of all necessity, so

irrational, that it had to be destroyed by the Great Revolution, of which Hegel always speaks with the greatest enthusiasm. In this case, therefore, the monarchy was the unreal and the revolution the real. And so, in the course of development, all that was previously real becomes unreal, loses its necessity, its right of existence, its rationality. And in the place of moribund reality comes a new, viable reality—peacefully if the old has enough intelligence to go to its death without a struggle; forcibly if it resists this necessity. Thus the Hegelian proposition turns into its opposite through Hegelian dialectics itself: All that is real in the sphere of human history becomes irrational in the process of time, is therefore irrational by its very destination, is tainted beforehand with irrationality; and everything which is rational in the minds of men is destined to become real, however much it may contradict existing apparent reality. In accordance with all the rules of the Hegelian method of thought, the proposition of the rationality of everything which is real resolves itself into the other proposition: All that exists deserves to perish.

But precisely therein lay the true significance and the revolutionary character of the Hegelian philosophy (to which, as the close of the whole movement since Kant, we must here confine ourselves), that it once for all dealt the death blow to the finality of all products of human thought and action. Truth, the cognition of which is the business of philosophy, was in the hands of Hegel no longer an aggregate of finished dogmatic statements, which, once discovered, had merely to be learned by heart. Truth lay now in the process of cognition itself, in the long historical development of science, which mounts from lower to ever higher levels of knowledge without ever reaching, by discovering so-called absolute truth, a point at which it can proceed no further, where it would have nothing more to do than to fold its hands and gaze with wonder at the absolute truth to which it had attained. And what holds good for the realm of philosophical knowledge holds good also for that of every other kind of knowledge and also for practical action. Just as knowledge is unable to reach a complete conclusion in a perfect, ideal condition of humanity, so is history unable to do so; a perfect society, a perfect "state", are things which can only exist in imagination. On the

contrary, all successive historical systems are only transitory stages in the endless course of development of human society from the lower to the higher. Each stage is necessary, and therefore justified for the time and conditions to which it owes its origin. But in the face of new, higher conditions which gradually develop in its own womb, it loses its validity and justification. It must give way to a higher stage which will also in its turn decay and perish. Just as the bourgeoisie by large-scale industry, competition and the world market dissolves in practice all stable time-honoured institutions, so this dialectical philosophy dissolves all conceptions of final, absolute truth and of absolute states of humanity corresponding to it. For it [dialectical philosophy] nothing is final, absolute, sacred. It reveals the transitory character of everything and in everything; nothing can endure before it except the uninterrupted process of becoming and of passing away, of endless ascendancy from the lower to the higher. And dialectical philosophy itself is nothing more than the mere reflection of this process in the thinking brain. It has, of course, also a conservative side: it recognises that definite stages of knowledge and society are justified for their time and circumstances; but only so far. The conservatism of this mode of outlook is relative; its revolutionary character is absolute—the only absolute dialectical philosophy admits.

It is not necessary, here, to go into the question of whether this mode of outlook is thoroughly in accord with the present state of natural science, which predicts a possible end even for the earth, and for its habitability a fairly certain one; which therefore recognises that for the history of mankind, too, there is not only an ascending but also a descending branch. At any rate we still find ourselves a considerable distance from the turning-point at which the historical course of society becomes one of descent, and we cannot expect Hegelian philosophy to be concerned with a subject which natural science, in its time, had not at all placed upon the agenda as yet.

But what must, in fact, be said here is this: that in Hegel the views developed above are not so sharply delineated. They are a necessary conclusion from his method, but one which he himself never drew with such explicitness. And this, indeed, for the simple reason that he was compelled to make a system

and, in accordance with traditional requirements, a system of philosophy must conclude with some sort of absolute truth. Therefore, however much Hegel, especially in his *Logic*, emphasised that this eternal truth is nothing but the logical, or, the historical, process itself, he nevertheless finds himself compelled to supply this process with an end, just because he has to bring his system to a termination at some point or other. In his *Logic* he can make this end a beginning again, since here the point of conclusion, the absolute idea—which is only absolute in so far as he has absolutely nothing to say about it—“alienates,” that is, transforms, itself into nature and comes to itself again later in the mind, that is, in thought and in history. But at the end of the whole philosophy a similar return to the beginning is possible only in one way. Namely, by conceiving of the end of history as follows: mankind arrives at the cognition of this selfsame absolute idea, and declares that this cognition of the absolute idea is reached in Hegelian philosophy. In this way, however, the whole dogmatic content of the Hegelian system is declared to be absolute truth, in contradiction to his dialectical method, which dissolves all dogmatism. Thus the revolutionary side is smothered beneath the overgrowth of the conservative side. And what applies to philosophical cognition applies also to historical practice. Mankind, which, in the person of Hegel, has reached the point of working out the absolute idea, must also in practice have gotten so far that it can carry out this absolute idea in reality. Hence the practical political demands of the absolute idea on contemporaries may not be stretched too far. And so we find at the conclusion of the *Philosophy of Law* that the absolute idea is to be realised in that monarchy based on social estates which Frederick William III so persistently but vainly promised to his subjects, that is, in a limited, moderate, indirect rule of the possessing classes suited to the petty-bourgeois German conditions of that time; and, moreover, the necessity of the nobility is demonstrated to us in a speculative fashion.

The inner necessities of the system are, therefore, of themselves sufficient to explain why a thoroughly revolutionary method of thinking produced an extremely tame political conclusion. As a matter of fact the specific form of this conclusion springs from this, that Hegel was a German, and

like his contemporary Goethe had a bit of the Philistine's queue dangling behind. Each of them was an Olympian Zeus in his own sphere, yet neither of them ever quite freed himself from German Philistinism.

But all this did not prevent the Hegelian system from covering an incomparably greater domain than any earlier system, nor from developing in this domain a wealth of thought which is astounding even today. The phenomenology of mind (which one may call a parallel of the embryology and palaeontology of the mind, a development of individual consciousness through its different stages, set in the form of an abbreviated reproduction of the stages through which the consciousness of man has passed in the course of history), logic, philosophy of nature, philosophy of mind, and the latter worked out in its separate, historical subdivisions: philosophy of history, of law, of religion, history of philosophy, aesthetics, etc.—in all these different historical fields Hegel laboured to discover and demonstrate the pervading thread of development. And as he was not only a creative genius but also a man of encyclopaedic erudition, he played an epoch-making role in every sphere. It is self-evident that owing to the needs of the "system" he very often had to resort to those forced constructions about which his pigmy opponents make such a terrible fuss even today. But these constructions are only the frame and scaffolding of his work. If one does not loiter here needlessly, but presses on farther into the immense building, one finds innumerable treasures which today still possess undiminished value. With all philosophers it is precisely the "system" which is perishable; and for the simple reason that it springs from an imperishable desire of the human mind—the desire to overcome all contradictions. But if all contradictions are once for all disposed of, we shall have arrived at so-called absolute truth—world history will be at an end. And yet it has to continue, although there is nothing left for it to do—hence, a new, insoluble contradiction. As soon as we have once realised—and in the long run no one has helped us to realise it more than Hegel himself—that the task of philosophy thus stated means nothing but the task that a single philosopher should accomplish that which can only be accomplished by the entire human race in its progressive development—as soon as

we realise that, there is an end to all philosophy in the hitherto accepted sense of the word. One leaves alone "absolute truth", which is unattainable along this path or by any single individual; instead, one pursues attainable relative truths along the path of the positive sciences, and the summation of their results by means of dialectical thinking. At any rate, with Hegel philosophy comes to an end: on the one hand, because in his system he summed up its whole development in the most splendid fashion; and on the other hand, because, even though unconsciously, he showed us the way out of the labyrinth of systems to real positive knowledge of the world.

One can imagine what a tremendous effect this Hegelian system must have produced in the philosophy-tinged atmosphere of Germany. It was a triumphal procession which lasted for decades and which by no means came to a standstill on the death of Hegel. On the contrary, it was precisely from 1830 to 1840 that "Hegelianism" reigned most exclusively, and to a greater or lesser extent infected even its opponents. It was precisely in this period that Hegelian views, consciously or unconsciously, most extensively penetrated the most diversified sciences and leavened even popular literature and the daily press, from which the average "educated consciousness" derives its mental pabulum. But this victory along the whole front was only the prelude to an internal struggle.

As we have seen, the doctrine of Hegel, taken as a whole, left plenty of room for giving shelter to the most diverse practical party views. And in the theoretical Germany of that time, two things above all were practical: religion and politics. Whoever placed the chief emphasis on the Hegelian *system* could be fairly conservative in both spheres; whoever regarded the dialectical *method* as the main thing could belong to the most extreme opposition, both in politics and religion. Hegel himself, despite the fairly frequent outbursts of revolutionary wrath in his works, seemed on the whole to be more inclined to the conservative side. Indeed, his system had cost him much more "hard mental plugging" than his method. Towards the end of the thirties, the cleavage in the school became more and more apparent. The Left wing, the so-called Young Hegelians, in their fight with the pietist orthodox and the feudal reactionaries, abandoned bit by bit that philosophical-genteel

reserve in regard to the burning questions of the day which up to that time had secured state toleration and even protection for their teachings. And when, in 1840, orthodox pietism and absolutist feudal reaction ascended the throne with Frederick William IV, open partisanship became unavoidable. The fight was still carried on with philosophical weapons, but no longer for abstract philosophical aims. It turned directly on the destruction of traditional religion and of the existing state. And while in the *Deutsche Jahrbücher*⁸⁶ the practical ends were still predominantly put forward in philosophical disguise, in the *Rheinische Zeitung*⁸⁷ of 1842 the Young Hegelian school revealed itself directly as the philosophy of the aspiring radical bourgeoisie and used the meagre cloak of philosophy only to deceive the censorship.

At that time, however, politics was a very thorny field, and hence the main fight came to be directed against religion; this fight, particularly since 1840, was indirectly also political. Strauss' *Life of Jesus*, published in 1835, had provided the first impulse. The theory therein developed of the formation of the gospel myths was combated later by Bruno Bauer with proof that a whole series of evangelic stories had been fabricated by the authors themselves. The controversy between these two was carried out in the philosophical disguise of a battle between "self-consciousness" and "substance". The question whether the miracle stories of the gospels came into being through unconscious-traditional myth-creation within the bosom of the community or whether they were fabricated by the evangelists themselves was magnified into the question whether, in world history, "substance" or "self-consciousness" was the decisive operative force. Finally came Stirner, the prophet of contemporary anarchism — Bakunin has taken a great deal from him — and capped the sovereign "self-consciousness" by his sovereign "ego".⁸⁸

We will not go further into this side of the decomposition process of the Hegelian school. More important for us is the following: the main body of the most determined Young Hegelians was, by the practical necessities of its fight against positive religion, driven back to Anglo-French materialism. This brought them into conflict with their school system. While materialism conceives nature as the sole reality, nature in the

Hegelian system represents merely the "alienation" of the absolute idea, so to say, a degradation of the idea. At all events, thinking and its thought-product, the idea, is here the primary, nature the derivative, which only exists at all by the condescension of the idea. And in this contradiction they floundered as well or as ill as they could.

Then came Feuerbach's *Essence of Christianity*. With one blow it pulverised the contradiction, in that without circumlocutions it placed materialism on the throne again. Nature exists independently of all philosophy. It is the foundation upon which we human beings, ourselves products of nature, have grown up. Nothing exists outside nature and man, and the higher beings our religious fantasies have created are only the fantastic reflection of our own essence. The spell was broken; the "system" was exploded and cast aside, and the contradiction, shown to exist only in our imagination, was dissolved.—One must himself have experienced the liberating effect of this book to get an idea of it. Enthusiasm was general; we all became at once Feuerbachians. How enthusiastically Marx greeted the new conception and how much—in spite of all critical reservations—he was influenced by it, one may read in *The Holy Family*.⁸⁹

Even the shortcomings of the book contributed to its immediate effect. Its literary, sometimes even high-flown, style secured for it a large public and was at any rate refreshing after long years of abstract and abstruse Hegelianising. The same is true of its extravagant deification of love, which, coming after the now intolerable sovereign rule of "pure reason", had its excuse, if not justification. But what we must not forget is that it was precisely these two weaknesses of Feuerbach that "true socialism", which had been spreading like a plague in "educated" Germany since 1844, took as its starting-point, putting literary phrases in the place of scientific knowledge, the liberation of mankind by means of "love" in place of the emancipation of the proletariat through the economic transformation of production—in short, losing itself in the nauseous fine writing and ecstasies of love typified by Herr Karl Grün.

Another thing we must not forget is this: the Hegelian school disintegrated, but Hegelian philosophy was not overcome

through criticism; Strauss and Bauer each took one of its sides and set it polemically against the other. Feuerbach broke through the system and simply discarded it. But a philosophy is not disposed of by the mere assertion that it is false. And so powerful a work as Hegelian philosophy, which had exercised so enormous an influence on the intellectual development of the nation, could not be disposed of by simply being ignored. It had to be "sublated" in its own sense, that is, in the sense that while its form had to be annihilated through criticism, the new content which had been won through it had to be saved. How this was brought about we shall see below.

But in the meantime the Revolution of 1848 thrust the whole of philosophy aside as unceremoniously as Feuerbach had thrust aside Hegel. And in the process Feuerbach himself was also pushed into the background.

II

The great basic question of all philosophy, especially of more recent philosophy, is that concerning the relation of thinking and being. From the very early times when men, still completely ignorant of the structure of their own bodies, under the stimulus of dream apparitions* came to believe that their thinking and sensation were not activities of their bodies, but of a distinct soul which inhabits the body and leaves it at death—from this time men have been driven to reflect about the relation between this soul and the outside world. If upon death it took leave of the body and lived on, there was no occasion to invent yet another distinct death for it. Thus arose the idea of its immortality, which at that stage of development appeared not at all as a consolation but as a fate against which it was no use fighting, and often enough, as among the Greeks,

* Among savages and lower barbarians the idea is still universal that the human forms which appear in dreams are souls which have temporarily left their bodies; the real man is, therefore, held responsible for acts committed by his dream apparition against the dreamer. Thus Im Thurn found this belief current, for example, among the Indians of Guiana in 1884. [*Note by Engels.*]

as a positive misfortune. Not religious desire for consolation, but the quandary arising from the common universal ignorance of what to do with this soul, once its existence had been accepted, after the death of the body, led in a general way to the tedious notion of personal immortality. In an exactly similar manner the first gods arose through the personification of natural forces. And these gods in the further development of religions assumed more and more an extramundane form, until finally by a process of abstraction, I might almost say of distillation, occurring naturally in the course of man's intellectual development, out of the many more or less limited and mutually limiting gods there arose in the minds of men the idea of the one exclusive God of the monotheistic religions.

Thus the question of the relation of thinking to being, the relation of the spirit to nature — the paramount question of the whole of philosophy — has, no less than all religion, its roots in the narrow-minded and ignorant notions of savagery. But this question could for the first time be put forward in its whole acuteness, could achieve its full significance, only after humanity in Europe had awakened from the long hibernation of the Christian Middle Ages. The question of the position of thinking in relation to being, a question which, by the way, had played a great part also in the scholasticism of the Middle Ages, the question: which is primary, spirit or nature — that question, in relation to the church, was sharpened into this: Did God create the world or has the world been in existence eternally?

The answers which the philosophers gave to this question split them into two great camps. Those who asserted the primacy of spirit to nature and, therefore, in the last instance, assumed world creation in some form or other — and among the philosophers, Hegel, for example, this creation often becomes still more intricate and impossible than in Christianity — comprised the camp of idealism. The others, who regarded nature as primary, belong to the various schools of materialism.

These two expressions, idealism and materialism, originally signify nothing else but this; and here too they are not used in any other sense. What confusion arises when some other meaning is put into them will be seen below.

But the question of the relation of thinking and being has yet another side: in what relation do our thoughts about the world surrounding us stand to this world itself? Is our thinking capable of the cognition of the real world? Are we able in our ideas and notions of the real world to produce a correct reflection of reality? In philosophical language this question is called the question of the identity of thinking and being, and the overwhelming majority of philosophers give an affirmative answer to this question. With Hegel, for example, its affirmation is self-evident; for what we cognise in the real world is precisely its thought-content—that which makes the world a gradual realisation of the absolute idea, which absolute idea has existed somewhere from eternity, independent of the world and before the world. But it is manifest without further proof that thought can know a content which is from the outset a thought-content. It is equally manifest that what is to be proved here is already tacitly contained in the premise. But that in no way prevents Hegel from drawing the further conclusion from his proof of the identity of thinking and being that his philosophy, because it is correct for his thinking, is therefore the only correct one, and that the identity of thinking and being must prove its validity by mankind immediately translating his philosophy from theory into practice and transforming the whole world according to Hegelian principles. This is an illusion which he shares with well-nigh all philosophers.

In addition there is yet a set of different philosophers—those who question the possibility of any cognition, or at least of an exhaustive cognition, of the world. To them, among the more modern ones, belong Hume and Kant, and they have played a very important role in philosophical development. What is decisive in the refutation of this view has already been said by Hegel, in so far as this was possible from an idealist standpoint. The materialistic additions made by Feuerbach are more ingenious than profound. The most telling refutation of this as of all other philosophical crotchets is practice, namely, experiment and industry. If we are able to prove the correctness of our conception of a natural process by making it ourselves, bringing it into being out of its conditions and making it serve our own purposes into the

bargain, then there is an end to the Kantian ungraspable "thing-in-itself". The chemical substances produced in the bodies of plants and animals remained just such "things-in-themselves" until organic chemistry began to produce them one after another, whereupon the "thing-in-itself" became a thing for us, as, for instance, alizarin, the colouring matter of the madder, which we no longer trouble to grow in the madder roots in the field, but produce much more cheaply and simply from coal tar. For three hundred years the Copernican solar system was a hypothesis with a hundred, a thousand or ten thousand chances to one in its favour, but still always a hypothesis. But when Leverrier, by means of the data provided by this system, not only deduced the necessity of the existence of an unknown planet, but also calculated the position in the heavens which this planet must necessarily occupy, and when Galle really found this planet,⁹⁰ the Copernican system was proved. If, nevertheless, the neo-Kantians are attempting to resurrect the Kantian conception in Germany and the agnostics that of Hume in England (where in fact it never became extinct), this is, in view of their theoretical and practical refutation accomplished long ago, scientifically a regression and practically merely a shamefaced way of surreptitiously accepting materialism, while denying it before the world.

But during this long period from Descartes to Hegel and from Hobbes to Feuerbach, the philosophers were by no means impelled, as they thought they were, solely by the force of pure reason. On the contrary, what really pushed them forward most was the powerful and ever more rapidly onrushing progress of natural science and industry. Among the materialists this was plain on the surface, but the idealist systems also filled themselves more and more with a materialist content and attempted pantheistically to reconcile the antithesis between mind and matter. Thus, ultimately, the Hegelian system represents merely a materialism idealistically turned upside down in method and content.

It is, therefore, comprehensible that Starcke in his characterisation of Feuerbach first of all investigates the latter's position in regard to this fundamental question of the relation of thinking and being. After a short introduction, in which the

views of the preceding philosophers, particularly since Kant, are described in unnecessarily ponderous philosophical language, and in which Hegel, by an all too formalistic adherence to certain passages of his works, gets far less than his due, there follows a detailed description of the course of development of Feuerbach's "metaphysics" itself, as this course was successively reflected in those writings of this philosopher which have a bearing here. This description is industriously and lucidly elaborated; only, like the whole book, it is loaded with a ballast of philosophical phraseology by no means everywhere unavoidable, which is the more disturbing in its effect the less the author keeps to the manner of expression of one and the same school, or even of Feuerbach himself, and the more he interjects expressions of very different tendencies, especially of the tendencies now rampant and calling themselves philosophical.

The course of evolution of Feuerbach is that of a Hegelian—a never quite orthodox Hegelian, it is true—into a materialist; an evolution which at a definite stage necessitates a complete rupture with the idealist system of his predecessor. With irresistible force Feuerbach is finally driven to the realisation that the Hegelian premundane existence of the "absolute idea", the "pre-existence of the logical categories" before the world existed, is nothing more than the fantastic survival of the belief in the existence of an extramundane creator; that the material, sensuously perceptible world to which we ourselves belong is the only reality; and that our consciousness and thinking, however suprasensuous they may seem, are the product of a material, bodily organ, the brain. Matter is not a product of mind, but mind itself is merely the highest product of matter. This is, of course, pure materialism. But, having got so far, Feuerbach stops short. He cannot overcome the customary philosophical prejudice, prejudice not against the thing but against the name materialism. He says:

"To me materialism is the foundation of the edifice of human essence and knowledge; but to me it is not what it is to the physiologist, to the natural scientist in the narrower sense, for example, to Moleschott, and necessarily is from their standpoint and profession, namely, the edifice itself. Backwards I fully agree with the materialists; but not forwards."⁹¹

Here Feuerbach lumps together the materialism that is a general world outlook resting upon a definite conception of the relation between matter and mind, and the special form in which this world outlook was expressed at a definite historical stage, namely, in the eighteenth century. More than that, he lumps it with the shallow, vulgarised form in which the materialism of the eighteenth century continues to exist today in the heads of naturalists and physicians, the form which was preached on their tours in the fifties by Büchner, Vogt and Moleschott. But just as idealism underwent a series of stages of development, so also did materialism. With each epoch-making discovery even in the sphere of natural science it has to change its form; and after history also was subjected to materialistic treatment, a new avenue of development has opened here too.

The materialism of the last century was predominantly mechanical, because at that time, of all natural sciences, only mechanics, and indeed only the mechanics of solid bodies—celestial and terrestrial—in short, the mechanics of gravity, had come to any definite close. Chemistry at that time existed only in its infantile, phlogistic form.⁹² Biology still lay in swaddling clothes; vegetable and animal organisms had been only roughly examined and were explained as the result of purely mechanical causes. What the animal was to Descartes, man was to the materialists of the eighteenth century—a machine. This exclusive application of the standards of mechanics to processes of a chemical and organic nature—in which processes the laws of mechanics are, indeed, also valid, but are pushed into the background by other, higher laws—constitutes the first specific but at that time inevitable limitation of classical French materialism.

The second specific limitation of this materialism lay in its inability to comprehend the universe as a process, as matter undergoing uninterrupted historical development. This was in accordance with the level of the natural science of that time, and with the metaphysical, that is, anti-dialectical manner of philosophising connected with it. Nature, so much was known, was in eternal motion. But according to the ideas of that time, this motion turned, also eternally, in a circle and therefore never moved from the spot; it produced the same results over and over again. This conception was at that time inevitable.

The Kantian theory of the origin of the solar system had been put forward but recently and was still regarded merely as a curiosity. The history of the development of the earth, geology, was still totally unknown, and the conception that the animate natural beings of today are the result of a long sequence of development from the simple to the complex could not at that time scientifically be put forward at all. The unhistorical view of nature was therefore inevitable. We have the less reason to reproach the philosophers of the eighteenth century on this account since the same thing is found in Hegel. According to him, nature, as a mere "alienation" of the idea, is incapable of development in time—capable only of extending its manifoldness in space, so that it displays simultaneously and alongside of one another all the stages of development comprised in it, and is condemned to an eternal repetition of the same processes. This absurdity of a development in space, but outside of time—the fundamental condition of all development—Hegel imposes upon nature just at the very time when geology, embryology, the physiology of plants and animals, and organic chemistry were being built up, and when everywhere on the basis of these new sciences brilliant foreshadowings of the later theory of evolution were appearing (for instance, Goethe and Lamarck). But the system demanded it; hence the method, for the sake of the system, had to become untrue to itself.

This same unhistorical conception prevailed also in the domain of history. Here the struggle against the remnants of the Middle Ages blurred the view. The Middle Ages were regarded as a mere interruption of history by a thousand years of universal barbarism. The great progress made in the Middle Ages—the extension of the area of European culture, the viable great nations taking form there next to each other, and finally the enormous technical progress of the fourteenth and fifteenth centuries—all this was not seen. Thus a rational insight into the great historical interconnections was made impossible, and history served at best as a collection of examples and illustrations for the use of philosophers.

The vulgarising pedlars, who in Germany in the fifties dabbled in materialism, by no means overcame this limitation of their teachers. All the advances of natural science which had

been made in the meantime served them only as new proofs against the existence of a creator of the world; and, indeed, they did not in the least make it their business to develop the theory any further. Though idealism was at the end of its tether and was dealt a death-blow by the Revolution of 1848, it had the satisfaction of seeing that materialism had for the moment fallen lower still. Feuerbach was unquestionably right when he refused to take responsibility for this materialism; only he should not have confounded the doctrines of these itinerant preachers with materialism in general.

Here, however, there are two things to be pointed out. First, even during Feuerbach's lifetime, natural science was still in that process of violent fermentation which only during the last fifteen years had reached a clarifying, relative conclusion. New scientific data were acquired to a hitherto unheard-of extent, but the establishing of interrelations, and thereby the bringing of order into this chaos of discoveries following closely upon each other's heels, has only quite recently become possible. It is true that Feuerbach had lived to see all three of the decisive discoveries — that of the cell, the transformation of energy and the theory of evolution named after Darwin. But how could the lonely philosopher, living in rural solitude, be able sufficiently to follow scientific developments in order to appreciate at their full value discoveries which natural scientists themselves at that time either still contested or did not know how to make adequate use of? The blame for this falls solely upon the wretched conditions in Germany, in consequence of which cobweb-spinning eclectic flea-crackers had taken possession of the chairs of philosophy, while Feuerbach, who towered above them all, had to rusticate and grow sour in a little village. It is therefore not Feuerbach's fault that the historical conception of nature, which had now become possible and which removed all the one-sidedness of French materialism, remained inaccessible to him.

Secondly, Feuerbach is quite correct in asserting that exclusively natural-scientific materialism is indeed "the foundation of the edifice of human knowledge, but not the edifice itself". For we live not only in nature but also in human society, and this also no less than nature has its history of development and its science. It was therefore a question of bringing the

science of society, that is, the sum-total of the so-called historical and philosophical sciences, into harmony with the materialist foundation, and of reconstructing it thereupon. But it did not fall to Feuerbach's lot to do this. In spite of the "foundation", he remained here bound by the traditional idealist fetters, a fact which he recognises in these words: "Backwards I agree with the materialists; but not forwards!" But it was Feuerbach himself who did not go "forwards" here, in the social domain, who did not get beyond his standpoint of 1840 or 1844. And this was again chiefly due to his reclusion which compelled him, who, of all philosophers, was the most inclined to social intercourse, to produce thoughts out of his solitary head instead of in amicable and hostile encounters with other men of his calibre. Later we shall see in detail how much he remained an idealist in this sphere.

It need only be added here that Starcke looks for Feuerbach's idealism in the wrong place.

"Feuerbach is an idealist; he believes in the progress of mankind." (P. 19.)
 "The foundation, the substructure of the whole, remains nevertheless idealism. Realism for us is nothing more than a protection against aberrations, while we follow our ideal trends. Are not compassion, love and enthusiasm for truth and justice ideal forces?" (P. VIII.)

In the first place, idealism here means nothing but the pursuit of ideal aims. But these necessarily have to do at the most with Kantian idealism and its "categorical imperative"; however, Kant himself called his philosophy "transcendental idealism" by no means because he dealt therein also with ethical ideals, but for quite other reasons, as Starcke will remember. The superstition that philosophical idealism is pivoted round a belief in ethical, that is, social, ideals, arose outside philosophy, among the German Philistines, who learned by heart from Schiller's poems the few morsels of philosophical culture they needed. No one has criticised more severely the impotent "categorical imperative" of Kant—impotent because it demands the impossible, and therefore never attains to any reality—no one has more cruelly derided the Philistine sentimental enthusiasm for unrealisable ideals purveyed by Schiller than precisely the complete idealist Hegel. (See, for example, his *Phenomenology*.)

In the second place, we simply cannot get away from the fact that everything that sets men acting must find its way through their brains—even eating and drinking, which begins as a consequence of the sensation of hunger or thirst transmitted through the brain, and ends as a result of the sensation of satisfaction likewise transmitted through the brain. The influences of the external world upon man express themselves in his brain, are reflected therein as feelings, thoughts, impulses, volitions—in short, as “ideal tendencies”, and in this form become “ideal powers”. If, then, a man is to be deemed an idealist because he follows “ideal tendencies” and admits that “ideal powers” have an influence over him, then every person who is at all normally developed is a born idealist and how, in that case, can there still be any materialists?

In the third place, the conviction that humanity, at least at the present moment, moves on the whole in a progressive direction has absolutely nothing to do with the antagonism between materialism and idealism. The French materialists no less than the deists Voltaire and Rousseau held this conviction to an almost fanatical degree, and often enough made the greatest personal sacrifices for it. If ever anybody dedicated his whole life to the “enthusiasm for truth and justice”—using this phrase in the good sense—it was Diderot, for instance. If, therefore, Starcke declares all this to be idealism, this merely proves that the word materialism, and the whole antagonism between the two trends, has lost all meaning for him here.

The fact is that Starcke, although perhaps unconsciously, in this makes an unpardonable concession to the traditional Philistine prejudice against the word materialism resulting from its long-continued defamation by the priests. By the word materialism the Philistine understands gluttony, drunkenness, lust of the eye, lust of the flesh, arrogance, cupidity, avarice, covetousness, profit-hunting and stock-exchange swindling—in short, all the filthy vices in which he himself indulges in private. By the word idealism he understands the belief in virtue, universal philanthropy and in a general way a “better world”, of which he boasts before others but in which he himself at the utmost believes only so long as he is having the blues or is going through the bankruptcy consequent upon his

customary "materialist" excesses. It is then that he sings his favourite song, What is man?—Half beast, half angel.

For the rest, Starcke takes great pains to defend Feuerbach against the attacks and doctrines of the vociferous assistant professors who today go by the name of philosophers in Germany. For people who are interested in this afterbirth of classical German philosophy this is, of course, a matter of importance; for Starcke himself it may have appeared necessary. We, however, will spare the reader this.

IV

Strauss, Bauer, Stirner, Feuerbach—these were the offshoots of Hegelian philosophy, in so far as they did not abandon the field of philosophy. Strauss, after his *Life of Jesus* and *Dogmatics*,⁹⁸ produced only literary studies in philosophy and ecclesiastical history after the fashion of Renan. Bauer only achieved something in the field of the history of the origin of Christianity, though what he did here was important. Stirner remained a curiosity, even after Bakunin blended him with Proudhon and labelled the blend "anarchism". Feuerbach alone was of significance as a philosopher. But not only did philosophy—claimed to soar above all special sciences and to be the science of sciences connecting them—remain to him an impassable barrier, an inviolable holy thing, but as a philosopher, too, he stopped halfway, was a materialist below and an idealist above. He was incapable of disposing of Hegel through criticism; he simply threw him aside as useless, while he himself, compared with the encyclopaedic wealth of the Hegelian system, achieved nothing positive beyond a turgid religion of love and a meagre, impotent morality.

Out of the dissolution of the Hegelian school, however, there developed still another tendency, the only one which has borne real fruit. And this tendency is essentially connected with the name of Marx.*

* Here I may be permitted to make a personal explanation. Lately repeated reference has been made to my share in this theory, and so I can

The separation from Hegelian philosophy was here also the result of a return to the materialist standpoint. That means it was resolved to comprehend the real world—nature and history—just as it presents itself to everyone who approaches it free from preconceived idealist crotchets. It was decided mercilessly to sacrifice every idealist crotchet which could not be brought into harmony with the facts conceived in their own and not in a fantastic interconnection. And materialism means nothing more than this. But here the materialistic world outlook was taken really seriously for the first time and was carried through consistently—at least in its basic features—in all domains of knowledge concerned.

Hegel was not simply put aside. On the contrary, one started out from his revolutionary side, described above, from the dialectical method. But in its Hegelian form this method was unusable. According to Hegel, dialectics is the self-development of the concept. The absolute concept does not only exist—unknown where—from eternity, it is also the actual living soul of the whole existing world. It develops into itself through all the preliminary stages which are treated at length in the *Logic* and which are all included in it. Then it “alienates” itself by changing into nature, where, without consciousness of itself, disguised as the necessity of nature, it goes through a new development and finally comes again to self-consciousness in man. This self-consciousness then elaborates itself again in history from the crude form until finally the absolute concept again comes to itself completely in the Hegelian philosophy. According to Hegel, therefore, the dialectical development apparent in nature and history, that is,

hardly avoid saying a few words here to settle this point. I cannot deny that both before and during my forty years' collaboration with Marx I had a certain independent share in laying the foundations of the theory, and more particularly in its elaboration. But the greater part of its leading basic principles, especially in the realm of economics and history, and, above all, their final trenchant formulation, belong to Marx. What I contributed—at any rate with the exception of my work in a few special fields—Marx could very well have done without me. What Marx accomplished I would not have achieved. Marx stood higher, saw further, and took a wider and quicker view than all the rest of us. Marx was a genius; we others were at best talented. Without him the theory would not be by far what it is today. It therefore rightly bears his name. [Note by Engels.]

the causal interconnection of the progressive movement from the lower to the higher, which asserts itself through all zig-zag movements and temporary retrogressions, is only a copy [*Abklatsch*] of the self-movement of the concept going on from eternity, no one knows where, but at all events independently of any thinking human brain. This ideological perversion had to be done away with. We comprehended the concepts in our heads once more materialistically — as images [*Abbilder*] of real things instead of regarding the real things as images of this or that stage of the absolute concept. Thus dialectics reduced itself to the science of the general laws of motion, both of the external world and of human thought — two sets of laws which are identical in substance, but differ in their expression in so far as the human mind can apply them consciously, while in nature, and also up to now for the most part in human history, these laws assert themselves unconsciously, in the form of external necessity, in the midst of an endless series of seeming accidents. Thereby the dialectic of concepts itself became merely the conscious reflex of the dialectical motion of the real world and thus the dialectic of Hegel was placed upon its head; or rather, turned off its head, on which it was standing, and placed upon its feet. And this materialist dialectic, which for years has been our best working tool and our sharpest weapon, was, remarkably enough, discovered not only by us but also, independently of us and even of Hegel, by a German worker, Joseph Dietzgen.*

In this way, however, the revolutionary side of Hegelian philosophy was again taken up and at the same time freed from the idealist trimmings which with Hegel had prevented its consistent execution. The great basic thought that the world is not to be comprehended as a complex of ready-made *things*, but as a complex of *processes*, in which the things apparently stable no less than their mind images in our heads, the concepts, go through an uninterrupted change of coming into being and passing away, in which, in spite of all seeming accidentality and of all temporary retrogression, a progressive development

* See *Das Wesen der menschlichen Kopfarbeit, dargestellt von einem Handarbeiter* [*The Nature of Human Brainwork, Described by a Manual Worker*]. Hamburg, Meissner. [Note by Engels.]

asserts itself in the end—this great fundamental thought has, especially since the time of Hegel, so thoroughly permeated ordinary consciousness that in this generality it is now scarcely ever contradicted. But to acknowledge this fundamental thought in words and to apply it in reality in detail to each domain of investigation are two different things. If, however, investigation always proceeds from this standpoint, the demand for final solutions and eternal truths ceases once for all; one is always conscious of the necessary limitation of all acquired knowledge, of the fact that it is conditioned by the circumstances in which it was acquired. On the other hand, one no longer permits oneself to be imposed upon by the antitheses, insuperable for the still common old metaphysics, between true and false, good and bad, identical and different, necessary and accidental. One knows that these antitheses have only a relative validity; that that which is recognised now as true has also its latent false side which will later manifest itself, just as that which is now regarded as false has also its true side by virtue of which it could previously be regarded as true. One knows that what is maintained to be necessary is composed of sheer accidents and that the so-called accidental is the form behind which necessity hides itself—and so on.

The old method of investigation and thought which Hegel calls “metaphysical”, which preferred to investigate *things* as given, as fixed and stable, a method the relics of which still strongly haunt people’s minds, had a great deal of historical justification in its day. It was necessary first to examine things before it was possible to examine processes. One had first to know what a particular thing was before one could observe the changes it was undergoing. And such was the case with natural science. The old metaphysics, which accepted things as finished objects, arose from a natural science which investigated dead and living things as finished objects. But when this investigation had progressed so far that it became possible to take the decisive step forward, that is, to pass on to the systematic investigation of the changes which these things undergo in nature itself, then the last hour of the old metaphysics struck in the realm of philosophy also. And in fact, while natural science up to the end of the last century was predominantly a *collecting* science, a science of finished things,

in our century it is essentially a *systematising* science, a science of the processes, of the origin and development of these things and of the interconnection which binds all these natural processes into one great whole. Physiology, which investigates the processes occurring in plant and animal organisms; embryology, which deals with the development of individual organisms from germ to maturity; geology, which investigates the gradual formation of the earth's surface — all these are the offspring of our century.

But, above all, there are three great discoveries which have enabled our knowledge of the interconnection of natural processes to advance by leaps and bounds: first, the discovery of the cell as the unit from whose multiplication and differentiation the whole plant and animal body develops, so that not only is the development and growth of all higher organisms recognised to proceed according to a single general law, but also, in the capacity of the cell to change, the way is pointed out by which organisms can change their species and thus go through a more than individual development. Second, the transformation of energy, which has demonstrated to us that all the so-called forces operative in the first instance in inorganic nature — mechanical force and its complement, so-called potential energy, heat, radiation (light, or radiant heat), electricity, magnetism and chemical energy — are different forms of manifestation of universal motion, which pass into one another in definite proportions so that in place of a certain quantity of the one which disappears, a certain quantity of another makes its appearance and thus the whole motion of nature is reduced to this incessant process of transformation from one form into another. Finally, the proof which Darwin first developed in connected form that the stock of organic products of nature environing us today, including man, is the result of a long process of evolution from a few originally unicellular germs, and that these again have arisen from protoplasm or albumen, which came into existence by chemical means.

Thanks to these three great discoveries and the other immense advances in natural science, we have now arrived at the point where we can demonstrate the interconnection between the processes in nature not only in particular spheres

but also the interconnection of these particular spheres on the whole, and so can present in an approximately systematic form a comprehensive view of the interconnection in nature by means of the facts provided by empirical natural science itself. To furnish this comprehensive view was formerly the task of so-called natural philosophy. It could do this only by putting in place of the real but as yet unknown interconnections ideal, fancied ones, filling in the missing facts by figments of the mind and bridging the actual gaps merely in imagination. In the course of this procedure it conceived many brilliant ideas and foreshadowed many later discoveries, but it also produced a considerable amount of nonsense, which indeed could not have been otherwise. Today, when one needs to comprehend the results of natural scientific investigation only dialectically, that is, in the sense of their own interconnection, in order to arrive at a "system of nature" sufficient for our time; when the dialectical character of this interconnection is forcing itself against their will even into the metaphysically-trained minds of the natural scientists, today natural philosophy is finally disposed of. Every attempt at resurrecting it would be not only superfluous but a *step backwards*.

But what is true of nature, which is hereby recognised also as a historical process of development, is likewise true of the history of society in all its branches and of the totality of all sciences which occupy themselves with things human (and divine). Here, too, the philosophy of history, of law, of religion, etc., has consisted in the substitution of an interconnection fabricated in the mind of the philosopher for the real interconnection to be demonstrated in the events; has consisted in the comprehension of history as a whole as well as in its separate parts, as the gradual realisation of ideas—and naturally always only the pet ideas of the philosopher himself. According to this, history worked unconsciously but of necessity towards a certain ideal goal set in advance—as, for example, in Hegel, towards the realisation of his absolute idea—and the unalterable trend towards this absolute idea formed the inner interconnection in the events of history. A new mysterious providence—unconscious or gradually coming into consciousness—was thus put in the place of the real, still unknown interconnection. Here, therefore, just as in the

realm of nature, it was necessary to do away with these fabricated, artificial interconnections by the discovery of the real ones — a task which ultimately amounts to the discovery of the general laws of motion which assert themselves as the ruling ones in the history of human society.

Written at the beginning of
1886

Karl Marx and Frederick Engels, *Selected Works* in three volumes, Vol. 3, Moscow, 1973, pp. 337-53, 360-65

Frederick Engels

From **Special Introduction**
to the English Edition of 1892
of *Socialism: Utopian and Scientific*

What, indeed, is agnosticism but, to use an expressive Lancashire term, "shamefaced" materialism? The agnostic's conception of Nature is materialistic throughout. The entire natural world is governed by law, and absolutely excludes the intervention of action from without. But, he adds, we have no means either of ascertaining or of disproving the existence of some Supreme Being beyond the known universe. Now, this might hold good at the time when Laplace, to Napoleon's question, why in the great astronomer's *Mécanique céleste* the Creator was not even mentioned, proudly replied: "*Je n'avais pas besoin de cette hypothèse.*" But nowadays, in our evolutionary conception of the universe, there is absolutely no room for either a Creator or a Ruler; and to talk of a Supreme Being shut out from the whole existing world, implies a contradiction in terms, and, as it seems to me, a gratuitous insult to the feelings of religious people.

Again, our agnostic admits that all our knowledge is based upon the information imparted to us by our senses. But, he adds, how do we know that our senses give us correct representations of the objects we perceive through them? And he proceeds to inform us that, whenever he speaks of objects or their qualities, he does in reality not mean these objects and qualities, of which he cannot know anything for certain, but merely the impressions which they have produced on his senses. Now, this line of reasoning seems undoubtedly hard to beat by mere argumentation. But before there was argumentation there was action. *In Anfang war die Tat.* And human action had solved the difficulty long before human ingenuity

invented it. The proof of the pudding is in the eating. From the moment we turn to our own use these objects, according to the qualities we perceive in them, we put to an infallible test the correctness or otherwise of our sense-perceptions. If these perceptions have been wrong, then our estimate of the use to which an object can be turned must also be wrong, and our attempt must fail. But if we succeed in accomplishing our aim, if we find that the object does agree with our idea of it, and does answer the purpose we intended it for, then that is positive proof that our perceptions of it and of its qualities, *so far*, agree with reality outside ourselves. And whenever we find ourselves face to face with a failure, then we generally are not long in making out the cause that made us fail; we find that the perception upon which we acted was either incomplete and superficial, or combined with the results of other perceptions in a way not warranted by them—what we call defective reasoning. So long as we take care to train and to use our senses properly, and to keep our action within the limits prescribed by perceptions properly made and properly used, so long we shall find that the result of our action proves the conformity of our perceptions with the objective nature of the things perceived. Not in one single instance, so far, have we been led to the conclusion that our sense-perceptions, scientifically controlled, induce in our minds ideas respecting the outer world that are, by their very nature, at variance with reality, or that there is an inherent incompatibility between the outer world and our sense-perceptions of it.

But then come the neo-Kantian agnostics and say: We may correctly perceive the qualities of a thing, but we cannot by any sensible or mental process grasp the thing-in-itself. This "thing-in-itself" is beyond our ken. To this Hegel, long since, has replied: If you know all the qualities of a thing, you know the thing itself; nothing remains but the fact that the said thing exists without us; and when your senses have taught you that fact, you have grasped the last remnant of the thing-in-itself, Kant's celebrated unknowable *Ding an sich*. To which it may be added that in Kant's time our knowledge of natural objects was indeed so fragmentary that he might well suspect, behind the little we knew about each of them, a mysterious "thing-in-itself". But one after another these ungraspable things have

been grasped, analysed, and, what is more, *reproduced* by the giant progress of science; and what we can produce we certainly cannot consider as unknowable. To the chemistry of the first half of this century organic substances were such mysterious objects; now we learn to build them up one after another from their chemical elements without the aid of organic processes. Modern chemists declare that as soon as the chemical constitution of no matter what body is known, it can be built up from its elements. We are still far from knowing the constitution of the highest organic substances, the albuminous bodies; but there is no reason why we should not, if only after centuries, arrive at the knowledge and, armed with it, produce artificial albumen. But if we arrive at that, we shall at the same time have produced organic life, for life, from its lowest to its highest forms, is but the normal mode of existence of albuminous bodies.

As soon, however, as our agnostic has made these formal mental reservations, he talks and acts as the rank materialist he at bottom is. He may say that, as far as *we* know, matter and motion, or as it is now called, energy, can neither be created nor destroyed, but that we have no proof of their not having been created at some time or other. But if you try to use this admission against him in any particular case, he will quickly put you out of court. If he admits the possibility of spiritualism *in abstracto*, he will have none of it *in concreto*. As far as we know and can know, he will tell you, there is no Creator and no Ruler of the universe; as far as we are concerned, matter and energy can neither be created nor annihilated; for us, mind is a mode of energy, a function of the brain; all we know is that the material world is governed by immutable laws, and so forth. Thus, as far as he is a scientific man, as far as he *knows* anything, he is a materialist; outside his science, in spheres about which he knows nothing, he translates his ignorance into Greek and calls it agnosticism.

Written on April 20, 1892

Karl Marx and Frederick Engels, *Selected Works* in three volumes, Vol. 3, Moscow, 1973, pp. 100-02

II Lenin

From *Materialism and Empirio-criticism*

How Certain "Marxists" in 1908 and Certain Idealists in 1710 Refuted Materialism

Anyone in the least acquainted with philosophical literature must know that scarcely a single contemporary professor of philosophy (or of theology) can be found who is not directly or indirectly engaged in refuting materialism. They have declared materialism refuted a thousand times, yet are continuing to refute it for the thousand and first time. All our revisionists are engaged in refuting materialism, pretending, however, that actually they are only refuting the materialist Plekhanov, and not the materialist Engels, nor the materialist Feuerbach, nor the materialist views of J. Dietzgen—and, moreover, that they are refuting materialism from the standpoint of "recent" and "modern" positivism, natural science, and so forth. Without citing quotations, which anyone desiring to do so could cull by the hundred from the books above mentioned, I shall refer to those arguments by which materialism is being combated by Bazarov, Bogdanov, Yushkevich, Valentinov, Chernov* and other Machists. I shall use this latter term throughout as a synonym for "empirio-critics" because it is shorter and simpler and has already acquired rights of citizenship in Russian literature. That Ernst

* V. Chernov, *Philosophical and Sociological Studies*, Moscow, 1907. The author is as ardent an adherent of Avenarius and enemy of dialectical materialism as Bazarov and Co.

Mach is the most popular representative of empirio-criticism today is universally acknowledged in philosophical literature,* while Bogdanov's and Yushkevich's departures from "pure" Machism are of absolutely secondary importance, as will be shown later.

The materialists, we are told, recognise something unthinkable and unknowable — "things-in-themselves" — matter "outside of experience" and outside of our knowledge. They lapse into genuine mysticism by admitting the existence of something beyond, something transcending the bounds of "experience" and knowledge. When they say that matter, by acting upon our sense-organs, produces sensations, the materialists take as their basis the "unknown", nothingness; for do they not themselves declare our sensations to be the only source of knowledge? The materialists lapse into "Kantianism" (Plekhanov, by recognising the existence of "things-in-themselves", i.e., things outside of our consciousness); they "double" the world and preach "dualism", for the materialists hold that beyond the appearance there is the thing-in-itself; beyond the immediate sense data there is something else, some fetish, an "idol", an absolute, a source of "metaphysics", a double of religion ("holy matter", as Bazarov says).

Such are the arguments levelled by the Machists against materialism, as repeated and retold in varying keys by the above-mentioned writers.

In order to test whether these arguments are new, and whether they are really directed against only one Russian materialist who "lapsed into Kantianism", we shall give some detailed quotations from the works of an old idealist, George Berkeley. This historical inquiry is all the more necessary in the introduction to our comments since we shall have frequent occasion to refer to Berkeley and his trend in philosophy, for the Machists misrepresent both the relation of Mach to Berkeley and the essence of Berkeley's philosophical line.

The work of Bishop George Berkeley, published in 1710 under the title *Treatise Concerning the Principles of Human*

* See, for instance, Dr. Richard Höningwald, *Ueber die Lehre Hume's von der Realität der Aussendunge*, Berlin, 1904, S. 26.

*Knowledge**, begins with the following argument: "It is evident to anyone who takes a survey of the *objects* of human knowledge, that they are either ideas actually imprinted on the senses; or else such as are perceived by attending to the passions and operations of the mind; or lastly, ideas formed by help of memory and imagination.... By sight I have the ideas of light and colours, with their several degrees and variations. By touch I perceive hard and soft, heat and cold, motion and resistance.... Smelling furnishes me with odours; the palate with tastes; and hearing conveys sounds.... And as several of these are observed to accompany each other, they come to be marked by one name, and so to be reputed as one thing. Thus, for example, a certain colour, taste, smell, figure and consistence having been observed to go together, are accounted one distinct thing, signified by the name *apple*; other collections of ideas constitute a stone, a tree, a book, and the like sensible things..." (§ 1).

Such is the content of the first section of Berkeley's work. We must remember that Berkeley takes as the basis of his philosophy "hard, soft, heat, cold, colours, tastes, odours", etc. For Berkeley, things are "collections of ideas", this last word designating the aforesaid, let us say, qualities or sensations, and not abstract thoughts.

Berkeley goes on to say that besides these "ideas or objects of knowledge" there exists something that perceives them—"mind, spirit, soul or *myself*" (§ 2). It is self-evident, the philosopher concludes, that "ideas" cannot exist outside of the mind that perceives them. In order to convince ourselves of this it is enough to consider the meaning of the word "exist". "The table I write on I say exists, that is, I see and feel it; and if I were out of my study I should say it existed; meaning thereby that if I was in my study I might perceive it...." That is what Berkeley says in § 3 of his work and thereupon he begins a polemic against the people whom he calls materialists (§§ 18, 19, etc.). "For as to what is said of the absolute existence of unthinking things, without any relation to their being per-

* Vol. I of *Works of George Berkeley*, edited by A. Fraser, Oxford, 1871. There is a Russian translation.

ceived," he says, "that is to me perfectly unintelligible." To exist means to be perceived ("Their *esse* is *percipi*," § 3—a dictum of Berkeley's frequently quoted in textbooks on the history of philosophy). "It is indeed an opinion strangely prevailing amongst men, that houses, mountains, rivers, and in a word all sensible objects have an existence, natural or real, distinct from their being perceived by the understanding" (§ 4). This opinion is a "manifest contradiction", says Berkeley. "For, what are the afore-mentioned objects but the things we perceive by sense? and what do we perceive besides our own ideas or sensations? and is it not plainly repugnant that any one of these, or any combination of them, should exist unperceived?" (§ 4.)

The expression "collection of ideas" Berkeley now replaces by what to him is an equivalent expression, *combination of sensations*, and accuses the materialists of a "repugnant" tendency to go still further, of seeking some source of this complex—that is, of this combination of sensations. In § 5 the materialists are accused of trifling with an abstraction, for to divorce the sensation from the object, according to Berkeley, is an empty abstraction. "In truth," he says at the end of § 5, omitted in the second edition, "the object and the sensation are the same thing, and cannot therefore be abstracted from each other." Berkeley goes on: "But, say you, though the ideas themselves do not exist without the mind, yet there may be things like them, whereof they are copies or resemblances; which things exist without the mind, in an unthinking substance. I answer, an idea can be like nothing but an idea; a colour or figure can be like nothing but another colour or figure.... I ask whether those supposed originals, or external things, of which our ideas are the pictures or representations, be themselves perceivable or not? If they are, then they are ideas and we have gained our point; but if you say they are not, I appeal to anyone whether it be sense to assert a colour is like something which is invisible; hard or soft, like something which is intangible; and so of the rest" (§ 8).

As the reader sees, Bazarov's "arguments" against Plekhanov concerning the problem of whether things can exist outside of us apart from their action on us do not differ in the least from Berkeley's arguments against the materialists whom

he does not mention by name. Berkeley considers the notion of the existence of "matter or corporeal substance" (§ 9) such a "contradiction", such an "absurdity that it is really not worth wasting time exposing it. He says: "But because the tenet of the existence of Matter seems to have taken so deep a root in the minds of philosophers, and draws after it so many ill consequences, I choose rather to be thought prolix and tedious than omit anything that might conduce to the full discovery and extirpation of that prejudice" (§9).

We shall presently see to what ill consequences Berkeley is referring. Let us first finish with his theoretical arguments against the materialists. Denying the "absolute" existence of objects, that is, the existence of things outside human knowledge, Berkeley bluntly defines the viewpoint of his opponents as being that they recognise the "thing-in-itself". In § 24 Berkeley writes in italics that the opinion which he is refuting recognises "*the absolute existence of sensible objects in themselves, or without the mind*" (op. cit., pp. 167-68). The two fundamental lines of philosophical outlook are here depicted with the straightforwardness, clarity and precision that distinguish the classical philosophers from the inventors of "new" systems in our day. Materialism is the recognition of "objects in themselves", or outside the mind; ideas and sensations are copies or images of those objects. The opposite doctrine (idealism) claims that objects do not exist "without the mind"; objects are "combinations of sensations".

This was written in 1710, fourteen years before the birth of Immanuel Kant, yet our Machists, supposedly on the basis of "recent" philosophy, have made the discovery that the recognition of "things-in-themselves" is a result of the infection or distortion of materialism by Kantianism! The discoveries of the Machists are the product of an astounding ignorance of the history of the basic philosophical trends.

Their next "new" thought consists in this: that the concepts "matter" or "substance" are remnants of old uncritical views. Mach and Avenarius, you see, have advanced philosophical thought, deepened analysis and eliminated these "absolutes", "unchangeable entities", etc. If you wish to check such assertions with the original sources, go to Berkeley and you will see that they are pretentious fictions. Berkeley says quite

definitely that matter is a "nonentity" (§ 68), that matter is *nothing* (§ 80). "You may," thus Berkeley ridicules the materialists, "if so it shall seem good, use the word 'matter' in the same sense as other men use 'nothing'" (op. cit., pp. 196-97). At the beginning, says Berkeley, it was believed that colours, odours, etc., "really exist", but subsequently such views were renounced, and it was seen that they only exist in dependence on our sensations. But this elimination of old erroneous concepts was not completed; a remnant is the concept "substance" (§ 73), which is also a "prejudice" (p. 195), and which was finally exposed by Bishop Berkeley in 1710! In 1908 there are still humorists who seriously believe Avenarius, Petzoldt, Mach and Co., when they maintain that it is only "recent positivism" and "recent natural science" which have at last succeeded in eliminating these "metaphysical" concepts.

These same humorists (Bogdanov among them) assure their readers that it was the new philosophy that explained the error of the "duplication of the world" in the doctrine of the eternally refuted materialists, who speak of some sort of a "reflection" by the human consciousness of things existing outside the consciousness. A mass of sentimental verbiage has been written by the above-named authors about this "duplication". Owing to forgetfulness or ignorance, they failed to add that these new discoveries had already been discovered in 1710. Berkeley says:

"Our knowledge of these [i.e., ideas or things] has been very much obscured and confounded, and we have been led into very dangerous errors by supposing a twofold existence of the objects of sense—the one *intelligible* or in the mind, the other *real* and without the mind" (i.e., outside consciousness). And Berkeley ridicules this "absurd" notion, which admits the possibility of thinking the unthinkable! The source of the "absurdity", of course, follows from our supposing a difference between "things" and "ideas" (§ 87), "the supposition of external objects". This same source—as discovered by Berkeley in 1710 and rediscovered by Bogdanov in 1908—engenders belief in fetishes and idols. "The existence of Matter," says Berkeley, "or bodies unperceived, has not only been the main support of Atheists and Fatalists, but on the same

principle doth Idolatry likewise in all its various forms depend" (§ 94).

Here we arrive at those "ill consequences" derived from the "absurd" doctrine of the existence of an external world which compelled Bishop Berkeley not only to refute this doctrine theoretically, but passionately to persecute its adherents as enemies. "For as we have shown the doctrine of Matter or corporeal Substance to have been the main pillar and support of Scepticism, so likewise upon the same foundation have been raised all the impious schemes of Atheism and Irreligion.... How great a friend material substance has been to Atheists in all ages were needless to relate. All their monstrous systems have so visible and necessary a dependence on it, that when this corner-stone is once removed, the whole fabric cannot choose but fall to the ground, insomuch that it is no longer worth while to bestow a particular consideration on the absurdities of every wretched sect of Atheists" (§ 92, *op. cit.*, pp. 203-04).

"Matter being once expelled out of nature drags with it so many sceptical and impious notions, such an incredible number of disputes and puzzling questions ["the principle of economy of thought", discovered by Mach in the seventies, "philosophy as a conception of the world according to the principle of minimum expenditure of effort"—Avenarius in 1876!] which have been thorns in the sides of divines as well as philosophers, and made so much fruitless work for mankind, that if the arguments we have produced against it are not found equal to demonstration (as to me they evidently seem), yet I am sure all friends to knowledge, peace, and religion have reason to wish they were" (§ 96).

Frankly and bluntly did Bishop Berkeley argue! In our time these very same thoughts on the "economical" elimination of "matter" from philosophy are enveloped in a much more artful form, and confused by the use of a "new" terminology, so that these thoughts may be taken by naive people for "recent" philosophy!

But Berkeley was not only candid as to the tendencies of his philosophy, he also endeavoured to cover its idealistic nakedness, to represent it as being free from absurdities and acceptable to "common sense". Instinctively defending himself against the accusation of what would nowadays be called

subjective idealism and solipsism, he says that by our philosophy "we are not deprived of any one thing in nature" (§ 34). Nature remains, and the distinction between realities and chimeras remains, only "they both equally exist in the mind". "I do not argue against the existence of any one thing that we can apprehend, either by sense or reflection. That the things I see with my eyes and touch with my hands do exist, really exist, I make not the least question. The only thing whose existence we deny is that which *philosophers* [Berkeley's italics] call Matter or corporeal substance. And in doing this there is no damage done to the rest of mankind, who, I dare say, will never miss it... The Atheist indeed will want the colour of an empty name to support his impiety...."

This thought is made still clearer in § 37, where Berkeley replies to the charge that his philosophy destroys corporeal substance: "... if the word *substance* be taken in the vulgar sense, for a *combination* of sensible qualities, such as extension, solidity, weight, and the like—this we cannot be accused of taking away; but if it be taken in a philosophic sense, for the support of accidents or qualities without the mind—then indeed I acknowledge that we take it away, if one may be said to take away that which never had any existence, not even in the imagination."

Not without good cause did the English philosopher, Fraser, an idealist and adherent of Berkeleianism, who published Berkeley's works and supplied them with his own annotations, designate Berkeley's doctrine by the term "natural realism" (op. cit., p. x). This amusing terminology must by all means be noted, for it in fact expresses Berkeley's intention to counterfeit realism. In our further exposition we shall frequently find "recent" "positivists" repeating the same stratagem or counterfeit in a different form and in a different verbal wrapping. Berkeley does not deny the existence of real things! Berkeley does not go counter to the opinion of all humanity! Berkeley denies "only" the teaching of the philosophers, viz., the theory of knowledge, which seriously and resolutely takes as the foundation of all its reasoning the recognition of the external world and the reflection thereof in the minds of men. Berkeley does not deny natural science, which has always adhered (mostly unconsciously) to this, i. e., the materialist, theory of

knowledge. We read in § 59: "We may, from the experience [Berkeley—a philosophy of "pure experience"]* we have had of the train and succession of ideas in our minds ... be enabled to pass a right judgement of what would have appeared to us, in case we were placed in circumstances very different from those we are in at present. Herein consists the knowledge of nature, which [mark this!] may preserve its use and certainty very consistently with what hath been said."

Let us regard the external world, nature, as "a combination of sensations" evoked in our mind by a deity. Acknowledge this and give up searching for the "ground" of these sensations outside the mind, outside man, and I will acknowledge within the framework of my idealist theory of knowledge *all* natural science and all the use and certainty of its deductions. It is precisely this framework, and only this framework, that I need for my deductions in favour of "peace and religion". Such is Berkeley's train of thought. It correctly expresses the essence of idealist philosophy and its social significance, and we shall encounter it later when we come to speak of the relation of Machism to natural science.

Let us now consider another recent discovery that was borrowed from Bishop Berkeley in the twentieth century by the recent positivist and critical realist, P. Yushkevich. This discovery is "empirio-symbolism". "Berkeley," says Fraser, "thus reverts to his favourite theory of a Universal Natural Symbolism" (op. cit., p. 190). Did these words not occur in an edition of 1871, one might have suspected the English fideist philosopher Fraser of plagiarising both the modern mathematician and physicist Poincaré and the Russian "Marxist" Yushkevich!

This theory of Berkeley's, which threw Fraser into raptures, is set forth by the Bishop as follows:

"The connexion of ideas [do not forget that for Berkeley ideas and things are identical] does not imply the relation of *cause* and *effect*, but only of a mark or *sign* with the thing *signified*" (§ 65). "Hence, it is evident that those things which,

* In his preface Fraser insists that both Berkeley and Locke "appeal exclusively to experience" (p. 117).

under the notion of a cause co-operating or concurring to the production of effects, are altogether inexplicable, and run us into great absurdities, may be very naturally explained ... when they are considered only as marks or signs for our information" (§ 66). Of course, in the opinion of Berkeley and Fraser, it is no other than the deity who informs us by means of these "empirio-symbols". The epistemological significance of *symbolism* in Berkeley's theory, however, consists in this, that it is to replace "the doctrine" which "pretends to explain things by corporeal causes" (§ 66).

We have before us two philosophical trends in the question of causality. One "pretends to explain things by corporeal causes". It is clear that it is connected with the "doctrine of matter" refuted as an "absurdity" by Bishop Berkeley. The other reduces the "notion of cause" to the notion of a "mark or sign" which serves for "our information" (supplied by God). We shall meet these two trends in a twentieth-century garb when we analyse the attitudes of Machism and dialectical materialism to this question.

Further, as regards the question of reality, it ought also to be remarked that Berkeley, refusing as he does to recognise the existence of things outside the mind, tries to find a criterion for distinguishing between the real and the fictitious. In § 36 he says that those "ideas" which the minds of men evoke at pleasure "are faint, weak, and unsteady in respect to others they perceive by sense; which, being impressed upon them according to certain rules or laws of nature, speak themselves about the effects of a Mind more powerful and wise than human spirits. These latter are said to have more *reality* in them than the former; by which is meant that they are more affecting, orderly and distinct, and that they are not fictions of the mind perceiving them...." Elsewhere (§ 84) Berkeley tries to connect the notion of reality with the simultaneous perception of the same sensations by many people. For instance, how shall we resolve the question as to the reality of the transformation of water into wine, of which, let us say, we are being told? "If at table all who were present should see, and smell, and taste, and drink wine, and find the effects of it, with me there could be no doubt of its reality." And Fraser explains: "Simultaneous perception of the 'same' ... *sense-ideas*, by

different persons, as distinguished from purely individual consciousness of feelings and *fancies*, is here taken as a test of the ... *reality* of the former."

From this it is evident that Berkeley's subjective idealism is not to be interpreted as though it ignored the distinction between individual and collective perception. On the contrary, he attempts on the basis of this distinction to construct a criterion of reality. Deriving "ideas" from the action of a deity upon the human mind, Berkeley thus approaches objective idealism: the world proves to be not my idea but the product of a single supreme spiritual cause that creates both the "laws of nature" and the laws distinguishing "more real" ideas from less real, and so forth.

In another work, *Three Dialogues Between Hylas and Philonous* (1713), where he endeavours to present his views in an especially popular form, Berkeley sets forth the opposition between his doctrine and the materialist doctrine in the following way:

"I assert as well as you [materialists] that, since we are affected from without, we must allow Powers to be without, in a Being distinct from ourselves.... But then we differ as to the kind of this powerful being. I will have it to be Spirit, you Matter, or I know not what (I may add too, you know not what) third nature..." (op. cit., p. 335).

Fraser comments: this is the gist of the whole question; according to the materialists, sensible phenomena are due to *material substance*, or to some unknown "third nature"; according to Berkeley, to Rational Will; according to Hume and the positivists, their origin is absolutely unknown, and we can only generalise them inductively, through custom, as facts.

Here the English Berkeleian, Fraser, approaches from his consistent idealist standpoint the same fundamental "lines" in philosophy which were so clearly characterised by the materialist Engels. In his work *Ludwig Feuerbach* Engels divides philosophers into "two great camps"—materialists and idealists. Engels—dealing with theories of the two trends much more developed, varied and rich in content than Fraser dealt with—sees the fundamental distinction between them in the fact that while for the materialists nature is primary and spirit

secondary, for the idealists the reverse is the case. In between these two camps Engels places the adherents of Hume and Kant, who deny the possibility of knowing the world, or at least of knowing it fully, and calls them *agnostics*.⁹⁴ In his *Ludwig Feuerbach* Engels applies this term only to the adherents of Hume (those people whom Fraser calls, and who like to call themselves, "positivists"). But in his article "On Historical Materialism", Engels explicitly speaks of the standpoint of "*the neo-Kantian agnostic*",⁹⁵ regarding neo-Kantianism⁹⁶ as a variety of agnosticism.*

We cannot dwell here on this remarkably correct and profound judgement of Engels' (a judgement which is shamelessly ignored by the Machists). We shall discuss it in detail later on. For the present we shall confine ourselves to pointing to this Marxist terminology and to this meeting of extremes: the views of a consistent materialist and of a consistent idealist on the fundamental philosophical trends. In order to illustrate these trends (with which we shall constantly have to deal in our further exposition) let us briefly note the views of outstanding philosophers of the eighteenth century who pursued a different path from Berkeley.

Here are Hume's arguments. In his *An Enquiry Concerning Human Understanding*, in the chapter (XII) on sceptical philosophy, he says: "It seems evident, that men are carried, by a natural instinct or prepossession, to repose faith in their senses; and that, without any reasoning, or even almost before the use of reason, we always suppose an external universe, which depends not on our perception, but would exist though we and every sensible creature were absent or annihilated. Even the animal creations are governed by a like opinion, and preserve this belief of external objects, in all their thoughts, designs, and actions.... But this universal and primary opinion of all men is soon destroyed by the slightest philosophy, which teaches us that nothing can ever be present to the mind but an image or perception, and that the senses are only the inlets,

* Fr. Engels, "Ueber historischen Materialismus", *Neue Zeit*,⁹⁷ XI. Jg., Bd. I (1892-93), Nr. I, S. 18. Translated from the English by Engels himself. The Russian translation in *Historical Materialism* (St. Petersburg, 1908, p. 167) is inaccurate.

through which these images are conveyed, without being able to produce any immediate intercourse between the mind and the object. The table, which we see, seems to diminish, as we remove farther from it: But the real table, which exists independent of us, suffers no alteration: It was, therefore, nothing but its image, which was present to the mind. These are the obvious dictates of reason; and no man, who reflects, ever doubted, that the existences, which we consider, when we say, 'this house', and 'that tree' are nothing but perceptions in the mind... By what argument can it be proved, that the perceptions of the mind must be caused by external objects, entirely different from them, though resembling them (if that be possible), and could not arise either from the energy of the mind itself, or from the suggestion of some invisible and unknown spirit, or from some other cause still more unknown to us?... How shall this question be determined? By experience surely; as all other questions of a like nature. But here experience is, and must be entirely silent. The mind has never anything present to it but the perceptions, and cannot possibly reach any experience of their connection with objects. The supposition of such a connection is, therefore, without any foundation in reasoning. To have recourse to the veracity of the Supreme Being, in order to prove the veracity of our senses, is surely making a very unexpected circuit ... if the external world be once called in question, we shall be at a loss to find arguments, by which we may prove the existence of that Being, or any of his attributes."*

He says the same thing in his *Treatise of Human Nature* (Part IV, Sect. II, "On Scepticism Towards Sensations"): "Our perceptions are our only objects." (P. 281 of the French translation by Renouvier and Pillon, 1878.) By scepticism Hume means refusal to explain sensations as the effects of objects, spirit, etc., refusal to reduce perceptions to the external world, on the one hand, and to a deity or to an unknown spirit, on the other. And the author of the introduction to the French translation of Hume, F. Pillon—a philosopher of a trend akin to Mach (as we shall see

* David Hume, *An Enquiry Concerning Human Understanding. Essays and Treatises*, London, 1882, Vol. II, pp. 124-26.

below)—justly remarks that for Hume subject and object are reduced to “groups of various perceptions”, to “elements of consciousness, to impressions, ideas, etc.”; that the only concern should be with the “groupings and combinations of these elements”.* The English Humean, Huxley, who coined the apt and correct term “agnosticism”, in his book on Hume also emphasises the fact that the latter, regarding “sensations” as the “primary and irreducible states of consciousness”, is not entirely consistent on the question how the origin of sensations is to be explained, whether by the effect of objects on man or by the creative power of the mind. “Realism and idealism are equally probable hypotheses” (i.e., for Hume).** Hume does not go beyond sensations. “Thus the colours red and blue, and the odour of a rose, are simple impressions.... A red rose gives us a complex impression, capable of resolution into the simple impressions of red colour, rose-scent, and numerous others” (op. cit., pp. 64-65). Hume admits both the “materialist position” and the “idealist position” (p. 82); the “collection of perceptions” may be generated by the Fichtean “ego” or may be a “signification” and even a “symbol” of a “real something”. This is how Huxley interprets Hume.

As for the materialists, here is an opinion of Berkeley given by Diderot, the leader of the Encyclopaedists⁹⁸: “Those philosophers are called *idealists* who, being conscious only of their existence and of the sensations which succeed each other within themselves, do not admit anything else. An extravagant system which, to my thinking, only the blind could have originated; a system which, to the shame of human intelligence and philosophy, is the most difficult to combat, although the most absurd of all.”*** And Diderot, who came very close to the standpoint of contemporary materialism (that arguments and syllogisms alone do not suffice to refute idealism, and that here it is not a question for theoretical argument), notes the

* *Psychologie de Hume. Traité de la nature humaine, etc.* Trad. par Ch. Renouvier et F. Pillon, Paris, 1878. Introduction. p. x.

** Th. Huxley, *Hume*, London, 1879, p. 74.

*** *Œuvres complètes de Diderot*, éd. par J. Assézat, Paris, 1875, Vol. I, p. 304.

similarity of the premises both of the idealist Berkeley, and the sensationalist Condillac. In his opinion, Condillac should have undertaken a refutation of Berkeley in order to avoid such absurd conclusions being drawn from the treatment of sensations as the only source of our knowledge.

In the "Conversation Between d'Alembert and Diderot", Diderot states his philosophical position thus: "...Suppose a piano to be endowed with the faculty of sensation and memory, tell me, would it not of its own accord repeat those airs which you have played on its keys? We are instruments endowed with sensation and memory. Our senses are so many keys upon which surrounding nature strikes and which often strike upon themselves. And this is all, in my opinion, that occurs in a piano organised like you and me." D'Alembert retorts that such an instrument would have to possess the faculty of finding food for itself and of reproducing little pianos. Undoubtedly, contends Diderot.—But take an egg. "This is what refutes all the schools of theology and all the temples on earth. What is this egg? A mass that is insensible until the embryo is introduced into it, and when this embryo is introduced, what is it then? An insensible mass, for in its turn, this embryo is only an inert and crude liquid. How does this mass arrive at a different organisation, arrive at sensibility and life? By means of heat. And what produces heat? Motion...." The animal that is hatched from the egg is endowed with all your sensations; it performs all your actions. "Would you maintain with Descartes that this is a simple imitating machine? Little children will laugh at you, and the philosophers will reply that if this be a machine then you too are a machine. If you admit that the difference between these animals and you is only one of organisation, you will prove your common sense and sagacity, you will be right. But from this will follow a conclusion against you; namely, that from inert matter organised in a certain way, impregnated with another bit of inert matter, by heat and motion—sensibility, life, memory, consciousness, emotion, and thought are generated." One of the two, continues Diderot, either admit some "hidden element" in the egg, that penetrates to it in an unknown way at a certain stage of development, an element about which it is unknown whether it occupies space, whether it is material or whether it is created

for the purpose—which is contradictory to common sense, and leads to inconsistencies and absurdities; or we must make “a simple supposition which explains everything, namely, that the faculty of sensation is a general property of matter, or a product of its organisation”. To d’Alembert’s objection that such a supposition implies a quality which in its essence is incompatible with matter, Diderot retorts:

“And how do you know that the faculty of sensation is essentially incompatible with matter, since you do not know the essence of any thing at all, either of matter, or of sensation? Do you understand the nature of motion any better, its existence in a body, its communication from one body to another?” D’Alembert: “Without knowing the nature of sensation, or that of matter, I see that the faculty of sensation is a simple quality, single, indivisible, and incompatible with a divisible subject or substratum (*suppôt*).” Diderot: “Metaphysico-theological nonsense! What, do you not see that all qualities of matter, that all its forms accessible to our senses are in their essence indivisible? There cannot be a larger or a smaller degree of impenetrability. There may be half of a round body, but there is no half of roundness.... Be a physicist and admit the production of an effect when you see it produced, though you may be unable to explain the relation between the cause and the effect. Be logical and do not replace a cause that exists and explains everything by some other cause which it is impossible to conceive, and the connection of which with the effect is even more difficult to conceive, and which engenders an infinite number of difficulties without solving a single one of them.” D’Alembert: “And what if I abandon this cause?” Diderot: “There is only one substance in the universe, in men and in animals. A hand-organ is of wood, man of flesh. A finch is of flesh, and a musician is of flesh, but differently organised; but both are of the same origin, of the same formation, have the same functions and the same purpose.” D’Alembert: “And what establishes the similarity of sounds between your two pianos?” Diderot: “...The instrument endowed with the faculty of sensation, or the animal, has learned by experience that after a certain sound certain consequences follow outside of it; that other sentient instruments, like itself, or similar animals, approach, recede, demand, offer, wound, caress;—and all

these consequences are associated in its memory and in the memory of other animals with the formation of these sounds. Mark, in intercourse between people there is nothing besides sounds and actions. And to appreciate all the power of my system, mark again that it is faced with that same insurmountable difficulty which Berkeley adduced against the existence of bodies. There was a moment of insanity when the sentient piano imagined that it was the only piano in the world, and that the whole harmony of the universe took place within it.”*

That was written in 1769. And with it we shall conclude our brief historical enquiry. We shall have more than one occasion to meet “the insane piano” and the harmony of the universe occurring within man when we come to analyse “recent positivism”.

For the present we shall confine ourselves to one conclusion: the “recent” Machists have not adduced a single argument against the materialists that had not been adduced by Bishop Berkeley.

Let us mention as a curiosity that one of these Machists, Valentinov, vaguely sensing the falsity of his position, has tried to “cover up the traces” of his kinship with Berkeley and has done so in a rather amusing manner. On page 150 of his book we read: “...When those who, speaking of Mach, are hinting at Berkeley, we ask, which Berkeley do they mean? Do they mean the Berkeley who traditionally regards himself [Valentinov wishes to say who is regarded] as a solipsist, the Berkeley who defends the immediate presence and providence of the deity? Generally speaking [?], do they mean Berkeley, the philosophising bishop, the destroyer of atheism, or Berkeley, the thoughtful analyser? With Berkeley the solipsist and preacher of religious metaphysics Mach indeed has nothing in common.” Valentinov is muddled; he was unable to make clear to himself why he was obliged to defend Berkeley the “thoughtful analyser” and idealist against the materialist Diderot. Diderot drew a clear distinction between the fundamental philosophical trends. Valentinov confuses them, and

* *Œuvres complètes de Diderot*, éd. par J. Assézat, Paris, 1875, Vol. II, pp. 114-18.

while doing so very amusingly tries to console us: "We would not consider the 'kinship' of Mach to the idealist views of Berkeley a philosophical crime," he says, "even if this actually were the case" (149). To confuse two irreconcilable fundamental trends in philosophy—really, what "crime" is that? But that is what the whole wisdom of Mach and Avenarius amounts to. We shall now proceed to an examination of this wisdom.

From The Theory of Knowledge of Empirio-criticism and of Dialectical Materialism. I

Sensations and Complexes of Sensations

The fundamental premises of the theory of knowledge of Mach and Avenarius are frankly, simply and clearly expounded by them in their first philosophical works. To these works we shall now turn, postponing for later treatment an examination of the corrections and emendations subsequently made by these writers.

"The task of science," Mach wrote in 1872, "can only be:

1. To determine the laws of connection of ideas (Psychology).
2. To discover the laws of connection of sensations (Physics).
3. To explain the laws of connection between sensations and ideas (Psycho-physics)."

* This is quite clear.

The subject-matter of physics is the connection between sensations and not between things or bodies, of which our sensations are the image. And in 1883, in his *Mechanics* Mach repeats the same thought: "Sensations are not 'symbols of things'. The 'thing' is rather a mental symbol for a complex of sensations of relative stability. Not the things (bodies) but colours, sounds, pressures, spaces, times (what we usually call sensations) are the real *elements* of the world." **

About this word "elements", the fruit of twelve years of "reflection", we shall speak later. At present let us note that Mach explicitly states here that things or bodies are complexes of sensations, and that he quite clearly sets up his own philosophical point of view against the opposite theory which

* E. Mach, *Die Geschichte und die Wurzel des Satzes von der Erhaltung der Arbeit*. Vortrag, gehalten in der K. Böhm. Gesellschaft der Wissenschaften am 15. Nov. 1871, Prag, 1872, S. 57-58.

** E. Mach, *Die Mechanik in ihrer Entwicklung historisch-kritisch dargestellt*, 3. Auflage, Leipzig, 1897, S. 473.

holds that sensations are “symbols” of things (it would be more accurate to say images or reflections of things). The latter theory is *philosophical materialism*. For instance, the materialist Frederick Engels—the not unknown collaborator of Marx and a founder of Marxism—constantly and without exception speaks in his works of things and their mental pictures or images (*Gedanken-Abbilder*), and it is obvious that these mental images arise exclusively from sensations. It would seem that this fundamental standpoint of the “philosophy of Marxism” ought to be known to everyone who speaks of it, and especially to anyone who comes out in print *in the name of* this philosophy. But because of the extraordinary confusion which our Machists have introduced, it becomes necessary to repeat what is generally known. We turn to the first section of *Anti-Dühring* and read: “...things and their mental images...”*; or to the first section of the philosophical part, which reads: “But whence does thought obtain these principles [i.e., the fundamental principles of all knowledge]? From itself? No ... these forms can never be created and derived by thought out of itself, but only from the external world ... the principles are not the starting-point of the investigation [as Dühring who would be a materialist, but cannot consistently adhere to materialism, holds], but its final result; they are not applied to nature and human history, but abstracted from them; it is not nature and the realm of humanity which conform to these principles, but the principles are only valid insofar as they are in conformity with nature and history. That is the only materialistic conception of the matter, and Herr Dühring’s contrary conception is idealistic, makes things stand completely on their heads, and fashions the real world out of ideas” (*ibid.*, S. 21).⁹⁹ Engels, we repeat, applies this “only materialistic conception” everywhere and without exception, relentlessly attacking Dühring for the least deviation from materialism to idealism. Anybody who reads *Anti-Dühring* and *Ludwig Feuerbach* with the slightest care will find scores of instances when Engels speaks of things and their reflections in the human brain, in our consciousness, thought, etc. Engels does

* Fr. Engels, *Herrn Eugen Dührings Umwälzung der Wissenschaft*, 5. Auflage, Stuttgart, 1904, S. 6.

not say that sensations or ideas are "symbols" of things, for consistent materialism must here use "image", picture, or reflection instead of "symbol", as we shall show in detail in the proper place. But the question here is not of this or that formulation of materialism, but of the antithesis between materialism and idealism, of the difference between the two fundamental *lines* in philosophy. Are we to proceed from things to sensation and thought? Or are we to proceed from thought and sensation to things? The first line, i.e., the materialist line, is adopted by Engels. The second line, i.e., the idealist line, is adopted by Mach. No evasions, no sophisms (a multitude of which we shall yet encounter) can remove the clear and indisputable fact that Ernst Mach's doctrine that things are complexes of sensations is subjective idealism and a simple rehash of Berkeleianism. If bodies are "complexes of sensations", as Mach says, or "combinations of sensations", as Berkeley said, it inevitably follows that the whole world is but my idea. Starting from such a premise it is impossible to arrive at the existence of other people besides oneself: it is the purest solipsism. Much as Mach, Avenarius, Petzoldt and Co. may abjure solipsism, they cannot in fact escape solipsism without falling into howling logical absurdities. To make this fundamental element of the philosophy of Machism still clearer, we shall give a few additional quotations from Mach's works. Here is a sample from the *Analysis of Sensations** (I quote from Kotlyar's Russian translation, published by Skirmunt, Moscow, 1907):

"We see a body with a point S. If we touch S, that is, bring it into contact with our body, we receive a prick. We can see S without feeling the prick. But as soon as we feel the prick we find S on the skin. Thus, the visible point is a permanent nucleus, to which, according to circumstances, the prick is attached as something accidental. By frequent repetitions of analogous occurrences we finally habituate ourselves to regard *all* properties of bodies as 'effects' which proceed from permanent nuclei and are conveyed to *the self* through the medium of the body; which effects we call *sensations*..." (p. 20).

In other words, people "habituate" themselves to adopt the

* E. Mach, *Analyse der Empfindungen*, 1885.—Ed.

standpoint of materialism, to regard sensations as the result of the action of bodies, things, nature on our sense-organs. This "habit", so noxious to the philosophical idealists (a habit acquired by all mankind and all natural science!), is not at all to the liking of Mach, and he proceeds to destroy it:

"...Thereby, however, these nuclei are deprived of their entire sensible content and are converted into naked abstract symbols...."

An old song, most worthy Professor! This is a literal repetition of Berkeley who said that matter is a naked abstract symbol. But it is Ernst Mach, in fact, who goes naked, for if he does not admit that the "sensible content" is an objective reality, existing independently of us, there remains only a "naked abstract" *I*, and *I* infallibly written with a capital letter and italicised, equal to "the insane piano, which imagined that it was the sole existing thing in this world". If the "sensible content" of our sensations is not the external world, then nothing exists save this naked *I* engaged in empty "philosophical" fancies. A stupid and fruitless occupation!

"...It is then correct that the world consists only of our sensations. In which case we have knowledge *only* of sensations, and the assumption of those nuclei, and of their interaction, from which alone sensations proceed, turns out to be quite idle and superfluous. Such a view can only appeal to *half-hearted* realism or *half-hearted* criticism."

We have quoted the sixth paragraph of Mach's "anti-metaphysical observations" in full. It is a sheer plagiarism of Berkeley. Not a single idea, not a glimmer of thought, except that "we sense only our sensations". From which there is only one possible inference, namely, that the "world consists only of *my* sensations". The word "our" employed by Mach instead of "my" is employed illegitimately. By this word alone Mach betrays that "half-heartedness" of which he accuses others. For if the "assumption" of the existence of the external world is "idle", if the assumption that the needle exists independently of me and that an interaction takes place between my body and the point of the needle is really "idle and superfluous", then primarily the "assumption" of the existence of other people is idle and superfluous. Only *I* exist, and all other people, as well as the external world, come under the category of idle

"nuclei". Holding this point of view one cannot speak of "our" sensations; and when Mach does speak of them, it is only a betrayal of his own manifest half-heartedness. It only proves that his philosophy is a jumble of idle and empty words in which their author himself does not believe.

Here is a particularly graphic example of Mach's half-heartedness and confusion. In § 6 of Chapter XI of the *Analysis of Sensations* we read: "If I imagine that while I am experiencing sensations, I or someone else could observe my brain with all possible physical and chemical means, it would be possible to ascertain with what processes of the organism particular sensations are connected..." (197).

Very good! This means, then, that our sensations are connected with definite processes which take place in the organism in general, and in our brain in particular? Yes, Mach very definitely makes this "assumption"—it would be quite a task not to make it from the standpoint of natural science! But is not this the very "assumption" of those very same "nuclei and their interaction" which our philosopher declared to be idle and superfluous? We are told that bodies are complexes of sensations; to go beyond that, Mach assures us, to regard sensations as a product of the action of bodies upon our sense-organs, is metaphysics, an idle and superfluous assumption, etc., *à la* Berkeley. But the brain is a body. Consequently, the brain also is no more than a complex of sensations. It follows, then, that with the help of a complex of sensations I (and I also am nothing but a complex of sensations) sense complexes of sensations. A delightful philosophy! First sensations are declared to be "the real elements of the world"; on this an "original" Berkeleianism is erected—and then the very opposite view is smuggled in, viz., that sensations are connected with definite processes in the organism. Are not these "processes" connected with metabolic exchange between the "organism" and the external world? Could this metabolism take place if the sensations of the particular organism did not give it an objectively correct idea of this external world?

Mach does not ask himself such embarrassing questions when he mechanically jumbles fragments of Berkeleianism with the views of natural science, which instinctively adheres to the materialist theory of knowledge.... In the same paragraph

Mach writes: "It is sometimes also asked whether (inorganic) 'matter' experiences sensation...." This means that there is no doubt that *organic* matter experiences sensation? This means that sensation is not something primary but that it is one of the properties of matter? Mach skips over all the absurdities of Berkeleianism!... "The question," he avers, "is natural enough, if we proceed from the current widespread physical notions, according to which matter is the *immediate* and indisputably given *reality*, out of which everything, inorganic and organic, is constructed...." Let us bear in mind this truly valuable admission of Mach's that the current widespread *physical* notions regard matter as the immediate reality, and that only one variety of this reality (organic matter) possesses the well-defined property of sensation.... Mach continues: "Then, indeed, sensation must suddenly arise somewhere in this structure consisting of matter, or else have previously been present in the foundation. From *our* standpoint the question is a false one. For us matter is not what is primarily given. Rather, what is primarily given are the *elements* (which in a certain familiar relation are designated as sensations)...."

What is primarily given, then, are sensations, although they are "connected" only with definite processes in organic matter! And while uttering such absurdities Mach wants to blame materialism ("the current widespread physical notion") for leaving unanswered the question whence sensation "arises". This is a sample of the "refutation" of materialism by the fideists and their hangers-on. Does any other philosophical standpoint "solve" a problem before enough data for its solution has been collected? Does not Mach himself say in the very same paragraph: "So long as this problem (how far sensation extends in the organic world) has not been solved even in a single special case, no answer to the question is possible."

The difference between materialism and "Machism" in this particular question thus consists in the following. Materialism, in full agreement with natural science, takes matter as primary and regards consciousness, thought, sensation as secondary, because in its well-defined form sensation is associated only with the higher forms of matter (organic matter), while "in the foundation of the structure of matter" one can only surmise

the existence of a faculty akin to sensation. Such, for example, is the supposition of the well-known German scientist Ernst Haeckel, the English biologist Lloyd Morgan and others, not to speak of Diderot's conjecture mentioned above. Machism holds to the opposite, the idealist point of view, and at once lands into an absurdity: since, in the first place, sensation is taken as primary, in spite of the fact that it is associated only with definite processes in matter organised in a definite way; and since, in the second place, the basic premise that bodies are complexes of sensations is violated by the assumption of the existence of other living beings and, in general, of other "complexes" besides the given great *I*.

The word "element", which many naïve people (as we shall see) take to be some sort of a new discovery, in reality only obscures the question, for it is a meaningless term which creates the false impression that a solution or a step forward has been achieved. This impression is a false one, because there still remains to be investigated and reinvestigated how matter, apparently entirely devoid of sensation, is related to matter which, though composed of the same atoms (or electrons), is yet endowed with a well-defined faculty of sensation. Materialism clearly formulates the as yet unsolved problem and thereby stimulates the attempt to solve it, to undertake further experimental investigation. Machism, which is a species of muddled idealism, befogs the issue and side-tracks it by means of the futile verbal trick, "element".

Here is a passage from Mach's latest, comprehensive and concluding philosophical work that clearly betrays the falsity of this idealist artifice. In his *Knowledge and Error* we read: "While there is no difficulty in constructing (*aufzubauen*) every physical experience out of sensations, i. e., *psychical* elements, it is impossible to imagine (*ist keine Möglichkeit abzusehen*) how to represent (*darstellen*) any *psychical* experience out of the elements employed in modern physics, i. e., mass and motion (in their rigidity—*Starrheit*—which is serviceable only for this special science)." *

* E. Mach, *Erkenntnis und Irrtum*, 2. Auflage, 1906, S. 12, Anmerkung.

Of the rigidity of the conceptions of many modern scientists and of their metaphysical (in the Marxist sense of the term, i.e., anti-dialectical) views, Engels speaks repeatedly and very precisely. We shall see later that it was just on this point that Mach went astray, because he did not understand or did not know the relation between relativism and dialectics. But this is not what concerns us here. It is important for us here to note how glaringly Mach's *idealism* emerges, in spite of the confused—ostensibly new—terminology. There is no difficulty, you see, in constructing any physical element out of sensations, i.e., psychical elements! Oh yes, such constructions, of course, are not difficult, for they are purely verbal constructions, empty scholasticism, serving as a loophole for fideism. It is not surprising after this that Mach dedicates his works to the immanentists; it is not surprising that the immanentists, who profess the most reactionary kind of philosophical idealism, welcome Mach with open arms. The "recent positivism" of Ernst Mach was only about two hundred years too late. Berkeley had already sufficiently shown that "out of sensations, i.e., psychical elements", nothing can be "built" except *solipsism*. As regards materialism, to which Mach here, too, counterposes his own views, without frankly and explicitly naming the "enemy", we have already seen in the case of Diderot what the real views of the materialists are. These views do not consist in deriving sensation from the movement of matter or in reducing sensation to the movement of matter, but in recognising sensation as one of the properties of matter in motion. On this question Engels shared the standpoint of Diderot. Engels dissociated himself from the "vulgar" materialists, Vogt, Büchner and Moleschott, for the very reason, among others, that they erred in believing that the brain secretes thought *in the same way* as the liver secretes bile. But Mach, who constantly counterposes his views to materialism, ignores, of course, all the great materialists—Diderot, Feuerbach, Marx and Engels—just as all other official professors of official philosophy do.

In order to characterise Avenarius' earliest and basic view, let us take his first independent philosophical work, *Philosophie als Denken der Welt gemäss dem Prinzip des kleinsten Kraftmasses. Prolegomena zu einer Kritik der reinen Erfahrung*, which appeared

in 1876. Bogdanov in his *Empirio-monism* (Bk. 1, 2nd ed., 1905, p. 9, note) says that "in the development of Mach's views, the starting-point was philosophical idealism, while a realistic tinge was characteristic of Avenarius from the very beginning". Bogdanov said so because he believed what Mach said (see *Analysis of Sensations*, Russian translation, p. 288). Bogdanov should not have believed Mach, and his assertion is diametrically opposed to the truth. On the contrary, Avenarius' idealism emerges so clearly in his work of 1876 that Avenarius himself in 1891 was obliged to admit it. In the introduction to *The Human Concept of the World* Avenarius says: "He who has read my first systematic work, *Philosophie, etc.*, will at once presume that I would have attempted to treat the problems of a criticism of pure experience from the 'idealist' standpoint" (*Der menschliche Weltbegriff*, 1891, Vorwort, S. ix), but "the sterility of philosophical idealism compelled me to doubt the correctness of my previous path" (S. x). This idealist starting-point of Avenarius' is universally acknowledged in philosophical literature. Of the French writers I shall refer to Cauwelaert, who says that Avenarius' philosophical standpoint in the *Prolegomena* is "monistic idealism".* Of the German writers, I shall name Rudolf Willy, Avenarius' disciple, who says that "Avenarius in his youth—and particularly in his work of 1876—was totally under the spell (*ganz im Banne*) of so-called epistemological idealism".**

And, indeed, it would be ridiculous to deny the idealism in Avenarius' *Prolegomena*, where he explicitly states that "*only sensation can be thought of as the existing*" (pp. 10 and 65 of the second German edition; all italics in quotations are ours). This is how Avenarius himself presents the contents of § 116 of his work. Here is the paragraph in full: "We have recognised that the existing (*das Seiende*) is substance endowed with sensation; substance falls away [it is "more economical", don't you see, there is "a lesser expenditure of effort" in thinking that there is no "substance" and that no external world exists!], sensation

* F. Van Cauwelaert, "L'empiriocriticisme", *Revue néo-scholastique*,¹⁰⁰ 1907, Feb., p. 51.

** Rudolf Willy, *Gegen die Schulweisheit. Eine Kritik der Philosophie*, München, 1905, S. 170.

remains; we must then regard the existing as sensation, at the basis of which there is nothing which does not possess sensation (*nichts Empfindungsloses*)."

Sensation, then, exists without "substance", i.e., thought exists without the brain! Are there really philosophers capable of defending this brainless philosophy? There are. Professor Richard Avenarius is one of them. And we must pause for a while to consider this defence, difficult though it be for a normal person to take it seriously. Here, in §§ 89 and 90 of this same work, is Avenarius' argument:

"...The proposition that motion produces sensation is based on apparent experience only. This experience, which includes the act of perception, is supposed to consist in the fact that sensation is generated in a certain kind of substance (brain) as a result of transmitted motion (excitation) and with the help of other material conditions (e.g., blood). However — apart from the fact that such generation has never itself (*selbst*) been observed — in order to construct the supposed experience, as an experience which is real in all its parts, empirical proof, at least, is required to show that the sensation, which assumedly is caused in a substance by transmitted motion, did not already exist in that substance in one way or another; so that the appearance of sensation cannot be conceived of in any other way than as a creative act on the part of the transmitted motion. Thus only by proving that where a sensation now appears there was none previously, not even a minimal one, would it be possible to establish a fact which, denoting as it does some act of creation, contradicts all the rest of experience and which would radically change all the rest of our conception of nature (*Naturanschauung*). But such proof is not furnished by any experience, and cannot be furnished by any experience; on the contrary, the notion of a state of a substance totally devoid of sensation which subsequently begins to experience sensation is only a hypothesis. But this hypothesis merely complicates and obscures our understanding instead of simplifying and clarifying it.

"Should the so-called experience, viz., that the sensation arises owing to transmitted motion in a substance that begins to perceive from this moment, prove upon closer examination to be only apparent, there is still sufficient material in the

remaining content of the experience to denote at least the relative origin of sensation from conditions of motion, namely, to denote that the sensation which is present, although latent or minimal, or for some other reason not manifest to the consciousness, becomes, owing to transmitted motion, released or enhanced or made manifest to the consciousness. However, even this bit of the remaining content of experience is only an appearance. Were we even by an ideal observation to trace the motion proceeding from the moving substance A, transmitted through a series of intermediate centres until it reaches the substance B, which is endowed with sensation, we should at best find that sensation in substance B is developed or becomes enhanced simultaneously with the reception of the incoming motion—but we should not find that this occurred as a *consequence* of the motion....”

We have purposely quoted this refutation of materialism by Avenarius in full, in order that the reader may see to what truly pitiful sophistries “recent” empirio-critical philosophy resorts. We shall compare with the argument of the idealist Avenarius the *materialist* argument of—Bogdanov, if only to punish Bogdanov for his betrayal of materialism!

In long bygone days, fully nine years ago, when Bogdanov was half “a natural-scientific materialist” (that is, an adherent of the materialist theory of knowledge, which the overwhelming majority of contemporary scientists instinctively hold), when he was only half led astray by the muddled Ostwald, he wrote: “From ancient times to the present day, descriptive psychology has adhered to the classification of the facts of consciousness into three categories: the domain of sensations and ideas, the domain of emotions and the domain of impulses.... To the first category belong the *images* of phenomena of the outer or inner world, as taken by themselves in consciousness.... Such an image is called a ‘sensation’ if it is directly produced through the external sense-organs by its corresponding external phenomenon.”* And a little farther on he says: “Sensation ... arises in consciousness as a result of a certain impulse from the external environment transmitted by

* A. Bogdanov, *The Fundamental Elements of the Historical Outlook on Nature*, St. Petersburg, 1899, p. 216.

the external sense-organs" (222). And further: "Sensation is the foundation of mental life; it is its immediate connection with the external world" (240). "At each step in the process of sensation a transformation of the energy of external excitation into the fact of consciousness takes place" (133). And even in 1905, when with the gracious assistance of Ostwald and Mach Bogdanov had already abandoned the materialist standpoint in philosophy for the idealist standpoint, he wrote (from forgetfulness!) in his *Empirio-monism*: "As is known, the energy of external excitation, transformed at the nerve-ends into a 'telegraphic' form of nerve current (still insufficiently investigated but devoid of all mysticism), first reaches the neurons that are located in the so-called 'lower' centres—ganglial cerebro-spinal, subcortical, etc." (Bk. 1, 2nd ed., 1905, (p. 118).

For every scientist who has not been led astray by professorial philosophy, as well as for every materialist, sensation is indeed the direct connection between consciousness and the external world; it is the transformation of the energy of external excitation into the fact of consciousness. This transformation has been, and is, observed by each of us a million times on every hand. The sophism of idealist philosophy consists in the fact that it regards sensation as being not the connection between consciousness and the external world, but a fence, a wall, separating consciousness from the external world—not an image of the external phenomenon corresponding to the sensation, but as the "sole entity". Avenarius gave but a slightly changed form to this old sophism, which had been already worn threadbare by Bishop Berkeley. Since we do not yet know all the conditions of the connection we are constantly observing between sensation and matter organised in a definite way, let us therefore acknowledge the existence of sensation alone—that is what the sophism of Avenarius amounts to.

To conclude our description of the fundamental idealist premises of empirio-criticism, we shall briefly refer to the English and French representatives of this philosophical trend. Mach explicitly says of Karl Pearson, the Englishman, that he (Mach) is "in agreement with his epistemological (*erkenntnis-kritischen*) views on all essential points" (*Mechanics*, ed. previ-

ously cited, p. ix). Pearson in turn agrees with Mach.* For Pearson "real things" are "sense-impressions". He declares any recognition of things outside the boundaries of sense-impressions to be metaphysics. Pearson fights materialism with great determination (without knowing either Feuerbach, or Marx and Engels); his arguments do not differ from those analysed above. However, the desire to masquerade as a materialist is so foreign to Pearson (that is a specialty of the Russian Machists), Pearson is so—incautious, that he invents no "new" names for his philosophy and simply declares that his views and those of Mach are "idealist" (ibid., p. 326)! He traces his genealogy directly to Berkeley and Hume. The philosophy of Pearson, as we shall repeatedly find, is distinguished from that of Mach by its far greater integrity and consistency.

Mach explicitly declares his solidarity with the French physicists, Pierre Duhem and Henri Poincaré.** We shall have occasion to deal with the particularly confused and inconsistent philosophical views of these writers in the chapter on the new physics. Here we shall content ourselves with noting that for Poincaré things are "groups of sensations"*** and that a similar view is casually expressed by Duhem.****

We shall now proceed to examine how Mach and Avenarius, having admitted the idealist character of their original views, *corrected* them in their subsequent works.

Did Nature Exist Prior to Man?

We have already seen that this question is a particularly annoying one for the philosophy of Mach and Avenarius. Natural science positively asserts that the earth once existed in such a state that no man or any other creature existed or could have existed on it. Organic matter is a later phenomenon, the

* Karl Pearson, *The Grammar of Science*, 2nd ed., London, 1900, p. 326.

** *Analysis of Sensations*, p. 4. Cf. Preface to *Erkenntnis und Irrtum*, 2nd ed.

*** Henri Poincaré, *La valeur de la science*, Paris, 1905 (there is a Russian translation), *passim*.

**** P. Duhem, *La théorie physique, son objet et sa structure*, Paris, 1906, Cf. pp. 6, 10.

fruit of a long evolution. It follows that there was no sentient matter, no "complexes of sensations", no *self* that was supposedly "indissolubly" connected with the environment in accordance with Avenarius' doctrine. Matter is primary, and thought, consciousness, sensation are products of a very high development. Such is the materialist theory of knowledge, to which natural science instinctively subscribes.

The question arises, have the eminent representatives of empirio-criticism observed this contradiction between their theory and natural science? They have observed it, and they have definitely asked themselves by what arguments this contradiction can be removed. Three attitudes to this question are of particular interest from the point of view of materialism, that of Avenarius himself and those of his disciples J. Petzoldt and R. Willy.

Avenarius tries to eliminate the contradiction to natural science by means of the theory of the "potential" central term in the co-ordination. As we know, co-ordination is the "indissoluble" connection between the *self* and the environment. In order to eliminate the obvious absurdity of this theory the concept of the "potential" central term is introduced. For instance, what about man's development from the embryo? Does the environment (=the "counter-term") exist if the "central term" is represented by an embryo? The embryonic system C—Avenarius replies—is the "potential central term in relation to the future individual environment" (*Notes on the concept of the Subject of Psychology*, p. 140). The potential central term is never equal to zero, even when there are as yet no parents (*elterliche Bestandteile*), but only "integral parts of the environment" capable of becoming parents (S. 141).

The co-ordination then is indissoluble. It is essential for the empirio-criticist to assert this in order to save the fundamentals of his philosophy—sensations and their complexes. Man is the central term of this co-ordination. But when there is no man, when he has not yet been born, the central term is nevertheless not equal to zero; it has only become a *potential* central term! It is astonishing that there are people who can take seriously a philosopher who advances such arguments! Even Wundt, who stipulates that he is not an enemy of every form of metaphysics (i.e., of fideism), was compelled to admit "the mystical

obscurization of the concept experience" by the word "potential", which destroys co-ordination entirely (op. cit., p. 379).

And, indeed, how can one seriously speak of a co-ordination the indissolubility of which consists in one of its terms being potential?

Is this not mysticism, the very antechamber of fideism? If it is possible to think of a potential central term in relation to a future environment, why not think of it in relation to a *past* environment, that is, *after* man's *death*? You will say that Avenarius did not draw this conclusion from his theory. Granted, but that absurd and reactionary theory became the more cowardly but not any the better for that. Avenarius, in 1894, did not carry this theory to its logical conclusion, or perhaps feared to do so. But R. Schubert-Soldern, as we shall see, resorted in 1896 to *this very theory* to arrive at theological conclusions, which in 1906 earned the *approval* of Mach, who said that Schubert-Soldern was following "*very close paths*" (to Machism) (*Analysis of Sensations*, p. 4). Engels was quite right in attacking Dühring, an avowed atheist, for inconsistently *leaving loopholes* for fideism in his philosophy. Engels several times, and very justly, brought this accusation against the materialist Dühring, although the latter had not drawn any theological conclusions, in the seventies at least. Among us, however, there are people who desire to be regarded as Marxists, yet who bring to the masses a philosophy which comes very close to fideism.

"...It might seem," Avenarius wrote in the *Notes*, "that from the empirio-critical standpoint natural science is not entitled to enquire about periods of our present environment which in time preceded the existence of man" (S. 144). Avenarius answers: "The enquirer cannot avoid mentally projecting himself" (*sich hinzuzudenken*, i.e., imagining oneself to be present). "For"—Avenarius continues—"what the scientist wants (although he may not be clearly aware of it) is essentially only this: how is the earth to be defined prior to the appearance of living beings or man if I were mentally to project myself in the role of an observer—in much the same way as though it were thinkable that we could from our earth follow the history of another star or even of another solar system with the help of perfected instruments."

An object cannot exist independently of our consciousness. "We always mentally project ourselves as the intelligence endeavouring to apprehend the object."

This theory of the necessity of "mentally projecting" the human mind to every object and to nature prior to man is given by me in the first paragraph in the words of the "recent positivist", R. Avenarius, and in the second, in the words of the subjective idealist, J. G. Fichte.* The sophistry of this theory is so manifest that it is embarrassing to analyse it. If we "mentally project" ourselves, our presence will be *imaginary*—but the existence of the earth prior to man is *real*. Man *could not* in practice be an observer, for instance, of the earth in an incandescent state, and to "imagine" his being present at the time is *obscurantism*, exactly as though I were to endeavour to prove the existence of hell by the argument that if I "mentally projected" myself thither as an observer I could observe hell. The "reconciliation" of empirio-criticism and natural science amounts to this, that Avenarius graciously consents to "mentally project" something the possibility of admitting which is *excluded* by natural science. No man at all educated or sound-minded doubts that the earth existed at a time when there *could not* have been any life on it, any sensation or any "central term", and consequently the whole theory of Mach and Avenarius, from which it follows that the earth is a complex of sensations ("bodies are complexes of sensations") or "complexes of elements in which the psychical and physical are identical", or "a counter-term of which the central term can never be equal to zero", is *philosophical obscurantism*, the carrying of subjective idealism to absurdity.

J. Petzoldt perceived the absurdity of the position into which Avenarius had fallen and felt ashamed. In his *Introduction to the Philosophy of Pure Experience* (Vol. II) he devotes a whole paragraph (§ 65) "to the question of the reality of earlier (*frühere*) periods of the earth".

"In the teaching of Avenarius," says Petzoldt, "the *self* (*das Ich*) plays a role different from that which it plays with Schuppe [let us note that Petzoldt openly and repeatedly

* J. G. Fichte, *Rezension des Aenesidemus*, 1794, *Sämtliche Werke*, Bd. I, S. 19.

declares: our philosophy was founded by *three* men—Avenarius, Mach and Schuppe], yet it is a role which, perhaps, possesses too much importance for his theory.” (Petzoldt was evidently influenced by the fact that Schuppe had unmasked Avenarius by showing that with him too everything rests entirely on the *self*; and Petzoldt wishes to make a correction.) “Avenarius said on one occasion,” Petzoldt continues, “that we can think of a region where no human foot has yet trodden, but to be able *to think* [Avenarius’ italics] of such an environment there is required what we designate by the term *self* (*Ich-Bezeichnetes*), *whose* [Avenarius’ italics] thought it is” (*Vierteljahrsschrift für wissenschaftliche Philosophie*, 18. Bd., 1894, S. 146, Anmerkung).

Petzoldt replies:

“The epistemologically important question, however, is not whether we can think of such a region at all, but whether we are entitled to think of it as existing, or as having existed, independently of any individual mind.”

What is true, is true. People can think and “mentally project” for themselves any kind of hell and all sorts of devils. Lunacharsky even “mentally projected” for himself—well, to use a mild expression—religious conceptions. But it is precisely the purpose of the theory of knowledge to show the unreal, fantastic and reactionary character of such projections.

“...For that the system C [i.e., the brain] is necessary for thought is obvious both for Avenarius and for the philosophy which is here presented....”

That is not true. Avenarius’ theory of 1876 is a theory of thought without brain. And in his theory of 1891-94, as we shall presently see, there is a similar element of idealist nonsense.

“...But is this system C *a condition of existence* [Petzoldt’s italics] of, say, the Mesozoic period (*Sekundärzeit*) of the earth?” And Petzoldt, presenting the argument of Avenarius I have already cited, on the subject of what science actually wants and how we can “mentally project” the observer, objects:

“No, we wish to know whether I have the right to think that the earth at that remote epoch existed in the same way as I think of it as having existed yesterday or a minute ago. Or must the existence of the earth be made conditional, as Willy

claimed, on our right at least to assume that at the given period there coexisted some system C, even though at the lowest stage of its development?" (Of this idea of Willy's we shall speak presently.)

"Avenarius evades Willy's strange conclusion by the argument that the person who puts the question cannot mentally remove himself (*sich wegdenken*, i.e., think himself as absent), nor can he avoid mentally projecting himself (*sich hinzuzudenken*, see Avenarius, *The Human Concept of the World*, 1st German edition, p. 130). But then Avenarius makes the individual *self* of the person who puts the question, or the thought of such a *self*, the condition not only of the act of thought regarding the uninhabitable earth, but also of the justification for believing in the existence of the earth at that time.

"These false paths are easily avoided if we do not ascribe so much theoretical importance to the *self*. The only thing the theory of knowledge should demand of any conceptions of that which is remote in space or time is that it be conceivable and can be uniquely (*eindeutig*) determined; all the rest is a matter for the special sciences" (Vol. II, p. 325).

Petzoldt rechristened the law of causality the law of unique determination and imported into his theory, as we shall see later, the *apriority* of this law. This means that Petzoldt saves himself from Avenarius' subjective idealism and solipsism ("he attributes an exaggerated importance to the *self*", as the professorial jargon has it) with the help of *Kantian* ideas. The absence of the objective factor in Avenarius' doctrine, the impossibility of reconciling it with the demands of natural science, which declares the earth (object) to have existed long before the appearance of living beings (subject), compelled Petzoldt to resort to causality (unique determination). The earth existed, for its existence prior to man is causally connected with the present existence of the earth. Firstly, where does causality come from? *A priori*, says Petzoldt. Secondly, are not the ideas of hell, devils, and Lunacharsky's "mental projections" also connected by causality? Thirdly, the theory of "complexes of sensations" in any case turns out to be destroyed by Petzoldt. Petzoldt failed to resolve the contradiction he observed in Avenarius, and only entangled himself still more, for only one solution is possible, viz., the recognition that

the external world reflected by our mind exists independently of our mind. This materialist solution alone is really compatible with natural science, and it alone eliminates both Petzoldt's and Mach's idealist solution of the question of causality, which we shall speak of separately.

The third empirio-criticist, R. Willy, first raised the question of this difficulty for Avenarius' philosophy in 1896, in an article entitled "Der Empiriokritizismus als einzig wissenschaftlicher Standpunkt" ("Empirio-criticism as the Only Scientific Standpoint"). What about the world prior to man?—Willy asks here,* and at first answers according to Avenarius: "we project ourselves *mentally* into the past". But then he goes on to say that we are not necessarily obliged to regard *experience* as human experience. "For we must simply regard the animal kingdom—be it the most insignificant worm—as primitive fellow-men (*Mitmenschen*) if we regard animal life only in connection with general experience" (73-74). Thus, prior to man the earth was the "experience" of a worm, which fulfilled the function of the "central term" in order to save Avenarius' "co-ordination" and Avenarius' philosophy! No wonder Petzoldt tried to dissociate himself from an argument which is not only the height of absurdity (ideas of the earth corresponding to the theories of geologists are attributed to a worm), but which does not in any way help our philosopher, for the earth existed not only before man but before any living being at all.

Willy returned to the question in 1905. The worm was now set aside.** But Petzoldt's "law of unique determination" could not, of course, satisfy Willy, who regarded it as merely "logical formalism". The author says—will not the question of the world prior to man, as Petzoldt puts it, lead us "back again to the things-in-themselves of common sense?" (i. e., to materialism! How terrible indeed!) What does millions of years without life mean? "Is time perhaps a thing-in-itself? Of course not! *** Well, that means that things outside men are only impressions,

* *Vierteljahrsschrift für wissenschaftliche Philosophie*, Band XX, 1896, S. 72.

** R. Willy, *Gegen die Schulweisheit*, 1905, S. 173-78.

*** We shall discuss this point with the Machists later.

bits of fantasy fabricated by men with the help of a few fragments we find around us. And why not? Need the philosopher fear the stream of life?... And so I say to myself: abandon all erudite system-making and grasp the moment (*ergreife den Augenblick*), the moment you are living in, the moment which alone brings happiness" (177-78).

Well, well! Either materialism or solipsism—this, in spite of his vociferous phrases, is what Willy arrives at when he analyses the question of the existence of nature before man.

To summarise. Three augurs of empirio-criticism have appeared before us and have laboured in the sweat of their brow to reconcile their philosophy with natural science, to patch up the holes of solipsism. Avenarius repeated Fichte's argument and substituted an imaginary world for the real world. Petzoldt withdrew from Fichtean idealism and moved towards Kantian idealism. Willy, having suffered a fiasco with the "worm", threw up the sponge and inadvertently blurted out the truth: either materialism or solipsism, or even the recognition of nothing but the present moment.

It only remains for us to show the reader *how* this problem was understood and treated by our own native Machists. Here is Bazarov in the *Studies "in" the Philosophy of Marxism* (p. 11):

"It remains for us now, under the guidance of our faithful *vademecum* [i. e., Plekhanov], to descend into the last and most horrible circle of the solipsist inferno, into that circle where, as Plekhanov assures us, every subjective idealist is menaced with the necessity of conceiving the world as it was contemplated by the ichthyosauruses and archaeopteryxes. 'Let us mentally transport ourselves,' writes Plekhanov, 'to that epoch when only very remote ancestors of man existed on the earth, for instance, to the Mesozoic period. The question arises, what was the status of space, time and causality then? Whose subjective forms were they then? Were they the subjective forms of the ichthyosauruses? And whose intelligence at that time dictated its laws to nature? The intelligence of the archaeopteryx? To these queries the Kantian philosophy can give no answer. And it must be rejected as absolutely incompatible with modern science' (*L. Feuerbach*, p. 117)."

Here Bazarov breaks off the quotation from Plekhanov just before a very important passage—as we shall soon

see — namely: “Idealism says that without a subject there is no object. The history of the earth shows that the object existed long before the subject appeared, i.e., long before the appearance of organisms possessing a perceptible degree of consciousness.... The history of development reveals the truth of materialism.”

Let us continue the quotation from Bazarov:

“...But does Plekhanov's thing-in-itself provide the desired solution? Let us remember that even according to Plekhanov we can have no idea of things as they are in themselves; we know only their manifestations, only the results of their action on our sense-organs. ‘Apart from this action they possess no aspect’ (*L. Feuerbach*, p. 112). What sense-organs existed in the period of the ichthyosauruses? Evidently, only the sense-organs of the ichthyosauruses and their like. Only the ideas of the ichthyosauruses were then the actual, the real manifestations of things-in-themselves. Hence, according to Plekhanov also, if the paleontologist desires to remain on ‘real’ ground he must write the story of the Mesozoic period in the light of the contemplations of the ichthyosaurus. And here, consequently, not a single step forward is made in comparison with solipsism.”

Such is the complete argument (the reader must pardon the lengthy quotation—we could not avoid it) of a Machist, an argument worthy of perpetuation as a first-class example of muddle-headedness.

Bazarov imagines that he has caught Plekhanov out. If things-in-themselves, apart from their action on our sense-organs, have no aspect of their own, then in the Mesozoic period they did not exist except as the “aspect” of the sense-organs of the ichthyosaurus. And this is the argument of a materialist?! If an “aspect” is the result of the action of “things-in-themselves” on sense-organs, does it follow from this that things *do not exist independently* of sense-organs of one kind or another??

Let us assume for a moment that Bazarov indeed “misunderstood” Plekhanov's words (improbable as such an assumption may seem), that they did appear obscure to him. Be it so. We ask: is Bazarov engaged in a fencing bout with Plekhanov (whom the Machists themselves exalt to the position of the only

representative of materialism!), or is he endeavouring to elucidate the problem of *materialism*? If Plekhanov seemed to you obscure or contradictory, and so forth, why did you not turn to other materialists? Is it because you do not know them? But ignorance is no argument.

If Bazarov indeed does not know that the fundamental premise of materialism is the recognition of the external world, of the existence of *things* outside and independent of our mind, this is truly a striking case of crass ignorance. We would remind the reader of Berkeley, who in 1710 rebuked the materialists for their recognition of "objects in themselves" existing independently of our mind and reflected by our mind. Of course, everybody is free to side with Berkeley or anyone else *against* the materialists; that is unquestionable. But it is equally unquestionable that to speak of the materialists and distort or ignore the fundamental premise of *all* materialism is to import preposterous confusion into the problem.

Was Plekhanov right when he said that for idealism there is no object without a subject, while for materialism the object exists independently of the subject and is reflected more or less adequately in the subject's mind? If this is *wrong*, then any man who has the slightest respect for Marxism should have pointed out *this* error of Plekhanov's, and should have dealt *not* with him, but with someone else, with Marx, Engels, or Feuerbach, on the question of materialism and the existence of nature prior to man. But if this is right, or, at least, if you are unable to find an error here, then your attempt to shuffle the cards and to confuse in the reader's mind the most elementary conception of materialism, as distinguished from idealism, is a literary indecency.

As for the Marxists who are interested in the question *independently* of every little word uttered by Plekhanov, we shall quote the opinion of L. Feuerbach, who, as is known (perhaps *not* to Bazarov?), was a materialist, and through whom Marx and Engels, as is well known, came from the idealism of Hegel to their materialist philosophy. In his rejoinder to R. Haym, Feuerbach wrote:

"Nature, which is not an object of man or mind, is for speculative philosophy, or at least for idealism, a Kantian thing-in-itself [we shall speak later in detail of the fact that our

Machists confuse the Kantian thing-in-itself with the materialist thing-in-itself], an abstraction without reality, but it is nature that causes the downfall of idealism. Natural science, at least in its present state, necessarily leads us back to a point when the conditions for human existence were still absent, when nature, i.e., the earth, was not yet an object of the human eye and mind, when, consequently, nature was an absolutely non-human entity (*absolut unmenschliches Wesen*). Idealism may retort: but this nature also is something thought of by you (*von dir gedachte*). Certainly, but from this it does not follow that this nature did not at one time actually exist, just as from the fact that Socrates and Plato do not exist for me if I do not think of them, it does not follow that Socrates and Plato did not actually at one time exist without me.”*

That is how Feuerbach regarded materialism and idealism from the standpoint of the existence of nature prior to the appearance of man. Avenarius' sophistry (the “mental projection of the observer”) was refuted by Feuerbach, who did not know the “recent positivism” but who thoroughly knew the old idealist sophistries. And Bazarov offers us absolutely nothing new, but merely repeats this sophistry of the idealists: “Had I been there [on earth, prior to man], I would have seen the world so-and-so” (*Studies “in” the Philosophy of Marxism*, p. 29). In other words: if I make an assumption that is obviously absurd and contrary to natural science (that man can be an observer in an epoch before man existed), I shall be able to patch up the breach in my philosophy!

This gives us an idea of the extent of Bazarov's knowledge of the subject or of his literary methods. Bazarov did not even hint at the “difficulty” with which Avenarius, Petzoldt and Willy wrestled; and, moreover, he made such a hash of the whole subject, placed before the reader such an incredible hotchpotch, that there ultimately appears to be no difference between materialism and solipsism! Idealism is represented as “realism”, and to materialism is ascribed denial of the

* L. Feuerbach, *Sämtliche Werke*, herausgegeben von Bolin und Jodl, Band VII, Stuttgart, 1903, S. 510; or Karl Grün, *L. Feuerbach in seinem Briefwechsel und Nachlass, sowie in seiner philosophischen Charakterentwicklung*, I. Band, Leipzig, 1874, S. 423-35.

existence of things outside of their action on the sense-organs! Truly, either Feuerbach did not know the elementary difference between materialism and idealism, or else Bazarov and Co. have completely altered the elementary truths of philosophy.

Or let us take Valentinov, a philosopher who, naturally, is delighted with Bazarov: 1) "Berkeley is the founder of the correlativist theory of the relativity of subject and object" (148). But this is not Berkeleian idealism, oh, no! This is a "profound analysis"! 2) "In the most realistic aspect, irrespective of the forms [!] of their usual idealist interpretation [only interpretation!], the fundamental premises of the theory are formulated by Avenarius" (148). Infants, as we see, are taken in by mystification! 3) "Avenarius' conception of the starting-point of knowledge is that each individual finds himself in a definite environment, in other words, the individual and the environment are given as connected and inseparable [!] terms of one and the same co-ordination" (148). Delightful! This is not idealism—Valentinov and Bazarov have risen above materialism and idealism—this "inseparability" of the subject and object is the most "realist" of all. 4) "Is the reverse assertion correct, namely, that there is no counter-term to which there would be no corresponding central term—an individual? Naturally [!] it is not correct.... In the Archean period the woods were verdant ... yet there was no man" (148). That means that the inseparable *can* be separated! Is that not "natural"? 5) "Yet from the standpoint of the theory of knowledge, the question of the object in itself is absurd" (148). Of course! When there were no sentient organisms objects were nevertheless "complexes of elements" *identical* with sensations! 6) "The immanentist school, in the person of Schubert-Soldern and Schuppe, clad these [!] thoughts in an unsuitable form and found itself in the *cul-de-sac* of solipsism" (149). But "these thoughts" themselves, of course, contain no solipsism, and empirio-criticism is not a paraphrase of the reactionary theory of the immanentists, who lie when they declare themselves to be in sympathy with Avenarius!

This, Machist gentlemen, is not philosophy, but an incoherent jumble of words.

Does Man Think with the Help of the Brain?

Bazarov emphatically answers this question in the affirmative. He writes: "If Plekhanov's thesis that 'consciousness is an internal [? Bazarov] state of matter' be given a more satisfactory form, e.g., that 'every mental process is a function of the cerebral process', then neither Mach nor Avenarius would dispute it" (*Studies "in" the Philosophy of Marxism*, 29).

To the mouse no beast is stronger than the cat. To the Russian Machists there is no materialist stronger than Plekhanov. Was Plekhanov really the *only* one, or the first, to advance the materialist thesis that consciousness is an internal state of matter? And if Bazarov did not like Plekhanov's formulation of materialism, why did he take Plekhanov and not Engels or Feuerbach?

Because the Machists are afraid to admit the truth. They are fighting materialism, but pretend that it is only Plekhanov they are fighting. A cowardly and unprincipled method.

But let us turn to empirio-criticism. Avenarius "would not dispute" the statement that thought is a function of the brain. These words of Bazarov's contain a direct untruth. Not only does Avenarius *dispute* the materialist thesis, but invents a whole "theory" in order to refute it. "The brain," says Avenarius in *The Human Concept of the World*, "is not the habitation, the seat, the creator, it is not the instrument or organ, the supporter or substratum, etc., of thought" (S. 76—approvingly quoted by Mach in the *Analysis of Sensations*, p. 32). "Thought is not an inhabitant or commander, or the other half or side, etc., nor is it a product or even a physiological function, or a state in general of the brain" (*ibid.*). And Avenarius expresses himself no less emphatically in his *Notes*: "presentations" are "not functions (physiological, psychical, or psycho-physical) of the brain" (*op. cit.*, § 115, S. 419). Sensations are not "psychical functions of the brain" (§ 116).

Thus, according to Avenarius, the brain is not the organ of thought, and thought is not a function of the brain. Take Engels, and we immediately find directly contrary, frankly materialist formulations. "Thought and consciousness," says Engels in *Anti-Dühring*, "are products of the human brain"

(5th German edition, p. 22).¹⁰¹ This idea is often repeated in that work. In *Ludwig Feuerbach* we have the following exposition of the views of Feuerbach and Engels: "... the material (*stofflich*), sensuously perceptible world to which we ourselves belong is the only reality", "our consciousness and thinking, however suprasensuous they may seem, are the product (*Erzeugnis*) of a material, bodily organ, the brain. Matter is not a product of mind, but mind itself is merely the highest product of matter. This is, of course, pure materialism" (4th German edition, p. 18). Or p. 4, where he speaks of the reflection of the processes of nature in "the thinking brain",¹⁰² etc., etc.

Avenarius rejects this materialist standpoint and says that "the thinking brain" is a "*fetish of natural science*" (*The Human Concept of the World*, 2nd German edition, p. 70). Hence, Avenarius cherishes no illusions concerning his absolute disagreement with natural science on this point. He admits, as do Mach and all the immanentists, that natural science holds an instinctive and unconscious materialist point of view. He admits and explicitly declares that *he absolutely differs from the "prevailing psychology"* (*Notes*, p. 150, etc.). This prevailing psychology is guilty of an inadmissible "introjection"—such is the new term contrived by our philosopher—i.e., the insertion of thought into the brain, or of sensations into us. These "two words" (into us — *in uns*), Avenarius goes on to say, contain the assumption (*Annahme*) that empirio-criticism disputes. "This *insertion (Hineinverlegung)* of the visible, etc., into man is what we call *introjection*" (§ 45, S.153).

Introjection deviates "in principle" from the "natural conception of the world" (*natürlicher Weltbegriff*) by substituting "in me" for "before me" (*vor mir*, S. 154), "by turning a component part of the (real) environment into a component part of (ideal) thought" (*ibid.*). "Out of the *amechanical* [a new word in place of "mental"] which manifests itself freely and clearly in the given [or, in what is found — *im Vorgefundenen*], introjection makes something which mysteriously hides itself [*Latitierendes*, says Avenarius—another new word] in the central nervous system" (*ibid.*).

Here we have the same *mystification* that we encountered in the famous defence of "naïve realism" by the empirio-criticists

and immanentists. Avenarius here acts on the advice of Turgenev's charlatan¹⁰³: denounce most of all those vices which you yourself possess. Avenarius tries to pretend that he is combating idealism: philosophical idealism, you see, is usually deduced from introjection, the external world is converted into sensation, into idea, and so forth, while I defend "naïve realism", the equal reality of everything given, both "self" and environment, without inserting the external world into the human brain.

The sophistry here is exactly the same as that which we observed in the case of the famous co-ordination. While distracting the attention of the reader by attacking idealism, Avenarius is in fact defending idealism, albeit in slightly different words: thought is not a function of the brain; the brain is not the organ of thought; sensations are not a function of the nervous system; oh, no! sensations are—"elements", psychical only in one connection, while in another connection (although the elements are "identical") they are physical. With his new and muddled terminology, with his new and pretentious epithets, supposedly expressing a new "theory", Avenarius merely marked time and then returned to his fundamental idealist premise.

And if our Russian Machists (e.g., Bogdanov) failed to notice the "mystification" and discerned a refutation of idealism in the "new" defence of it, we find in the analysis of empirio-criticism given by the professional philosophers a sober estimate of the true nature of Avenarius' ideas, which is laid bare when stripped of its pretentious terminology.

In 1903 Bogdanov wrote ("Authoritative Thinking", an article in the symposium *From the Psychology of Society*, p. 119, et seq.):

"Richard Avenarius presented a most harmonious and complete philosophical picture of the development of the dualism of mind and body. The gist of his 'doctrine of introjection' is the following: [we observe only physical bodies directly, and we infer the experiences of others, i.e., the mind of another person, only by hypothesis].... The hypothesis is complicated by the fact that the experiences of the other person are assumed to be located in his body, are inserted (introjected) into his organism. This is already a superfluous

hypothesis and even gives rise to numerous contradictions. Avenarius systematically draws attention to these contradictions by unfolding a series of successive historical factors in the development of dualism and of philosophical idealism. But here we need not follow Avenarius." ... "Introjection serves as an explanation of the dualism of mind and body."

Bogdanov swallowed the bait of professorial philosophy in believing that "introjection" was aimed against idealism. He accepted the evaluation of introjection given by Avenarius himself *at its face value* and failed to notice the *barb* directed against materialism. Introjection denies that thought is a function of the brain, that sensations are a function of man's central nervous system, that is, it denies the most elementary truth of physiology in order to crush materialism. "Dualism", it turns out, is refuted *idealistically* (notwithstanding all Avenarius' diplomatic rage against idealism), for sensation and thought prove to be not secondary, not a product of matter, but *primary*. Dualism is here refuted by Avenarius only insofar as he "refutes" the existence of the object without the subject, matter without thought, the external world independent of our sensations; that is, it is refuted *idealistically*. The absurd denial of the fact that the visual image of a tree is a function of the retina, the nerves and the brain, was required by Avenarius in order to bolster up his theory of the "indissoluble" connection of the "complete" experience, which includes not only the "self" but also the tree, i.e., the environment.

The doctrine of introjection is a muddle; it smuggles in idealistic rubbish and is contradictory to natural science, which inflexibly holds that thought is a function of the brain, that sensations, *i.e.*, the images of the *external world*, exist *within us*, produced by the action of things on our sense-organs. The materialist elimination of the "dualism of mind and body" (*i.e.*, materialist monism) consists in the assertion that the mind does not exist independently of the body, that mind is secondary, a function of the brain, a reflection of the external world. The idealist elimination of the "dualism of mind and body" (*i.e.*, idealist monism) consists in the assertion that mind *is not* a function of the body, that, consequently, mind is primary, that the "environment" and the "self" exist only in an inseparable connection of one and the same "complexes of elements".

Apart from these two diametrically opposed methods of eliminating "the dualism of mind and body", there can be no third method, not counting eclecticism, which is a senseless jumble of materialism and idealism. And it was this jumble of Avenarius' that seemed to Bogdanov and Co. "the truth transcending materialism and idealism".

But the professional philosophers are not as naïve and credulous as the Russian Machists. True, each of these professors-in-ordinary advocates his "own" system of refuting materialism, or, at any rate, of "reconciling" materialism and idealism. But when it comes to a competitor they unceremoniously expose the unconnected fragments of materialism and idealism that are contained in all the various "recent" and "original" systems. And if a few young intellectuals swallowed Avenarius' bait, that old bird Wundt was not to be enticed so easily. The idealist Wundt tore the mask from the poseur Avenarius very unceremoniously *when he praised him for the anti-materialist tendency of the theory of introjection.*

"If empirio-criticism," Wundt wrote, "reproaches vulgar materialism because by such expressions as the brain 'has' thought, or the brain 'produces' thought, it expresses a relation which cannot be established at all by factual observation and description [evidently, for Wundt it is a "fact" that a person thinks without the help of the brain!] ... this reproach, of course, is well founded" (op. cit., S. 47-48).

Well, of course! The idealists will always join the half-hearted Avenarius and Mach in attacking materialism! It is only a pity, Wundt adds, that this theory of introjection "does not stand in any relation to the doctrine of the independent vital series, and was, to all appearances, only tacked on to it as an afterthought and in a rather artificial fashion" (S. 365).

Introjection, says O. Ewald, "is to be regarded as nothing but a fiction of empirio-criticism, which required it in order to shield its own fallacies" (op. cit., 44). "We observe a strange contradiction: on the one hand, the elimination of introjection and the restoration of the natural conception of the world is intended to restore to the world the character of living reality; on the other hand, in the principal co-ordination empirio-criticism leads to a purely idealist theory of an absolute correlation of the counter-term and the central term.

Avenarius is thus moving in a circle. He set out to do battle against idealism but laid down his arms before it came to an open fight against it. He wanted to liberate the world of objects from the yoke of the subject, but again bound that world to the subject. What he has actually destroyed by his criticism is a caricature of idealism rather than its genuine epistemological expression" (ibid., 64-65).

"In his [Avenarius'] frequently quoted statement," Norman Smith says, "that the brain is not the seat, organ or supporter of thought, he rejects the only terms which we possess for defining their connection" (op. cit., p. 30*).

Nor is it surprising that the theory of introjection approved by Wundt excites the sympathy of the outspoken spiritualist, James Ward,** who wages systematic war on "naturalism and agnosticism", and especially on T. H. Huxley (not because he was an insufficiently outspoken and determined materialist, for which Engels reproached him, but) because his agnosticism served in fact to conceal materialism.

Let us note that Karl Pearson, the English Machist, who avoids all philosophical artifices, and who recognises neither introjection nor co-ordination, nor yet "the discovery of the world-elements", arrives at the inevitable outcome of Machism when it is stripped of such "disguises", namely, pure subjective idealism. Pearson knows no "elements"; "sense-impressions" are his alpha and omega. He never doubts that man thinks with the help of the brain. And the contradiction between this thesis (which alone conforms with science) and the basis of his philosophy remains naked and obvious. Pearson spares no effort in combating the concept of matter as something existing independently of our sense-impressions (*The Grammar of Science*, Chap. VII). Repeating all Berkeley's arguments, Pearson declares that matter is a nonentity. But when he comes to speak of the relation of the brain to thought, Pearson emphatically declares: "From will and consciousness associated with material machinery we can infer nothing whatever as to

* Norman Smith, "Avenarius' Philosophy of Pure Experience", *Mind*, Vol. XV, 1906.—Ed.

** James Ward, *Naturalism and Agnosticism*, 3rd ed., London, 1906, Vol. II, pp. 171-72.

will and consciousness without that machinery.”* He even advances the following thesis as a summary of his investigations in this field: “Consciousness has no meaning beyond nervous systems akin to our own; it is illogical to assert that all matter is conscious [but it is logical to assert that all matter possesses a property which is essentially akin to sensation, the property of reflection], still more that consciousness or will can exist outside matter” (ibid., p. 75, 2nd thesis). Pearson’s muddle is glaring! Matter is nothing but groups of sense-impressions. That is his premise, that is his philosophy. Hence, sensation and thought are primary; matter, secondary. No, consciousness without matter does not exist, and apparently not even without a nervous system! That is, consciousness and sensation are secondary. The waters rest on the earth, the earth rests on a whale, and the whale rests on the waters. Mach’s “elements” and Avenarius’ co-ordination and introjection do not clear up this muddle, all they do is to obscure the matter, to cover up the traces with the help of an erudite philosophical gibberish.

Just such gibberish, and of this a word or two will suffice, is the special terminology of Avenarius, who coined a plenitude of diverse “notals”, “securals”, “fidentials”, etc., etc. Our Russian Machists for the most part shamefacedly avoid this professorial rigmarole, and only now and again bombard the reader (in order to stun him) with an “existential” and such like. But if naïve people take these words for a species of bio-mechanics, the German philosophers, who are themselves lovers of “erudite” words, laugh at Avenarius. To say “notal” (*notus*=known), or to say that this or the other thing is known to me, is absolutely one and the same, says Wundt in the section entitled “Scholastic Character of the Empirio-critical System”. And, indeed, it is the purest and most dreary scholasticism. One of Avenarius’ most faithful disciples, R. Willy, had the courage to admit it frankly. “Avenarius dreamed of a bio-mechanics,” says he, “but an understanding of the life of the brain can be arrived at only by actual discoveries, and is impossible by the way in which Avenarius attempted to arrive at it. Avenarius’ bio-mechanics is not based on any new observations whatever; its characteristic feature is purely

* *The Grammar of Science*, 2nd ed., London, 1900, p. 58.

schematic constructions of concepts, and, indeed, constructions that do not even have the nature of hypotheses that open up new vistas, but rather of mere stereotyped speculations (*blosse Spekulierschablonen*), which, like a wall, conceal our view.”*

The Russian Machists will soon be like fashion-lovers who are moved to ecstasy over a hat which has already been discarded by the bourgeois philosophers of Europe.

* R. Willy, *Gegen die Schulweisheit*, S. 169. Of course, the pedant Petzoldt will not make any such admissions. With the smug satisfaction of the philistine he chews the cud of Avenarius' "biological" scholasticism (Vol. I, Chap. II).

The Theory of Knowledge of Empirio-criticism and of Dialectical Materialism. II

The "Thing-in-Itself", or V. Chernov Refutes Frederick Engels

Our Machists have written so much about the "thing-in-itself" that if all their writings were to be collected it would result in mountains of printed matter. The "thing-in-itself" is a veritable *bête noire* for Bogdanov and Valentinov, Bazarov and Chernov, Berman and Yushkevich. There is no abuse they have not hurled at it, there is no ridicule they have not showered on it. And against whom are they breaking lances because of this luckless "thing-in-itself"? Here a division of the philosophers of Russian Machism according to political parties begins. All the would-be Marxists among the Machists are combating *Plekhanov's* "thing-in-itself"; they accuse Plekhanov of having become entangled and straying into Kantianism, and of having forsaken Engels. (We shall discuss the first accusation in the fourth chapter; the second accusation we shall deal with now.) The Machist Mr. Victor Chernov, a Narodnik and a sworn enemy of Marxism, opens a direct campaign *against Engels* because of the "thing-in-itself".

One is ashamed to confess it, but it would be a sin to conceal the fact that on this occasion open enmity towards Marxism has made Mr. Victor Chernov a *more* principled literary antagonist than our comrades in party and opponents in philosophy.¹⁰⁴ For only a *guilty conscience* (and in addition, perhaps, ignorance of materialism?) could have been responsible for the fact that the Machist would-be Marxists have diplomatically set Engels aside, have completely ignored Feuerbach and are circling exclusively around Plekhanov. It is indeed circling around one spot, tedious and petty pecking and cavilling at a disciple of Engels, while a frank examination of the views of the teacher

himself is cravenly avoided. And since the purpose of the present cursory comments is to disclose the reactionary character of Machism and the correctness of the materialism of Marx and Engels, we shall leave aside the fuss made by the Machist would-be Marxists about Plekhanov and turn directly to Engels, whom the empirio-criticist Mr. V. Chernov refuted. In his *Philosophical and Sociological Studies* (Moscow, 1907—a collection of articles written, with few exceptions, before 1900) the article “Marxism and Transcendental Philosophy” begins straight away with an attempt to counterpose Marx to Engels, accusing the latter of “naïve dogmatic materialism”, of “the crudest materialist dogmatism” (pp. 29 and 32). Mr. V. Chernov states that a “sufficient” example of this is Engels’ argument against the Kantian thing-in-itself and Hume’s philosophical line. We shall begin with this argument.

In his *Ludwig Feuerbach*, Engels declares that the fundamental philosophical trends are materialism and idealism. Materialism regards nature as primary and spirit as secondary; it places being first and thought second. Idealism holds the contrary view. This root distinction between the “two great camps” into which the philosophers of the “various schools” of idealism and materialism are divided Engels takes as the corner-stone, and he directly charges with “confusion” those who use the terms idealism and materialism in any other way.

“The great basic question of all philosophy,” Engels says, “especially of modern philosophy, is that concerning the relation of thinking and being”, of “spirit and nature”. Having divided the philosophers into “two great camps” on this basic question, Engels shows that there is “yet another side” to this basic philosophical question, viz., “in what relation do our thoughts about the world surrounding us stand to this world itself? Is our thinking capable of the cognition of the real world? Are we able in our ideas and notions of the real world to produce a correct reflection of reality?” *

* Fr. Engels, *Ludwig Feuerbach, etc.*, 4th Germ. ed., S. 15. Russian translation, Geneva ed., 1905, pp. 12-13. Mr. V. Chernov translates the word *Spiegelbild* literally (a mirror reflection), accusing Plekhanov of presenting the theory of Engels “in a very weakened form” by speaking in Russian simply of a “reflection” instead of a “mirror reflection”. This is mere cavilling. *Spiegelbild* in German is also used simply in the sense of *Abbild* (reflection, image.—Ed.).

"The overwhelming majority of philosophers give an affirmative answer to this question," says Engels, including under this head not only all materialists but also the most consistent idealists, as, for example, the absolute idealist Hegel, who considered the real world to be the realisation of some eternally existing "absolute idea", while the human spirit, correctly apprehending the real world, apprehends in it and through it the "absolute idea".

"In addition [i.e., to the materialists and the consistent idealists] there is yet a set of different philosophers—those who question the possibility of any cognition, or at least of an exhaustive cognition, of the world. To them, among the more modern ones, belong Hume and Kant, and they have played a very important role in philosophical development...."¹⁰⁵

Mr. V. Chernov, quoting these words of Engels', launches into the fray. To the word "Kant" he makes the following annotation:

"In 1888 it was rather strange to term such philosophers as Kant and especially Hume as 'modern'. At that time it was more natural to hear mentioned such names as Cohen, Lange, Riehl, Laas, Liebmann, Göring, etc. But Engels, evidently, was not well versed in 'modern' philosophy" (op. cit., p. 33, note 2).

Mr. V. Chernov is true to himself. In economic and philosophical questions alike he reminds one of Turgenev's Voroshilov¹⁰⁶ in annihilating now the ignorant Kautsky,* now the ignorant Engels by merely referring to "scholarly" names! The only trouble is that all the authorities mentioned by Mr. Chernov are the very *neo-Kantians* whom Engels refers to on this very same page of his *Ludwig Feuerbach* as theoretical reactionaries, who were endeavouring to resurrect the corpse of the long since refuted doctrines of Kant and Hume. The good Chernov did not understand that it is just these authoritative (for Machism) muddled professors whom Engels is refuting in his argument!

Having pointed out that Hegel had already presented the "decisive" arguments against Hume and Kant, and that the additions made by Feuerbach are more ingenious than profound, Engels continues:

* V. Ilyin, *The Agrarian Question*, Part I, St. Petersburg, 1908, p. 195. (See Lenin, *Collected Works*, Vol. 5, p. 151.—Ed.)

"The most telling refutation of this as of all other philosophical crotchets (*Schrullen*) is practice, namely, experiment and industry. If we are able to prove the correctness of our conception of a natural process by making it ourselves, bringing it into being out of its conditions and making it serve our own purposes into the bargain, then there is an end to the Kantian incomprehensible [or ungraspable, *unfassbaren*—this important word is omitted both in Plekhanov's translation and in Mr. V. Chernov's translation] 'thing-in-itself'. The chemical substances produced in the bodies of plants and animals remained just such 'things-in-themselves' until organic chemistry began to produce them one after another, whereupon the 'thing-in-itself' became a 'thing-for-us', as, for instance, alizarin, the colouring matter of the madder, which we no longer trouble to grow in the madder roots in the field, but produce much more cheaply and simply from coal tar" (op. cit., p. 16).¹⁰⁷

Mr. V. Chernov, quoting this argument, loses his temper altogether and completely annihilates poor Engels. Listen to this: "No neo-Kantian, of course, will be surprised that from coal tar we can produce alizarin 'more cheaply and simply'. But that together with alizarin it is possible to produce from this coal tar just as cheaply a refutation of the 'thing-in-itself'—this will indeed seem a wonderful and unprecedented discovery, and not to the neo-Kantians alone.

"Engels, apparently, having learned that according to Kant the 'thing-in-itself' is unknowable, turned this theorem into its converse and concluded that everything unknown is a thing-in-itself" (p. 33).

Listen, Mr. Machist: lie, but don't overdo it! Why, before the very eyes of the public you are misrepresenting the very quotation from Engels you have set out to "tear to pieces", without even having grasped the point under discussion!

In the first place, it is not true that Engels "is producing a refutation of the thing-in-itself". Engels said explicitly and clearly that he was refuting the Kantian ungraspable (or unknowable) thing-in-itself. Mr. Chernov confuses Engels' materialist view of the existence of things independently of our consciousness. In the second place, if Kant's theorem reads

that the thing-in-itself is unknowable, the "*converse*" theorem would be: the *unknowable* is the thing-in-itself. Mr. Chernov *replaces* the unknowable by the *unknown*, without realising that by such a substitution he has again confused and distorted the materialist view of Engels!

Mr. V. Chernov is so bewildered by the reactionaries of official philosophy whom he has taken as his mentors that he raises an outcry against Engels *without in the least comprehending* the meaning of the example quoted. Let us try to explain to this representative of Machism what it is all about.

Engels clearly and explicitly states that he is contesting both Hume and Kant. Yet there is no mention whatever in Hume of "unknowable things-in-themselves". What then is there in common between these two philosophers? It is that they both *in principle fence off* the "appearance" from that which appears, the perception from that which is perceived, the thing-for-us from the "thing-in-itself". Furthermore, Hume does not want to hear of the "thing-in-itself", he regards the very thought of it as philosophically inadmissible, as "metaphysics" (as the Humeans and Kantians call it); whereas Kant grants the existence of the "thing-in-itself", but declares it to be "unknowable", fundamentally different from the appearance, belonging to a fundamentally different realm, the realm of the "beyond" (*Jenseits*), inaccessible to knowledge, but revealed to faith.

What is the kernel of Engels' objection? Yesterday we did not know that coal tar contains alizarin. Today we have learned that it does. The question is, did coal tar contain alizarin yesterday?

Of course it did. To doubt it would be to make a mockery of modern science.

And if that is so, three important epistemological conclusions follow:

1) Things exist independently of our consciousness, independently of our sensations, outside of us, for it is beyond doubt that alizarin existed in coal tar yesterday and it is equally beyond doubt that yesterday we knew nothing of the existence of this alizarin and received no sensations from it.

2) There is definitely no difference in principle between the phenomenon and the thing-in-itself, and there cannot be any

such difference. The only difference is between what is known and what is not yet known. And philosophical inventions of specific boundaries between the one and the other, inventions to the effect that the thing-in-itself is "beyond" phenomena (Kant), or that we can and must fence ourselves off by some philosophical partition from the problem of a world which in one part or another is still unknown but which exists outside us (Hume)—all this is the sheerest nonsense, *Schrulle*, crotchet, fantasy.

3) In the theory of knowledge, as in every other sphere of science, we must think dialectically, that is, we must not regard our knowledge as ready-made and unalterable, but must determine how *knowledge* emerges from *ignorance*, how incomplete, inexact knowledge becomes more complete and more exact.

Once we accept the point of view that human knowledge develops from ignorance, we shall find millions of examples of it just as simple as the discovery of alizarin in coal tar, millions of observations not only in the history of science and technology but in the everyday life of each and every one of us that illustrate the transformation of "things-in-themselves" into "things-for-us", the appearance of "phenomena" when our sense-organs experience an impact from external objects, the disappearance of "phenomena" when some obstacle prevents the action upon our sense-organs of an object which we know to exist. The sole and unavoidable deduction to be made from this—a deduction which all of us make in everyday practice and which materialism deliberately places at the foundation of its epistemology—is that outside us, and independently of us, there exist objects, things, bodies and that our perceptions are images of the external world. Mach's converse theory (that bodies are complexes of sensations) is pitiful idealist nonsense. And Mr. Chernov, in his "analysis" of Engels, once more revealed his Voroshilov qualities; Engels' simple example seemed to him "strange and naïve"! He regards only *gelehrte* fictions as genuine philosophy and is unable to distinguish professorial eclecticism from the consistent materialist theory of knowledge.

It is both impossible and unnecessary to analyse Mr. Chernov's other arguments; they all amount to the same

pretentious nonsense (like the assertion that for the materialists the atom is the thing-in-itself!). We shall note only the argument which is relevant to our discussion (an argument which has apparently led certain people astray), viz., that Marx supposedly differed from Engels. The question at issue is Marx's *second* Thesis on Feuerbach and Plekhanov's translation of the word *Diesseitigkeit*.

Here is the second Thesis:

"The question whether objective truth can be attributed to human thinking is not a question of theory, but is a practical question. In practice man must prove the truth, i.e., the reality and power, the 'this-sidedness' of his thinking. The dispute over the reality or non-reality of thinking which is isolated from practice is a purely scholastic question."¹⁰⁸

Instead of "prove the this-sidedness of thinking" (a literal translation), Plekhanov has: prove that thinking "does not stop at this side of phenomena". And Mr. V. Chernov cries: "The contradiction between Marx and Engels has been eliminated very simply.... It appears as though Marx, like Engels, asserted the knowability of things-in-themselves and the 'other-sidedness' of thinking" (loc. cit., p. 34, note).

What can be done with a Voroshilov whose every phrase makes confusion worse confounded! It is sheer ignorance, Mr. Victor Chernov, not to know that all materialists assert the knowability of things-in-themselves. It is ignorance, Mr. Victor Chernov, or infinite slovenliness, to skip the *very first* phrase of the Thesis and not to realise that the "objective truth" (*gegenständliche Wahrheit*) of thinking means *nothing else* than the *existence* of objects ("things-in-themselves") *truly* reflected by thinking. It is sheer illiteracy, Mr. Victor Chernov, to assert that from Plekhanov's paraphrase (Plekhanov gave a paraphrase and not a translation) "it appears as though" Marx defended the *other-sidedness* of thought. Because only the Humeans and the Kantians confine thought to "this side of phenomena". But for all materialists, including those of the seventeenth century whom Bishop Berkeley demolished (see Introduction), "phenomena" are "things-for-us" or *copies* of the "objects in themselves". Of course, Plekhanov's free paraphrase is not obligatory for those who desire to know Marx himself, but it is obligatory to try to

understand what Marx meant and not to prance about like a Voroshilov.

It is interesting to note that while among people who call themselves socialists we encounter an unwillingness or inability to grasp the meaning of Marx's "Theses", bourgeois writers, specialists in philosophy, sometimes manifest greater scrupulousness. I know of one such writer who studied the philosophy of Feuerbach and in connection with it Marx's "Theses". That writer is Albert Lévy, who devoted the third chapter of the second part of his book on Feuerbach to an examination of the influence of Feuerbach on Marx.* Without going into the question whether Lévy always interprets Feuerbach correctly, or how he criticises Marx from the ordinary bourgeois standpoint, we shall only quote his opinion of the philosophical content of Marx's famous "Theses". Regarding the first Thesis, Lévy says: "Marx, on the one hand, together with all earlier materialism and with Feuerbach, recognises that there are real and distinct objects outside us corresponding to our ideas of things...."

As the reader sees, it was immediately clear to Albert Lévy that the basic position not only of Marxian materialism but of *every* materialism, of "*all earlier*" materialism, is the recognition of real objects outside us, to which objects our ideas "correspond". This elementary truth, which holds good for *all* materialism in general, is unknown only to the Russian Machists. Lévy continues:

"...On the other hand, Marx expresses regret that materialism had left it to idealism to appreciate the importance of the active forces [i.e., human practice]. It is these active forces which, according to Marx, must be wrested from idealism in order to integrate them into the materialist system; but it will of course be necessary to give these active forces the real and sensible character which idealism cannot grant them. Marx's idea, then, is the following: just as to our ideas there correspond real objects outside us, so to our phenomenal activity there corresponds a real activity outside us, an activity

* Albert Lévy, *La philosophie de Feuerbach et son influence sur la littérature allemande*, Paris, 1904, pp. 249-338, on the influence of Feuerbach on Marx, and pp. 290-98, an examination of the "Theses".

of things. In this sense humanity partakes of the absolute, not only through theoretical knowledge but also through practical activity; thus all human activity acquires a dignity, a nobility, that permits it to advance hand in hand with theory. Revolutionary activity henceforth acquires a metaphysical significance...."

Albert Lévy is a professor. And a proper professor cannot avoid abusing the materialists as being metaphysicians. For the professorial idealists, Humeans and Kantians every kind of materialism is "metaphysics", because beyond the phenomenon (appearance, the thing-for-us) it discerns a reality outside us. A. Lévy is therefore essentially right when he says that in Marx's opinion there corresponds to man's "phenomenal activity" "an activity of things", that is to say, human practice has not only a phenomenal (in the Humean and Kantian sense of the term), but an objectively real significance. The criterion of practice—as we shall show in detail in its proper place (§ 6)—has entirely different meanings for Mach and Marx. "Humanity partakes of the absolute" means that human knowledge reflects absolute truth (see below, § 5); the practice of humanity, by verifying our ideas, corroborates what in those ideas corresponds to absolute truth. A. Lévy continues:

"...Having reached this point, Marx naturally encounters the objections of the critics. He has admitted the existence of things-in-themselves, of which our theory is the human translation; he cannot evade the usual objection: what assurance have you of the accuracy of the translation? What proof have you that the human mind gives you an objective truth? To this objection Marx replies in his second Thesis" (p. 291).

The reader sees that Lévy does not for a moment doubt that Marx recognised the existence of things-in-themselves!

"Transcendence", or V. Bazarov "Revises" Engels

But while the Russian Machist would-be Marxists diplomatically evaded *one* of the most decisive and definite statements of Engels, they "revised" *another* statement of his in quite the

Chernov manner. However tedious and laborious the task of correcting distortions and perversions of the meaning of quotations may be, he who wishes to speak of the Russian Machists cannot avoid it.

Here is Bazarov's revision of Engels.

In the article "On Historical Materialism",* Engels speaks of the English agnostics (philosophers of Hume's trend of thought) as follows:

"...Our agnostic admits that all our knowledge is based upon the information (*Mitteilungen*) imparted to us by our senses...."

Let us note for the benefit of our Machists that the agnostic (Humean) also starts from *sensations* and recognises no other source of knowledge. The agnostic is a pure "*positivist*", be it said for the benefit of the adherents of the "recent positivism"!

"...But, he [the agnostic] adds, how do we know that our senses give us correct representations (*Abbilder*) of the objects we perceive through them? And he proceeds to inform us that, whenever he speaks of objects or their qualities, he does in reality not mean these objects and qualities, of which he cannot know anything for certain, but merely the impressions which they have produced on his senses...."¹⁰⁹

What two lines of philosophical tendency does Engels contrast here? One line is that the senses give us faithful images of things, that we know *the things themselves*, that the outer world acts on our sense-organs. This is materialism—with which the agnostic is not in agreement. What then is the *essence* of the agnostic's line? It is that he *does not go beyond* sensations, that *he stops on this side of phenomena*, refusing to see anything "certain" beyond the boundary of sensations. About *these things themselves* (i.e., about the things-in-themselves, the "objects in themselves", as the materialists whom Berkeley opposed called them), we can know nothing certain—so the agnostic categorically insists. Hence, in the controversy of which Engels speaks

* This article forms the Introduction to the English edition of Engels' *Socialism: Utopian and Scientific*, and was translated by Engels himself into German in the *Neue Zeit*, XI, 1 (1892-93, No. 1), S. 15, et seq. The only Russian translation, if I am not mistaken, is to be found in the symposium *Historical Materialism*, p. 162, et seq. Bazarov quotes the passage in the *Studies "in" the Philosophy of Marxism*, p. 64.

the materialist affirms the existence and knowability of things-in-themselves. The agnostic *does not even admit the thought* of things-in-themselves and insists that we can know nothing certain about them.

It may be asked in what way the position of the agnostic as outlined by Engels differs from the position of Mach? In the "new" term "element"? But it is sheer childishness to believe that a nomenclature can change a philosophical line, that sensations when called "elements" cease to be sensations! Or does the difference lie in the "new" idea that the very same elements constitute the physical in one connection and the psychical in another? But did you not observe that Engels' agnostic *also* puts "impressions" in place of the "things themselves"? That means that *in essence* the agnostic too differentiates between physical and psychical "impressions"! Here again the difference is *exclusively* one of nomenclature. When Mach says that objects *are* complexes of sensations, Mach is a Berkeleian; when Mach "corrects" himself, and says that "elements" (sensations) can be physical in one connection and psychical in another, Mach is an agnostic, a Humean. Mach does not go beyond these two *lines* in his philosophy, and it requires extreme naïveté to take this muddlehead at his word and believe that he has actually "transcended" both materialism and idealism.

Engels deliberately mentions no names in his exposition, and criticises not individual representatives of Humism (professional philosophers are very prone to call original systems the petty variations one or another of them makes in terminology or argument), but *the whole* Humean line. Engels criticises not particulars but the essence; he examines the *fundamental* wherein *all* Humeans *deviate* from materialism, and his criticism therefore embraces Mill, Huxley and Mach alike. Whether we say (with J. S. Mill) that matter is the permanent possibility of sensation, or (with Ernst Mach) that matter is more or less stable complexes of "elements"—sensations—we remain *within the bounds* of agnosticism, or Humism. Both standpoints, or more correctly both formulations, are *covered* by Engels' exposition of agnosticism: the agnostic does not go beyond sensations and asserts that he *cannot* know anything certain about their source, about their original, etc. And if

Mach attributes great importance to his disagreement with Mill on this question, it is because Mach comes under Engels' characterisation of a professor-in-ordinary: *Flohknacker*. Ay, gentlemen, you have only cracked a flea by making petty corrections and by altering terminology instead of abandoning the basic, half-hearted standpoint.

And how does the materialist Engels—at the beginning of the article Engels explicitly and emphatically contrasts his materialism to agnosticism—refute the foregoing arguments?

“...Now, this line of reasoning seems undoubtedly hard to beat by mere argumentation. But before there was argumentation there was action. *Im Anfang war die That*. And human action had solved the difficulty long before human ingenuity invented it. The proof of the pudding is in the eating. From the moment we turn to our own use these objects, according to the qualities we perceive in them, we put to an infallible test the correctness or otherwise of our sense-perceptions. If these perceptions have been wrong, then our estimate of the use to which an object can be turned must also be wrong, and our attempt must fail. But if we succeed in accomplishing our aim, if we find that the object does agree with our idea of it, and does answer the purpose we intended it for, then that is positive proof that our perceptions of it and of its qualities, so far, agree with reality outside ourselves....”

Thus, the materialist theory, the theory of the reflection of objects by our mind, is here presented with absolute clarity: things exist outside us. Our perceptions and ideas are their images. Verification of these images, differentiation between true and false images, is given by practice. But let us listen to a little more of Engels (Bazarov at this point ends his quotation from Engels, or rather from Plekhanov, for he deems it unnecessary to deal with Engels himself):

“...And whenever we find ourselves face to face with a failure, then we generally are not long in making out the cause that made us fail; we find that the perception upon which we acted was either incomplete and superficial, or combined with the results of other perceptions in a way not warranted by them” (the Russian translation in *Historical Materialism* is incorrect). “So long as we take care to train and to use our senses properly, and to keep our action within the limits

prescribed by perceptions properly made and properly used, so long we shall find that the result of our action proves the conformity (*Uebereinstimmung*) of our perceptions with the objective (*gegenständlich*) nature of the things perceived. Not in one single instance, so far, have we been led to the conclusion that our sense-perceptions, scientifically controlled, induce in our minds ideas respecting the outer world that are, by their very nature, at variance with reality, or that there is an inherent incompatibility between the outer world and our sense-perceptions of it.

"But then come the neo-Kantian agnostics and say...." ¹¹⁰

We shall leave to another time the examination of the arguments of the neo-Kantians. Let us remark here that anybody in the least acquainted with the subject, or even merely attentive, cannot fail to understand that Engels is here expounding the very same materialism against which the Machists are always and everywhere doing battle. And now just watch the methods by which Bazarov revises Engels:

"Here," writes Bazarov in connection with the fragment of the quotation we have given, "Engels is actually attacking Kantian idealism...."

It is not true. Bazarov is muddling things. In the fragment which he quoted, and which is quoted by us more fully, there is *not a syllable either* about Kantianism *or* about idealism. Had Bazarov really read the whole of Engels' article, he could not have avoided seeing that Engels speaks of neo-Kantianism, and of Kant's whole line, *only in the next* paragraph, just where we broke off our quotation. And had Bazarov attentively read and reflected on the fragment he himself quotes, he could not have avoided seeing that in the arguments of the agnostic which Engels here refutes there is *not a trace* of either idealism or Kantianism; for idealism begins only when the philosopher says that things are our sensations, while Kantianism begins when the philosopher says that the thing-in-itself exists but is unknowable. Bazarov confuses Kantianism with Humism; and he confuses them because, being himself a semi-Berkeleian, semi-Humean of the Machist sect, he does not understand (as will be shown in detail below) the distinction between the Humean and the materialist opposition to Kantianism.

"...But, alas!" continues Bazarov, "his argument is aimed

against Plekhanov's philosophy just as much as it is against Kantian philosophy. In the school of Plekhanov-Orthodox, as Bogdanov has already pointed out, there is a fatal misunderstanding regarding consciousness. To Plekhanov, as to all idealists, it seems that everything perceptually given, i.e., cognised, is 'subjective'; that to proceed only from what is factually given means being a solipsist; that real being can be found only beyond the boundaries of everything that is immediately given...."

This is entirely in the spirit of Chernov and his assurances that Liebknecht was a true-Russian Narodnik! If Plekhanov is an idealist who has deserted Engels, then why is it that you, who are supposedly an adherent of Engels, are not a materialist? This is nothing but wretched mystification, Comrade Bazarov! By means of the Machist expression "*immediately given*" you begin to confuse the difference between agnosticism, idealism and materialism. You ought to realise that such expressions as the "*immediately given*" and the "*factually given*" are a piece of confusion of the Machists, the immanentists, and the other reactionaries in philosophy, a masquerade, whereby the agnostic (and sometimes, as in Mach's case, the idealist too) disguises himself in the cloak of the materialist. For the materialist the "*factually given*" is the outer world, the image of which is our sensations. For the idealist the "*factually given*" is sensation, and the outer world is declared to be a "*complex of sensations*". For the agnostic the "*immediately given*" is also sensation, but the agnostic *does not go on* either to the materialist recognition of the reality of the outer world, or to the idealist recognition of the world as our sensation. Therefore your statement that "real being [according to Plekhanov] can be found only beyond the boundaries of *everything that is immediately given*" is sheer nonsense and inevitably follows from your Machist position. But while you have a perfect right to adopt any position you choose, including a Machist one, you have no right to falsify Engels once you have undertaken to speak of him. And from Engels' words it is perfectly clear that for the materialist real being lies *beyond the bounds of* the "sense-perceptions", impressions and ideas of man, while for the agnostic it is impossible to go *beyond the bounds of* these perceptions. Bazarov believed

Mach, Avenarius, and Schuppe when they said that the "immediately" (or factually) given connects the perceiving *self* with the perceived environment in the famous "indissoluble" co-ordination, and endeavours, unobserved by the reader, to impute this nonsense to the materialist Engels!

"...It is as though the foregoing passage from Engels was deliberately written by him in the most popular and accessible form in order to dissipate this idealist misunderstanding...."

Not for nothing was Bazarov a pupil of Avenarius! He continues his mystification: under the guise of combating idealism (of which Engels is not speaking here), he smuggles in the *idealist* "co-ordination". Not bad, Comrade Bazarov!

"...The agnostic asks, how do we know that our subjective senses give us a correct presentation of objects?..."

You are muddling things, Comrade Bazarov! Such nonsense as "*subjective*" senses Engels himself does not speak of, and does not even ascribe to his enemy the agnostic. There are no other senses except human, i.e., "*subjective*", senses, for we are speaking from the standpoint of man and not of a hobgoblin. You are again starting to impute Machism to Engels, to imply that he says: the agnostic regards senses, or, to be more precise, sensations, as *only* subjective (which the agnostic does *not* do!), while Avenarius and I have "co-ordinated" the object into an indissoluble connection with the subject. Not bad, Comrade Bazarov!

"...But what do you term 'correct'? — Engels rejoins.— Correct is that which is confirmed by our practice; and consequently, since our sense-perceptions are confirmed by experience, they are not 'subjective', that is, they are not arbitrary, or illusory, but correct and real as such...."

You are muddling things, Comrade Bazarov! You have substituted for the question of the existence of things outside our sensations, perceptions, ideas, the question of the criterion of the correctness of our ideas of "these things themselves", or, more precisely, you are *blocking* the former question by means of the latter. But Engels says explicitly and clearly that what distinguishes him from the agnostic is not only the agnostic's doubt as to whether our images are "correct", but also the agnostic's doubt as to whether we may speak of the *things themselves*, as to whether we may have "certain" knowledge of

their existence. Why did Bazarov resort to this juggling? In order to obscure and confuse what is the *basic* question for materialism (and for Engels, as a materialist), the question of the existence of things outside our mind, which by acting on our sense-organs evoke sensations. It is impossible to be a materialist without answering this question in the affirmative; but one can be a materialist and still differ on what constitutes the criterion of the correctness of the images presented by our senses.

And again Bazarov muddles matters when he attributes to Engels, in the dispute with the agnostic, the absurd and ignorant expression that our sense-perceptions are confirmed by "*experience*". Engels did not use and could not have used this word *here*, for Engels *was well aware* that the idealist Berkeley, the agnostic Hume and the materialist Diderot all had recourse to experience.

"...Inside the limits within which we have to do with objects in practice, *perceptions of the object and of its properties coincide with the reality existing outside us*. 'To coincide' is somewhat different from being a 'hieroglyphic'. 'They coincide' means that, within the given limits, the sense-perception is [Bazarov's italics] the reality existing outside us...."

The end crowns the work. Engels has been treated *à la* Mach, fried and served with a Machist sauce. But take care you do not choke, worthy cooks!

"Sense-perception is the reality existing outside us"!! This is just the fundamental absurdity, the fundamental muddle and falsity of Machism, from which flows all the rest of the balderdash of this philosophy and for which Mach and Avenarius have been embraced by those arrant reactionaries and preachers of priestlore, the immanentists. However much V. Bazarov wriggled, however cunning and diplomatic he was in evading ticklish points, in the end he gave himself away and betrayed his true Machist character! To say that "sense-perception is the reality existing outside us" is to return to *Humism*, or even *Berkeleianism*, concealing itself in the fog of "co-ordination". This is either an idealist lie or the subterfuge of the agnostic, Comrade Bazarov, for sense-perception is *not* the reality existing outside us, it is only the *image* of that reality. Are you trying to make capital of the ambiguous Russian word

sovpadat?* Are you trying to lead the unsophisticated reader to believe that "to coincide" here means "to be identical", and not "to correspond"? That means basing one's falsification of Engels *à la* Mach on a perversion of the meaning of a quotation, and nothing more.

Take the German original and you will find there the words *stimmen mit*, which means to correspond with, "to voice with"—the latter translation is literal, for *Stimme* means voice. The words "*stimmen mit*" cannot mean *to coincide* in the sense of "to be identical". And even for the reader who does not know German but who reads Engels with the least bit of attention, it is perfectly clear, it cannot be otherwise than clear, that Engels throughout his whole argument treats the expression "sense-perception" as the *image* (*Abbild*) of the reality existing outside us, and that therefore the word "coincide" can be used in Russian exclusively in the sense of "correspondence", "concurrency", etc. To attribute to Engels the thought that "sense-perception is the reality existing outside us" is such a gem of Machist distortion, such a flagrant attempt to palm off agnosticism and idealism as materialism, that one must admit that Bazarov has broken all records!

One asks, how can sane people having a sound mind and good memory assert that "sense-perception [within what limits is not important] is the reality existing outside us"? The earth is a reality existing outside us. It cannot "coincide" (in the sense of being identical) with our sense-perception, or be in indissoluble co-ordination with it, or be a "complex of elements" in another connection identical with sensation; for the earth existed at a time when there were no men, no sense-organs, no matter organised in that higher form in which the property of matter to possess sensation would be in any way clearly noticeable.

That is just the point, that the tortuous theories of "co-ordination", "introjection", and the newly-discovered world-elements which we analysed in Chapter One serve to cover up this idealist absurdity. Bazarov's formulation, so inadvertently and incautiously thrown off by him, is excellent in that it patently reveals that crying absurdity, which otherwise

* *Sovpadat*—to coincide.—Ed.

it would have been necessary to excavate from the piles of erudite, pseudo-scientific, professorial rigmarole.

All praise to you, Comrade Bazarov! We shall erect a monument to you in your lifetime. On one side we shall engrave your dictum, and on the other: "To the Russian Machist who dug the grave of Machism among the Russian Marxists!"

We shall speak separately of two points touched on by Bazarov in the above-mentioned quotation, viz., the criteria of practice of the agnostics (Machists included) and the materialists, and the difference between the theory of reflection (or images) and the theory of symbols (or hieroglyphs). For the present we shall continue to quote a little more from Bazarov:

"...But what is beyond these boundaries? Of this Engels does not say a word. He nowhere manifests a desire to perform that 'transcendence', that stepping beyond the boundaries of the perceptually-given world, which lies at the foundation of Plekhanov's theory of knowledge...."

Beyond what "boundaries"? Does he mean the boundaries of the "co-ordination" of Mach and Avenarius, which supposedly indissolubly merges the *self* with the environment, the subject with the object? The very question put by Bazarov is devoid of meaning. But if he had put the question in an intelligible way, he would have clearly seen that the external world lies "beyond the boundaries" of man's sensations, perceptions and ideas. But the word "transcendence" once more betrays Bazarov. It is a specifically Kantian and Humean "fancy" to erect *in principle* a boundary between the *appearance* and the *thing-in-itself*. To pass from the appearance, or, if you like, from our sensation, perception, etc., to the thing existing outside of perception is a *transcendence*, Kant says; and this *transcendence* is permissible not to knowledge but to faith. Transcendence is not permissible at all, Hume objects. And the Kantians, like the Humeans, call the materialists *transcendental* realists, "metaphysicians", who effect an illegitimate *passage* (in Latin, *transcensus*) from one region to another, fundamentally different, region. In the works of modern professors of

philosophy who follow the reactionary line of Kant and Hume you may encounter (take only the names enumerated by Voroshilov-Chernov) endless repetitions made in a thousand keys of these accusations that materialism is "metaphysical" and "transcendent". Bazarov borrowed from the reactionary professors both the word and the line of thought, and flourishes them in the name of "recent positivism"! But the whole point is that the very idea of "transcendence", i.e., of a boundary *in principle* between the appearance and the thing-in-itself, is a nonsensical idea of the agnostics (Humeans and Kantians included) and the idealists. We have already explained this in connection with Engels' example of alizarin, and we shall explain it again in the words of Feuerbach and Joseph Dietzgen. But let us first finish with Bazarov's "revision" of Engels:

"...In one place in his *Anti-Dühring*, Engels says that 'being' outside the realm of perception is an *offene Frage*, i.e., a question, for the answer to which, or even for the asking of which, we have no data."

Bazarov repeats this argument after the German Machist, Friedrich Adler. This last example is perhaps even worse than the "sense-perception" which "is the reality existing outside us". In his *Anti-Dühring*, p. 31 (5th German edition), Engels says:

"The unity of the world does not consist in its being, although its being is a pre-condition of its unity, as it must certainly first *be*, before it can be *one*. Being, indeed, is always an open question (*offene Frage*) beyond the point where our sphere of observation (*Gesichtskreis*) ends. The real unity of the world consists in its materiality, and this is proved not by a few juggled phrases, but by a long and wearisome development of philosophy and natural science."¹¹¹

Behold the new hash our cook has prepared. Engels is speaking of being *beyond* the point where our sphere of observation ends, for instance, of the existence of men on Mars. Obviously, such being is indeed an open question. But Bazarov, as though deliberately refraining from giving the full quotation, paraphrases Engels as saying that "*being outside the realm of perception*" is an open question!! This is the sheerest nonsense and Engels is here being saddled with the views of

those professors of philosophy whom Bazarov is accustomed to take at their word and whom J. Dietzgen justly called the graduated flunkeys of clericalism or fideism. Indeed, fideism positively asserts that something does exist "outside the realm of perception". The materialists, in agreement with natural science, emphatically deny this. An intermediate position is held by those professors, Kantians, Humeans (including the Machists), etc., "who have found the truth outside materialism and idealism" and who "compromise", saying: it is an open question. Had Engels ever said anything like this, it would be a shame and disgrace to call oneself a Marxist.

But enough! Half a page of quotation from Bazarov presents such a complete tangle that we are obliged to content ourselves with what has already been said and not to continue following all the waverings of Machist thought.

L. Feuerbach and J. Dietzgen on the Thing-in-Itself

To show how absurd are the assertions of our Machists that the materialists Marx and Engels denied the existence of things-in-themselves (i.e., things outside our sensations, perceptions, and so forth) and the possibility of their cognition, and that they admitted the existence of a fundamental boundary between the appearance and the thing-in-itself, we shall add a few quotations from Feuerbach. The whole trouble with our Machists is that they set about parroting the words of the reactionary professors on dialectical materialism without knowing anything *either* of dialectics *or* of materialism.

"Modern philosophical spiritualism," says Feuerbach, "which calls itself idealism, utters the annihilating, in its own opinion, stricture against materialism that it is dogmatism, viz., that it starts from the sensuous (*sinnlichen*) world as an undisputed (*ausgemacht*) objective truth, and assumes that it is a world in itself (*an sich*), i.e., as existing without us, while in reality the world is only a product of spirit" (*Sämtliche Werke*, X. Band, 1866, S. 185).

That seems clear enough. The world in itself is a world that exists *without us*. This materialism of Feuerbach's, like the

materialism of the seventeenth century contested by Bishop Berkeley, consisted in the recognition that "objects in themselves" exist outside our mind. The *an sich* (of itself, or "in itself") of Feuerbach is the direct opposite of the *an sich* of Kant. Let us recall the excerpt from Feuerbach already quoted, where he rebukes Kant because for the latter the "thing-in-itself" is an "abstraction without reality". For Feuerbach the "thing-in-itself" is an "abstraction *with* reality", that is, a world existing outside us, completely knowable and fundamentally not different from "appearance".

Feuerbach very ingeniously and clearly explains how ridiculous it is to postulate a "transcendence" from the world of phenomena to the world in itself, a sort of impassable gulf created by the priests and taken over from them by the professors of philosophy. Here is one of his explanations:

"Of course, the products of fantasy are also products of nature, for the force of fantasy, like all other human forces, is in the last analysis (*zuletzt*) both in its basis and in its origin a force of nature; nevertheless, a human being is a being distinguished from the sun, moon and stars, from stones, animals and plants, in a word, from those beings (*Wesen*) which he designates by the general name: 'nature'; and, consequently, man's ideas (*Bilder*) of the sun, moon and stars and the other beings of nature (*Naturwesen*), although these ideas are products of nature, are yet products *distinct* from their objects in nature" (*Werke*, Band VII, Stuttgart, 1903, S. 516).

The objects of our ideas are distinct from our ideas, the thing-in-itself is distinct from the thing-for-us, for the latter is only a part, or only one aspect, of the former, just as man himself is only a fragment of the nature reflected in his ideas.

"...The taste-nerve is just as much a product of nature as salt is, but it does not follow from this that the taste of salt is directly as such an objective property of salt, that what salt is merely as an object of sensation it also is in itself (*an und für sich*), hence that the sensation of salt on the tongue is a property of salt thought of without sensation (*des ohne Empfindung gedachten Salzes*)...." And several pages earlier: "Saltiness, as a taste, is the subjective expression of an objective property of salt" (*ibid.*, 514).

Sensation is the result of the action of a thing-in-itself, existing objectively outside us, upon our sense-organs — such is Feuerbach's theory. Sensation is a subjective image of the objective world, of the world *an und für sich*.

"...So is man also a being of nature (*Naturwesen*), like sun, star, plant, animal, stone, nevertheless, he is distinct from nature, and, consequently, nature in the head and heart of man is distinct from nature outside the human head and heart.

"...However, this object, viz., man, is the only object in which, according to the statement of the idealists themselves, the requirement of the 'identity of object and subject' is realised; for man is an object whose equality and unity with my being are beyond all possible doubt.... And is not one man for another, even the most intimate, an object of fantasy, of the imagination? Does not each man comprehend another in his own way, after his own mind (*in und nach seinem Sinne*)?... And if even between man and man, between mind and mind, there is a very considerable difference which it is impossible to ignore, how much greater must be the difference between an unthinking, non-human being in itself (*Wesen an sich*), not identical with us, and the same being as we think of it, perceive it and apprehend it?" (*ibid.*, p. 518).

All the mysterious, sage and subtle distinctions between the appearance and the thing-in-itself are sheer philosophical balderdash. In practice each one of us has observed time without number the simple and obvious transformation of the "thing-in-itself" into phenomenon, into the "thing-for-us". It is precisely this transformation that is cognition. The "doctrine" of Machism that since we know *only* sensations, we cannot know of the *existence* of anything beyond the bounds of sensation, is an old sophistry of idealist and agnostic philosophy served up with a new sauce.

Joseph Dietzgen is a dialectical materialist. We shall show below that his mode of expression is often inexact, that he is often not free from confusion, a fact which has been seized upon by various foolish people (Eugen Dietzgen among them) and of course by our Machists. But they did not take the trouble or were unable to analyse the dominant line of his philosophy and to disengage his materialism from alien elements.

"Let us take the world as the 'thing-in-itself'," says Dietzgen in his *The Nature of the Working of the Human Mind*.^{*} "We shall easily see that the 'world in itself' and the world as it *appears* to us, the phenomena of the world, differ from each other only as the whole differs from its parts" (Germ. ed., 1903, p. 65). "A phenomenon differs no more and no less from the thing which produces it than the ten-mile stretch of a road differs from the road itself" (71-72). There is not, nor can there be, any essential difference here, any "transcendence", any "innate disagreement". But a difference there is, to be sure, viz., the passage *beyond the bounds* of sense-perceptions to the *existence* of things outside us.

"We learn by experience (*wir erfahren*)," says Dietzgen in his *Streifzügen eines Sozialisten in das Gebiet der Erkenntnistheorie*, "that each experience is only a part of that which, in the words of Kant, passes beyond the bounds of all experience.... For a consciousness that has become conscious of its own nature, each particle, be it of dust, or of stone, or of wood, is something *unknowable in its full extent* (*Unauskenntliches*), i.e., each particle is inexhaustible material for the human faculty of cognition and, consequently, something which passes beyond the bounds of experience" (*Kleinere philosophische Schriften*, 1903, S. 199).

You see: *in the words of Kant*, i.e., adopting — exclusively for purposes of popularisation, for purposes of contrast — Kant's *erroneous*, confusing terminology, Dietzgen recognises the passage "beyond the bounds of experience". This is a good example of what the Machists are grasping at when they pass from materialism to agnosticism: you see, they say, we do not wish to go "beyond the bounds of experience"; for us "sense-perception is the reality existing outside us".

"Unhealthy mysticism [Dietzgen says, objecting precisely to such a philosophy] unscientifically separates the absolute truth from the relative truth. It makes of the thing as it appears and the 'thing-in-itself', that is, of the appearance and the verity, two categories which differ *toto coelo* [completely, fundamentally] from each other and are not contained in any common category" (S. 200).

^{*} J. Dietzgen, *Das Wesen der menschlichen Kopfarbeit*, 1903.— Ed.

We can now judge the knowledge and ingenuity of the Russian Machist Bogdanov, who does not wish to acknowledge himself a Machist and wishes to be regarded as a Marxist in philosophy.

"A golden mean [between "panpsychism and panmaterialism"] has been adopted by materialists of a more critical shade who have rejected the *absolute* unknowability of the 'thing-in-itself', but at the same time regard it as being *fundamentally* [Bogdanov's italics] different from the 'phenomenon' and, therefore, always only 'dimly discernible' in the phenomenon, outside of experience as far as its content is concerned [that is, presumably, as far as the "elements" are concerned, which are not the same as elements of experience], but yet lying within the bounds of what is called the forms of experience, i.e., time, space and causality. Such is approximately the standpoint of the French materialists of the eighteenth century and among the modern philosophers—Engels and his Russian follower, Beltov" (*Empirio-monism*, Bk. II, 2nd ed., 1907, pp. 40-41).

This is a complete muddle. 1) The materialists of the *seventeenth century*, against whom Berkeley argues, hold that "objects in themselves" are absolutely knowable, for our presentations, ideas, are only copies or reflections of those objects, which exist "outside the mind" (see Introduction). 2) *Feuerbach*, and J. Dietzgen after him, vigorously dispute any "fundamental" difference between the thing-in-itself and the phenomenon, and Engels disposes of this view by his brief example of the transformation of the "thing-in-itself" into the "thing-for-us". 3) Finally, to maintain that the materialists regard things-in-themselves as "always only dimly discernible in the phenomenon" is sheer nonsense, as we have seen from Engels' refutation of the agnostic. The reason for Bogdanov's distortion of materialism lies in his failure to understand the relation of absolute truth to relative truth (of which we shall speak later). As regards the "outside-of-experience" thing-in-itself and the "elements of experience", these are already the beginnings of the Machist muddle of which we have already said enough.

Parroting the incredible nonsense uttered by the reactionary professors about the materialists, disavowing Engels in 1907,

and attempting to "revise" Engels into agnosticism in 1908—such is the philosophy of the "recent positivism" of the Russian Machists!

Does Objective Truth Exist?

Bogdanov declares: "As I understand it, Marxism contains a denial of the unconditional objectivity of any truth whatsoever, the denial of all eternal truths" (*Empirio-monism*, Bk. III, pp. iv-v). What is meant by "*unconditional* objectivity"? "Truth for all eternity" is "objective truth in the absolute meaning of the word," says Bogdanov in the same passage, and agrees to recognise "objective truth only within the limits of a given epoch".

Two questions are obviously confused here: 1) Is there such a thing as objective truth, that is, can human ideas have a content that does not depend on a subject, that does not depend either on a human being or on humanity? 2) If so, can human ideas, which give expression to objective truth, express it all at one time, as a whole, unconditionally, absolutely, or only approximately, relatively? This second question is a question of the relation of absolute truth to relative truth.

Bogdanov replies to the second question clearly, explicitly and definitely by rejecting even the slightest admission of absolute truth and by accusing Engels of *eclecticism* for making such an admission. Of this discovery of eclecticism in Engels by A. Bogdanov we shall speak separately later on. For the present we shall confine ourselves to the first question, which Bogdanov, without saying so explicitly, likewise answers in the negative—for although it is possible to deny the element of relativity* in one or another human idea without denying the existence of objective truth, it is impossible to deny absolute truth without denying the existence of objective truth.

"...The criterion of objective truth," writes Bogdanov a little further on (p.ix), "in Beltov's sense, does not exist; truth is an ideological form, an organising form of human experience..."

Neither "Beltov's sense"—for it is a question of one of the

* This is probably a slip. Here sense requires the word "absolute".—Ed.

fundamental philosophical problems and not of Beltov — nor the *criterion* of truth — which must be treated separately, without confusing it with the question of whether objective truth *exists* — has anything to do with the case here. Bogdanov's negative answer to the latter question is clear: if truth is *only* an ideological form, then there can be no truth independent of the subject, of humanity, for neither Bogdanov nor we know any other ideology but human ideology. And Bogdanov's negative answer emerges still more clearly from the second half of his statement: if truth is a form of human experience, then there can be no truth independent of humanity; there can be no objective truth.

Bogdanov's denial of objective truth is agnosticism and subjectivism. The absurdity of this denial is evident even from the single example of a scientific truth quoted above. Natural science leaves no room for doubt that its assertion that the earth existed prior to man is a truth. This is entirely compatible with the materialist theory of knowledge: the existence of the thing reflected independent of the reflector (the independence of the external world from the mind) is the fundamental tenet of materialism. The assertion made by science that the earth existed prior to man is an objective truth. This proposition of natural science is incompatible with the philosophy of the Machists and with their doctrine of truth: if truth is an organising form of human experience, then the assertion that the earth exists *outside* any human experience cannot be true.

But that is not all. If truth is only an organising form of human experience, then the teachings, say, of Catholicism are also true. For there is not the slightest doubt that Catholicism is an "organising form of human experience". Bogdanov himself senses the crying falsity of his theory and it is extremely interesting to watch how he attempts to extricate himself from the swamp into which he has fallen.

"The basis of objectivity," we read in Book I of *Empirio-monism*, "must lie in the sphere of collective experience. We term those data of experience objective which have the same vital meaning for us and for other people, those data upon which not only we construct our activities without contradiction, but upon which, we are convinced, other people must also base themselves in order to avoid contradiction. The objective

character of the physical world consists in the fact that it exists not for me personally, but for everybody [that is not true! It exists *independently* of "everybody"!], and has a definite meaning for everybody, the same, I am convinced, as for me. The objectivity of the physical series is its *universal significance*" (p. 25, Bogdanov's italics). "The objectivity of the physical bodies we encounter in our experience is in the last analysis established by the mutual verification and co-ordination of the utterances of various people. In general, the physical world is socially-co-ordinated, socially-harmonised, in a word, *socially-organised experience*" (p. 36, Bogdanov's italics).

We shall not repeat that this is a fundamentally untrue, idealist definition, that the physical world exists independently of humanity and of human experience, that the physical world existed at a time when no "sociality" and no "organisation" of human experience was possible, and so forth. We shall dwell now on an exposure of the Machist philosophy from another aspect, namely, that objectivity is so defined that religious doctrines, which undoubtedly possess a "universal significance", and so forth, come under the definition. But listen to Bogdanov again: "We remind the reader once more that 'objective' experience is by no means the same as 'social' experience.... Social experience is far from being altogether socially organised and always contains various contradictions, so that certain of its parts do not agree with others. Sprites and hobgoblins may exist in the sphere of social experience of a given people or of a given group of people — for example, the peasantry; but they need not therefore be included under socially-organised or objective experience, for they do not harmonise with the rest of collective experience and do not fit in with its organising forms, for example, with the chain of causality" (45).

Of course it is very gratifying that Bogdanov himself "does not include" social experience in regard to sprites and hobgoblins under objective experience. But this well-meant amendment in the spirit of anti-fideism by no means corrects the fundamental error of Bogdanov's whole position. Bogdanov's definition of objectivity and of the physical world completely falls to the ground, since the religious doctrine has "universal significance" to a greater degree than the scientific

doctrine; the greater part of mankind cling to the former doctrine to this day. Catholicism has been "socially organised, harmonised and co-ordinated" by centuries of development; it "fits in" with the "chain of causality" in the most indisputable manner; for religions did not originate without cause, it is not by accident that they retain their hold over the masses under modern conditions, and it is quite "in the order of things" that professors of philosophy should adapt themselves to them. If this undoubtedly universally significant and undoubtedly highly-organised religious social experience does "not harmonise" with the "experience" of science, it is because there is a radical and fundamental difference between the two, which Bogdanov obliterated when he rejected objective truth. And however much Bogdanov tries to "correct" himself by saying that fideism or clericalism does not harmonise with science, the undeniable fact remains that Bogdanov's denial of objective truth completely "harmonises" with fideism. Contemporary fideism does not at all reject science; all it rejects is the "exaggerated claims" of science, to wit, its claim to objective truth. If objective truth exists (as the materialists think), if natural science, reflecting the outer world in human "experience", is alone capable of giving us objective truth, then all fideism is absolutely refuted. But if there is no objective truth, if truth (including scientific truth) is only an organising form of human experience, then this in itself is an admission of the fundamental premise of clericalism, the door is thrown open for it, and a place is cleared for the "organising forms" of religious experience.

The question arises, does this denial of objective truth belong personally to Bogdanov, who refuses to own himself a Machist, or does it follow from the fundamental teachings of Mach and Avenarius? The latter is the only possible answer to the question. If only sensation exists in the world (Avenarius, in 1876), if bodies are complexes of sensations (Mach, in the *Analysis of Sensations*), then we are obviously confronted with a philosophical subjectivism which inevitably leads to the denial of objective truth. And if sensations are called "elements" which in one connection give rise to the physical and in another to the psychical, this, as we have seen, only confuses but does not reject the fundamental point of departure of empirio-

criticism. Avenarius and Mach recognise sensations as the source of our knowledge. Consequently, they adopt the standpoint of empiricism (all knowledge derives from experience) or sensationalism (all knowledge derives from sensations). But this standpoint gives rise to the difference between the fundamental philosophical trends, idealism and materialism, and does not eliminate that difference, no matter in what "new" verbal garb ("elements") the standpoint is clothed. Both the solipsist, that is, the subjective idealist, and the materialist may regard sensations as the source of our knowledge. Both Berkeley and Diderot started from Locke. The first premise of the theory of knowledge undoubtedly is that the sole source of our knowledge is sensation. Having recognised the first premise, Mach confuses the second important premise, i.e., regarding the objective reality that is given to man in his sensations, or that forms the source of man's sensations. Starting from sensations, one may follow the line of subjectivism, which leads to solipsism ("bodies are complexes or combinations of sensations"), or the line of objectivism, which leads to materialism (sensations are images of objects, of the external world). For the first point of view, i.e., agnosticism, or, pushed a little further, subjective idealism, there can be no objective truth. For the second point of view, i.e., materialism, the recognition of objective truth is essential. This old philosophical question of the two trends, or rather, of the two possible deductions from the premises of empiricism and sensationalism, is not solved by Mach, it is not eliminated or overcome by him, but is *muddled* by verbal trickery with the word "element", and the like. Bogdanov's denial of objective truth is an inevitable consequence of Machism as a whole, and not a deviation from it.

Engels in his *Ludwig Feuerbach* calls Hume and Kant philosophers "who question the possibility of any cognition, or at least of an exhaustive cognition, of the world". Engels, therefore, lays stress on what is common both to Hume and Kant, and not on what divides them. Engels states further that "what is decisive in the refutation of this [Humean and Kantian] view has already been said by Hegel" (4th German edition, pp. 15-16).¹¹² In this connection it seems to me not uninteresting to note that Hegel, declaring *materialism* to be "a

consistent system of empiricism", wrote: "For empiricism the external (*das Äusserliche*) in general is the truth, and if then a supersensible too be admitted, nevertheless knowledge of it cannot occur (*soll doch eine Erkenntnis desselben [d. h. des Uebersinnlichen] nicht stattfinden können*) and one must keep exclusively to what belongs to perception (*das der Wahrnehmung Angehörige*). However, this principle in its realisation. (*Durchführung*) produced what was subsequently termed *materialism*. This materialism regards matter, as such, as the truly objective (*das wahrhaft Objektive*).*

All knowledge comes from experience, from sensation, from perception. That is true. But the question arises, does *objective reality* "belong to perception", i.e., is it the source of perception? If you answer yes, you are a materialist. If you answer no, you are inconsistent and will inevitably arrive at subjectivism, or agnosticism, irrespective of whether you deny the knowability of the thing-in-itself, or the objectivity of time, space and causality (with Kant), or whether you do not even permit the thought of a thing-in-itself (with Hume). The inconsistency of your empiricism, of your philosophy of experience, will in that case lie in the fact that you deny the objective content of experience, the objective truth of knowledge through experience.

Those who hold to the line of Kant or Hume (Mach and Avenarius are among the latter, insofar as they are not pure Berkeleians) call us, the materialists, "metaphysicians" because we recognise objective reality which is given us in experience, because we recognise an objective source of our sensations independent of man. We materialists follow Engels in calling the Kantians and Humeans *agnostics* because they deny objective reality as the source of our sensations. Agnostic is a Greek word: *a* in Greek means "no", *gnosis* "knowledge". The agnostic says: *I do not know* if there is an objective reality which is reflected, imaged by our sensations; I declare there is no way of knowing this (see the words of Engels above quoted setting forth the position of the agnostic). Hence the denial of objective truth by the agnostic, and the tolerance—the philistine, cowardly tolerance—of the dogmas regarding

* Hegel, "Enzyklopädie der philosophischen Wissenschaften im Grundrisse", *Werke*, VI. Band (1843), S. 83. Cf. S. 122.

sprites, hobgoblins, Catholic saints, and the like. Mach and Avenarius, pretentiously advancing a "new" terminology, a supposedly "new" point of view, repeat, in fact, although in a confused and muddled way, the reply of the agnostic: on the one hand, bodies are complexes of sensations (pure subjectivism, pure Berkeleianism); on the other hand, if we rechristen our sensations "elements", we may think of them as existing independently of our sense-organs!

The Machists love to declaim that they are philosophers who completely trust the evidence of our sense-organs, who regard the world as actually being what it seems to us to be, full of sounds, colours, etc., whereas to the materialists, they say, the world is dead, devoid of sound and colour, and in its reality different from what it seems to be, and so forth. Such declamations, for example, are indulged in by J. Petzoldt, both in his *Introduction to the Philosophy of Pure Experience* and in his *World Problem from the Positivist Standpoint* (*Weltproblem von positivistischen Standpunkte aus*), 1906. Petzoldt is parroted by Mr. Victor Chernov, who waxes enthusiastic over the "new" idea. But, in fact, the Machists are subjectivists and agnostics, for they *do not sufficiently* trust the evidence of our sense-organs and are inconsistent in their sensationalism. They do not recognise objective reality, independent of man, as the source of our sensations. They do not regard sensations as a true copy of this objective reality, thereby coming into direct conflict with natural science and throwing the door open for fideism. On the contrary, for the materialist the world is richer, livelier, more varied than it seems, for with each step in the development of science new aspects are discovered. For the materialist, our sensations are images of the sole and ultimate objective reality, ultimate not in the sense that it has already been cognised to the end, but in the sense that there is not and cannot be any other. This view irrevocably closes the door not only to every species of fideism, but also to that professorial scholasticism which, while not recognising an objective reality as the source of our sensations, "deduces" the concept of the objective by means of such artificial verbal constructions as universal significance, socially-organised, and so on and so forth, and which is unable, and frequently unwilling, to separate objective truth from belief in sprites and hobgoblins.

The Machists contemptuously shrug their shoulders at the "antiquated" views of the "dogmatists", the materialists, who still cling to the concept *matter*, which supposedly has been refuted by "recent science" and "recent positivism". We shall speak separately of the new theories of physics on the structure of matter. But it is absolutely unpardonable to confuse, as the Machists do, any particular theory of the structure of matter with the epistemological category, to confuse the problem of the new properties of new aspects of matter (electrons, for example) with the old problem of the theory of knowledge, with the problem of the sources of our knowledge, the existence of objective truth, etc. Mach "discovered the world-elements": red, green, hard, soft, loud, long, etc. We ask, is a man given objective reality when he sees something red or feels something hard, etc., or not? This hoary philosophical query is confused by Mach. If you hold that it is not given, you, together with Mach, inevitably sink to subjectivism and agnosticism and deservedly fall into the embrace of the immanentists, i.e., the philosophical Men-shikovs. If you hold that it is given, a philosophical concept is needed for this objective reality, and this concept has been worked out long, long ago. This concept is *matter*. Matter is a philosophical category denoting the objective reality which is given to man by his sensations, and which is copied, photographed and reflected by our sensations, while existing independently of them. Therefore, to say that such a concept can become "antiquated" is *childish talk*, a senseless repetition of the arguments of fashionable *reactionary* philosophy. Could the struggle between materialism and idealism, the struggle between the tendencies or lines of Plato and Democritus in philosophy, the struggle between religion and science, the denial of objective truth and its assertion, the struggle between the adherents of supersensible knowledge and its adversaries, have become antiquated during the two thousand years of the development of philosophy?

Acceptance or rejection of the concept matter is a question of the confidence man places in the evidence of his sense-organs, a question of the source of our knowledge, a question which has been asked and debated from the very inception of philosophy, which may be disguised in a thousand different

garbs by professorial clowns, but which can no more become antiquated than the question whether the source of human knowledge is sight and touch, hearing and smell. To regard our sensations as images of the external world, to recognise objective truth, to hold the materialist theory of knowledge—these are all one and the same thing. To illustrate this, I shall only quote from Feuerbach and from two textbooks of philosophy, in order that the reader may judge how elementary this question is.

"How banal," wrote Feuerbach, "to deny that sensation is the evangel, the gospel (*Verkündigung*) of an objective saviour." * A strange, a preposterous terminology, as you see, but a perfectly clear philosophical line: sensation reveals objective truth to man. "My sensation is subjective, but its foundation or cause (*Grund*) is objective" (S. 195). Compare this with the quotation given above where Feuerbach says that materialism starts from the sensuous world as an ultimate (*ausgemachte*) objective truth.

Sensationalism, we read in Franck's dictionary of philosophy,** is a doctrine which deduces all our ideas "from the experience of the senses, reducing knowledge to sensations". There is subjective sensationalism (scepticism and Berkeleianism), moral sensationalism (Epicureanism¹¹³), and objective sensationalism. "Objective sensationalism is materialism, for matter or bodies are, in the opinion of the materialists, the only objects that can affect our senses (*atteindre nos sens*)."

"If sensationalism," says Schwegler in his *History of Philosophy**** "asserted that truth or being can be apprehended exclusively by means of the senses, one had only [Schwegler is speaking of philosophy at the end of the eighteenth century in France] to formulate this proposition objectively and one had the thesis of materialism: only the sensuous exists; there is no other being than material being."

These elementary truths, which have managed to find their way even into the textbooks, have been forgotten by our Machists.

* Feuerbach, *Sämtliche Werke*, X. Band, 1866, S. 194-95.

** *Dictionnaire des sciences philosophiques*, Paris, 1875.

*** Dr. Albert Schwegler, *Geschichte der Philosophie im Umriss*, 15-te Aufl., S. 194.

**Absolute and Relative Truth,
or the Eclecticism of Engels
as Discovered by A. Bogdanov**

Bogdanov made his discovery in 1906, in the preface to Book III of his *Empirio-monism*. "Engels in *Anti-Dühring*," writes Bogdanov, "expresses himself *almost* in the same sense in which I have just described the relativity of truth" (p.v)—that is, in the sense of denying all eternal truth, "denying the unconditional objectivity of all truth whatsoever". "Engels is wrong in his indecision, in the fact that in spite of his irony he recognises certain 'eternal truths', wretched though they may be..." (p. viii). "Only inconsistency can here permit such eclectic reservations as those of Engels..." (p. ix). Let us cite one instance of Bogdanov's refutation of Engels' eclecticism. "Napoleon died on May 5, 1821," says Engels in *Anti-Dühring*, in the chapter "Eternal Truths", explaining to Dühring what one who claims to discover eternal truths in the historical sciences has to confine himself to, what "platitudes" (*Plattheiten*) he has to be satisfied with. Bogdanov answers Engels as follows: "What sort of 'truth' is that? And what is there 'eternal' about it? The recording of a single correlation, which perhaps even has no longer any real significance for our generation, cannot serve as the starting-point for any activity, and leads nowhere" (p. ix). And on page viii: "Can *Plattheiten* be called *Wahrheiten*? Are 'platitudes' truths? Truth is a vital organising form of experience; it leads us somewhere in our activity and provides a point of support in the struggle of life."

It is clear enough from these two quotations that Bogdanov, instead of refuting Engels, makes a mere *declamation*. If you cannot assert that the proposition "Napoleon died on May 5, 1821" is false or inexact, you acknowledge that it is true. If you do not assert that it may be refuted in the future, you acknowledge this truth to be eternal. But to call phrases such as truth is a "vital organising form of experience" an answer, is to palm off a mere *jumble of words* as philosophy. Did the earth have the history which is expounded in geology, or was the earth created in seven days? Is one to be allowed to dodge this question by talking about "vital" (what does that mean?) truth

which "leads" somewhere, and the like? Can it be that knowledge of the history of the earth and of the history of humanity "has no real significance"? This is just turgid nonsense, used by Bogdanov to cover his *retreat*. For it is a retreat, when, having taken it upon himself to prove that the admission of eternal truths by Engels is eclecticism, he dodges the issue by a mere noise and clash of words and leaves unrefuted the fact that Napoleon did die on May 5, 1821, and that to regard this *truth* as refutable in the future is absurd.

The example given by Engels is elementary, and anybody without the slightest difficulty can think of scores of similar *truths* that are eternal and absolute and that only insane people can doubt (as Engels says, citing another example: "Paris is in France"). Why does Engels speak here of "platitudes"? Because he refutes and ridicules the dogmatic, metaphysical materialist Dühring, who was incapable of applying dialectics to the relation between absolute and relative truth. To be a materialist is to acknowledge objective truth, which is revealed to us by our sense-organs. To acknowledge objective truth, i.e., truth not dependent upon man and mankind, is, in one way or another, to recognise absolute truth. And it is this "one way or another" which distinguishes the metaphysical materialist Dühring from the dialectical materialist Engels. On the most complex questions of science in general, and of historical science in particular, Dühring scattered words right and left: ultimate, final and eternal truth. Engels jeered at him. Of course there are eternal truths, Engels said, but it is unwise to use high-sounding words (*gewaltige Worte*) in connection with simple things. If we want to advance materialism, we must drop this trivial play with the words "eternal truth"; we must learn to put, and answer, the question of the relation between absolute and relative truth dialectically. It was on this issue that the fight between Dühring and Engels was waged thirty years ago. And Bogdanov, who has contrived "*not to notice*" Engels' explanation of the problem of absolute and relative truth given in *this very same chapter*, and who has contrived to accuse Engels of "eclecticism" for his admission of a proposition which is a truism for *all* forms of materialism, only betrays once again his utter ignorance of both materialism and dialectics.

"Now we come to the question," Engels writes in *Anti-Dühring*, in the beginning of the chapter mentioned (Part I, Chap. IX), "whether any, and if so which, products of human knowledge ever can have sovereign validity and an unconditional claim (*Anspruch*) to truth" (5th German edition, p. 79). And Engels answers the question thus:

"The sovereignty of thought is realised in a series of extremely unsovereignly-thinking human beings; the knowledge which has an unconditional claim to truth is realised in a series of relative errors; neither the one nor the other [i.e., neither absolutely true knowledge, nor sovereign thought] can be fully realised except through an unending duration of human existence.

"Here once again we find the same contradiction as we found above, between the character of human thought, necessarily conceived as absolute, and its reality in individual human beings, all of whom think only limitedly. This is a contradiction which can be resolved only in the course of infinite progress, in what is—at least practically for us—an endless succession of generations of mankind. In this sense human thought is only as much sovereign as not sovereign, and its capacity for knowledge just as much unlimited as limited. It is sovereign and unlimited in its disposition (*Anlage*), its vocation, its possibilities and its historical ultimate goal; it is not sovereign and it is limited in its individual realisation and in reality at each particular moment" (81).*

"It is just the same," Engels continues, "with eternal truths."¹¹⁴

This argument is extremely important for the question of *relativism*, i.e., the principle of the relativity of our knowledge, which is stressed by all Machists. The Machists *all* insist that they are relativists, but the Russian Machists, while repeating the words of the Germans, are afraid, or unable to propound the question of the relation of relativism to dialectics clearly

* Cf. V. Chernov, loc. cit., p. 64, et seq. The Machist Mr. Chernov fully shares the position of Bogdanov, who does not wish to own himself a Machist. The difference is that Bogdanov tries to *gloss over* his disagreement with Engels, to present it as a casual matter, etc., while Chernov feels that it is a question of a struggle against both materialism and dialectics.

and straightforwardly. For Bogdanov (as for all the Machists) recognition of the relativity of our knowledge *excludes* even the least admission of absolute truth. For Engels absolute truth is compounded from relative truths. Bogdanov is a relativist; Engels is a dialectician. Here is another, no less important, argument of Engels from the chapter of *Anti-Dühring*, already quoted:

"Truth and error, like all thought-concepts which move in polar opposites, have absolute validity only in an extremely limited field, as we have just seen, and as even Herr Dühring would realise if he had any acquaintance with the first elements of dialectics, which deal precisely with the inadequacy of all polar opposites. As soon as we apply the antithesis between truth and error outside of that narrow field which has been referred to above it becomes relative and therefore unserviceable for exact scientific modes of expression; and if we attempt to apply it as absolutely valid outside that field we really find ourselves altogether beaten: both poles of the antithesis become transformed into their opposites, truth becomes error and error truth" (86).¹¹⁵ Here follows the example of Boyle's law (the volume of a gas is inversely proportional to its pressure). The "grain of truth" contained in this law is only absolute truth within certain limits. The law, it appears, is a truth "only approximately".

Human thought then by its nature is capable of giving, and does give, absolute truth, which is compounded of a sum-total of relative truths. Each step in the development of science adds new grains to the sum of absolute truth, but the limits of the truth of each scientific proposition are relative, now expanding, now shrinking with the growth of knowledge. "Absolute truth," says J. Dietzgen in his *Streifzügen*, "can be seen, heard, smelt, touched and, of course, also be *known*; but it is not entirely absorbed (*geht nicht auf*) in knowledge" (S. 195). "It goes without saying that a picture does not exhaust its object and the artist remains behind his model.... How can a picture 'coincide' with its model? Approximately it can" (197). "Hence, we can know nature and her parts only relatively; since even a part, though only a relation of nature, possesses nevertheless the nature of the absolute, the nature of nature as a whole (*des Naturganzen an sich*) which cannot be exhausted by knowl-

edge.... How, then, do we know that behind the phenomena of nature, behind the relative truths, there is a universal, unlimited, absolute nature which does not reveal itself to man completely?... Whence this knowledge? It is innate; it is given us with consciousness" (198). This last statement is one of the inexactitudes of Dietzgen's which led Marx, in a letter to Kugelmann, to speak of the confusion in Dietzgen's views.¹¹⁶ Only by seizing upon such incorrect passages can one speak of a specific philosophy of Dietzgen differing from dialectical materialism. But Dietzgen corrects himself *on the same page*: "When I say that the consciousness of eternal, absolute truth is innate in us, that it is the one and only *a priori* knowledge, experience nevertheless also confirms this innate consciousness" (198).

From all these statements by Engels and Dietzgen it is clearly seen that for dialectical materialism there is no impassable boundary between relative and absolute truth. Bogdanov entirely failed to grasp this if he could write: "It [the world outlook of the old materialism] sets itself up as the absolute *objective knowledge of the essence of things* [Bogdanov's italics] and is incompatible with the historically conditional nature of all ideologies" (*Empirio-monism*, Bk. III, p. iv). From the standpoint of modern materialism, i.e., Marxism, the *limits* of approximation of our knowledge to objective, absolute truth are historically conditional, but the existence of such truth is *unconditional*, and the fact that we are approaching nearer to it is also unconditional. The contours of the picture are historically conditional, but the fact that this picture depicts an objectively existing model is unconditional. When and under what circumstances we reached, in our knowledge of the essential nature of things, the discovery of alizarin in coal tar or the discovery of electrons in the atom is historically conditional; but that every such discovery is an advance of "absolutely objective knowledge" is unconditional. In a word, every ideology is historically conditional, but it is unconditionally true that to every scientific ideology (as distinct, for instance, from religious ideology) there corresponds an objective truth, absolute nature. You will say that this distinction between relative and absolute truth is indefinite. And I shall reply: it is sufficiently "indefinite" to prevent science from becoming a

dogma in the bad sense of the term, from becoming something dead, frozen, ossified; but at the same time it is sufficiently "definite" to enable us to dissociate ourselves in the most emphatic and irrevocable manner from fideism and agnosticism, from philosophical idealism and the sophistry of the followers of Hume and Kant. Here is a boundary which you have not noticed, and not having noticed it, you have fallen into the swamp of reactionary philosophy. It is the boundary between dialectical materialism and relativism.

We are relativists, proclaim Mach, Avenarius, Petzoldt. We are relativists, echo Mr. Chernov and certain Russian Machists, would-be Marxists. Yes, Mr. Chernov and Machist comrades — and therein lies your error. For to make relativism the basis of the theory of knowledge is inevitably to condemn oneself either to absolute scepticism, agnosticism and sophistry, or to subjectivism. Relativism as a basis of the theory of knowledge is not only recognition of the relativity of our knowledge, but also a denial of any objective measure or model existing independently of mankind to which our relative knowledge approximates. From the standpoint of naked relativism one can justify any sophistry; one may regard it as "conditional" whether Napoleon died on May 5, 1821, or not; one may declare the admission, alongside scientific ideology ("convenient" in one respect), of religious ideology (very "convenient" in another respect) to be a mere "convenience" for man or mankind, and so forth.

Dialectics — as Hegel in his time explained — *contains* an element of relativism, of negation, of scepticism, but is *not reducible* to relativism. The materialist dialectics of Marx and Engels certainly does contain relativism, but is not reducible to relativism, that is, it recognises the relativity of all our knowledge, not in the sense of denying objective truth, but in the sense that the limits of approximation of our knowledge to this truth are historically conditional.

Bogdanov writes in italics: "*Consistent Marxism does not admit such dogmatism and such static concepts*" as eternal truths. (*Empirio-monism*, Bk. III, p. ix.) This is a muddle. If the world is eternally moving and developing matter (as the Marxists think), reflected by the developing human consciousness, what is there "static" here? The point at issue is not the immutable

essence of things, or an immutable consciousness, but the *correspondence* between the consciousness which reflects nature and the nature which is reflected by consciousness. In connection with this question, and this question alone, the term "dogmatism" has a specific, characteristic philosophical flavour: it is a favourite word used by the idealists and the agnostics *against* the materialists, as we have already seen in the case of the fairly "old" materialist, Feuerbach. The objections brought against materialism from the standpoint of the celebrated "recent positivism" are just ancient trash.

The Criterion of Practice in the Theory of Knowledge

We have seen that Marx in 1845 and Engels in 1888 and 1892 placed the criterion of practice at the basis of the materialist theory of knowledge.¹¹⁷ "The dispute over the reality or non-reality of thinking which is isolated from practice is a purely scholastic question," says Marx in his second Thesis on Feuerbach. The best refutation of Kantian and Humean agnosticism as well as of other philosophical crotchets (*Schrullen*) is practice, repeats Engels. "The success of our action proves the conformity (*Uebereinstimmung*) of our perceptions with the objective nature of the things perceived," he says in reply to the agnostics.¹¹⁸

Compare this with Mach's argument about the criterion of practice: "In the common way of thinking and speaking *appearance*, *illusion*, is usually contrasted with *reality*. A pencil held in front of us in the air is seen as straight; when we dip it slantwise into water we see it as crooked. In the latter case we say that the pencil *appears crooked but in reality* it is straight. But what entitles us to declare *one* fact to be the reality, and to degrade *the other* to an appearance?... Our expectation, of course, is deceived when we fall into the natural error of expecting what we are accustomed to although the case is unusual. The facts are not to blame for that. In these cases, to speak of *appearance* may have a practical significance, but not a scientific significance. Similarly, the question which is often asked, whether the world is real or whether we merely dream

it, is devoid of all scientific significance. Even the wildest dream is a fact as much as any other" (*Analysis of Sensations*, pp. 18-19).

It is true that not only is the wildest dream a fact, but also the wildest philosophy. It is impossible to doubt this after an acquaintance with the philosophy of Ernst Mach. Like a common sophist, he confounds the scientific-historical and psychological investigation of human errors, of every "wild dream" of humanity, such as belief in sprites, hobgoblins, and so forth, with the epistemological distinction between truth and "wildness". It is as if an economist were to say that Senior's theory that the whole profit of the capitalist is obtained from the "last hour" of the worker's labour and Marx's theory are both facts, and that from the standpoint of science there is no point in asking which theory expresses objective truth and which — the prejudice of the bourgeoisie and the venality of its professors. The tanner Joseph Dietzgen regarded the scientific, i.e., the materialist, theory of knowledge as a "universal weapon against religious belief" (*Kleinere philosophische Schriften*, S. 55), but for the professor-in-ordinary Ernst Mach the distinction between the materialist and the subjective-idealist theories of knowledge "is devoid of all scientific significance"! That science is non-partisan in the struggle of materialism against idealism and religion is a favourite idea not only of Mach but of all modern bourgeois professors, who are, as Dietzgen justly expresses it, "graduated flunkies who stupefy the people by a twisted idealism" (op. cit., S. 53).

And a twisted professorial idealism it is, indeed, when the criterion of practice, which for every one of us distinguishes illusion from reality, is removed by Mach from the realm of science, from the realm of the theory of knowledge. Human practice proves the correctness of the materialist theory of knowledge, said Marx and Engels, who dubbed attempts to solve the fundamental question of epistemology without the aid of practice "scholastic" and "philosophical crotchets". But for Mach practice is one thing and the theory of knowledge something quite different; they can be placed side by side without making the latter conditional on the former. In his last work, *Knowledge and Error*, Mach says: "Knowledge is always a biologically useful (*förderndes*) mental experience" (2nd Ger-

man edition, p. 115). "Only success can separate knowledge from error" (116). "The concept is a physical working hypothesis" (143). With astonishing naïveté our Russian Machist would-be Marxists regard such phrases of Mach's as proof that he *comes close* to Marxism. But Mach here comes just as close to Marxism as Bismarck to the labour movement, or Bishop Eulogius to democracy. With Mach such propositions *stand side by side* with his idealist theory of knowledge and do not determine the choice of one or another definite line of epistemology. Knowledge can be useful biologically, useful in human practice, useful for the preservation of life, for the preservation of the species, only when it reflects objective truth, truth which is independent of man. For the materialist the "success" of human practice proves the correspondence between our ideas and the objective nature of the things we perceive. For the solipsist "success" is everything needed *by me in practice*, which can be regarded separately from the theory of knowledge. If we include the criterion of practice in the foundation of the theory of knowledge we inevitably arrive at materialism, says the Marxist. Let practice be materialist, says Mach, but theory is another matter.

"In practice," Mach writes in the *Analysis of Sensations*, "we can as little do without the idea of the *self* when we perform any act, as we can do without the idea of a body when we grasp at a thing. Physiologically we remain egoists and materialists with the same constancy as we forever see the sun rising again. But theoretically this view cannot be adhered to" (284-85).

Egoism is beside the point here, for egoism is not an epistemological category. The question of the apparent movement of the sun around the earth is also beside the point, for in practice, which serves us as a criterion in the theory of knowledge, we must include also the practice of astronomical observations, discoveries, etc. There remains only Mach's valuable admission that in their practical life men are entirely and exclusively guided by the materialist theory of knowledge; the attempt to obviate it "theoretically" is characteristic of Mach's *gelehrte* scholastic and twisted idealistic endeavours.

How little of a novelty are these efforts to eliminate practice — as something unsusceptible to epistemological treatment — in order to make room for agnosticism and idealism is

shown by the following example from the history of German classical philosophy. Between Kant and Fichte stands G. E. Schulze (known in the history of philosophy as Schulze-Aenesidemus). He openly advocates the sceptical trend in philosophy and calls himself a follower of Hume (and of the ancients Pyrrho and Sextus). He emphatically rejects every thing-in-itself and the possibility of objective knowledge, and emphatically insists that we should not go beyond "experience", beyond sensations, in which connection he anticipates the following objection from the other camp: "Since the sceptic when he takes part in the affairs of life assumes as indubitable the reality of objective things, behaves accordingly, and thus admits a criterion of truth, his own behaviour is the best and clearest refutation of his scepticism." * "Such proofs," Schulze indignantly retorts, "are only valid for the mob (*Pöbel*)." For "my scepticism does not concern the requirements of practical life, but remains within the bounds of philosophy" (S. 254, 255).

In similar manner, the subjective idealist Fichte also hopes to find room within the bounds of idealistic philosophy for that "realism which is inevitable (*sich aufdringt*) for all of us, and even for the most determined idealist, when it comes to action, i.e., the assumption that objects exist quite independently of us and outside us" (*Werke*, I, 455).

Mach's recent positivism has not travelled far from Schulze and Fichte! Let us note as a curiosity that on this question too for Bazarov there is no one but Plekhanov — there is no beast stronger than the cat. Bazarov ridicules the "*salto vitale* philosophy of Plekhanov" (*Studies, etc.*, p. 69), who indeed made the absurd remark that "belief" in the existence of the outer world "is an inevitable *salto vitale*" [vital leap] of philosophy" (*Notes on Ludwig Feuerbach*, p. 111). The word "belief" (taken from Hume), although put in quotation marks, discloses a confusion of terms on Plekhanov's part. There can be no question about that. But what has Plekhanov got to do with it? Why did not Bazarov take some other materialist,

* G. E. Schulze, *Aenesidemus oder über die Fundamente der von dem Herrn Professor Reinhold in Jena gelieferten Elementarphilosophie*, 1792, S. 253.

Feuerbach, for instance? Is it only because he does not know him? But ignorance is no argument. Feuerbach also, like Marx and Engels, makes an impermissible — from the point of view of Schulze, Fichte and Mach — “leap” to practice in the fundamental problems of epistemology. Criticising idealism, Feuerbach explains its essential nature by the following striking quotation from Fichte, which superbly demolishes Machism: “‘You assume,’ writes Fichte, ‘that things are real, that they exist outside of you, only because you see them, hear them and touch them. But vision, touch and hearing are only sensations.... You perceive, not the objects, but only your sensations’” (Feuerbach, *Werke*, X. Band, S. 185). To which Feuerbach replies that a human being is not an abstract *I*, but either a man or a woman, and the question whether the world is sensation can be compared to the question: is another human being my sensation, or do our relations in practical life prove the contrary? “The fundamental defect of idealism is precisely that it asks and answers the question of objectivity and subjectivity, of the reality or unreality of the world, only from the standpoint of theory” (*ibid.*, 189). Feuerbach makes the sum-total of human practice the basis of the theory of knowledge. He says that idealists of course also recognise the reality of the *I* and the *Thou* in practical life. For the idealists “this point of view is valid only for practical life and not for speculation. But a speculation which contradicts life, which makes the standpoint of death, of a soul separated from the body, the standpoint of truth, is a dead and false speculation” (192). Before we *perceive*, we breathe; we cannot exist without air, food and drink.

“Does this mean then that we must deal with questions of food and drink when examining the problem of the ideality or reality of the world? — exclaims the indignant idealist. How vile! What an offence against good manners soundly to trounce materialism in the scientific sense from the chair of philosophy and the pulpit of theology, only to practise materialism with all one’s heart and soul in the crudest form at the table d’hôte” (195). And Feuerbach exclaims that to identify subjective sensation with the objective world “is to identify pollution with procreation” (198).

A comment not of the politest order, but it hits the mark in

the case of those philosophers who teach that sense-perception is the reality existing outside us.

The standpoint of life, of practice, should be first and fundamental in the theory of knowledge. And it inevitably leads to materialism, sweeping aside the endless fabrications of professorial scholasticism. Of course, we must not forget that the criterion of practice can never, in the nature of things, either confirm or refute any human idea *completely*. This criterion too is sufficiently "indefinite" not to allow human knowledge to become "absolute", but at the same time it is sufficiently definite to wage a ruthless fight on all varieties of idealism and agnosticism. If what our practice confirms is the sole, ultimate and objective truth, then from this must follow the recognition that the only path to this truth is the path of science, which holds the materialist point of view. For instance, Bogdanov is prepared to recognise Marx's theory of the circulation of money as an objective truth only for "our time", and calls it "dogmatism" to attribute to this theory a "super-historically objective" truth (*Empirio-monism*, Bk. III, p. vii). This is again a muddle. The correspondence of this theory to practice cannot be altered by any future circumstances, for the same simple reason that makes it an *eternal* truth that Napoleon died on May 5, 1821. But inasmuch as the criterion of practice, i. e., the course of development of *all* capitalist countries in the last few decades, proves only the objective truth of Marx's *whole* social and economic theory in general, and not merely of one or other of its parts, formulations, etc., it is clear that to talk here of the "dogmatism" of the Marxists is to make an unpardonable concession to bourgeois economics. The sole conclusion to be drawn from the opinion held by Marxists that Marx's theory is an objective truth is that by following the *path* of Marxian theory we shall draw closer and closer to objective truth (without ever exhausting it); but by following *any other path* we shall arrive at nothing but confusion and lies.

From The Theory of Knowledge of Dialectical Materialism and of Empirio-criticism. III

What is Matter? What is Experience?

The first of these questions is constantly being hurled by the idealists and agnostics, including the Machists, at the materialists; the second question by the materialists at the Machists. Let us try to make the point at issue clear.

Avenarius says on the subject of matter:

“Within the purified, ‘complete experience’ there is nothing ‘physical’—‘matter’ in the metaphysical absolute conception—for ‘matter’ according to this conception is only an abstraction; it would be the total of the counter-terms while abstracting from every central term. Just as in the principal co-ordination, that is, ‘complete experience’, a counter-term is inconceivable (*undenkbar*) without a central term, so ‘matter’ in the metaphysical absolute conception is a complete chimera (*Unding*)” (*Notes*, p. 2, in the journal cited, § 119).

In all this gibberish one thing is evident, namely, that Avenarius calls the physical or matter absolute and metaphysics, for, according to his theory of the principal co-ordination (or, in the new way, “complete experience”), the counter-term is inseparable from the central term, the environment from the *self*; the *non-self* is inseparable from the *self* (as J. G. Fichte said). That this theory is disguised subjective idealism we have already shown, and the nature of Avenarius’ attacks on “matter” is quite obvious: the idealist denies physical being that is independent of the mind and therefore rejects the concept elaborated by philosophy for such being. That matter is “physical” (i. e., that which is most familiar and immediately given to man, and the existence of which no one save an inmate of a lunatic asylum can doubt) is not denied by Avenarius; he

only insists on the acceptance of "his" theory of the indissoluble connection between the environment and the *self*.

Mach expresses the same thought more simply, without philosophical flourishes: "What we call matter is a certain systematic combination of the *elements* (sensations)" (*Analysis of Sensations*, p. 265). Mach thinks that by this assertion he is effecting a "radical change" in the usual world outlook. In reality this is the old, old subjective idealism, the nakedness of which is concealed by the word "element".

And lastly, the English Machist, Pearson, a rabid antagonist of materialism, says: "Now there can be no scientific objection to our classifying certain more or less permanent groups of sense-impressions together and terming them matter,—to do so indeed leads us very near to John Stuart Mill's definition of matter as a 'permanent possibility of sensation',—but this definition of matter then leads us entirely away from matter as the thing which moves" (*The Grammar of Science*, 2nd ed., 1900, p. 249). Here there is not even the fig-leaf of the "elements", and the idealist openly stretches out a hand to the agnostic.

As the reader sees, all these arguments of the founders of empirio-criticism entirely and exclusively revolve around the old epistemological question of the relation of thinking to being, of sensation to the physical. It required the extreme naïveté of the Russian Machists to discern anything here that is even remotely related to "recent science", or "recent positivism". All the philosophers mentioned by us, some frankly, others guardedly, replace the fundamental philosophical line of materialism (from being to thinking, from matter to sensation) by the reverse line of idealism. Their denial of matter is the old familiar answer to epistemological problems, which consists in denying the existence of an external, objective source of our sensations, of an objective reality corresponding to our sensations. On the other hand, the recognition of the philosophical line denied by the idealists and agnostics is expressed in the definitions: matter is that which, acting upon our sense-organs, produces sensation; matter is the objective reality given to us in sensation, and so forth.

Bogdanov, pretending to argue only against Belov and cravenly ignoring Engels, is indignant at such definitions,

which, don't you see, "prove to be simple repetitions" (*Empirio-monism*, Bk. III, p. xvi) of the "formula" (of Engels, our "Marxist" forgets to add) that for one trend in philosophy matter is primary and spirit secondary, while for the other trend the reverse is the case. All the Russian Machists exultantly echo Bogdanov's "refutation"! But the slightest reflection could have shown these people that it is impossible, in the very nature of the case, to give any definition of these two ultimate concepts of epistemology, except an indication which of them is taken as primary. What is meant by giving a "definition"? It means essentially to bring a given concept within a more comprehensive concept. For example, when I give the definition "an ass is an animal", I am bringing the concept "ass" within a more comprehensive concept. The question then is, are there more comprehensive concepts with which the theory of knowledge could operate than those of being and thinking, matter and sensation, physical and mental? No. These are the ultimate, most comprehensive concepts, which epistemology has in point of fact so far not surpassed (apart from changes in *nomenclature*, which are *always* possible). One must be a charlatan or an utter blockhead to demand a "definition" of these two "series" of concepts of ultimate comprehensiveness which would not be a "mere repetition": one or the other must be taken as primary. Take the three above-mentioned arguments on matter. What do they all amount to? To this, that these philosophers proceed from the mental, or the *self*, to the physical, or environment, as from the central term to the counter-term—or from sensation to matter, or from sense-perception to matter. Could Avenarius, Mach and Pearson in fact have given any other "definition" of these fundamental concepts, save by indicating the *trend* of their philosophical line? Could they have defined in any other way, in any specific way, what the *self* is, what sensation is, what sense-perception is? One has only to formulate the question clearly to realise what sheer nonsense the Machists talk when they demand that the materialists give a definition of matter which would not amount to a repetition of the proposition that matter, nature, being, the physical—is primary, and spirit, consciousness, sensation, the psychical—is secondary.

One expression of the genius of Marx and Engels was that they despised pedantic playing with new words, erudite terms, and subtle "isms", and said simply and plainly: there is a materialist line and an idealist line in philosophy, and between them there are various shades of agnosticism. The vain attempts to find a "new" point of view in philosophy betray the same poverty of mind that is revealed in similar efforts to create a "new" theory of value, a "new" theory of rent, and so forth.

Of Avenarius, his disciple Carstanjen says that he once expressed himself in private conversation as follows: "I know neither the physical nor the mental, but only some third." To the remark of one writer that the concept of this third was not given by Avenarius, Petzoldt replied: "We know why he could not advance such a concept. The third lacks a counter-concept (*Gegenbegriff*).... The question, what is the third? is illogically put" (*Einführung in die Philosophie der reinen Erfahrung*, II, 329). Petzoldt understands that an ultimate concept cannot be defined. But he does not understand that the resort to a "third" is a mere subterfuge, for every one of us knows what is physical and what is mental, but none of us knows at present what that "third" is. Avenarius was merely covering up his tracks by this subterfuge, while *in fact* declaring that the *self* is the primary (central term) and nature (environment) the secondary (counter-term).

Of course, even the antithesis of matter and mind has absolute significance only within the bounds of a very limited field—in this case exclusively within the bounds of the fundamental epistemological problem of what is to be regarded as primary and what as secondary. Beyond these bounds the relative character of this antithesis is indubitable....

Causality and Necessity in Nature

The question of causality is particularly important in determining the philosophical line of any of the recent "isms", and we must therefore dwell on it in some detail.

Let us begin with an exposition of the materialist theory of knowledge on this point. Feuerbach's views are expounded

with particular clarity in his reply to R. Haym already referred to.

“‘Nature and human reason,’ says Haym, ‘are for him (Feuerbach) completely divorced, and between them a gulf is formed which cannot be spanned from one side or the other.’ Haym bases this reproach mainly on § 48 of my *Essence of Religion* where it is said that ‘nature may be conceived only through nature itself, that its necessity is neither human nor logical, neither metaphysical nor mathematical, that nature alone is *that* being to which it is impossible to apply any human measure, although we compare and give names to its phenomena, in order to make them comprehensible to us, and in general apply human expressions and conceptions to them, as for example: order, purpose, law; and are obliged to do so because of the character of our language’. What does this mean? Does it mean that there is no order in nature, so that, for example, autumn may be succeeded by summer, spring by winter, winter by autumn? That there is no purpose, so that, for example, there is no co-ordination between the lungs and the air, between light and the eye, between sound and the ear? That there is no law, so that, for example, the earth may move now in an ellipse, now in a circle, that it may revolve around the sun now in a year, now in a quarter of an hour? What nonsense! What then is meant by this passage? Nothing more than to distinguish between that which belongs to nature and that which belongs to man; it does not assert that there is actually nothing in nature corresponding to the words or ideas of order, purpose, law. All that it does is to deny the identity between thought and being; it denies that they exist in nature exactly as they do in the head or mind of man. Order, purpose, law are words used by man to translate the acts of nature into *his own* language in order that he may understand them. These words are not devoid of meaning or of objective content (*nicht sinn-, d. h. gegenstandlose Worte*); nevertheless, a distinction must be made between the original and the translation. Order, purpose, law in the human sense express something arbitrary.

“From the contingency of order, purpose and law in nature, theism *expressly* infers their arbitrary origin; it infers the existence of a being distinct from nature which brings order, purpose, law into a nature that is in itself (*an sich*) chaotic

(*dissolute*) and indifferent to all determination. The reason of the theists ... is reason contradictory to nature, reason absolutely devoid of understanding of the essence of nature. The reason of the theists splits nature into two beings—one material, and the other formal or spiritual" (*Werke*, VII. Band, 1903, S. 518-20).

Thus Feuerbach recognises objective law in nature and objective causality, which are reflected only with approximate fidelity by human ideas of order, law and so forth. With Feuerbach the recognition of objective law in nature is inseparably connected with the recognition of the objective reality of the external world, of objects, bodies, things, reflected by our mind. Feuerbach's views are consistently materialist. All other views, or rather, any other philosophical line on the question of causality, the denial of objective law, causality and necessity in nature, are justly regarded by Feuerbach as belonging to the fideist trend. For it is, indeed, clear that the subjectivist line on the question of causality, the deduction of the order and necessity of nature not from the external objective world, but from consciousness, reason, logic, and so forth, not only cuts human reason off from nature, not only opposes the former to the latter, but makes nature a *part* of reason, instead of regarding reason as a part of nature. The subjectivist line on the question of causality is philosophical idealism (varieties of which are the theories of causality of both Hume and Kant), i. e., fideism, more or less weakened and diluted. The recognition of objective law in nature and the recognition that this law is reflected with approximate fidelity in the mind of man is materialism.

As regards Engels, he had, if I am not mistaken, no occasion to contrast his materialist view with other trends on the particular question of causality. He had no need to do so, since he had definitely dissociated himself from all the agnostics on the more fundamental question of the objective reality of the external world in general. But to anyone who has read his philosophical works at all attentively it must be clear that Engels does not admit even a shadow of doubt as to the existence of objective law, causality and necessity in nature. We shall confine ourselves to a few examples. In the first section of *Anti-Dühring* Engels says: "In order to understand these

details [of the general picture of the world phenomena], we must detach them from their natural (*natürlich*) or historical connection and examine each one separately, its nature, special causes, effects, etc." (5-6). That this natural connection, the connection between natural phenomena, exists objectively, is obvious. Engels particularly emphasises the dialectical view of cause and effect: "And we find, in like manner, that cause and effect are conceptions which only hold good in their application to individual cases; but as soon as we consider the individual cases in their general connection with the universe as a whole, they run into each other, and they become confounded when we contemplate that universal action and reaction in which causes and effects are eternally changing places, so that what is effect here and now will be cause there and then, and vice versa" (8). Hence, the human conception of cause and effect always somewhat simplifies the objective connection of the phenomena of nature, reflecting it only approximately, artificially isolating one or another aspect of a single world process. If we find that the laws of thought correspond with the laws of nature, says Engels, this becomes quite conceivable when we take into account that reason and consciousness are "products of the human brain and that man himself is a product of nature". Of course, "the products of the human brain, being in the last analysis also products of nature, do not contradict the rest of nature's interconnections (*Naturzusammenhang*) but are in correspondence with them" (22).¹¹⁹ There is no doubt that there exists a natural, objective interconnection between the phenomena of the world. Engels constantly speaks of the "laws of nature", of the "necessities of nature" (*Naturnotwendigkeiten*), without considering it necessary to explain the generally known propositions of materialism.

In *Ludwig Feuerbach* also we read that "the general laws of motion—both of the external world and of human thought—[are] two sets of laws which are identical in substance but differ in their expression insofar as the human mind can apply them consciously, while in nature and also up to now for the most part in human history, these laws assert themselves unconsciously in the form of external necessity in the midst of an endless series of seeming accidents" (38). And

Engels reproaches the old natural philosophy for having replaced "the real but as yet unknown interconnections" (of the phenomena of nature) by "ideal and imaginary ones" (42).¹²⁰ Engels' recognition of objective law, causality and necessity in nature is absolutely clear, as is his emphasis on the relative character of our, i. e., man's, approximate reflections of this law in various concepts.

Passing to Joseph Dietzgen, we must first note one of the innumerable distortions committed by our Machists. One of the authors of the *Studies "in" the Philosophy of Marxism*, Mr. Helfond, tells us: "The basic points of Dietzgen's world outlook may be summarised in the following propositions: '... (9) The causal dependence which we ascribe to things is in reality not contained in the things themselves'" (248). *This is sheer nonsense.* Mr. Helfond, whose own views represent a veritable hash of materialism and agnosticism, *has outrageously falsified* J. Dietzgen. Of course, we can find plenty of confusion, inexactnesses and errors in Dietzgen, such as gladden the hearts of the Machists and oblige materialists to regard Dietzgen as a philosopher who is not entirely consistent. But to attribute to the materialist J. Dietzgen a direct denial of the materialist view of causality—only a Helfond, only the Russian Machists are capable of that.

"Objective scientific knowledge," says Dietzgen in his *The Nature of the Workings of the Human Mind* (German edition, 1903), "seeks for causes not by faith or speculation, but by experience and induction, not *a priori*, but *a posteriori*. Natural science looks for causes not outside or behind phenomena, but within or by means of them" (S. 94-95). "Causes are the products of the faculty of thought. They are, however, not its pure products, but are produced by it in conjunction with sense material. This sense material gives the causes thus produced their objective existence. Just as we demand that a truth should be the truth of an objective phenomenon, so we demand that a cause should be real, that it should be the cause of an objectively given effect" (S. 98-99). "The cause of a thing is its connection" (S. 100).

It is clear from this that Mr. Helfond has made a statement which is *directly contrary to fact*. The world outlook of materialism expounded by J. Dietzgen recognises that "the

causal dependence" is contained "in the things themselves". It was necessary for the Machist hash that Mr. Helfond should confuse the materialist line with the idealist line on the question of causality.

Let us now proceed to this latter line.

A clear statement of the starting-point of Avenarius' philosophy on this question is to be found in his first work, *Philosophie als Denken der Welt gemäss dem Prinzip des kleinsten Kraftmasses*. In § 81 we read: "Just as we do not experience (*erfahren*) force as causing motion, so we do not experience the necessity for any motion.... All we experience (*erfahren*) is that the one follows the other." This is the Humean standpoint in its purest form: sensation, experience tell us nothing of any necessity. A philosopher who asserts (on the principle of "the economy of thought") that only sensation exists could not come to any other conclusion. "Since the idea of *causality*," we read further, "demands force and necessity or constraint as integral parts of the effect, so it falls together with these latter" (§ 82). "Necessity therefore expresses a particular degree of probability with which the effect is, or may be, expected" (§ 83, thesis).

This is outspoken subjectivism on the question of causality. And if one is to remain at all consistent when not recognising objective reality as the source of our sensations one cannot come to any other conclusion.

Let us turn to Mach. In a special chapter, "Causality and Explanation" (*Wärmelehre*, 2. Auflage, 1900, S. 432-39), we read: "The Humean criticism (of the conception of causality) nevertheless remains valid." Kant and Hume (Mach does not even take account of other philosophers!) solve the problem of causality differently. "We prefer" Hume's solution. "Apart from *logical* necessity [Mach's italics] no other necessity, for instance physical necessity, exists." This is exactly the view which was so vigorously combated by Feuerbach. It never even occurs to Mach to deny his kinship with Hume. Only the Russian Machists could go so far as to assert that Hume's agnosticism could be "combined" with Marx's and Engels' materialism. In Mach's *Mechanics*, we read: "In nature there is neither cause nor effect" (S. 474, 3. Auflage, 1897). "I have repeatedly demonstrated that all forms of the law of causality

spring from subjective motives (*Trieben*) and that there is no necessity for nature to correspond with them" (495).

We must here note that our Russian Machists with amazing naïveté replace the question of the materialist or idealist trend of all arguments on the law of causality by the question of one or another formulation of this law. They believed the German empirio-critical professors that merely to say "functional correlation" was to make a discovery in "recent positivism" and to release one from the "fetishism" of expressions like "necessity", "law", and so forth. This of course is utterly absurd, and Wundt was fully justified in ridiculing such a *change of words* (in the article, quoted above, in *Philosophische Studien*, S. 383, 388), which in fact changes nothing. Mach himself speaks of "all forms" of the law of causality and in his *Knowledge and Error* (2. Auflage, S. 278) makes the self-evident reservation that the concept function can express the "dependence of elements" more precisely only when the possibility is achieved of expressing the results of investigation in *measurable* quantities, which even in sciences like chemistry has only partly been achieved. Apparently, in the opinion of our Machists, who are so credulous as to professorial discoveries, Feuerbach (not to mention Engels) did not know that the concepts order, law, and so forth, can under certain conditions be expressed as a mathematically defined functional relation!

The really important epistemological question that divides the philosophical trends is not the degree of precision attained by our descriptions of causal connections, or whether these descriptions can be expressed in exact mathematical formulas, but whether the source of our knowledge of these connections is objective natural law or properties of our mind, its innate faculty of apprehending certain *a priori* truths, and so forth. This is what irrevocably divides the materialists Feuerbach, Marx and Engels from the agnostics (Humeans) Avenarius and Mach.

In certain parts of his works, Mach, whom it would be a sin to accuse of consistency, frequently "forgets" his agreement with Hume and his own subjectivist theory of causality and argues "simply" as a natural scientist, i. e., from the instinctive materialist standpoint. For instance, in his *Mechanics*, we read of "the uniformity which nature teaches us to find in its

phenomena" (French edition, p. 182). But if we *do find* uniformity in the phenomena of nature this means, does it not, that uniformity exists objectively outside our mind? No. On the question of the uniformity of nature Mach also delivers himself thus: "The power that prompts us to complete in thought facts only partially observed is the power of association. It is greatly strengthened by repetition. It then appears to us to be a power which is independent of our will and of individual facts, a power which directs thoughts *and* [Mach's italics] facts, which keeps them in accord with each other as a *law* governing both. That we consider ourselves capable of making predictions with the help of such a law only [!] proves that there is sufficient uniformity in our environment, but it does not at all prove the *necessity* of the success of our predictions" (*Wärmelehre*, S. 383).

It follows that we may and ought to look for a necessity *apart from* the uniformity of our environment, i. e., of nature! Where to look for it is the secret of idealist philosophy which is afraid to recognise man's perceptive faculty as a simple reflection of nature. In his last work, *Knowledge and Error*, Mach even defines a law of nature as a "limitation of expectation" (2. Auflage, S. 450 ff.)! Solipsism comes into its own.

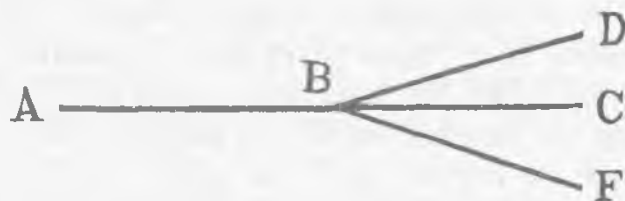
Let us look at the position of other writers of the same philosophical trend. The Englishman, Karl Pearson, expresses himself with characteristic precision (*The Grammar of Science*, 2nd ed.): "The laws of science are products of the human mind rather than factors of the external world" (p. 36). "Those, whether poets or materialists, who do homage to nature, as the sovereign of man, too often forget that the order and complexity they admire are at least as much a product of man's perceptive and reasoning faculties as are their own memories and thoughts" (185). "The comprehensive character of natural law is due to the ingenuity of the human mind" (ibid.). "*Man is the maker of natural law,*" it is stated in Chapter III, § 4. "There is more meaning in the statement that man gives laws to nature than in its converse that nature gives laws to man", although—the worthy professor regretfully admits—the latter (materialist) view is "unfortunately far too common today" (p. 87). In the fourth chapter, which is devoted to the question of causality, Pearson formulates the following *thesis* (§ 11): "*The necessity lies in the world of conceptions and not in the world of*

perceptions." It should be noted that for Pearson perceptions or sense-impressions are *the* reality existing outside us. "In the uniformity with which sequences of perception are repeated (the routine of perceptions) there is also no inherent necessity, but it is a necessary condition for the existence of thinking beings that there should be a routine in the perceptions. The necessity thus lies in the nature of the thinking being and not in the perceptions themselves; thus it is conceivably a product of the perceptive faculty" (p. 139).

Our Machist, with whom Mach "himself" frequently expresses complete solidarity, thus arrives safely and soundly at pure Kantian idealism: it is man who dictates laws to nature and not nature that dictates laws to man! The important thing is not the repetition of Kant's doctrine of apriorism — which does not define the idealist line in philosophy as such, but only a particular formulation of this line — but the fact that reason, mind, consciousness are here primary, and nature secondary. It is not reason that is a part of nature, one of its highest products, the reflection of its processes, but nature that is a part of reason, which thereby is stretched from the ordinary, simple human reason known to us all to an "immoderate", as Dietzgen puts it, mysterious, divine reason. The Kantian-Machist formula, that "man gives laws to nature", is a fideist formula. If our Machists stare wide-eyed on reading Engels' statement that the fundamental characteristic of materialism is the acceptance of nature and not spirit as primary, it only shows how incapable they are of distinguishing the really important philosophical trends from the mock erudition and sage jargon of the professors.

J. Petzoldt, who in his two-volume work analysed and developed Avenarius, may serve as an excellent example of reactionary Machist scholasticism. "Even to this day," says he, "one hundred and fifty years after Hume, substantiality and causality paralyse boldness of thought" (*Einführung in die Philosophie der reinen Erfahrung*, Bd. 1, S. 31). It goes without saying that the "boldest" of all are the solipsists who discovered sensation without organic matter, thought without brain, nature without objective law! "And the last formulation of causality, which we have not yet mentioned, necessity of occurrence, or *necessity in nature*, contains something vague and

mystical"—(the idea of "fetishism", "anthropomorphism", etc.) (32, 34). Oh, the poor mystics, Feuerbach, Marx and Engels! They have been talking all the time of necessity in nature, and have even been calling those who hold the Humean position theoretical reactionaries! Petzoldt rises above all "anthropomorphism". He has discovered the great "*law of unique determination*", which eliminates every obscurity, every trace of "fetishism", etc., etc., etc. For example, the parallelogram of forces (S. 35). This cannot be "proven"; it must be accepted as a "fact of experience". It cannot be conceded that a body under identical impulses will move in different ways. "We cannot concede nature such indefiniteness and arbitrariness; we must demand from it definiteness and law" (35). Well, well! We demand of nature obedience to law. The bourgeoisie demands reaction of its professors. "Our thought demands definiteness from nature, and nature always accedes to this demand; we shall even see that in a certain sense it is compelled to accede to it" (36). Why, having received an impulse in the direction of the line AB, does a body move towards C and not towards D or F, etc.?



"Why does nature not choose any of the countless other directions?" (37). Because that would be "multiple determination", and the great empirio-critical discovery of Joseph Petzoldt demands *unique determination*.

The "empirio-critics" fill scores of pages with such unspeakable nonsense!

"...We have repeatedly indicated that our thesis does not derive its force from a sum of separate experiences, but that, on the contrary, we demand that nature should recognise its validity (*seine Geltung*). Indeed, even before it becomes a law it is already for us a principle with which we approach reality, a postulate. It is valid, so to speak, *a priori*, independently of all

separate experiences. It would, indeed, be unbefitting for a philosophy of pure experience to preach *a priori* truths and thus relapse into the most sterile metaphysics. Its apriorism can only be a logical one, never a psychological or metaphysical one" (40). Well, of course, if we call apriorism logical, then the reactionary nature of the idea disappears and it becomes elevated to the level of "recent positivism"!

There can be no unique determination of psychical phenomena, Petzoldt further teaches us; the role of imagination, the significance of great inventions, etc., here create exceptions, while a law of nature, or a law of spirit, tolerates "no exceptions" (65). We have before us a pure metaphysician, who has not the slightest inkling of the relativity of the difference between the accidental and the necessary.

I may, perhaps, be reminded — continues Petzoldt — of the motivation of historical events or of the development of character in poetry. "If we examine the matter carefully we shall find that there is no such unique determination. There is not a single historical event or a single drama in which we could not imagine the participants acting differently under similar psychical conditions..." (73). "Unique determination is not only absent in the realm of the psychical, but we are also entitled to *demand* its absence from reality [Petzoldt's italics]. Our doctrine is thus elevated to the rank of a *postulate*, i.e., to the rank of a fact which we recognise as a necessary condition of a much earlier experience, as its *logical a priori*" (Petzoldt's italics, S. 76).

And Petzoldt continues to operate with this "logical *a priori*" in both volumes of his *Introduction*, and in the booklet issued in 1906, *The World Problem from the Positivist Standpoint*.^{*} Here is a second instance of a noted empirio-criticist who has imperceptibly slipped into Kantianism and who serves up the most reactionary doctrines with a slightly different sauce. And this is not fortuitous, for at the very foundations of Mach's and Avenarius' teachings on causality there lies an idealist false-

^{*} J. Petzoldt, *Das Weltproblem von positivistischem Standpunkte aus*, Leipzig, 1906, S. 130: "Also from the empirical standpoint there can be a logical *a priori*; causality is the logical *a priori* of the experienced (*erfahrungsmässige*) constancy of our environment."

hood, which no high-flown talk of "positivism" can cover up. The distinction between the Humean and the Kantian theories of causality is only a secondary difference of opinion between agnostics who are basically at one, viz., in their denial of objective law in nature, and who thus inevitably condemn themselves to idealist conclusions of one kind or another. A rather more "scrupulous" empirio-criticist than J. Petzoldt, Rudolf Willy, who is ashamed of his kinship with the immanentists, rejects, for example, Petzoldt's whole theory of "unique determination" as leading to nothing but "logical formalism". But does Willy improve his position by disavowing Petzoldt? Not in the least, for he disavows Kantian agnosticism solely for the sake of Humean agnosticism. "We have long known, from the time of Hume," he writes, "that 'necessity' is a purely logical (not a 'transcendental') characteristic (*Merkmal*), or, as I would rather say and have already said, a purely verbal (*sprachlich*) characteristic" (R. Willy, *Gegen die Schulweisheit*, München, 1905, S. 91; cf. S. 173, 175).

The agnostic calls our materialist view of necessity "transcendental", for from the standpoint of Kantian and Humean "school wisdom", which Willy does not reject but only furbishes up, any recognition of objective reality given us in experience is an illegitimate "transcendence".

Among the French writers of the philosophical trend we are analysing, we find Henri Poincaré constantly straying into this same path of agnosticism. Henri Poincaré is an eminent physicist but a poor philosopher, whose errors Yushkevich, of course, declared to be the last word of recent positivism, so "recent" indeed that it even required a new "ism", viz., empirio-symbolism. For Poincaré (with whose views as a whole we shall deal in the chapter on the new physics), the laws of nature are symbols, conventions, which man creates for the sake of "*convenience*". "The only true objective reality is the internal harmony of the world." By "objective", Poincaré means that which is generally valid, that which is accepted by the majority of men, or by all*; that is to say, in a purely subjectivist manner he destroys objective truth, as do all the

* Henri Poincaré, *La valeur de la science*, Paris, 1905, pp. 7, 9. There is a Russian translation.

Machists. And as regards "harmony", he categorically declares in answer to the question whether it exists *outside of us* — "undoubtedly, no". It is perfectly obvious that the new terms do not in the least change the ancient philosophical position of agnosticism, for the essence of Poincaré's "original" theory amounts to a denial (although he is far from consistent) of objective reality and of objective law in nature. It is, therefore, perfectly natural that in contradistinction to the Russian Machists, who accept new formulations of old errors as the latest discoveries, the German Kantians greeted such views as a conversion to their own views, i.e., to agnosticism, on a fundamental question of philosophy. "The French mathematician Henri Poincaré," we read in the work of the Kantian, Philipp Frank, "holds the point of view that many of the most general laws of theoretical natural science (e.g., the law of inertia, the law of the conservation of energy, etc.) of which it is often difficult to say whether they are of empirical or of *a priori* origin, are, in fact, neither one nor the other, but are purely conventional propositions depending upon human discretion...." "Thus [exults the Kantian] the latest *Naturphilosophie* unexpectedly renews the fundamental idea of critical idealism, namely, that experience merely fills in a framework, which man brings with him by his very nature...."*

We quote this example in order to give the reader a clear idea of the degree of naïveté of our Yushkeviches and Co., who take a "theory of symbolism" for something genuinely *new*, whereas philosophers in the least versed in their subject say plainly and explicitly: he has become converted to the standpoint of critical idealism! For the essence of this point of view does not necessarily lie in the repetition of Kant's formulations, but in the recognition of the fundamental idea *common* to both Hume and Kant, viz., the denial of objective law in nature and the deduction of particular "conditions of experience", particular principles, postulates and propositions *from the subject*, from human consciousness, and not from nature. Engels was right when he said that the essential thing is not which of the numerous schools of materialism or idealism a particular philosopher belongs to, but whether he takes nature,

* *Annalen der Naturphilosophie*,¹²¹ VI. B., 1907, S. 443, 447.

the external world, matter in motion, or spirit, reason, consciousness, etc., as primary.¹²²

Another characterisation of Machism on this question, in contrast to the other philosophical lines, is given by the expert Kantian, E. Lucka. On the question of causality "Mach entirely agrees with Hume".* "P. Volkmann derives the necessity of thought from the necessity of the processes of nature—a standpoint that, in contradistinction to Mach and in agreement with Kant, recognises the fact of necessity; but contrary to Kant, it seeks the source of necessity not in thought, but in the processes of nature" (424).

Volkmann is a physicist who writes fairly extensively on epistemological questions, and who tends, as do the vast majority of natural scientists, to materialism, albeit an inconsistent, timid and incoherent materialism. The recognition of necessity in nature and the derivation from it of necessity in thought is materialism. The derivation of necessity, causality, law, etc., from thought is idealism. The only inaccuracy in the passage quoted is that a total denial of all necessity is attributed to Mach. We have already seen that this is not true either of Mach or of the empirio-critical trend generally, which, having definitely departed from materialism, inevitably slides into idealism.

It remains for us to say a few words about the Russian Machists in particular. They would like to be Marxists; they have all "read" Engels' decisive demarcation of materialism from the Humean trend; they could not have failed to learn both from Mach himself and from anyone in the least acquainted with his philosophy that Mach and Avenarius follow the line of Hume. Yet they are all careful *not to say a single word* about Humism and materialism on the question of causality! Their confusion is utter. Let us give a few examples. Mr. P. Yushkevich preaches the "new" empirio-symbolism. The "sensations of blue, hard, etc.—these supposed data of pure experience" and "the creations supposedly of pure reason, such as a chimera or a chess game"—all these are "empirio-symbols". (*Studies, etc.*, p. 179) "Knowledge is

* E. Lucka, "Das Erkenntnisproblem und Machs *Analyse der Empfindungen*", *Kantstudien*, VIII. Bd., S. 409.

empirio-symbolic, and as it develops leads to empirio-symbols of an ever greater degree of symbolisation.... The so-called laws of nature ... are such empirio-symbols..." (ibid.). "The so-called true reality, being in itself, is that infinite [a terribly learned fellow, this Mr. Yushkevich!]* ultimate system of symbols to which our knowledge is striving" (188). "The stream of experience ... which lies at the foundation of our knowledge is ... irrational ... illogical" (187, 194). Energy "is just as little a thing, a substance, as time, space, mass and the other fundamental concepts of science: energy is a constancy, an empirio-symbol, like other empirio-symbols that for a time satisfy the fundamental human need of introducing reason, Logos, into the irrational stream of experience" (209).

Clad like a harlequin in a garish motley of shreds of the "latest" terminology, there stands before us a subjective idealist, for whom the external world, nature and its laws are all symbols of our knowledge. The stream of experience is devoid of reason, order and law: our knowledge brings reason into it. The celestial bodies are symbols of human knowledge, and so is the earth. If science teaches us that the earth existed long before it was possible for man and organic matter to have appeared, we, you see, have changed all that! *We* introduce order in the motion of the planets, it is a product of our knowledge. And sensing that human reason is being inflated by such a philosophy into the author and founder of nature, Mr. Yushkevich puts alongside reason the word *Logos*, that is, reason in the abstract, not reason, but Reason, not a function of the human brain, but something existing prior to any brain, something divine. The last word of "recent positivism" is that old formula of fideism which Feuerbach had already exposed.

Let us take A. Bogdanov. In 1899, when he was still a semi-materialist and had only just begun to go astray under the influence of a very great chemist and very muddled philosopher, Wilhelm Ostwald, he wrote: "The universal causal connection of phenomena is the last and best child of human knowledge; it is the universal law, the highest of those

* The exclamation is provoked by the fact that Yushkevich here uses the foreign word *infinite* with a Russian ending.—Ed.

laws which, to express it in the words of a philosopher, human reason dictates to nature" (*Fundamental Elements, etc.*, p. 41).

Allah alone knows from what source Bogdanov took this reference. But the fact is that "the words of a philosopher" trustingly repeated by the "Marxist"—are the words of *Kant*. An unpleasant event! And all the more unpleasant in that it cannot even be explained by the "mere" influence of Ostwald.

In 1904, having already managed to discard both natural-scientific materialism and Ostwald, Bogdanov wrote: "...Modern positivism regards the law of causality only as a means of cognitively connecting phenomena into a continuous series, only as a form of co-ordinating experience" (*From the Psychology of Society*, p. 207). Bogdanov either did not know, or would not admit, that this modern positivism is agnosticism and that it denies the objective necessity of nature, which existed prior to, and apart from, all "knowledge" and all human beings. He accepted on faith from the German professors what they called "modern positivism". Finally, in 1905, having passed through all the previous stages and the stage of empirio-criticism, and being already in the stage of "empirio-monism", Bogdanov wrote: "Laws do not belong to the sphere of experience ... they are not given in it, but are created by thought as a means of organising experience, of harmoniously co-ordinating it into a symmetrical whole" (*Empirio-monism*, I, 40). "Laws are abstractions of knowledge; and physical laws possess physical properties just as little as psychological laws possess psychical properties" (*ibid.*).

And so, the law that winter succeeds autumn and the spring winter is not given us in experience but is created by thought as a means of organising, harmonising, co-ordinating ... what with what, Comrade Bogdanov?

"Empirio-monism is possible only because knowledge actively harmonises experience, eliminating its infinite contradictions, creating for it universal organising forms, replacing the primeval chaotic world of elements by a derivative, ordered world of relations" (57). That is not true. The idea that knowledge can "create" universal forms, replace the primeval chaos by order, etc., is the idea of idealist philosophy. The world is matter moving in conformity to law, and our

knowledge, being the highest product of nature, is in a position only to *reflect* this conformity to law.

To sum up, our Machists, blindly believing the "recent" reactionary professors, repeat the mistakes of Kantian and Humean agnosticism on the question of causality and fail to notice that these doctrines are in absolute contradiction to Marxism, i. e., materialism, and that they themselves are rolling down an inclined plane towards idealism.

Space and Time

Recognising the existence of objective reality, i. e., matter in motion, independently of our mind, materialism must also inevitably recognise the objective reality of time and space, in contrast above all to Kantianism, which in this question sides with idealism and regards time and space not as objective realities but as forms of human understanding. The basic difference between the two fundamental philosophical lines on this question too is quite clearly recognised by writers of the most diverse trends who are at all consistent thinkers. Let us begin with the materialists.

"Space and time," says Feuerbach, "are not mere forms of phenomena but essential conditions (*Wesensbedingungen*) ... of being" (*Werke*, II, 332). Regarding the sensible world we know through sensations as objective reality, Feuerbach naturally also rejects the phenomenalist (as Mach would call his own conception) or the agnostic (as Engels calls it) conception of space and time. Just as things or bodies are not mere phenomena, not complexes of sensations, but objective realities acting on our senses, so space and time are not mere forms of phenomena, but objectively real forms of being. There is nothing in the world but matter in motion, and matter in motion cannot move otherwise than in space and time. Human conceptions of space and time are relative, but these relative conceptions go to compound absolute truth. These relative conceptions, in their development, move towards absolute truth and approach nearer and nearer to it. The mutability of human conceptions of space and time no more refutes the objective reality of space and time than the

mutability of scientific knowledge of the structure and forms of matter in motion refutes the objective reality of the external world.

Engels, exposing the inconsistent and muddled materialist Dühring, catches him on the very point where he speaks of the change in the *idea* of time (a question beyond controversy for contemporary philosophers of any importance even of the *most diverse* philosophical trends) but *evades* a direct answer to the question: are space and time real or ideal, and are our relative ideas of space and time *approximations* to objectively real forms of being; or are they only products of the developing, organising, harmonising, etc., human mind? This and this alone is the basic epistemological problem on which the truly fundamental philosophical trends are divided. Engels, in *Anti-Dühring*, says: "We are here not in the least concerned with what ideas change in Herr Dühring's head. The subject at issue is not the *idea* of time, but *real* time, which Herr Dühring cannot rid himself of so cheaply [i. e., by the use of such phrases as the mutability of our conceptions]" (*Anti-Dühring*, 5th German edition, S. 41).¹²³

This would seem so clear that even the Yushkeviches should be able to grasp the essence of the matter. Engels sets up against Dühring the proposition of the *reality*, i. e., objective reality, of time which is generally accepted by and obvious to every materialist, and says that *one cannot escape* a direct affirmation or denial of this proposition merely by talking of the change in the *ideas* of time and space. The point is not that Engels denies the necessity and scientific value of investigations into the change and development of our ideas of time and space, but that we should give a consistent answer to the epistemological question, viz., the question of the source and significance of all human knowledge. Any at all intelligent philosophical idealist—and Engels when he speaks of idealists has in mind the great consistent idealists of classical philosophy—will readily admit the development of our ideas of time and space; he would not cease to be an idealist for thinking, for example, that our developing ideas of time and space are approaching towards the absolute idea of time and space, and so forth. It is impossible to hold consistently to a standpoint in philosophy which is hostile to all forms of fideism and idealism if we do not definitely and resolutely recognise

that our developing notions of time and space *reflect* an objectively real time and space; that here, too, as in general, they are approaching objective truth.

"The basic forms of all being," Engels admonishes Dühring, "are space and time, and being out of time is just as gross an absurdity as being out of space" (op. cit.).

Why was it necessary for Engels, in the first half of the quotation, to repeat Feuerbach almost literally and, in the second, to recall the struggle which Feuerbach fought so successfully against the gross absurdities of theism? Because Dühring, as one sees from this same chapter of Engels', could not make his philosophy hang together without resorting now to the "final cause" of the world, now to the "initial impulse" (which is another expression for the concept "God", Engels says). Dühring no doubt wanted to be a materialist and atheist no less sincerely than our Machists want to be Marxists, but he *was unable* consistently to develop the philosophical point of view that would really cut the ground from under idealist and theist nonsense. Since he did not recognise, or at least did not recognise clearly and distinctly (for he wavered and was muddled on this question), the objective reality of time and space, it was not accidental but inevitable that Dühring should slide down an inclined plane to "final causes" and "initial impulses"; for he had deprived himself of the objective criterion which prevents one going beyond the bounds of time and space. If time and space are *only* concepts, man, who created them, is justified in *going beyond their bounds*, and bourgeois professors are justified in receiving salaries from reactionary governments for defending the legitimacy of going beyond these bounds, for directly or indirectly defending medieval "nonsense".

Engels showed Dühring that denial of the objective reality of time and space is theoretically philosophical confusion, while practically it is capitulation to, or impotence in face of, fideism.

Let us now take a look at the "teachings" of "recent positivism" on this subject. We read in Mach: "Space and time are well-ordered (*wohlgeordnete*) systems of series of sensations" (*Mechanics*, 3rd German edition, p. 498). This is obvious idealist nonsense, such as inevitably follows from the doctrine that bodies are complexes of sensations. According to Mach, it

is not man with his sensations that exists in space and time, but space and time that exist in man, that depend upon man and are generated by man. He feels that he is falling into idealism, and "resists" by making a host of reservations and, like Dühring, burying the question under lengthy disquisitions (see especially *Knowledge and Error*) on the mutability of our conceptions of space and time, their relativity, and so forth. But this does not save him, and cannot save him, for one can really overcome the idealist position on this question only by recognising the objective reality of space and time. And this Mach will not do at any price. He constructs his epistemological theory of time and space on the principle of relativism, and that is all. In actual fact, such a construction can lead to nothing but subjective idealism, as we have already made clear when speaking of absolute and relative truth.

Resisting the idealist conclusions which inevitably follow from his premises, Mach argues against Kant and insists that our notion of space is derived from experience (*Knowledge and Error*, 2nd German edition, pp. 350, 385). But if objective reality is *not* given us in experience (as Mach teaches), such an objection to Kant does not in the least destroy the general position of agnosticism in the case *both* of Kant *and* of Mach. If our notion of space is taken from experience *without being* a reflection of objective reality outside us, Mach's theory remains idealistic. The existence of nature *in time*, measured in millions of years, *prior to* the appearance of man and human experience, shows how absurd this idealist theory is.

"In the physiological respect," writes Mach, "time and space are systems of sensations of orientation which together with sense-perceptions determine the discharge (*Auslösung*) of biologically purposive reactions of adaptation. In the physical respect, time and space are interdependencies of physical elements" (*ibid.*, p. 434).

The relativist Mach confines himself to an examination of the *concept* of time in various relations! And like Dühring he gets nowhere. If "elements" are sensations, then the dependence of physical elements upon one another cannot exist outside of man, and could not have existed prior to man and prior to organic matter. If the sensations of time and space can give man a biologically purposive orientation, this can only be

so on the condition that these sensations reflect an *objective reality* outside man: man could never have adapted himself biologically to the environment if his sensations had not given him an *objectively correct* idea of it. The theory of space and time is inseparably connected with the answer to the fundamental question of epistemology: are our sensations images of bodies and things, or are bodies complexes of our sensations? Mach merely blunders about between the two answers.

In modern physics, he says, Newton's idea of absolute time and space prevails (pp. 442-44), of time and space as such. This idea seems "to us" senseless, Mach continues — apparently not suspecting the existence of materialists and of a materialist theory of knowledge. But *in practice*, he claims, this view was *harmless* (*unschädlich*, S. 442) and therefore for a long time escaped criticism.

This naïve remark regarding the harmlessness of the materialist view betrays Mach completely. Firstly, it is not true that for a "long time" the idealists did not criticise this view. Mach simply ignores the struggle between the idealist and materialist theories of knowledge on this question; he evades giving a plain and direct statement of these two views. Secondly, by recognising "the harmlessness" of the materialist views he contests, Mach thereby in fact admits their correctness. For if they were incorrect, how could they have remained harmless throughout the course of centuries? What has become of the criterion of practice with which Mach attempted to flirt? The materialist view of the objective reality of time and space can be "harmless" only because natural science *does not transcend* the bounds of time and space, the bounds of the material world, leaving this occupation to the professors of reactionary philosophy. Such "harmlessness" is equivalent to correctness.

It is Mach's idealist view of space and time that is "harmful", for, in the first place, it opens the door for fideism and, in the second place, it *seduces* Mach himself into drawing reactionary conclusions. For instance, in 1872 Mach wrote that "one does not have to conceive of the chemical elements in a space of three dimensions" (*Erhaltung der Arbeit*, S. 29, repeated on S. 55). To do so would be "to impose an unnecessary restriction upon ourselves. There is no more necessity to think of what is

mere thought (*das bloss Gedachte*) spatially, that is to say, in relation to the visible and tangible, than there is to think of it in a definite pitch" (27). "The reason why a satisfactory theory of electricity has not yet been established is perhaps because we have invariably wanted to explain electrical phenomena in terms of molecular processes in a three-dimensional space" (30).

The argument from the standpoint of the straightforward and unmuddled Machism which Mach openly advocated in 1872 is quite indisputable: if molecules, atoms, in a word, chemical elements, cannot be perceived, they are "mere thought" (*das bloss Gedachte*). If so, and if space and time have no objective reality, it is clear that it is not essential to think of atoms *spatially*! Let physics and chemistry "restrict themselves" to a three-dimensional space in which matter moves; for the explanation of electricity, however, we may seek its elements in a space which is *not* three-dimensional!

That our Machists should circumspectly avoid all reference to this absurdity of Mach's, although he repeats it in 1906 (*Knowledge and Error*, 2nd ed., p. 418), is understandable, for otherwise they would have to raise the question of the idealist and materialist views of space point-blank, without evasions and attempts to "reconcile" these antagonistic positions. It is likewise understandable that at that time, in the seventies, when Mach was still entirely unknown and when "orthodox physicists" even refused to publish his articles, one of the chiefs of the immanentist school, Anton von Leclair, should *eagerly* have seized upon *precisely this* argument of Mach's as a noteworthy renunciation of materialism and recognition of idealism! For at that time Leclair had not yet invented, or had not yet borrowed from Schuppe and Schubert-Soldern, or J. Rehmke, the "new" sobriquet, "immanentist school", but *plainly* called himself a *critical idealist*.* This unequivocal advocate of fideism, who openly preached it in his philosophical works, immediately proclaimed Mach a great philosopher because of these statements, a "revolutionary in the best sense of the word" (S. 252); and he was absolutely right. Mach's

* Anton von Leclair, *Der Realismus der modernen Naturwissenschaft im Lichte der von Berkeley und Kant angebahnten Erkenntniskritik*, Prag, 1879.

argument amounts to deserting natural science for fideism. Natural science was seeking, both in 1872 and in 1906, is now seeking, and is discovering—at least *it is groping its way towards*—the atom of electricity, the electron, in three-dimensional space. Science does not doubt that the substance it is investigating exists in three-dimensional space and, hence, that the particles of that substance, although they be so small that we cannot see them, must also “necessarily” exist in this three-dimensional space. Since 1872, during the course of three decades of immense, dazzling scientific successes in the problem of the structure of matter, the materialist view of space and time has remained “harmless”, i. e., compatible, as heretofore, with natural science, while the contrary view of Mach and Co. was a “harmful” capitulation to the position of fideism.

In his *Mechanics*, Mach defends the mathematicians who are investigating the problem of conceivable spaces with n dimensions; he defends them against the charge of drawing “preposterous” conclusions from their investigations. The defence is absolutely and undoubtedly just, but see the *epistemological* position Mach takes up in this defence. Recent mathematics, Mach says, has raised the very important and useful question of a space of n dimensions as a conceivable space; nevertheless, only three-dimensional space remains the “real case” (*ein wirklicher Fall*) (3rd German edition, pp. 483-85). In vain, therefore, “many theologians, who experience difficulty in deciding where to place hell”, as well as the spiritualists, have sought to take advantage of the fourth dimension (*ibid.*).

Very good! Mach refuses to join company with the theologians and the spiritualists. But how does he dissociate himself from them in his *theory of knowledge*? By stating that three-dimensional space alone is *real*! But what sort of defence is this against the theologians and their like when you deny objective reality to space and time? Why, it comes to this, that when you have to dissociate yourself from the spiritualists you resort to tacit borrowings from the materialists. For the materialists, by recognising the real world, the matter we perceive, as an *objective* reality, have the right to conclude from this that all human concepts, whatever their purpose, that go

beyond the bounds of time and space are *unreal*. But you Machist gentlemen deny the objective validity of "reality" when you combat materialism, yet secretly introduce it again when you have to combat an idealism that is consistent, fearless and frank throughout! If in the *relative* conception of time and space there is nothing but relativity, if there is no objective reality (i.e., reality independent of man and mankind) reflected by these relative concepts, why should mankind, why should the majority of mankind, not be entitled to conceive of beings outside time and space? If Mach is entitled to seek atoms of electricity, or atoms in general, *outside* three-dimensional space, why should the majority of mankind not be entitled to seek the atoms, or foundations of morality, *outside* three-dimensional space?

"There has never been an accoucheur who has helped a delivery by means of the fourth dimension," Mach goes on to say.

An excellent argument—but only for those who regard the criterion of practice as a confirmation of the *objective* truth and *objective* reality of our perceptual world. If our sensations give us an objectively true image of the external world, existing independently of us, the argument based on the accoucheur, on human practice generally, is valid. But if so, Machism as a philosophical trend is not valid.

"I hope, however," Mach continues, referring to his work of 1872, "that nobody will defend ghost-stories (*die Kosten einer Spukgeschichte bestreiten*) with the help of what I have said and written on this subject."

One cannot hope that Napoleon did not die on May 5, 1821. One cannot hope that Machism will not be used in the service of "ghost-stories" when it has already served and continues to serve the immanentists!

And not only the immanentists, as we shall see later. Philosophical idealism is nothing but a disguised and embellished ghost-story. Look at the French and English representatives of empirio-criticism, who are less pretentious than the German representatives of this philosophical trend. Poincaré says that the concepts space and time are relative and that it follows (for non-materialists "it follows" indeed) that "nature does not impose them upon us, but we impose them upon

nature, for we find them convenient" (op. cit., p. 6). Does this not justify the exultation of the German Kantians? Does this not confirm Engels' statement that consistent philosophical doctrines must take either nature or human thought as primary?

The views of the English Machist Karl Pearson are quite definite. He says: "Of time as of space we cannot assert a real existence: it is not in things but in our mode of perceiving them" (op. cit., p. 184). This is idealism, pure and simple. "Like space, it [time] appears to us as one of the plans on which that great sorting-machine, the human perceptive faculty, arranges its material" (ibid.). Pearson's final conclusion, expounded as usual in clear and precise theses, is as follows: "Space and time are not realities of the phenomenal world, but the modes under which we perceive things apart. They are not infinitely large nor infinitely divisible, but are essentially limited by the contents of our perception" (p. 191, summary of Chapter V on Space and Time).

This conscientious and honest opponent of materialism, with whom, we repeat, Mach frequently expresses his complete agreement and who in his turn speaks openly of his agreement with Mach, invents no special signboard for his philosophy, and without the least ambiguity names Hume and Kant as the classics from whom he derives his philosophical trend! (P. 192.)

And while in Russia there are naïve people who believe that Machism has provided a "new" solution of the problem of space and time, in English writings we find that natural scientists, on the one hand, and idealist philosophers, on the other, at once took up a definite position in regard to the Machist Karl Pearson. Here, for example, is the opinion of Lloyd Morgan, a biologist: "Physics as such accepts the phenomenal world as external to, and for its purposes independent of, the mind of the investigator.... He [Professor Pearson] is forced to a position which is largely idealistic...." * "Physics, as a science, is wise, I take it, in dealing with space and time in frankly objective terms, and I think the biologist may still discuss the distribution of organisms in space, and the geologist their distribution in time, without pausing to remind

* *Natural Science*,¹²⁴ Vol. I, 1892, p. 300.

their readers that after all they are only dealing with sense-impressions, and stored sense-impressions, and certain forms of perception.... All this may be true enough, but it is out of place either in physics or biology" (p. 304). Lloyd Morgan is a representative of the kind of agnosticism that Engels called "shamefaced materialism", and however "conciliatory" the tendencies of such a philosophy are, nevertheless it proved impossible to reconcile Pearson's views with natural science. With Pearson "the mind is first in space, and then space in it", says another critic.* "There can be no doubt," retorted a defender of Pearson, R. J. Ryle, "that the doctrine as to the nature of space and time which is associated with the name of Kant is the most important positive addition which has been made to the idealistic theory of human knowledge since the days of Bishop Berkeley; and it is one of the noteworthy features of the *Grammar of Science* that here, perhaps for the first time in the writings of English men of science, we find at once a full recognition of the general truth of Kant's doctrine, a short but clear exposition of it...." **

Thus we find that in England the Machists themselves, their opponents among the natural scientists, and their adherents among the professional philosophers *have not even a shadow of doubt* as to the idealistic character of Mach's doctrine of time and space. Only some Russian writers, would-be Marxists, "failed to notice" it.

"Many of Engels' particular views," V. Bazarov, for instance, writes in the *Studies* (p. 67), "as for example, his conception of 'pure' space and time, are now obsolete."

Indeed! The views of the materialist Engels are now obsolete, but the views of the idealist Pearson and the muddled idealist Mach are very modern! The most curious thing of all is that Bazarov does not even doubt that views of space and time, viz., the recognition or denial of their objective reality, can be classed among "*particular views*", in contradistinction to the "*starting-point of the world outlook*" spoken of by this author in his next sentence. Here you have a glaring example of that "eclectic pauper's broth" of which Engels used to speak in

* J. M. Bentley, *The Philosophical Review*,¹²⁵ Vol. VI, 5. Sept. 1897, p. 523.

** R. J. Ryle, *Natural Science*, Aug. 1892, p. 454.

reference to German philosophy of the eighties. For to contrast the "starting-point" of Marx's and Engels' materialist world outlook with their "particular view" of the objective reality of time and space is as utterly nonsensical as if you were to contrast the "starting-point" of Marx's economic theory with his "particular view" of surplus-value. To sever Engels' doctrine of the objective reality of time and space from his doctrine of the transformation of "things-in-themselves" into "things-for-us", from his recognition of objective and absolute truth: the objective reality given us in our sensations, and from his recognition of objective law, causality and necessity in nature—is to reduce an integral philosophy to a hotchpotch. Like all the Machists, Bazarov erred in confusing the mutability of human conceptions of time and space, their exclusively relative character, with the immutability of the fact that man and nature exist only in time and space, and that beings outside time and space, as invented by the priests and maintained by the imagination of the ignorant and downtrodden mass of humanity, are disordered fantasies, the artifices of philosophical idealism, rotten products of a rotten social system. The teachings of science on the structure of matter, on the chemical composition of food, on the atom and the electron, may and constantly do become obsolete, but the truth that man is unable to subsist on ideas and to beget children by Platonic love alone never becomes obsolete. And a philosophy that denies the objective reality of time and space is as absurd, as intrinsically rotten and false as is the denial of these latter truths. The artifices of the idealists and the agnostics are, taken as a whole, as hypocritical as the Pharisees' sermons on Platonic love!

In order to illustrate this distinction between the relativity of our concepts of time and space and the *absolute* opposition, within the bounds of epistemology, between the materialist and idealist lines on this question, I shall further quote a characteristic passage from a very old and very pure "empirio-criticist", namely, the Humean Schulze-Aenesidemus, who wrote in 1792:

"If we infer 'things outside us' from ideas and thoughts within us, [then] space and time are something real and actually existing outside us, for the existence of bodies can be conceived only in an existing (*vorhandenen*) space, and the

existence of changes only in an existing time" (op. cit., S. 100).

Exactly! While firmly rejecting materialism, and even the slightest concession to materialism, Schulze, a follower of Hume, described in 1792 the relation between the question of space and time and the question of an objective reality outside us just as the materialist Engels described it in 1894 (Engels' last preface to *Anti-Dühring* is dated May 23, 1894). This does not mean that during these hundred years our ideas of time and space have undergone no change, or that a vast amount of new material has not been gathered *on the development* of these ideas (material to which both Voroshilov-Chernov and Voroshilov-Valentinov refer as supposedly refuting Engels). It does mean that the *relation between* materialism and agnosticism, as the fundamental lines in philosophy, could not have changed, in spite of all the "new" names paraded by our Machists.

And Bogdanov too contributes absolutely nothing but "new" names to the old philosophy of idealism and agnosticism. When he repeats the arguments of Hering and Mach on the difference between physiological and geometrical space, or between perceptual and abstract space (*Empirio-monism*, Bk. I, p. 26), he is repeating in full the mistake of Dühring. It is one thing how, with the help of various sense-organs, man perceives space, and how, in the course of a long historical development, abstract ideas of space are derived from these perceptions; it is an entirely different thing whether there is an objective reality independent of mankind which corresponds to these perceptions and conceptions of mankind. This latter question, although it is the only philosophical question, Bogdanov "did not notice" beneath the mass of detailed investigations on the former question, and he was therefore unable clearly to counterpose Engels' materialism to Mach's confusion.

Time, like space, is "a form of social co-ordination of the experiences of different people", the "objectivity" of both lies in their "general significance" (ibid., p. 34).

This is absolutely false. Religion also has general significance as expressing the social co-ordination of the experience of the greater part of humanity. But there is no objective reality that corresponds to the teachings of religion, for example, on the

past of the earth and the creation of the world. There is an objective reality that *corresponds* to the teaching of science (although the latter is as relative at every stage in the development of science as every stage in the development of religion is relative) that the earth existed *prior* to any society, *prior* to man, *prior* to organic matter, and that it has existed for a *definite* time and in a *definite* space in relation to the other planets. According to Bogdanov, the various forms of space and time adapt themselves to man's experience and his perceptive faculty. As a matter of fact, just the reverse is true: our "experience" and our knowledge adapt themselves more and more to *objective* space and time, and *reflect* them ever more correctly and profoundly.

Freedom and Necessity

On pages 140-41 of the *Studies*, A. Lunacharsky quotes the argument given by Engels in *Anti-Dühring* on this question and fully endorses the "remarkably precise and apt" statement of the problem made by Engels in that "wonderful page" * of the work mentioned.

There is, indeed, much that is wonderful here. And even more "wonderful" is the fact that neither Lunacharsky, nor the whole crowd of other Machist would-be Marxists, "noticed" the epistemological significance of Engels' discussion of freedom and necessity. They read it and they copied it, but they could not make head or tail of it.

Engels says: "Hegel was the first to state correctly the relation between freedom and necessity. To him, freedom is the appreciation of necessity. 'Necessity is *blind* only *insofar as it is not understood*.' Freedom does not consist in an imaginary independence from natural laws, but in the knowledge of these laws, and in the possibility this gives of systematically making them work towards definite ends. This holds good in relation both to the laws of external nature and to those which govern

* Lunacharsky says: "... a wonderful page of religious economics. I say this at the risk of provoking a smile from the non-religious reader". However good your intentions may be, Comrade Lunacharsky, it is not a smile, but disgust that your flirtation with religion provokes.

the bodily and mental existence of men themselves—two classes of laws which we can separate from each other at most only in thought but not in reality. Freedom of the will therefore means nothing but the capacity to make decisions with knowledge of the subject. Therefore the *freer* a man's judgement is in relation to a definite question, the greater is the *necessity* with which the content of this judgement will be determined.... Freedom therefore consists in the control over ourselves and over external nature, a control founded on knowledge of natural necessity (*Naturnotwendigkeiten*).” (5th German edition, pp. 112-13.)¹²⁶

Let us examine the epistemological premises upon which this argument is based.

Firstly, Engels at the very outset of his argument recognises laws of nature, laws of external nature, the necessity of nature—i.e., all that Mach, Avenarius, Petzoldt and Co. characterise as “metaphysics”. If Lunacharsky had really wanted to reflect on Engels’ “wonderful” argument he could not have helped noticing the fundamental difference between the materialist theory of knowledge and agnosticism and idealism, which deny law in nature or declare it to be only “logical”, etc., etc.

Secondly, Engels does not attempt to contrive “definitions” of freedom and necessity, the kind of scholastic definitions with which the reactionary professors (like Avenarius) and their disciples (like Bogdanov) are most concerned. Engels takes the knowledge and will of man, on the one hand, and the necessity of nature, on the other, and instead of giving any definitions, simply says that the necessity of nature is primary, and human will and mind secondary. The latter must necessarily and inevitably adapt themselves to the former. Engels regards this as so obvious that he does not waste words explaining his view. It needed the Russian Machists to *complain* of Engels’ general definition of materialism (that nature is primary and mind secondary; remember Bogdanov’s “perplexity” on this point!), and at the same time to regard *one of the particular applications* by Engels of this general and fundamental definition as “wonderful” and “remarkably apt”!

Thirdly, Engels does not doubt the existence of “blind necessity”. He admits the existence of a necessity *unknown* to

man. This is quite obvious from the passage just quoted. But how, from the standpoint of the Machists, can man *know* of the existence of something that he *does not know*? How can he know of the existence of an unknown necessity? Is this not "mysticism", "metaphysics", the admission of "fetishes" and "idols", is it not the "Kantian unknowable thing-in-itself"? Had the Machists given the matter any thought they could not have failed to observe the *complete identity* between Engels' argument on the knowability of the objective nature of things and on the transformation of "things-in-themselves" into "things-for-us", on the one hand, and his argument on a blind, unknown necessity, on the other. The development of consciousness in each human individual and the development of the collective knowledge of humanity as a whole present us at every step with examples of the transformation of the unknown "thing-in-itself" into the known "thing-for-us", of the transformation of blind, unknown necessity, "necessity-in-itself", into the known "necessity-for-us". Epistemologically, there is no difference whatever between these two transformations, for the basic point of view in both cases is the same, viz., materialistic, the recognition of the objective reality of the external world and of the laws of external nature, and of the fact that both this world and these laws are fully knowable to man but can never be known to him *with finality*. We do not know the necessity of nature in the phenomena of the weather, and to that extent we are inevitably slaves of the weather. But while we *do not know* this necessity, *we know* that it exists. Whence this knowledge? From the very source whence comes the knowledge that things exist outside our mind and independently of it, namely, from the development of our knowledge, which provides millions of examples to every individual of knowledge replacing ignorance when an object acts upon our sense-organs, and conversely of ignorance replacing knowledge when the possibility of such action is eliminated.

Fourthly, in the above-mentioned argument Engels plainly employs the *salto vitale* method in philosophy, that is to say, he makes a *leap* from theory to practice. Not a single one of the learned (and stupid) professors of philosophy, in whose footsteps our Machists follow, would ever permit himself to make such a leap, for this would be a disgraceful thing for a

devotee of "pure science" to do. For them the theory of knowledge, which demands the cunning concoction of "definitions", is one thing, while practice is another. For Engels all living human practice permeates the theory of knowledge itself and provides an *objective* criterion of truth. For until we know a law of nature, it, existing and acting independently of and outside our mind, makes us slaves of "blind necessity". But once we come to know this law, which acts (as Marx repeated a thousand times) *independently* of our will and our mind, we become the masters of nature. The mastery of nature manifested in human practice is a result of an objectively correct reflection within the human head of the phenomena and processes of nature, and is proof of the fact that this reflection (within the limits of what is revealed by practice) is objective, absolute, eternal truth.

What is the result? Every step in Engels' argument, literally almost every phrase, every proposition, is constructed entirely and exclusively upon the epistemology of dialectical materialism, upon premises which stand out in striking contrast to the Machist nonsense about bodies being complexes of sensations, about "elements", "the coincidence of sense-perceptions with the reality that exists outside us", etc., etc., etc. Without being in the least perturbed by this, the Machists abandon materialism and repeat (*à la* Berman) threadbare banalities about dialectics, and at the same time welcome with open arms *one* of the applications of dialectical materialism! They have taken their philosophy from an eclectic pauper's broth and are continuing to offer this hotchpotch to the reader. They take a bit of agnosticism and a morsel of idealism from Mach, add to it a bit of dialectical materialism from Marx, and call this hash a *development* of Marxism. They imagine that if Mach, Avenarius, Petzoldt, and all the other authorities of theirs have not the slightest inkling of how Hegel and Marx solved the problem (of freedom and necessity), this is purely accidental: why, it was simply because they overlooked a certain page in a certain book, and not because these "authorities" were and are utter ignoramuses on the subject of the *real* progress made by philosophy in the nineteenth century, and because they were and are philosophical obscurantists.

Here is the argument of one such obscurantist, the

philosophy professor-in-ordinary at the University of Vienna, Ernst Mach:

"The correctness of the position of determinism or indeterminism cannot be demonstrated. Only a perfect science or a demonstrably impossible science could decide this question. It is a matter of the presuppositions which we bring (*man heranbringt*) to the consideration of things, depending upon whether we ascribe to previous successes or failures of the investigation a greater or lesser subjective weight (*subjektives Gewicht*). But during the investigation every thinker is of necessity a theoretical determinist" (*Knowledge and Error*, 2nd German edition, pp. 282-83).

Is this not obscurantism, when pure theory is carefully partitioned off from practice; when determinism is confined to the field of "investigation", while in the field of morality, social activity and all fields other than "investigation" the question is left to a "subjective" estimate? In my work-room, says the learned pedant, I am a determinist; but that the philosopher should seek to obtain an integral conception of the world based on determinism, embracing both theory and practice—of that there is no mention. Mach utters banalities because on the theoretical problem of freedom and necessity he is entirely at sea.

"...Every new discovery discloses the defects of our knowledge, reveals a residue of dependencies hitherto unheeded..." (283). Excellent! And is this "residue" the "thing-in-itself", which our knowledge reflects ever more deeply? Not at all: "...Thus, he also who in theory defends extreme determinism, must nevertheless in practice remain an indeterminist..." (283). And so things have been amicably divided*: theory for the professors, practice for the theologians! Or: objectivism (i.e., "shamefaced" materialism) in theory and the "subjective method in sociology"¹²⁷ in practice. No wonder the Russian ideologists of philistinism, the Narodniks, from Lesevich to Chernov, sympathise with this banal philosophy. But it is very sad that would-be Marxists have been captivated

* Mach in the *Mechanics* says: "Religious opinions are people's strictly private affair as long as they do not try to impose them on others and do not apply them to things which belong to another sphere" (French translation, p. 434).

by such nonsense and are embarrassedly covering up the more absurd of Mach's conclusions.

But on the question of the will Mach is not content with confusion and half-hearted agnosticism: he goes much further. "... Our sensation of hunger," we read in the *Mechanics*, "is not so essentially different from the affinity of sulphuric acid for zinc, and our will is not so very different from the pressure of the stone on its support.... We shall thus find ourselves [that is, if we hold such a view] nearer to nature without it being necessary to resolve ourselves into an incomprehensible nebula of atoms, or to resolve nature into a system of phantoms" (French translation, p. 434). Thus there is no need for materialism ("nebula of atoms" or electrons, i.e., the recognition of the objective reality of the material world), there is no need for an idealism which would recognise the world as "the other being" of spirit; but there is possible an idealism which recognises the world as *will*! We are superior not only to materialism, but also to the idealism of a Hegel; but we are not averse to coquetting with an idealism like Schopenhauer's! Our Machists, who assume an air of injured innocence at every reminder of Mach's kinship to philosophical idealism, preferred to keep silent on this delicate question too. Yet it is difficult to find in philosophical writings an exposition of Mach's views which does not mention his tendency towards *Willensmetaphysik*, i.e., voluntaristic idealism. This was pointed out by J. Baumann,* and in replying to him the Machist Kleinpeter does not take exception to this point, but declares that Mach is, of course, "nearer to Kant and Berkeley than to the metaphysical empiricism prevailing in science" (i.e., instinctive materialism; *ibid.*, Bd. 6, S. 87). This is also pointed out by E. Becher, who remarks that if Mach in some places advocates voluntaristic metaphysics, and in others renounces it, it only testifies to the arbitrariness of his terminology; in fact, Mach's kinship to voluntarist metaphysics is beyond doubt.** Lucka, too, admits the admixture of this metaphysics (i.e.,

* *Archiv für systematische Philosophie*,¹²⁸ 1898, II, Bd. IV, S. 63, article on Mach's philosophical views.

** Erich Becher, "The Philosophical Views of Ernst Mach", *The Philosophical Review*, Vol. XIV, 5, 1905, pp. 536, 546, 547, 548.

idealism) to "phenomenalism" (i. e., agnosticism).^{*} W. Wundt also points this out.^{**} That Mach is a phenomenalist who is "not averse to voluntaristic idealism" is noted also in Ueberweg-Henze's textbook on the history of modern philosophy.^{***}

In short, Mach's eclecticism and his tendency to idealism are clear to everyone except perhaps the Russian Machists.

^{*} E. Lucka, "Das Erkenntnisproblem und Machs *Analyse der Empfindungen*", *Kantstudien*, Bd. VIII, 1903, S. 400.

^{**} *Systematische Philosophie*, Leipzig, 1907, S. 131.

^{***} *Grundriss der Geschichte der Philosophie*, Bd. IV, 9. Aufl., Berlin, 1903, S. 250.

From The Recent Revolution in Natural Science, and Philosophical Idealism

A year ago, in *Die Neue Zeit* (1906-07, No. 52), there appeared an article by Joseph Diner-Dénes entitled "Marxism and the Recent Revolution in the Natural Sciences". The defect of this article is that it ignores the epistemological conclusions which are being drawn from the "new" physics and which are of special interest to us at the present time. But it is precisely this defect which renders the point of view and the conclusions of the author particularly interesting for us. Joseph Diner-Dénes, like the present writer, holds the view of the "rank-and-file Marxist", of whom our Machists speak with such haughty contempt. For instance, Mr. Yushkevich writes that "ordinarily, the average rank-and-file Marxist calls himself a dialectical materialist" (p. 1 of his book). And now this rank-and-file Marxist, in the person of J. Diner-Dénes, has *directly* compared the recent discoveries in science, and especially in physics (X-rays, Becquerel rays, radium, etc.), with Engels' *Anti-Dühring*. To what conclusion has this comparison led him? "In the most varied fields of natural science," writes Diner-Dénes, "new knowledge has been acquired, all of which tends towards that single point which Engels desired to make clear, namely, that in nature 'there are no irreconcilable contradictions, no forcibly fixed boundary-lines and distinctions', and that if contradictions and distinctions are met with in nature, it is because we alone have introduced their rigidity and absoluteness into nature." It was discovered, for instance, that light and electricity are only manifestations of one and the

same force of nature.¹²⁹ Each day it becomes more probable that chemical affinity may be reduced to electrical processes. The indestructible and non-disintegrable elements of chemistry, whose number continues to grow as though in derision of the unity of the world, prove to be destructible and disintegrable. The element radium has been converted into the element helium.¹³⁰ "Just as all the forces of nature have been reduced to one force, so all substances in nature have been reduced to *one substance*" (Diner-Dénes' italics). Quoting the opinion of one of the writers who regard the atom as only a condensation of the ether, the author exclaims: "How brilliantly does this confirm the statement made by Engels thirty years ago that motion is the mode of existence of matter." "All phenomena of nature are motion, and the differences between them lie only in the fact that we human beings perceive this motion in different forms.... It is as Engels said. Nature, like history, is subject to the dialectical law of motion."

On the other hand, one cannot take up any of the writings of the Machists or about Machism without encountering pretentious references to the new physics, which is said to have refuted materialism, and so on and so forth. Whether these assertions are well founded is another question, but the connection between the new physics, or rather a definite school of the new physics, and Machism and other varieties of modern idealist philosophy is beyond doubt. To analyse Machism and at the same time to ignore this connection—as Plekhanov does—is to scoff at the spirit of dialectical materialism, i. e., to sacrifice the method of Engels to the letter of Engels. Engels says explicitly that "with each epoch-making discovery even in the sphere of natural science ["not to speak of the history of mankind"], materialism has to change its form" (*Ludwig Feuerbach*, German edition, p. 19).¹³¹ Hence, a revision of the "form" of Engels' materialism, a revision of his natural-philosophical propositions is not only not "revisionism", in the accepted meaning of the term, but, on the contrary, is an essential requirement of Marxism. We criticise the Machists not for making such a revision, but for their *purely revisionist* trick of betraying the *essence* of materialism under the guise of criticising its *form* and of adopting the fundamental propositions of reactionary bourgeois philosophy without making the

slightest attempt to deal directly, frankly and definitely with assertions of Engels' which are unquestionably of extreme importance for the given question, as, for example, his assertion that "...motion without matter is unthinkable" (*Anti-Dühring*, p. 50).¹³²

It goes without saying that in examining the connection between one of the schools of modern physicists and the rebirth of philosophical idealism, it is far from being our intention to deal with specific physical theories. What interests us exclusively is the epistemological conclusions that follow from certain definite propositions and generally known discoveries. These epistemological conclusions are of themselves so insistent that many physicists are already almost reaching them. What is more, there are already various trends among physicists, and definite schools are beginning to be formed on this basis. Our object, therefore, will be confined to explaining clearly the essence of the difference between these various trends and the relation in which they stand to the fundamental lines of philosophy.

The Crisis in Modern Physics

In his book *Value of Science*,* the famous French physicist Henri Poincaré says that there are "signs of a serious crisis" in physics, and he devotes a special chapter to this crisis (Chap. VIII, cf. p. 171). The crisis is not confined to the fact that "radium, the great revolutionary", is undermining the principle of the conservation of energy. "All the other principles are equally endangered" (180). For instance, Lavoisier's principle, or the principle of the conservation of mass, has been undermined by the electron theory of matter. According to this theory atoms are composed of very minute particles called electrons, which are charged with positive or negative electricity and "are immersed in a medium which we call the ether". The experiments of physicists provide data for calculating the velocity of the electrons and their mass (or the relation of their mass to their electric charge). The velocity proves to be

* H. Poincaré, *Valeur de la science*.—Ed.

comparable with the velocity of light (300,000 kilometres per second), attaining, for instance, one-third of the latter. Under such circumstances the twofold mass of the electron has to be taken into account, corresponding to the necessity of overcoming the inertia, firstly, of the electron itself and, secondly, of the ether. The former mass will be the real or mechanical mass of the electron, the latter the "electrodynamic mass which represents the inertia of the ether". And it turns out that the former mass is equal to zero. The entire mass of the electrons, or, at least, of the negative electrons, proves to be totally and exclusively electrodynamic in its origin. Mass disappears. The foundations of mechanics are undermined. Newton's principle, the equality of action and reaction, is undermined, and so on.¹³³

We are faced, says Poincaré, with the "ruins" of the old principles of physics, "a general debacle of principles". It is true, he remarks, that all the mentioned departures from principles refer to infinitesimal magnitudes; it is possible that we are still ignorant of other infinitesimals counteracting the undermining of the old principles. Moreover, radium is very rare. But at any rate we have reached a "*period of doubt*". We have already seen what epistemological deductions the author draws from this "period of doubt": "it is not nature which imposes on [or dictates to] us the concepts of space and time, but we who impose them on nature"; "whatever is not thought, is pure nothing". These deductions are idealist deductions. The break-down of the most fundamental principles shows (such is Poincaré's trend of thought) that these principles are not copies, photographs of nature, not images of something external in relation to man's consciousness, but products of his consciousness. Poincaré does not develop these deductions consistently, nor is he essentially interested in the philosophical aspect of the question. It is dealt with in detail by the French writer on philosophical problems, Abel Rey, in his book *The Physical Theory of the Modern Physicists* (*La théorie de la physique chez les physiciens contemporains*, Paris, F. Alcan, 1907). True, the author himself is a positivist, i.e., a muddlehead and a semi-Machist, but in this case this is even a certain advantage, for he cannot be suspected of a desire to "slander" our Machists' idol. Rey cannot be trusted when it comes to giving

an exact philosophical definition of concepts and of materialism in particular, for Rey too is a professor, and as such is imbued with an utter contempt for the materialists (and distinguishes himself by utter ignorance of the epistemology of materialism). It goes without saying that a Marx or an Engels is absolutely non-existent for such "men of science". But Rey summarises carefully and in general conscientiously the extremely abundant literature on the subject, not only French, but English and German as well (Ostwald and Mach in particular), so that we shall have frequent recourse to his work.

The attention of philosophers in general, says the author, and also of those who, for one reason or another, wish to criticise science in general, has now been particularly attracted towards physics. "In discussing the limits and value of physical knowledge, it is in effect the legitimacy of positive science, the possibility of knowing the object, that is criticised" (pp. i-ii). From the "crisis in modern physics" people hasten to draw sceptical conclusions (p. 14). Now, what is the essence of this crisis? During the first two-thirds of the nineteenth century the physicists agreed among themselves on everything essential. "They believed in a purely mechanical explanation of nature: they assumed that physics is nothing but a more complicated mechanics, namely, a molecular mechanics. They differed only as to the methods used in reducing physics to mechanics and as to the details of the mechanism.... At present the spectacle presented by the physico-chemical sciences seems completely changed. Extreme disagreement has replaced general unanimity, and no longer does it only concern details, but leading and fundamental ideas. While it would be an exaggeration to say that each scientist has his own peculiar tendencies, it must nevertheless be noted that science, and especially physics, has, like art, its numerous schools, the conclusions of which often differ from, and sometimes are directly opposed and hostile to one another....

"From this one may judge the significance and scope of what has been called the crisis in modern physics.

"Until the middle of the nineteenth century, traditional physics had assumed that it was sufficient merely to extend physics in order to arrive at a metaphysics of matter. This

physics ascribed to its theories an ontological value. And its theories were all mechanistic. The traditional mechanism [Rey employs this word in the specific sense of a system of ideas which reduces physics to mechanics] thus claimed, over and above the results of experience, a *real* knowledge of the material universe. This was not a hypothetical account of experience; it was a dogma..." (16).

We must here interrupt the worthy "positivist". It is clear that he is describing the materialist philosophy of traditional physics but does not want to call the devil (materialism) by name. Materialism to a Humean must appear to be metaphysics, dogma, a transgression of the bounds of experience, and so forth. Knowing nothing of materialism, the Humean Rey has no conception whatever of dialectics, of the difference between dialectical materialism and metaphysical materialism, in Engels' meaning of the term. Hence, the relation between absolute and relative truth, for example, is absolutely unclear to Rey.

"... The criticisms of traditional mechanism made during the whole of the second half of the nineteenth century weakened the premise of the ontological reality of mechanism. On the basis of these criticisms a philosophical conception of physics was founded which became almost traditional in philosophy at the end of the nineteenth century. Science was nothing but a symbolic formula, a method of notation (*repérage*, the creation of signs, marks, symbols), and since the methods of notation varied according to the schools, the conclusion was soon reached that only that was denoted which had been previously designed (*façonné*) by man for notation (for symbolisation). Science became a work of art for dilettantes, a work of art for utilitarians: views which could with legitimacy be generally interpreted as the negation of the possibility of science. A science which is a pure artifice for acting upon nature, a mere utilitarian technique, has no right to call itself science, without perverting the meaning of words. To say that science can be nothing but such an artificial means of action is to disavow science in the proper meaning of the term.

"The collapse of traditional mechanism, or, more precisely, the criticism to which it was subjected, led to the proposition that science itself had also collapsed. From the impossibility of

adhering purely and simply to traditional mechanism it was inferred that science was impossible" (16-17).

And the author asks: "Is the present crisis in physics a temporary and external incident in the evolution of science, or is science itself making an abrupt right-about-face and definitely abandoning the path it has hitherto pursued?..."

"If the physical and chemical sciences, which in history have been essentially emancipators, collapse in a crisis that reduces them to the status of mere technically useful recipes but deprives them of all significance from the standpoint of knowledge of nature, the result must needs be a complete revolution both in the art of logic and the history of ideas. Physics loses all educational value; the spirit of positive science it represents becomes false and dangerous." Science can offer only practical recipes but no real knowledge. "Knowledge of the real must be sought and given by other means.... One must take another road, one must return to subjective intuition, to a mystical sense of reality, in a word, to the mysterious, all that of which one thought it had been deprived" (19).

As a positivist, the author considers such a view wrong and the crisis in physics only temporary. We shall presently see how Rey purifies Mach, Poincaré and Co. of these conclusions. At present we shall confine ourselves to noting the fact of the "crisis" and its significance. From the last words of Rey quoted by us it is quite clear what reactionary elements have taken advantage of and aggravated this crisis. Rey explicitly states in the preface to his work that "the fideist and anti-intellectualist movement of the last years of the nineteenth century" is seeking "to base itself on the general spirit of modern physics" (p. ii). In France, those who put faith above reason are called fideists (from the Latin *fides*, faith). Anti-intellectualism is a doctrine that denies the rights or claims of reason. Hence, in its philosophical aspect, the essence of the "crisis in modern physics" is that the old physics regarded its theories as "real knowledge of the material world", i. e., a reflection of objective reality. The new trend in physics regards theories only as symbols, signs, and marks for practice, i. e., it denies the existence of an objective reality independent of our mind and reflected by it. If Rey had used correct philosophical terminology, he would have said: the materialist theory of knowledge,

instinctively accepted by the earlier physics, has been replaced by an idealist and agnostic theory of knowledge, which, against the wishes of the idealists and agnostics, has been taken advantage of by fideism.

But Rey does not present this replacement, which constitutes the crisis, as though all the modern physicists stand opposed to all the old physicists. No. He shows that in their epistemological trends the modern physicists are divided into three schools: the energeticist or conceptualist school; the mechanistic or neo-mechanistic school, to which the vast majority of physicists still adhere; and in between the two, the critical school. To the first belong Mach and Duhem; to the third, Henri Poincaré; to the second, Kirchhoff, Helmholtz, Thomson (Lord Kelvin), Maxwell—among the older physicists—and Larmor and Lorentz among the modern physicists. What the essence of the *two* basic trends is (for the third is not independent, but intermediate) may be judged from the following words of Rey's:

"Traditional mechanism constructed a system of the material world." Its doctrine of the structure of matter was based on "elements qualitatively homogeneous and identical"; and elements were to be regarded as "immutable, impenetrable", etc. Physics "constructed a *real* edifice out of *real* materials and *real* cement. The physicist possessed *material elements*, *the causes and modes* of their action, and the *real* laws of their action" (33-38). "The changes in this view of physics consist above all in the rejection of the ontological significance of the theories and in an exaggerated emphasis on the phenomenological significance of physics." The conceptualist view operates with "pure abstractions ... and seeks a purely abstract theory which will as far as possible eliminate the hypothesis of matter.... The notion of energy thus becomes the substructure of the new physics. That is why conceptualist physics may most often be called *energeticist* physics", although this designation does not fit, for example, such a representative of conceptualist physics as Mach (p. 46).

Rey's confusion of energetics with Machism is not altogether correct, of course; nor is his assurance that the neo-mechanistic school as well is approaching a phenomenalist view of physics (p. 48), despite the profundity of its disagreement with the conceptualists. Rey's "new" terminology does not clarify but

rather obscure matters; but we could not avoid it if we were to give the reader an idea of how a "positivist" regards the crisis in physics. Essentially, the opposition of the "new" school to the old views fully coincides, as the reader could convince himself, with Kleinpeter's criticism of Helmholtz quoted above. In his presentation of the views of the various physicists Rey reflects the indefiniteness and vacillation of their philosophical views. The *essence* of the crisis in modern physics consists in the break-down of the old laws and basic principles, in the rejection of an objective reality existing outside the mind, that is, in the replacement of materialism by idealism and agnosticism. "Matter has disappeared"—one may thus express the fundamental and characteristic difficulty in relation to many particular questions which has created this crisis. Let us consider this difficulty.

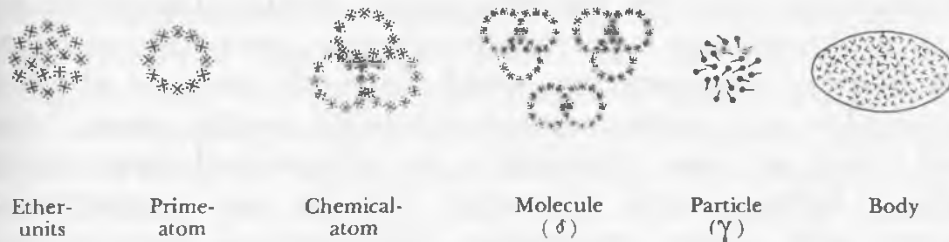
"Matter Has Disappeared"

Such, literally, is the expression that may be encountered in the descriptions given by modern physicists of recent discoveries. For instance, L. Houllévigüe, in his book *The Evolution of the Sciences*, entitles his chapter on the new theories of matter: "Does Matter Exist?" He says: "The atom dematerialises ... matter disappears."* To see how easily fundamental philosophical conclusions are drawn from this by the Machists, let us take Valentinov. He writes: "The statement that the scientific explanation of the world can find a firm foundation 'only in materialism' is nothing but a fiction, and what is more, an absurd fiction" (p. 67). He quotes as a destroyer of this absurd fiction Augusto Righi, the well-known Italian physicist, who says that the electron theory "is not so much a theory of electricity as of matter; the new system simply puts electricity in the place of matter". (Augusto Righi, *Die moderne Theorie der physikalischen Erscheinungen*, Leipzig, 1905, S. 131. There is a Russian translation.) Having quoted these words (p. 64), Mr. Valentinov exclaims:

* L. Houllévigüe, *L'évolution des sciences*, Paris (A. Gollin), 1908, pp. 63, 87, 88; cf. his article: "Les idées des physiciens sur la matière", *L'année psychologique*,¹³⁴ 1908.

"Why does Righi permit himself to commit this offence against sacred matter? Is it perhaps because he is a solipsist, an idealist, a bourgeois criticist, an empirio-monist, or even someone worse?"

This remark, which seems to Mr. Valentinov to annihilate the materialists by its sarcasm, only discloses his virgin innocence on the subject of philosophical materialism. Mr. Valentinov has absolutely failed to understand the *real* connection between philosophical idealism and the "disappearance of matter". That "disappearance of matter" of which he speaks, in imitation of the modern physicists, has no relation to the epistemological distinction between materialism and idealism. To make this clear, let us take one of the most consistent and clear of the Machists, Karl Pearson. For him the physical universe consists of groups of sense-impressions. He illustrates "our conceptual model of the physical universe" by the following diagram, explaining, however, that it takes no account of relative sizes (*The Grammar of Science*, p. 282):—



In order to simplify his diagram, Karl Pearson entirely omits the question of the relation between ether and electricity, or positive electrons and negative electrons. But that is not important. What is important is that from Pearson's idealist standpoint "bodies" are first regarded as sense-impressions, and then the constitution of these bodies out of particles, particles out of molecules and so forth affects the changes in the model of the physical world, but in no way affects the question of whether bodies are symbols of sensations, or sensations images of bodies. Materialism and idealism differ in their answers to the question of the

source of our knowledge and the relation of knowledge (and of the "mental" in general) to the *physical* world; while the question of the structure of matter, of atoms and electrons, is a question that concerns only this "physical world". When the physicists say "matter disappears" they mean that hitherto science reduced its investigations of the physical world to three ultimate concepts: matter, electricity and ether; now *only* the two latter remain. For it has become possible to reduce matter to electricity*; the atom can be explained as resembling an infinitely small solar system, within which negative electrons move around a positive electron with a definite (and, as we have seen, enormously large) velocity. It is consequently possible to reduce the physical world from scores of elements to two or three elements (inasmuch as positive and negative electrons constitute "two essentially distinct kinds of matter", as the physicist Pellat says—Rey, op. cit., pp. 294-95). Hence, natural science leads to the "*unity of matter*" (ibid.)**—such is the real meaning of the statement about the disappearance of matter, its replacement by electricity, etc., which is leading so many people astray. "Matter disappears" means that the limit within which we have hitherto known matter disappears and that our knowledge is penetrating deeper; properties of matter are likewise disappearing which formerly seemed absolute, immutable, and primary (impenetrability, inertia, mass,¹³⁶ etc.) and which are now revealed to be relative and characteristic only of certain states of matter. For the *sole* "property" of matter with whose recognition philosophical materialism is bound up is the property of *being an objective reality*, of existing outside the mind.

The error of Machism in general, as of the Machist new physics, is that it ignores this basis of philosophical materialism

* See footnote on pp. 351-52 of this book.—Ed.

** Cf. Oliver Lodge, *Sur les électrons*, Paris, 1906, p. 159: "The electrical theory of matter", the recognition of electricity as the "fundamental substance", is "an approximate accomplishment of that to what the philosophers strove always, that is, the unity of matter"; cf. also Augusto Righi, *Ueber die Struktur der Materie*, Leipzig, 1908; J. J. Thomson, *The Corpuscular Theory of Matter*, London, 1907; P. Langevin, "La physique des électrons", *Revue générale des sciences*,¹³⁵ 1905, pp. 257-76.

and the distinction between metaphysical materialism and dialectical materialism. The recognition of immutable elements, "of the immutable essence of things", and so forth, is not materialism, but *metaphysical*, i. e., anti-dialectical, materialism. That is why J. Dietzgen emphasised that the "subject-matter of science is endless", that not only the infinite, but the "smallest atom" is immeasurable, unknowable to the end, *inexhaustible*, "for nature in all her parts has no beginning and no end" (*Kleinere philosophische Schriften*, S. 229-30). That is why Engels gave the example of the discovery of alizarin in coal tar and criticised *mechanical* materialism. In order to present the question in the only correct way, that is, from the dialectical materialist standpoint, we must ask: Do electrons, ether *and so on* exist as objective realities outside the human mind or not? The scientists will also have to answer this question unhesitatingly; and they do invariably answer it in the *affirmative*, just as they unhesitatingly recognise that nature existed prior to man and prior to organic matter. Thus, the question is decided in favour of materialism, for the concept matter, as we already stated, epistemologically implies *nothing but* objective reality existing independently of the human mind and reflected by it.

But dialectical materialism insists on the approximate, relative character of every scientific theory of the structure of matter and its properties; it insists on the absence of absolute boundaries in nature, on the transformation of moving matter from one state into another, that from our point of view is apparently irreconcilable with it, and so forth. However bizarre from the standpoint of "common sense" the transformation of imponderable ether into ponderable matter and vice versa may appear, however "strange" may seem the absence of any other kind of mass in the electron save electromagnetic mass, however extraordinary may be the fact that the mechanical laws of motion are confined only to a single sphere of natural phenomena and are subordinated to the more profound laws of electromagnetic phenomena, and so forth—all this is but another *corroboration* of dialectical materialism. It is mainly because the physicists did not know dialectics that the new physics strayed into idealism. They combated metaphysical (in Engels', and not the positivist, i. e., Humean, sense of the word) materialism and its one-sided "mechanism", and in so doing

threw out the baby with the bath-water. Denying the immutability of the elements and of the properties of matter known hitherto, they ended by denying matter, i.e., the objective reality of the physical world. Denying the absolute character of some of the most important and basic laws, they ended by denying all objective law in nature and by declaring that a law of nature is a mere convention, "a limitation of expectation", "a logical necessity", and so forth. Insisting on the approximate and relative character of our knowledge, they ended by denying the object independent of the mind, reflected approximately-correctly and relatively-truthfully by the mind. And so on, and so forth, without end.

The opinions expressed by Bogdanov in 1899 regarding "the immutable essence of things", the opinions of Valentinov and Yushkevich regarding "substance", and so forth—are similar fruits of ignorance of dialectics. From Engels' point of view, the only immutability is the reflection by the human mind (when there is a human mind) of an external world existing and developing independently of the mind. No other "immutability", no other "essence", no other "absolute substance", in the sense in which these concepts were depicted by the empty professorial philosophy, exist for Marx and Engels. The "essence" of things, or "substance", is *also* relative; it expresses only the degree of profundity of man's knowledge of objects; and while yesterday the profundity of this knowledge did not go beyond the atom, and today does not go beyond the electron and ether, dialectical materialism insists on the temporary, relative, approximate character of all these *milestones* in the knowledge of nature gained by the progressing science of man. The electron is as *inexhaustible* as the atom, nature is infinite, but it infinitely *exists*. And it is this sole categorical, this sole unconditional recognition of nature's *existence* outside the mind and perception of man that distinguishes dialectical materialism from relativist agnosticism and idealism.

Let us cite two examples of the way in which the new physics wavers unconsciously and instinctively between dialectical materialism, which remains unknown to the bourgeois scientists, and "phenomenalism", with its inevitable subjectivist (and, subsequently, directly fideist) deductions.

This same Augusto Righi, whom Mr. Valentinov was *unable* to interrogate on the question which interested him about materialism, writes in the introduction to his book: "What the electrons, or electrical atoms, really are remains even now a mystery; but in spite of this, the new theory is perhaps destined in time to achieve no small philosophical significance, since it is arriving at entirely new hypotheses regarding the structure of ponderable matter and is striving to reduce all phenomena of the external world to one common origin.

"For the positivist and utilitarian tendencies of our time such an advantage may be of small consequence, and a theory may serve in the first place only as a means of conveniently ordering and summarising facts and as a guide in the search for further phenomena. But while in former times perhaps too much confidence was placed in the faculties of the human mind, and it was considered too easy to grasp the ultimate causes of all things, there is nowadays a tendency to fall into the opposite error" (op. cit., S. 3).

Why does Righi dissociate himself here from the positivist and utilitarian tendencies? Because, while apparently he has no definite philosophical standpoint, he instinctively clings to the reality of the external world and to the recognition that the new theory is not only a "convenience" (Poincaré), not only an "empirio-symbol" (Yushkevich), not only a "harmonising of experience" (Bogdanov), or whatever else such subjectivist fancies are called, but a further step in the cognition of objective reality. Had this physicist been acquainted with *dialectical* materialism, his opinion of the error which is the opposite of the old metaphysical materialism might perhaps have become the starting-point of a correct philosophy. But these people's whole environment estranges them from Marx and Engels and throws them into the embrace of vulgar official philosophy.

Rey too is entirely unfamiliar with dialectics. But he too is compelled to state that among the modern physicists there are those who continue the traditions of "mechanism" (i.e., materialism). The path of "mechanism", says he, is pursued not only by Kirchhoff, Hertz, Boltzmann, Maxwell, Helmholtz and Lord Kelvin. "Pure mechanists, and in some respects more mechanist than anybody else, and representing the culmina-

tion (*l'aboutissant*) of mechanism, are those who follow Lorentz and Larmor in formulating an electrical theory of matter and who arrive at a denial of the constancy of mass, declaring it to be a function of motion. *They are all mechanists because they take real motion as their starting-point*" (Rey's italics, pp. 290-91).

"...If, for example, the recent hypotheses of Lorentz, Larmor and Langevin were, thanks to certain experimental confirmation, to obtain a sufficiently stable basis for the systematisation of physics, it would be certain that the laws of present-day mechanics are nothing but a corollary of the laws of electromagnetism: they would constitute a special case of the latter within well-defined limits. Constancy of mass and our principle of inertia would be valid only for moderate velocities of bodies, the term 'moderate' being taken in relation to our senses and to the phenomena which constitute our general experience. A general recasting of mechanics would result, and hence also a general recasting of the systematisation of physics.

"Would this imply the abandonment of mechanism? By no means. The purely mechanist tradition would still be followed, and mechanism would pursue its normal course of development" (295).

"Electronic physics, which should be ranked among the theories of a generally mechanist spirit, tends at present to impose its systematisation on physics. Although the fundamental principles of this electronic physics are not furnished by mechanics but by the experimental data of the theory of electricity, its spirit is mechanistic, because: (1) It uses *figurative* (*figurés*), *material* elements to represent physical properties and their laws; it expresses itself in terms of perception. (2) While it no longer regards physical phenomena as particular cases of mechanical phenomena, it regards mechanical phenomena as particular cases of physical phenomena. The laws of mechanics thus retain their *direct continuity* with the laws of physics, and the concepts of mechanics remain concepts of the same order as physico-chemical concepts. In traditional mechanism it was motions copied (*calqués*) from *relatively slow* motions, which, since they alone were known and most directly observable, were taken ... as types of all possible motions. *Recent experiments*,

on the contrary, show that it is necessary to *extend* our conception of possible motions. Traditional mechanics remains entirely intact, but it now applies only to relatively slow motions.... In relation to large velocities, the laws of motion are different. Matter appears to be reduced to electrical particles, the ultimate elements of the atom... (3) Motion, displacement in space, remains the only figurative (*figure*) element of physical theory. (4) Finally, what from the standpoint of the general spirit of physics comes before every other consideration is the fact that the conception of physics, its methods, its theories, and their relation to experience remains *absolutely identical* with the conception of mechanism, with the conception of physics held since the Renaissance" (46-47).

I have given this long quotation from Rey in full because owing to his perpetual anxiety to avoid "materialist metaphysics", it would have been impossible to expound his statements in any other way. But however much both Rey and the physicists of whom he speaks abjure materialism, it is nevertheless beyond question that mechanics was a copy of real motions of moderate velocity, while the new physics is a copy of real motions of enormous velocity. The recognition of theory as a copy, as an approximate copy of objective reality, is materialism. When Rey says that among modern physicists there "is a reaction against the conceptualist [Machist] and energeticist school", and when he includes the physicists of the electron theory among the representatives of this reaction (46), we could desire no better corroboration of the fact that the struggle is essentially between the materialist and the idealist tendencies. But we must not forget that, apart from the general prejudices against materialism common to all educated philistines, the most outstanding theoreticians are handicapped by a complete ignorance of dialectics.

Is Motion Without Matter Conceivable?

The fact that philosophical idealism is attempting to make use of the new physics, or that idealist conclusions are being drawn from the latter, is due not to the discovery of new kinds of substance and force, of matter and motion, but to the fact

that an attempt is being made to conceive motion without matter. And it is the essence of this attempt which our Machists fail to examine. They were unwilling to take account of Engels' statement that "motion without matter is *unthinkable*". J. Dietzgen in 1869, in his *The Nature of the Workings of the Human Mind*, expressed the same idea as Engels, although, it is true, not without his usual muddled attempts to "reconcile" materialism and idealism. Let us leave aside these attempts, which are to a large extent to be explained by the fact that Dietzgen is arguing against Büchner's non-dialectical materialism, and let us examine Dietzgen's own statements on the question under consideration. He says: "They [the idealists] want to have the general without the particular, mind without matter, force without substance, science without experience or material, the absolute without the relative" (*Das Wesen der menschlichen Kopfarbeit*, 1903, S. 108). Thus the endeavour to divorce motion from matter, force from substance, Dietzgen associates with idealism, ranking it with the endeavour to divorce thought from the brain. "Liebig," Dietzgen continues, "who is especially fond of straying from his inductive science into the field of speculation, says in the spirit of idealism: 'force cannot be seen'" (109). "The spiritualist or the idealist *believes* in the spiritual, i.e., ghost-like and inexplicable, nature of force" (110). "The antithesis between force and matter is as old as the antithesis between idealism and materialism" (111). "Of course, there is no force without matter, no matter without force; forceless matter and matterless force are absurdities. If idealist natural scientists believe in the immaterial existence of forces, then on this point they are not natural scientists ... but seers of ghosts" (114).

Thus we see that scientists who were prepared to assume that motion is conceivable without matter were to be encountered forty years ago too, and that "on this point" Dietzgen declared them to be seers of ghosts. What, then, is the connection between philosophical idealism and the divorce of matter from motion, the separation of substance from force? Is it not "more economical", indeed, to conceive motion without matter?

Let us imagine a consistent idealist who holds, let us say, that the entire world is his sensation, his idea, etc. (if we take

"nobody's" sensation or idea, this changes only the variety of philosophical idealism but not its essence). The idealist would not even think of denying that the world is motion, i.e., the motion of his thoughts, ideas, sensations. The question as to *what* moves, the idealist will reject and regard as absurd: what is taking place is a change of his sensations, ideas come and go, and nothing more. Outside him there is nothing. "It moves"—and that is all. It is impossible to conceive a more "economical" way of thinking. And no proofs, syllogisms, or definitions are capable of refuting the solipsist if he consistently adheres to his view.

The fundamental distinction between the materialist and the adherent of idealist philosophy consists in the fact that the materialist regards sensation, perception, idea, and the mind of man generally, as an image of objective reality. The world is the movement of this objective reality reflected by our consciousness. To the movement of ideas, perceptions, etc., there corresponds the movement of matter outside me. The concept matter expresses nothing more than the objective reality which is given us in sensation. Therefore, to divorce motion from matter is equivalent to divorcing thought from objective reality, or to divorcing my sensations from the external world—in a word, it is to go over to idealism. The trick which is usually performed in denying matter, in assuming motion without matter, consists in ignoring the relation of matter to thought. The question is presented as though this relation did not exist, but in reality it is introduced surreptitiously; at the beginning of the argument it remains unexpressed, but subsequently crops up more or less imperceptibly.

Matter has disappeared, they tell us, wishing from this to draw epistemological conclusions. But has thought remained?—we ask. If not, if with the disappearance of matter thought has also disappeared, if with the disappearance of the brain and nervous system ideas and sensations, too, have disappeared—then it follows that everything has disappeared, and your argument as a sample of "thought" (or lack of thought) has disappeared. But if thought has remained—if it is assumed that with the disappearance of matter, thought (idea, sensation, etc.) does not disappear, then you have

surreptitiously gone over to the standpoint of philosophical idealism. And this always happens with people who wish, for the sake of "economy", to conceive of motion without matter, for *tacitly*, by the very fact that they continue their argument, they are acknowledging the existence of thought *after* the disappearance of matter. This means that a very simple, or a very complex philosophical idealism is taken as a basis; a very simple one, if it is a case of frank solipsism (*I* exist, and the world is only *my* sensation); a very complex one, if instead of the thought, ideas and sensations of a living person, a dead abstraction is taken, that is, nobody's thought, nobody's idea, nobody's sensation, but thought in general (the Absolute Idea, the Universal Will, etc.), sensation as an indeterminate "element", the "psychical", which is substituted for the whole of physical nature, etc., etc. Thousands of shades of varieties of philosophical idealism are possible and it is always possible to create a thousand and first shade; and to the author of this thousand and first little system (empirio-monism, for example) what distinguishes it from the rest may appear important. From the standpoint of materialism, however, these distinctions are absolutely unessential. What is essential is the point of departure. What is essential is that the attempt to *think* of motion without matter smuggles in *thought* divorced from matter—and that is philosophical idealism.

Therefore, for example, the English Machist Karl Pearson, the clearest and most consistent of the Machists, who is averse to verbal artifices, directly begins the seventh chapter of his book, devoted to "matter", with a section having the characteristic heading "*All things move—but only in conception*". "It is therefore, for the sphere of perception, idle to ask what moves and why it moves" (*The Grammar of Science*, p. 243).

Therefore, too, in the case of Bogdanov, his philosophical misadventures in fact began before his acquaintance with Mach. They began from the moment he put his trust in the assertion of the eminent chemist, but poor philosopher, Ostwald, that motion can be thought of without matter. It is all the more fitting to dwell on this long-past episode in Bogdanov's philosophical development since it is impossible when speaking of the connection between philosophical

idealism and certain trends in the new physics to ignore Ostwald's "energetics".

"We have already said," wrote Bogdanov in 1899, "that the nineteenth century did not succeed in definitively ridding itself of the problem of 'the immutable essence of things'. This essence, under the name of 'matter', holds an important place even in the world outlook of the foremost thinkers of the century" (*Fundamental Elements of the Historical Outlook on Nature*, p. 38).

We said that this is a muddle. The recognition of the objective reality of the outer world, the recognition of the existence outside our mind of eternally moving and eternally changing matter, is here confused with the recognition of the immutable essence of things. It is hardly possible that Bogdanov in 1899 did not rank Marx and Engels among the "foremost thinkers". But he obviously did not understand dialectical materialism.

"...In the processes of nature two aspects are usually still distinguished: matter and its motion. It cannot be said that the concept matter is distinguished by great clarity. It is not easy to give a satisfactory answer to the question — what is matter? It is defined as the 'cause of sensations' or as the 'permanent possibility of sensation'; but it is evident that matter is here confused with motion...."

It is evident that Bogdanov is arguing incorrectly. Not only does he confuse the materialist recognition of an objective source of sensation (unclearly formulated in the words "cause of sensations") with Mill's agnostic definition of matter as the permanent *possibility* of sensation, but the chief error here is that the author, having come within an ace of the question of the existence or non-existence of an objective source of sensations, abandons this question halfway and jumps to another question, that of the existence or non-existence of matter without motion. The idealist may regard the world as the *movement* of our sensations (even though "socially organised" and "harmonised" to the highest degree); the materialist regards the world as the movement of an objective source, of an objective model of our sensations. The metaphysical, i.e., anti-dialectical, materialist may accept the existence of matter without motion (even though temporarily, before "the first

impulse", etc.). The dialectical materialist not only regards motion as an inseparable property of matter, but also rejects the simplified view of motion and so forth.

"...The most exact definition would, perhaps, be the following: 'matter is what moves'; but this is as devoid of content as though one were to say that matter is the subject of a sentence, the predicate of which is 'moves'. The fact, most likely, is that in the epoch of statics men were wont to see something necessarily solid in the role of the subject, an 'object', and such an inconvenient thing for statical thought as 'motion' they were prepared to tolerate only as a predicate, as one of the attributes of 'matter'."

This is something like the charge Akimov brought against the Iskristis, namely, that their programme did not contain the world proletariat in the nominative case! ¹³⁷ Whether we say the world is moving matter, or that the world is material motion, makes no difference whatever.

"...But energy must have a vehicle—say those who believe in matter. Why?—asks Ostwald, and with reason. Must nature necessarily consist of subject and predicate?" (P. 39.)

Ostwald's answer, which so pleased Bogdanov in 1899, is plain sophistry. Must our judgements necessarily consist of electrons and ether?—one might retort to Ostwald. As a matter of fact, the mental elimination from "nature" of matter as the "subject" only implies the tacit admission into *philosophy* of *thought* as the "subject" (i.e., as the primary, the starting-point, independent of matter). Not the subject, but the objective source of sensation is eliminated, and *sensation* becomes the "subject", i.e., philosophy becomes Berkeleian, no matter in what trappings the word "sensation" is afterwards decked. Ostwald endeavoured to avoid this inevitable philosophical alternative (materialism or idealism) by an indefinite use of the word "energy", but this very endeavour only once again goes to prove the futility of such artifices. If energy is motion, you have only shifted the difficulty from the subject to the predicate, you have only changed the question, does matter move? into the question, is energy material? Does the transformation of energy take place outside my mind, independently of man and mankind, or are these only ideas, symbols, conventional signs, and so forth? And this question

proved fatal to the "energeticist" philosophy, that attempt to disguise old epistemological errors by a "new" terminology.

Here are examples of how the energeticist Ostwald got into a muddle. In the preface to his *Lectures on Natural Philosophy** he declares that he regards "as a great gain the simple and natural removal of the old difficulties in the way of uniting the concepts matter and mind by subordinating both to the concept energy". This is not a gain, but a loss, because the question whether epistemological investigation (Ostwald does not clearly realise that he is raising an epistemological and not a chemical issue!) is to be conducted along materialist or idealist lines is not being solved but is being confused by an arbitrary use of the term "energy". Of course, if we "subordinate" both matter and mind to this concept, the *verbal* annihilation of the antithesis is beyond question, but the absurdity of the belief in sprites and hobgoblins, for instance, is not removed by calling it "energetics". On page 394 of Ostwald's *Lectures* we read: "That all external events may be presented as processes between energies can be most simply explained if our mental processes are themselves energetic and impose (*aufprägen*) this property of theirs on all external phenomena." This is pure idealism: it is not our thought that reflects the transformation of energy in the external world, but the external world that reflects a "property" of our mind! The American philosopher Hibben, pointing to this and similar passages in Ostwald's *Lectures*, aptly says that Ostwald here "appears in a Kantian disguise": the explicability of the phenomena of the external world is deduced from the properties of our mind!** "It is obvious therefore," says Hibben, "that if the primary concept of energy is so defined as to embrace psychical phenomena, we have no longer the simple concept of energy as understood and recognised in scientific circles or even among the *Energetiker* themselves...." The transformation of energy is regarded by science as an objective process independent of the minds of men and of the experience of mankind, that is to say, it is regarded materialistically. And by energy, Ostwald himself

* Wilhelm Ostwald, *Vorlesungen über Naturphilosophie*, 2. Aufl., Leipzig, 1902, S. viii.

** J. G. Hibben, "The Theory of Energetics and its Philosophical Bearings", *The Monist*, Vol. XIII, No. 3, April 1903, pp. 329-30.

in many instances, probably in the vast majority of instances, means *material* motion.

And this accounts for the remarkable phenomenon that Bogdanov, a disciple of Ostwald, having become a disciple of Mach, began to reproach Ostwald not because he does not adhere consistently to a materialistic view of energy, but because he admits the materialistic view of energy (and at times even takes it as his basis). The materialists criticise Ostwald because he lapses into idealism, because he attempts to reconcile materialism and idealism. Bogdanov criticises Ostwald from the *idealist* standpoint. In 1906 he wrote: "...Ostwald's energetics, hostile to atomism but for the rest closely akin to the old materialism, enlisted my warmest sympathy. I soon noticed, however, an important contradiction in his natural philosophy: although he frequently emphasises the *purely methodological* significance of the concept 'energy', in a great number of instances he himself fails to adhere to it. He every now and again converts 'energy' from a pure symbol of correlations between the facts of experience into the *substance* of experience, into the 'world stuff'" (*Empirio-monism*, Bk. III, pp. xvi-xvii).

Energy is a pure symbol! After this Bogdanov may dispute as much as he pleases with the "empirio-symbolist" Yushkevich, with the "pure Machists", the empirio-criticists, etc.—from the standpoint of the materialist it is a dispute between a man who believes in a yellow devil and a man who believes in a green devil. For the important thing is not the differences between Bogdanov and the other Machists, but what they have in common: the *idealist* interpretation of "experience" and "energy", the denial of objective reality, adaptation to which constitutes human experience and the copying of which constitutes the only scientific "methodology" and scientific "energetics".

"It [Ostwald's energetics] is indifferent to the material of the world, it is fully compatible with both the old materialism and panpsychism" (i.e., philosophical idealism?) (p. xvii). And Bogdanov departed from muddled energetics *not* by the materialist road *but by the idealist* road.... "When energy is represented as substance it is nothing but the old materialism minus the absolute atoms—materialism with a correction in

the sense of the *continuity* of the existing" (ibid.). Yes, Bogdanov left the "old" materialism, i.e., the metaphysical materialism of the natural scientists, not for *dialectical* materialism, which he understood as little in 1906 as he did in 1899, but for idealism and fideism; for no educated representative of modern fideism, no immanentist, no "neo-criticist", and so forth, will object to the "methodological" conception of energy, to its interpretation as a "pure symbol of correlation of the facts of experience". Take Paul Carus, with whose mental make-up we have already become sufficiently acquainted, and you will find that this Machist criticises Ostwald *in the very same way as Bogdanov*: "...Materialism and energetics," writes Carus, "are exactly in the same predicament" (*The Monist*, Vol. XVII, 1907, No. 4, p. 536). "We are very little helped by materialism when we are told that everything is matter, that bodies are matter, and that thoughts are merely a function of matter, and Professor Ostwald's energetics is not a whit better when it tells us that matter is energy, and that the soul too is only a factor of energy" (533).

Ostwald's energetics is a good example of how quickly a "new" terminology becomes fashionable, and how quickly it turns out that a somewhat altered mode of expression can in no way eliminate fundamental philosophical questions and fundamental philosophical trends. Both materialism and idealism can be expressed in terms of "energetics" (more or less consistently, of course) just as they can be expressed in terms of "experience", and the like. Energeticist physics is a source of new idealist attempts to conceive motion without matter—because of the disintegration of particles of matter which hitherto had been accounted non-disintegrable and because of the discovery of hitherto unknown forms of material motion.

The Essence and Significance of "Physical" Idealism

We have seen that the question of the epistemological deductions that can be drawn from the new physics has been raised and is being discussed from the most varied points of view in English, German and French literature. There can be

no doubt that we have before us a certain international ideological current, which is not dependent upon any one philosophical system, but which is the result of certain general causes lying outside the sphere of philosophy. The foregoing review of the facts undoubtedly shows that Machism is "connected" with the new physics, but at the same time reveals that the idea of this connection spread by our Machists is *fundamentally incorrect*. As in philosophy, so in physics, our Machists slavishly follow the *fashion*, and are unable from their own, Marxist, standpoint to give a general survey of particular currents and to judge the place they occupy.

A double falsity pervades all the talk about Mach's philosophy being "the philosophy of twentieth-century natural science", "the recent philosophy of the sciences", "recent natural-scientific positivism" and so forth. (Bogdanov in the introduction to *Analysis of Sensations*, pp. iv, xii; cf. also Yushkevich, Valentinov and Co.) Firstly, Machism is ideologically connected with only *one* school in *one* branch of modern natural science. Secondly, and *this is the main point*, what in Machism is connected with this school is *not what distinguishes it from all other trends and systems of idealist philosophy, but what it has in common with philosophical idealism in general*. It suffices to cast a glance at the entire ideological current in question *as a whole* in order to leave no shadow of doubt as to the truth of this statement. Take the physicists of this school: the German Mach, the Frenchman Henri Poincaré, the Belgian Pierre Duhem, the Englishman Karl Pearson. They have much in common: they have the same basis and are following the same direction, as each of them rightly acknowledges. But what they have in common includes neither the doctrine of empirio-criticism in general, nor Mach's doctrine, say, of the "world-elements" in particular. The three latter physicists even know nothing of either of these doctrines. They have "only" one thing in common — philosophical idealism, towards which they all, without exception, *tend* more or less consciously, more or less decisively. Take the philosophers who base themselves on *this school* of the new physics, who try to give it an epistemological basis and to develop it, and you will again find the German immanentists, the disciples of Mach, the French neo-criticists and idealists, the English spiritualists, the Russian

Lopatin and, in addition, the one and only empirio-monist, A. Bogdanov. They all have only one thing in common, namely, that they all—more or less consciously, more or less decisively, with an abrupt and precipitate slant towards fideism or with a personal aversion to it (Bogdanov)—are vehicles of philosophical idealism.

The fundamental idea of the school of the new physics under discussion is denial of the objective reality given us in sensation and reflected in our theories, doubt as to the existence of such a reality. Here this school departs from *materialism* (inaccurately called realism, neo-mechanism, hylokinetism, and not in any appreciable degree consciously developed by the physicists themselves), which by *general acknowledgement* prevails among the physicists—and departs from it as a school of “physical” idealism.

To explain this last term, which sounds very strange, it is necessary to recall an episode in the history of modern philosophy and modern science. In 1866 L. Feuerbach attacked Johannes Müller, the famous founder of modern physiology, and ranked him with the “physiological idealists” (*Werke*, Bd. X, S. 197). The idealism of this physiologist consisted in the fact that when investigating the significance of the mechanism of our sense-organs in relation to sensations, showing, for instance, that the sensation of light is produced as the result of the action of various stimuli on the eye, he was inclined to arrive from this at a denial that our sensations are images of objective reality. This tendency of one school of scientists towards “physiological idealism”, i.e., towards an idealist interpretation of certain data of physiology, was very accurately discerned by L. Feuerbach. The “connection” between physiology and philosophical idealism, chiefly of the Kantian kind, was for a long time after that exploited by reactionary philosophy. F. A. Lange made great play with physiology in support of Kantian idealism and in refutation of materialism; while among the immanentists (whom Bogdanov so incorrectly places midway between Mach and Kant), J. Rehmke in 1882 specially campaigned against the alleged confirmation of Kantianism by physiology.* That a number of

* Johannes Rehmke, *Philosophie und Kantianismus*, Eisenach, 1882, S. 15, et seq.

eminent physiologists at that time *gravitated* towards idealism and Kantianism is as indisputable as that today a number of eminent physicists *gravitate* towards philosophical idealism. "Physical" idealism, i.e., the idealism of a certain school of physicists at the end of the nineteenth century and the beginning of the twentieth century, no more "refutes" materialism, no more establishes the connection between idealism (or empirio-criticism) and natural science, that did the similar efforts of F. A. Lange and the "physiological" idealists. The deviation towards reactionary philosophy manifested in both cases by one school of natural scientists in one branch of natural science is a temporary deflection, a transitory period of sickness in the history of science, an ailment of growth, mainly caused by the *abrupt break-down* of old established concepts.

The connection between modern "physical" idealism and the crisis of modern physics is, as we have already pointed out, generally acknowledged. "The arguments of sceptical criticism levelled against modern physics"—writes A. Rey, who is referring not so much to the sceptics as to the outspoken adherents of fideism, like Brunetière — "essentially amount to the proverbial argument of all sceptics: the diversity of opinions" (among physicists). But this diversity "cannot be any proof against the objectivity of physics". "In the history of physics, as in history generally, one can distinguish great periods which differ by the form and general aspect of theories.... But as soon as a discovery is made that affects all fields of physics because it establishes some cardinal fact hitherto badly or very partially perceived, the entire aspect of physics is modified; a new period begins. This is what occurred after Newton's discoveries, and after the discoveries of Joule-Mayer and Carnot-Clausius. The same thing, apparently, is taking place since the discovery of radioactivity.... The historian who later sees things from the necessary distance has no difficulty in discerning a steady evolution where contemporaries saw conflicts, contradictions, and divisions into various schools. Apparently, the crisis which physics has undergone in recent years (despite the conclusions drawn from it by philosophical criticism) is no different. It even excellently illustrates the typical crisis of growth (*crise de croissance*)

occasioned by the great modern discoveries. The undeniable transformation of physics which will result (could there be evolution or progress without it?) will not perceptibly alter the scientific spirit" (op. cit., pp. 370-72).

Rey the conciliator tries to unite all schools of modern physics against fideism! This is a falsity, well meant, but a falsity nevertheless; for the deviation of the school of Mach-Poincaré-Pearson towards idealism (i.e., refined fideism) is beyond dispute. And the objectivity of physics that is associated with the basis of the "scientific spirit", as distinct from the fideist spirit, and that Rey defends so ardently, is nothing but a "shamefaced" formulation of materialism. The basic materialist spirit of physics, as of all modern science, will overcome all crises, but only by the indispensable replacement of metaphysical materialism by dialectical materialism.

Rey the conciliator very often tries to gloss over the fact that the crisis in modern physics consists in the latter's departure from a direct, resolute and irrevocable recognition of the objective value of its theories. But facts are stronger than all attempts at reconciliation. The mathematicians, writes Rey, "in dealing as a rule with a science, the subject-matter of which, apparently at least, is created by the mind of the scientist, and in which, at any rate, concrete phenomena are not involved in the investigation, have formed too abstract a conception of the science of physics. Attempts have been made to bring it ever closer to mathematics, and a general conception of mathematics has been transposed into a general conception of physics.... This is an invasion of the mathematical spirit into the methods of judging and understanding physics that is denounced by all the experimenters. And is it not to this influence, none the less powerful because at times concealed, that are often due the uncertainty, the wavering of mind regarding the objectivity of physics, and the detours made or the obstacles surmounted in order to demonstrate it?"... (227)

This is excellently said. "Wavering of mind" as to the objectivity of physics—this is the very essence of fashionable "physical" idealism.

"...The abstract fictions of mathematics seem to have interposed a screen between physical reality and the manner in which the mathematicians understand the science of this

reality. They vaguely feel the objectivity of physics.... Although they desire above all to be objective when they engage in physics; although they seek to find and retain a foothold in reality, they are still haunted by old habits. So that even in the concepts of energetics, which had to be built more solidly and with fewer hypotheses than the old mechanism — which sought to copy (*décalquer*) the sensible universe and not to reconstruct it — we are still dealing with the theories of the mathematicians.... They [the mathematicians] have done everything to save objectivity, for they are well aware that without it there can be no physics.... But the complexity or deviousness of their theories nevertheless leaves an uneasy feeling. It is too artificial, too far-fetched, too stilted (*édifié*); the experimenter here does not feel the spontaneous confidence which constant contact with physical reality gives him.... This in effect is what is said by all physicists who are primarily physicists or who are exclusively physicists — and their name is legion; this is what is said by the entire neo-mechanist school.... The crisis in physics lies in the conquest of the realm of physics by the mathematical spirit. The progress of physics on the one hand, and the progress of mathematics on the other, led in the nineteenth century to a close amalgamation between these two sciences.... Theoretical physics became mathematical physics.... Then there began the formal period, that is to say, the period of mathematical physics, purely mathematical; mathematical physics not as a branch of physics so to speak, but as a branch of mathematics cultivated by the mathematicians. In this new phase the mathematician, accustomed to conceptual (purely logical) elements, which furnish the sole subject-matter of his work, and feeling himself cramped by crude, material elements, which he found insufficiently pliable, necessarily always tended to reduce them to abstractions as far as possible, to present them in an entirely non-material and conceptual manner, or even to ignore them altogether. The elements, as real, objective data, as *physical* elements, that is to say, completely disappeared. There remained only formal relations represented by differential equations.... If the mathematician is not the dupe of his constructive work, when he analyses theoretical physics ... he can recover its ties with experience and its objective value, but at a first glance, and to the

uninitiated person, we seem faced with an arbitrary development.... The concept, the notion, has everywhere replaced the real element... Thus, historically, by virtue of the mathematical form assumed by theoretical physics, is explained ... the ailment (*le malaise*), the crisis of physics, and its apparent withdrawal from objective facts" (228-32).

Such is the first cause of "physical" idealism. The reactionary attempts are engendered by the very progress of science. The great successes achieved by natural science, the approach to elements of matter so homogeneous and simple that their laws of motion can be treated mathematically, caused the mathematicians to overlook matter. "Matter disappears", only equations remain. At a new stage of development and apparently in a new manner, we get the old Kantian idea: reason prescribes laws to nature. Hermann Cohen, who, as we have seen, rejoices over the idealist spirit of the new physics, goes so far as to advocate the introduction of higher mathematics in the schools—in order to imbue high-school students with the spirit of idealism, which is being driven out by our materialistic age (F. A. Lange, *Geschichte des Materialismus*, 5. Auflage, 1896, Bd. II, S. xlix). This, of course, is the ridiculous dream of a reactionary and, in fact, there is and can be nothing here but a temporary infatuation with idealism on the part of a small number of specialists. But what is highly characteristic is the way the drowning man clutches at a straw, the subtle means whereby representatives of the educated bourgeoisie artificially attempt to preserve, or to find a place for, the fideism which is engendered among the masses of the people by their ignorance and their downtrodden condition, and by the senseless barbarity of capitalist contradictions.

The other cause which gave rise to "physical" idealism is the principle of *relativism*, the relativity of our knowledge, a principle which, in a period of abrupt break-down of the old theories, is taking a firm hold upon the physicists, and which, *if the latter are ignorant of dialectics*, inevitably leads to idealism.

This question of the relation between relativism and dialectics plays perhaps the most important part in explaining the theoretical misadventures of Machism. Take Rey, for instance, who like all European positivists has no conception whatever of Marxian dialectics. He employs the word

dialectics exclusively in the sense of idealist philosophical speculation. As a result, although he feels that the new physics has gone astray on the question of relativism, he nevertheless flounders helplessly and attempts to differentiate between moderate and immoderate relativism. Of course, "immoderate relativism logically, if not in practice, borders on actual scepticism" (215), but there is none of this "immoderate" relativism, you see, in Poincaré. Just fancy, one can, like an apothecary, weigh out a little more or a little less relativism and thus save Machism!

As a matter of fact, the only theoretically correct formulation of the question of relativism is given in the dialectical materialism of Marx and Engels, and ignorance of it is *bound* to lead from relativism to philosophical idealism. Incidentally, the failure to understand this fact is enough by itself to render Mr. Berman's absurd book, *Dialectics in the Light of the Modern Theory of Knowledge*, utterly valueless. Mr. Berman repeats the old, old nonsense about dialectics, which he has entirely failed to understand. We have already seen that in the theory of knowledge *all* the Machists, *at every step*, reveal a similar lack of understanding.

All the old truths of physics, including those which were regarded as firmly established and incontestable, prove to be relative truths—*hence*, there can be no objective truth independent of mankind. Such is the argument not only of all the Machists, but of the "physical" idealists in general. That absolute truth results from the sum-total of relative truths in the course of their development; that relative truths represent relatively faithful reflections of an object independent of mankind; that these reflections become more and more faithful; that every scientific truth, notwithstanding its relative nature, contains an element of absolute truth—all these propositions, which are obvious to anyone who has thought over Engels' *Anti-Dühring*, are for the "modern" theory of knowledge a book with seven seals.

Such works as Duhem's *Theory of Physics*,* or Stallo's *The Concepts and Theories of Modern Physics*,** which Mach particu-

* P. Duhem, *La théorie physique, son objet et sa structure*, Paris, 1906.

** J. B. Stallo, *The Concepts and Theories of Modern Physics*, London, 1882. There are French and German translations.

larly recommends, show very clearly that these "physical" idealists attach the most significance to the proof of the relativity of our knowledge, and that they are in reality vacillating between idealism and dialectical materialism. Both authors, who belong to different periods and who approach the question from different angles (Duhem's speciality is physics, in which field he has worked for twenty years; Stallo is a former orthodox Hegelian who grew ashamed of his book on the philosophy of nature in the old Hegelian spirit, published in 1848), most energetically combat the atomistic-mechanical conception of nature. They show the narrowness of this conception, the impossibility of accepting it as the limit of our knowledge, the rigidity of many of the ideas of writers who hold this conception. And it is indeed undeniable that the *old* materialism did suffer from such a defect; Engels reproached the earlier materialists for their failure to appreciate the relativity of all scientific theories, for their ignorance of dialectics and for their exaggeration of the mechanical point of view. But Engels (unlike Stallo) was able to discard Hegelian idealism *and to grasp* the great and true kernel of Hegelian dialectics. Engels rejected the old metaphysical materialism for *dialectical* materialism, and not for relativism that sinks into subjectivism. "The mechanical theory," says Stallo, for instance, "in common with all metaphysical theories, hypostasises partial, ideal, and, it may be, purely conventional groups of attributes, or single attributes, and treats them as varieties of objective reality" (p. 150). This is true if you do not deny objective reality and combat metaphysics for being anti-dialectical. Stallo does not realise this clearly. He has not understood materialist dialectics and therefore frequently slips, by way of relativism, into subjectivism and idealism.

The same is true of Duhem. With an enormous expenditure of labour, and with the help of a number of interesting and valuable examples from the history of physics, such as one frequently encounters in Mach, he shows that "every law of physics is provisional and relative, because it is approximate" (280). The man is hammering at an open door! — will be the thought of the Marxist when he reads the lengthy disquisitions on this subject. But that is just the trouble with Duhem, Stallo, Mach and Poincaré, that they do not perceive the door opened

by dialectical materialism. Being unable to give a correct formulation of relativism, they slide from the latter into idealism. "A law of physics, properly speaking, is neither true nor false, but approximate" — writes Duhem (p. 274). And this "but" contains the beginning of the falsity, the beginning of the obliteration of the boundary between a scientific theory that approximately *reflects the object*, i.e., approaches objective truth, and an arbitrary, fantastic, purely conventional theory, such as, for example, a religious theory or the theory of the game of chess.

Duhem carries this falsity to the point of declaring that the question whether "material reality" corresponds to perceptual phenomena is *metaphysics* (p. 10). Away with the question of reality! Our concepts and hypotheses are mere signs (p. 26), "arbitrary" (27) constructions, and so forth. There is only one step from this to idealism, to the "physics of the believer", which too M. Pierre Duhem preaches in the Kantian spirit (Rey, p. 162; cf. p. 160). But the good Adler (Fritz) — also a Machist would-be Marxist! — could find nothing cleverer to do than to "correct" Duhem as follows: Duhem, he claims, eliminates the "realities concealed behind phenomena only as objects of theory, but not as *objects of reality*".* This is the familiar criticism of Kantianism from the standpoint of Hume and Berkeley.

But, of course, there can be no question of any conscious Kantianism on the part of Duhem. He is merely *vacillating*, as is Mach, not knowing on what to base his relativism. In many passages he comes very close to dialectical materialism. He says that we know sound "such as it is in relation to us but not as it is in itself, in the sound-producing bodies. This reality, of which our sensations give us only the external and the veil, is made known to us by the theories of acoustics. They tell us that where our perceptions register only this appearance which we call sound, there really exists a very small and very rapid periodic movement," etc. (p. 7). Bodies are not symbols of sensations, but sensations are symbols (or rather, images) of bodies. "The development of physics gives rise to a constant

* Translator's note to the German translation of Duhem, Leipzig, 1903, J. Barth.

struggle between nature, which does not tire of offering new material, and reason, which does not tire of cognising" (p. 32). Nature is infinite, just as its smallest particle (including the electron) is infinite, but reason just as infinitely transforms "things-in-themselves" into "things-for-us". "Thus, the struggle between reality and the laws of physics will continue indefinitely; to every law that physics may formulate, reality will sooner or later oppose a rude refutation in the form of a fact; but, indefatigable, physics will improve, modify, and complicate the refuted law" (290). This would be a quite correct exposition of dialectical materialism if the author firmly held to the existence of this objective reality independent of mankind. "...The theory of physics is not a purely artificial system which is convenient today and unsuitable tomorrow ... it is a classification, which becomes more and more natural, a reflection, which grows clearer and clearer, of the realities that the experimental method cannot contemplate face to face" (p. 445).

In this last phrase the Machist Duhem flirts with Kantian idealism: it is as if the way is being opened for a method other than the "experimental" one, and as if we cannot know the "things-in-themselves" directly, immediately, face to face. But if the theory of physics becomes more and more natural, that means that "nature", reality, "reflected" by this theory, exists independently of our consciousness — and that is precisely the view of dialectical materialism.

In short, the "physical" idealism of today, exactly like the "physiological" idealism of yesterday, merely signifies that one school of natural scientists in one branch of natural science has slid into a reactionary philosophy, being unable to rise directly and at once from metaphysical materialism to dialectical materialism.* This step is being made, and will be made, by

* The famous chemist, William Ramsay, says: "I have been frequently asked: 'But is not electricity a vibration? How can wireless telegraphy be explained by the passage of little particles or corpuscles?' The answer is: 'Electricity is a *thing*; it is [Ramsay's italics] these minute corpuscles, but when they leave an object, a wave, like a wave of light, spreads through the ether, and this wave is used for wireless telegraph'" (William Ramsay, *Essays, Biographical and Chemical*, London, 1908, p. 126). Having spoken about the transformation of radium into helium, Ramsay remarks: "At least one so-called element can no longer be regarded as ultimate matter, but is itself

modern physics; but it is advancing towards the only true method and the only true philosophy of natural science not directly, but by zigzags, not consciously, but instinctively, not clearly perceiving its "final goal", but drawing closer to it gropingly, unsteadily, and sometimes even with its back turned to it. Modern physics is in travail; it is giving birth to dialectical materialism. The process of child-birth is painful. And in addition to a living healthy being, there are bound to be produced certain dead products, refuse fit only for the garbage-heap. And the entire school of physical idealism, the entire empirio-critical philosophy, together with empirio-symbolism, empirio-monism, and so on, and so forth, must be regarded as such refuse!

undergoing change into a simpler form of matter" (p. 160). "Now it is almost certain that negative electricity is a particular form of matter; and positive electricity is matter deprived of negative electricity—that is, minus this electric matter" (176). "Now what is electricity? It used to be believed, formerly, that there were two kinds of electricity, one called positive and the other negative. At that time it would not have been possible to answer the question. But recent researches make it probable that what used to be called negative electricity is really a substance. Indeed, the relative weight of its particles has been measured; each is about one seven-hundredth of the mass of an atom of hydrogen.... Atoms of electricity are named 'electrons' " (196). If our Machists who write books and articles on philosophical subjects were capable of thinking, they would understand that the expression "matter disappears", "matter is reduced to electricity", etc., is only an epistemologically helpless expression of the truth that science is able to discover new forms of matter, new forms of material motion, to reduce the old forms to the new forms, and so on.

From Empirio-criticism and Historical Materialism

Parties in Philosophy and Philosophical Blockheads

It remains for us to examine the relation between Machism and religion. But this broadens into the question of whether, in general, there are parties in philosophy, and what is meant by non-partisanship in philosophy.

Throughout the preceding exposition, in connection with every problem of epistemology touched upon and in connection with every philosophical question raised by the new physics, we traced the struggle between *materialism* and *idealism*. Behind the mass of new terminological artifices, behind the clutter of erudite scholasticism, we invariably discerned *two* principal alignments, two fundamental trends in the solution of philosophical problems. Whether nature, matter, the physical, the external world should be taken as primary, and consciousness, mind, sensation (experience—as the *widespread* terminology of our time has it), the psychical, etc., should be regarded as secondary—that is the root question which *in fact* continues to divide the philosophers into *two great camps*. The source of thousands upon thousands of errors and of the confusion reigning in this sphere is the fact that beneath the covering of terms, definitions, scholastic devices and verbal artifices, these two fundamental trends are *overlooked*. (Bogdanov, for instance, refuses to acknowledge his idealism, because, you see, instead of the “metaphysical” concepts “nature” and “mind”, he has taken the “experiential”: physical and psychical. A word has been changed!)

The genius of Marx and Engels lies precisely in the fact that during a very long period, *nearly half a century*, they developed materialism, further advanced one fundamental trend in

philosophy, did not rest content with repeating epistemological problems that had already been solved, but consistently applied—and showed *how* to apply—*this same* materialism in the sphere of the social sciences, mercilessly brushing aside as rubbish all nonsense, pretentious hotchpotch, the innumerable attempts to “discover” a “new” line in philosophy, to invent a “new” trend and so forth. The verbal nature of such attempts, the scholastic play with new philosophical “isms”, the clogging of the issue by pretentious devices, the inability to comprehend and clearly present the struggle between the two fundamental epistemological trends—this is what Marx and Engels persistently tracked down and fought against throughout their activity.

We said, “nearly half a century”. And, indeed, as far back as 1843, when Marx was only becoming Marx, i.e., the founder of socialism as a science, the founder of *modern materialism*, which is immeasurably richer in content and incomparably more consistent than all preceding forms of materialism—even at that time Marx pointed out with amazing clarity the basic trends in philosophy. Karl Grün quotes a letter from Marx to Feuerbach dated October 20, 1843, in which Marx invites Feuerbach to write an article for the *Deutsch-Französische Jahrbücher*³⁸ against Schelling. This Schelling, writes Marx, is a shallow braggart with his claims to having embraced and transcended all previous philosophical trends. “To the French romanticists and mystics he [Schelling] says: I am the union of philosophy and theology; to the French materialists: I am the union of the flesh and the idea; to the French sceptics: I am the destroyer of dogmatism.” * That the “sceptics”, be they called Humeans or Kantians (or, in the twentieth century, Machists), cry out against the “dogmatism” of both materialism and idealism, Marx at that time already saw; and, without letting himself be diverted by any one of a thousand wretched little philosophical systems, he was able through Feuerbach to take directly the materialist road against idealism. Thirty years later, in the afterword to the second edition of the first volume of *Capital*, Marx just as clearly and definitely contrasted *his materialism* to

* Karl Grün, *Ludwig Feuerbach in seinem Briefwechsel und Nachlass, sowie in seiner philosophischen Charakterentwicklung*, I. Bd., Leipzig, 1874, S. 361.

Hegel's *idealism*, i.e., the most consistent and most developed idealism; he contemptuously brushed Comtean "positivism" aside and dubbed as wretched epigoni the contemporary philosophers who imagined that they had destroyed Hegel when in reality they had reverted to a repetition of the pre-Hegelian errors of Kant and Hume. In the letter to Kugelmann of June 27, 1870, Marx refers just as contemptuously to "Büchner, Lange, Dühring, Fechner, etc.", because they were incapable of understanding Hegel's dialectics and treated him with scorn.* And finally, take the various philosophical utterances by Marx in *Capital* and other works, and you will find an *invariable* basic motif: insistence upon *materialism* and contemptuous derision of all obscurity, of all confusion and all deviations towards *idealism*. All Marx's philosophical utterances revolve within these two fundamental opposites, and from the standpoint of professorial philosophy, their defect lies in this "narrowness" and "one-sidedness". In reality, this refusal to recognise the hybrid projects for reconciling materialism and idealism constitutes the great merit of Marx, who moved *forward* along a sharply-defined philosophical road.

Entirely in the spirit of Marx, and in close collaboration with him, Engels in all his philosophical works briefly and clearly contrasts the materialist and idealist lines in regard to *all* questions, without, either in 1878, or 1888, or 1892,¹⁴⁰ taking seriously the endless attempts to "transcend" the "one-sidedness" of materialism and idealism, to proclaim a *new* trend—some kind of "positivism", "realism", or other professorial charlatanism. Engels conducted his whole fight against Dühring *completely* under the watchword of consistent adherence to materialism, accusing the materialist Dühring of verbally confusing the issue, of phrase-mongering, of methods of reasoning which involved a concession to idealism and adoption of the position of idealism. Either materialism consistent to the end, or the falsehood and confusion of philosophical idealism—such is the formulation of the question

* Of the positivist Beesly, Marx, in a letter of December 13, 1870, speaks as follows: "Professor Beesly is a Comtist and as such obliged to think up all sorts of crotchets." Compare this with the opinion of the positivists *à la* Huxley given by Engels in 1892.¹³⁹

given in *every paragraph* of *Anti-Dühring*; and only people whose minds had already been corrupted by reactionary professorial philosophy could fail to notice it. And right until 1894, when the last preface was written to *Anti-Dühring*, revised and enlarged by the author for the last time, Engels continued to follow the latest developments both in philosophy and science, and continued with all his former resoluteness to hold to his lucid and firm position, brushing away the litter of new systems, big and little.

That Engels followed the new developments in philosophy is evident from *Ludwig Feuerbach*. In the 1888 preface, mention is even made of such a phenomenon as the rebirth of classical German philosophy in England and Scandinavia, whereas Engels (both in the preface and in the text of the book) has nothing but the most extreme contempt for the prevailing neo-Kantianism and Humism. It is quite obvious that Engels, observing the repetition by *fashionable* German and English philosophy of the old pre-Hegelian errors of Kantianism and Humism, was prepared to expect some good even *from the turn to Hegel* (in England and Scandinavia), hoping that the great idealist and dialectician would help to disclose petty idealist and metaphysical errors.

Without undertaking an examination of the vast number of shades of neo-Kantianism in Germany and of Humism in England, Engels *from the very outset* refutes their fundamental deviation from materialism. Engels declares that the *entire tendency* of these two schools is "*scientifically a step backward*". And what is his opinion of the undoubtedly "positivist", according to the current terminology, the undoubtedly "realist" tendency of these neo-Kantians and Humeans, among whose number, for instance, he could not help knowing Huxley? That "positivism" and that "realism" which attracted, and which continue to attract, an infinite number of muddleheads, Engels declared to be *at best a philistine method of smuggling in materialism* while publicly abusing and disavowing it¹⁴¹! It suffices to reflect only very little on *such an appraisal* of Thomas Huxley—a very great scientist and an incomparably more realistic realist and positive positivist than Mach, Avenarius and Co.—in order to understand how contemptuously Engels would have greeted the present infatuation of a

handful of Marxists with "recent positivism", or "recent realism", etc.

Marx and Engels were partisans in philosophy from start to finish, they were able to detect the deviations from materialism and concessions to idealism and fideism in every one of the "recent" trends. They therefore appraised Huxley *exclusively* from the standpoint of his materialist consistency. They therefore reproached Feuerbach for not pursuing materialism to the end, for renouncing materialism because of the errors of individual materialists, for combating religion in order to renovate it or invent a new religion, for being unable in sociology to rid himself of idealist phraseology and become a materialist.

And whatever particular mistakes he committed in his exposition of dialectical materialism, J. Dietzgen fully appreciated and took over this great and most precious tradition of his teachers. Dietzgen sinned much by his clumsy deviations from materialism, but he never attempted to dissociate himself from it in principle, he never attempted to raise a "new" banner and always at the decisive moment he firmly and categorically declared: I am a materialist; our philosophy is a materialist philosophy. "Of all parties," our Joseph Dietzgen justly said, "the middle party is the most repulsive.... Just as parties in politics are more and more becoming divided into two camps ... so science too is being divided into two general classes (*Generalklassen*): metaphysicians on the one hand, and physicists, or materialists, on the other.* The intermediate elements and conciliatory quacks, with their various appellations—spiritualists, sensationalists, realists, etc., etc.—fall into the current on their way. We aim at definiteness and clarity. The reactionaries who sound a retreat (*Retraitebläser*) call themselves idealists,** and materialists should be the name for all who are striving to liberate the human mind from the

* Here again we have a clumsy and inexact expression: instead of "metaphysicians", he should have said "idealists". Elsewhere Dietzgen himself contrasts the metaphysicians and the dialecticians.

** Note that Dietzgen has corrected himself and now explains *more exactly* which is the party of the enemies of materialism.

metaphysical spell.... If we compare the two parties respectively to solid and liquid, between them there is a mush." *

True! The "realists", etc., including the "positivists", the Machists, etc., are all a wretched mush; they are a contemptible *middle party* in philosophy, who confuse the materialist and idealist trends on every question. The attempt to escape from these two basic trends in philosophy is nothing but "conciliatory quackery".

J. Dietzgen had not the slightest doubt that the "scientific priestcraft" of idealist philosophy is simply the antechamber to open priestcraft. "Scientific priestcraft," he wrote, "is seriously endeavouring to assist religious priestcraft" (op. cit., 51). "In particular, the sphere of epistemology, the misunderstanding of the human mind, is such a louse-hole" (*Lausgrube*) in which both kinds of priests "lay their eggs". "Graduated flunkies", who with their talk of "ideal blessings" stultify the people by their tortuous (*geschraubte*) "idealism" (53)—that is J. Dietzgen's opinion of the professors of philosophy. "Just as the antipode of the good God is the devil, so the professorial priest (*Kathederpfaffen*) has his opposite pole in the materialist." The materialist theory of knowledge is "a universal weapon against religious belief" (55), and not only against the "notorious, formal and common religion of the priests, but also against the most refined, elevated professorial religion of muddled (*benebelte*) idealists" (58).

Dietzgen was ready to prefer "religious honesty" to the "half-heartedness" of free-thinking professors (60), for "there a system prevails", there we find integral people, people who do not separate theory from practice. For the Herr professors "philosophy is not a science, but a means of defence against Social-Democracy" (107). "Those who call themselves philosophers—professors and university lecturers—are, despite their apparent free-thinking, more or less immersed in superstition and mysticism ... and in relation to Social-Democracy constitute a single ... reactionary mass" (108). "Now, in order to follow the true path, without being led astray by all the religious and philosophical gibberish (*Welsch*), it is

* See the article. "Social-Democratic Philosophy", written in 1876, *Kleinere philosophische Schriften*, 1903, S. 135.

necessary to study the falsest of all false paths (*der Holzweg der Holzwege*), philosophy" (103).

Let us now examine Mach, Avenarius and their school from the standpoint of parties in philosophy. Oh, these gentlemen boast of their *non-partisanship*, and if they have an antipode, it is the *materialist* ... and *only* the materialist. A red thread that runs through *all* the writings of *all* the Machists is the stupid claim to have "risen above" materialism and idealism, to have transcended this "obsolete" antithesis; but *in fact* this whole fraternity is *continually* sliding into idealism and it conducts a steady and incessant struggle against materialism. The subtle epistemological crotchets of a man like Avenarius remain a professorial invention, an attempt to form a small philosophical sect "of his own"; but, *as a matter of fact*, in the general circumstances of the struggle of ideas and trends in modern society, the *objective* part played by these epistemological artifices is in every case the same, namely, to clear the way for idealism and fideism, and to serve them faithfully. In fact, it cannot be an accident that the English spiritualists, like Ward, the French neo-criticists, who praise Mach for his attack on materialism, and the German immanentists all fasten on the small school of empirio-criticists! Dietzgen's expression, "graduated flunkies of fideism", hits the nail on the head in the case of Mach, Avenarius and their whole school.*

* Here is another example of how the widespread currents of reactionary bourgeois philosophy make use of Machism in practice. Perhaps the "latest fashion" in the latest American philosophy is "pragmatism" (from the Greek word "pragma"—action; that is, a philosophy of action). The philosophical journals speak perhaps more of pragmatism than of anything else. Pragmatism ridicules the metaphysics both of materialism and idealism, acclaims experience and only experience, recognises practice as the only criterion, refers to the positivist movement in general, *especially turns for support to Ostwald, Mach, Pearson, Poincaré and Duhem*, for the belief that science is not an "absolute copy of reality" and ... successfully deduces from all this a God for practical purposes, and only for practical purposes, without any metaphysics, and without transcending the bounds of experience (cf. William James, *Pragmatism. A New Name for Some Old Ways of Thinking*, New York and London, 1907, pp. 57 and 106 especially). From the standpoint of materialism the difference between Machism and pragmatism is as insignificant and unimportant as the difference between empirio-criticism and empirio-monism. Compare, for example, Bogdanov's definition of truth with the pragmatist definition of truth, which is: "Truth for a pragmatist becomes a class-name for all sorts of definite working values in experience" (*ibid.*, p. 68).

It is the misfortune of the Russian Machists, who undertook to "reconcile" Machism and Marxism, that they trusted the reactionary professors of philosophy and as a result slipped down an inclined plane. The methods of operation employed in the various attempts to develop and supplement Marx were very naïve. They read Ostwald, believe Ostwald, paraphrase Ostwald and call it Marxism. They read Mach, believe Mach, paraphrase Mach and call it Marxism. They read Poincaré, believe Poincaré, paraphrase Poincaré and call it Marxism! *Not a single one* of these professors, who are capable of making very valuable contributions in the special fields of chemistry, history or physics, *can be trusted one iota* when it comes to philosophy. Why? For the same reason that *not a single* professor of political economy, who may be capable of very valuable contributions in the field of factual and specialised investigations, can be trusted *one iota* when it comes to the general theory of political economy. For in modern society the latter is as much a *partisan* science as is *epistemology*. Taken as a whole, the professors of economics are nothing but learned salesmen of the capitalist class, while the professors of philosophy are learned salesmen of the theologians.

The task of Marxists in both cases is to be able to master and refashion the achievements of these "salesmen" (for instance, you will not make the slightest progress in the investigation of new economic phenomena without making use of the works of these salesmen) and *to be able* to lop off their reactionary tendency, to pursue our *own* line and to combat the *whole line* of the forces and classes hostile to us. And this is just what our Machists were unable to do; they *slavishly* follow the lead of the reactionary professorial philosophy. "Perhaps we have gone astray, but we are seeking," wrote Lunacharsky in the name of the authors of the *Studies*. The trouble is that it is not *you* who are seeking, but *you who are being sought!* You do not go with your, i.e., Marxist (for you want to be Marxists), standpoint to every change in the bourgeois philosophical fashion; the fashion comes to you, foists upon you its new falsifications adapted to the idealist taste, one day *à la* Ostwald, the next day *à la* Mach, and the day after *à la* Poincaré. These silly "theoretical" devices ("energetics", "elements", "introjections", etc.) in which you so naïvely believe are confined to a

narrow and tiny school, while the ideological and *social tendency* of these devices is immediately seized upon by the Wards, the neo-criticists, the immanentists, the Lopatins and the pragmatists, and *serves their purposes*. The infatuation for empirio-criticism and "physical" idealism passes as rapidly as the infatuation for neo-Kantianism and "physiological" idealism; but fideism takes advantage of every such infatuation and modifies its devices in a thousand ways for the benefit of philosophical idealism.

The attitude towards religion and the attitude towards natural science excellently illustrate the *actual* class utilisation of empirio-criticism by bourgeois reactionaries.

Take the first question. Do you think it is an accident that in a collective work directed *against* the philosophy of Marxism Lunacharsky went so far as to speak of the "deification of the higher human potentialities", of "religious atheism", etc.?* If you do, it is only because the Russian Machists have not informed the public correctly regarding the *whole* Machist current in Europe and the attitude of this current to religion. Not only is this attitude in no way like that of Marx, Engels, J. Dietzgen and even Feuerbach, but it is the *very opposite*, beginning with Petzoldt's statement that empirio-criticism "contradicts neither theism nor atheism" (*Einführung in die Philosophie der reinen Erfahrung*, Bd. 1, S. 351) or Mach's declaration that "religious opinion is a private affair" (French translation, p. 434), and ending with the *explicit fideism*, the explicitly *arch-reactionary* views of Cornelius, who praises Mach and whom Mach praises, of Carus and of all the immanentists. The neutrality of a *philosopher* in this question is *in itself* servility to fideism, and Mach and Avenarius, because of the very premises of their epistemology, do not and cannot rise above neutrality.

Once you deny objective reality, given us in sensation, you have already lost every weapon against fideism, for you have

* *Studies*, pp. 157, 159. In *Zagranichnaya Gazeta*¹⁴² the same author speaks of "scientific socialism in its religious significance" (No. 3, p. 5) and in *Obrazovaniye*,¹⁴³ 1908, No. 1, p. 164, he explicitly says: "For a long time a new religion has been maturing within me."

slipped into agnosticism or subjectivism—and that is all that fideism requires. If the perceptual world is objective reality, then the door is closed to every other “reality” or quasi-reality (remember that Bazarov believed the “realism” of the immanentists, who declare God to be a “real concept”). If the world is matter in motion, matter can and must be infinitely studied in the infinitely complex and detailed manifestations and ramifications of *this* motion, the motion of *this* matter; but beyond it, beyond the “physical”, external world, with which everyone is familiar, there can be nothing. And the hostility to materialism and the torrents of slander against the materialists are all in the order of things in civilised and democratic Europe. All this is going on to this day. All this is being *concealed* from the public by the Russian Machists, who have *not once* attempted even simply to compare the attacks made on materialism by Mach, Avenarius, Petzoldt and Co., with the statements made *in favour of* materialism by Feuerbach, Marx, Engels and J. Dietzgen.

But this “concealment” of the attitude of Mach and Avenarius to fideism will not avail. The facts speak for themselves. No efforts can release these reactionary professors from the pillory in which they have been placed by the kisses of Ward, the neo-criticists, Schuppe, Schubert-Soldern, Leclair, the pragmatists, etc. And the influence of the persons mentioned, as philosophers and professors, the widespread extent of their ideas among the “educated”, i.e., the bourgeois, public and the special literature they have created are ten times wider and richer than the special little school of Mach and Avenarius. The little school serves those who require it, and it is exploited as it deserves to be exploited.

The shameful things to which Lunacharsky has stooped are not exceptional; they are the product of empirio-criticism, both Russian and German. They cannot be defended on the grounds of the “good intentions” of the author, or the “special meaning” of his words; if it were the direct and common, i.e., the directly fideist meaning, we should not stop to discuss matters with the author, for most likely not a single Marxist could be found in whose eyes such statements would *not* place Anatole Lunacharsky *exactly* in the same category as Peter Struve. If this is not the case (and it is not *yet* the case), it is

exclusively because we perceive the "special" meaning and are *fighting while there is still ground* for a fight on comradely lines. This is just the disgrace of Lunacharsky's statements—that he *could* combine them with his "good" intentions. This is just the evil of his "theory"—that it permits the use of *such* methods or of *such* conclusions for realising good intentions. This is just the trouble—that *at best* "good" intentions are the subjective affair of Tom, Dick or Harry, while the *social significance* of such statements is definite and indisputable, and no reservation or explanation can diminish it.

One must be blind not to see the ideological affinity between Lunacharsky's "deification of the higher human potentialities" and Bogdanov's "general substitution" of the psychical for all physical nature. This is one and the same thought; in the one case it is expressed principally from the aesthetic standpoint, and in the other from the epistemological standpoint. "Substitution", approaching the subject *tacitly* and from a different angle, *already deifies* the "higher human potentialities", by divorcing the "psychical" from man and by substituting an immensely extended, abstract, divinely-lifeless "psychical in general" for *all physical nature*. And what of Yushkevich's "Logos" introduced into the "irrational stream of experience"?

A single claw ensnared, and the bird is lost. And our Machists have all become ensnared in idealism, that is, in a diluted, subtle fideism; they became ensnared from the moment they took "sensation" not as an image of the external world but as a special "element". It is nobody's sensation, nobody's mind, nobody's spirit, nobody's will—this is what one inevitably comes to if one does not recognise the materialist theory that the human mind *reflects* an objectively real external world.

Written in February-October 1908

V. I. Lenin, *Collected Works*, Vol. 14, Moscow, 1962, pp. 22-53, 75-94, 98-147, 153-69, 175-93, 250-73, 302-13, 335-46

The Three Sources and Three Component Parts of Marxism¹⁴⁴

Throughout the civilised world the teachings of Marx evoke the utmost hostility and hatred of all bourgeois science (both official and liberal), which regards Marxism as a kind of "pernicious sect". And no other attitude is to be expected, for there can be no "impartial" social science in a society based on class struggle. In one way or another, *all* official and liberal science *defends* wage-slavery, whereas Marxism has declared relentless war on that slavery. To expect science to be impartial in a wage-slave society is as foolishly naïve as to expect impartiality from manufacturers on the question of whether workers' wages ought not to be increased by decreasing the profits of capital.

But this is not all. The history of philosophy and the history of social science show with perfect clarity that there is nothing resembling "sectarianism" in Marxism, in the sense of its being a hidebound, petrified doctrine, a doctrine which arose *away from* the high road of the development of world civilisation. On the contrary, the genius of Marx consists precisely in his having furnished answers to questions already raised by the foremost minds of mankind. His doctrine emerged as the direct and immediate *continuation* of the teachings of the greatest representatives of philosophy, political economy and socialism.

The Marxist doctrine is omnipotent because it is true. It is comprehensive and harmonious, and provides men with an integral world outlook irreconcilable with any form of superstition, reaction, or defence of bourgeois oppression. It is the legitimate successor to the best that man produced in the nineteenth century, as represented by German philosophy, English political economy and French socialism.

It is these three sources of Marxism, which are also its component parts that we shall outline in brief.

I

The philosophy of Marxism is *materialism*. Throughout the modern history of Europe, and especially at the end of the eighteenth century in France, where a resolute struggle was conducted against every kind of medieval rubbish, against serfdom in institutions and ideas, materialism has proved to be the only philosophy that is consistent, true to all the teachings of natural science and hostile to superstition, cant and so forth. The enemies of democracy have, therefore, always exerted all their efforts to "refute", undermine and defame materialism, and have advocated various forms of philosophical idealism, which always, in one way or another, amounts to the defence or support of religion.

Marx and Engels defended philosophical materialism in the most determined manner and repeatedly explained how profoundly erroneous is every deviation from this basis. Their views are most clearly and fully expounded in the works of Engels, *Ludwig Feuerbach* and *Anti-Dühring*, which, like the *Communist Manifesto*,¹⁴⁵ are handbooks for every class-conscious worker.

But Marx did not stop at eighteenth-century materialism: he developed philosophy to a higher level. He enriched it with the achievements of German classical philosophy, especially of Hegel's system, which in its turn had led to the materialism of Feuerbach. The main achievement was *dialectics*, i.e., the doctrine of development in its fullest, deepest and most comprehensive form, the doctrine of the relativity of the human knowledge that provides us with a reflection of eternally developing matter. The latest discoveries of natural science—radium, electrons, the transmutation of elements—have been a remarkable confirmation of Marx's dialectical materialism despite the teachings of the bourgeois philosophers with their "new" reversions to old and decadent idealism.

Marx deepened and developed philosophical materialism to the full, and extended the cognition of nature to include the

cognition of *human society*. His *historical materialism* was a great achievement in scientific thinking. The chaos and arbitrariness that had previously reigned in views on history and politics were replaced by a strikingly integral and harmonious scientific theory, which shows how, in consequence of the growth of productive forces, out of one system of social life another and higher system develops—how capitalism, for instance, grows out of feudalism.

Just as man's knowledge reflects nature (i.e., developing matter), which exists independently of him, so man's *social knowledge* (i.e., his various views and doctrines—philosophical, religious, political and so forth) reflects the *economic system* of society. Political institutions are a superstructure on the economic foundation. We see, for example, that the various political forms of the modern European states serve to strengthen the domination of the bourgeoisie over the proletariat.

Marx's philosophy is a consummate philosophical materialism which has provided mankind, and especially the working class, with powerful instruments of knowledge.

II

Having recognised that the economic system is the foundation on which the political superstructure is erected, Marx devoted his greatest attention to the study of this economic system. Marx's principal work, *Capital*, is devoted to a study of the economic system of modern, i.e., capitalist, society.

Classical political economy, before Marx, evolved in England, the most developed of the capitalist countries. Adam Smith and David Ricardo, by their investigations of the economic system, laid the foundations of the *labour theory of value*. Marx continued their work; he provided a proof of the theory and developed it consistently. He showed that the value of every commodity is determined by the quantity of socially necessary labour time spent on its production.

Where the bourgeois economists saw a relation between things (the exchange of one commodity for another) Marx revealed a *relation between people*. The exchange of commodities

expresses the connection between individual producers through the market. *Money* signifies that the connection is becoming closer and closer, inseparably uniting the entire economic life of the individual producers into one whole. *Capital* signifies a further development of this connection: man's labour-power becomes a commodity. The wage-worker sells his labour-power to the owner of land, factories and instruments of labour. The worker spends one part of the day covering the cost of maintaining himself and his family (wages), while the other part of the day he works without remuneration, creating for the capitalist *surplus-value*, the source of profit, the source of the wealth of the capitalist class.

The doctrine of surplus-value is the corner-stone of Marx's economic theory.

Capital, created by the labour of the worker, crushes the worker, ruining small proprietors and creating an army of unemployed. In industry, the victory of large-scale production is immediately apparent, but the same phenomenon is also to be observed in agriculture, where the superiority of large-scale capitalist agriculture is enhanced, the use of machinery increases and the peasant economy, trapped by money-capital, declines and falls into ruin under the burden of its backward technique. The decline of small-scale production assumes different forms in agriculture, but the decline itself is an indisputable fact.

By destroying small-scale production, capital leads to an increase in productivity of labour and to the creation of a monopoly position for the associations of big capitalists. Production itself becomes more and more social—hundreds of thousands and millions of workers become bound together in a regular economic organism—but the product of this collective labour is appropriated by a handful of capitalists. Anarchy of production, crises, the furious chase after markets and the insecurity of existence of the mass of the population are intensified.

By increasing the dependence of the workers on capital, the capitalist system creates the great power of united labour.

Marx traced the development of capitalism from embryonic

commodity economy, from simple exchange, to its highest forms, to large-scale production.

And the experience of all capitalist countries, old and new, year by year demonstrates clearly the truth of this Marxian doctrine to increasing numbers of workers.

Capitalism has triumphed all over the world, but this triumph is only the prelude to the triumph of labour over capital.

III

When feudalism was overthrown and “free” capitalist society appeared in the world, it at once became apparent that this freedom meant a new system of oppression and exploitation of the working people. Various socialist doctrines immediately emerged as a reflection of and protest against this oppression. Early socialism, however, was *utopian* socialism. It criticised capitalist society, it condemned and damned it, it dreamed of its destruction, it had visions of a better order and endeavoured to convince the rich of the immorality of exploitation.

But utopian socialism could not indicate the real solution. It could not explain the real nature of wage-slavery under capitalism, it could not reveal the laws of capitalist development, or show what *social force* is capable of becoming the creator of a new society.

Meanwhile, the stormy revolutions which everywhere in Europe, and especially in France, accompanied the fall of feudalism, of serfdom, more and more clearly revealed the *struggle of classes* as the basis and the driving force of all development.

Not a single victory of political freedom over the feudal class was won except against desperate resistance. Not a single capitalist country evolved on a more or less free and democratic basis except by a life-and-death struggle between the various classes of capitalist society.

The genius of Marx lies in his having been the first to deduce from this the lesson world history teaches and to apply that lesson consistently. The deduction he made is the doctrine of the *class struggle*.

People always have been the foolish victims of deception and self-deception in politics, and they always will be until they have learnt to seek out the *interests* of some class or other behind all moral, religious, political and social phrases, declarations and promises. Champions of reforms and improvements will always be fooled by the defenders of the old order until they realise that every old institution, however barbarous and rotten it may appear to be, is kept going by the forces of certain ruling classes. And there is *only one* way of smashing the resistance of those classes, and that is to find, in the very society which surrounds us, the forces which can—and, owing to their social position, *must*—constitute the power capable of sweeping away the old and creating the new, and to enlighten and organise those forces for the struggle.

Marx's philosophical materialism alone has shown the proletariat the way out of the spiritual slavery in which all oppressed classes have hitherto languished. Marx's economic theory alone has explained the true position of the proletariat in the general system of capitalism.

Independent organisations of the proletariat are multiplying all over the world, from America to Japan and from Sweden to South Africa. The proletariat is becoming enlightened and educated by waging its class struggle; it is ridding itself of the prejudices of bourgeois society; it is rallying its ranks ever more closely and is learning to gauge the measure of its successes; it is steeling its forces and is growing irresistibly.

Prosveshcheniye No. 3,
March 1913

V. I. Lenin, *Collected Works*, Vol. 19,
Moscow, 1963, pp. 23-28

From Karl Marx

The Marxist Doctrine

Marxism is the system of Marx's views and teachings. Marx was the genius who continued and consummated the three main ideological currents of the nineteenth century, as represented by the three most advanced countries of mankind: classical German philosophy, classical English political economy, and French socialism combined with French revolutionary doctrines in general. Acknowledged even by his opponents, the remarkable consistency and integrity of Marx's views, whose totality constitutes modern materialism and modern scientific socialism, as the theory and programme of the working-class movement in all the civilised countries of the world, make it incumbent on us to present a brief outline of his world-conception in general, prior to giving an exposition of the principal content of Marxism, namely, Marx's economic doctrine.

Philosophical Materialism

Beginning with the years 1844-45, when his views took shape, Marx was a materialist and especially a follower of Ludwig Feuerbach, whose weak points he subsequently saw only in his materialism being insufficiently consistent and comprehensive. To Marx Feuerbach's historic and "epoch-making" significance lay in his having resolutely broken with Hegel's idealism and in his proclamation of materialism, which already "in the eighteenth century, particularly French materialism, was not only a struggle against the existing

political institutions and against ... religion and theology, but also ... against all metaphysics" (in the sense of "drunken speculation" as distinct from "sober philosophy"). (*The Holy Family*, in *Literarischer Nachlass*.)¹⁴⁶ "To Hegel..." wrote Marx, "the process of thinking, which, under the name of 'the Idea', he even transforms into an independent subject, is the demiurgos (the creator, the maker) of the real world.... With me, on the contrary, the ideal is nothing else than the material world reflected by the human mind, and translated into forms of thought" (*Capital*, Vol. I, Afterword to the Second Edition). In full conformity with this materialist philosophy of Marx's, and expounding it, Frederick Engels wrote in *Anti-Dühring* (read by Marx in the manuscript): "The unity of the world does not consist in its being.... The real unity of the world consists in its materiality, and this is proved ... by a long and wearisome development of philosophy and natural science...." "Motion is the mode of existence of matter. Never anywhere has there been matter without motion, or motion without matter, nor can there be.... But if the ... question is raised: what thought and consciousness really are, and where they come from; it becomes apparent that they are products of the human brain and that man himself is a product of Nature, which has developed in and along with its environment; hence it is self-evident that the products of the human brain, being in the last analysis also products of Nature, do not contradict the rest of Nature's interconnections but are in correspondence with them...."

"Hegel was an idealist, that is to say, the thoughts within his mind were to him not the more or less abstract images [*Abbilder*, reflections; Engels sometimes speaks of "imprints"] of real things and processes, but, on the contrary, things and their development were to him only the images, made real, of the 'Idea' existing somewhere or other before the world existed."¹⁴⁷ In his *Ludwig Feuerbach*—which expounded his own and Marx's views on Feuerbach's philosophy, and was sent to the printers after he had re-read an old manuscript Marx and himself had written in 1844-45 on Hegel, Feuerbach and the materialist conception of history—Engels wrote: "The great basic question of all philosophy, especially of more recent philosophy, is the relation of thinking and being ... spirit to

Nature ... which is primary, spirit or Nature.... The answers which the philosophers gave to this question split them into two great camps. Those who asserted the primacy of spirit to Nature and, therefore, in the last instance, assumed world creation in some form or other ... comprised the camp of idealism. The others, who regarded Nature as primary, belonged to the various schools of materialism." Any other use of the concepts of (philosophical) idealism and materialism leads only to confusion. Marx decidedly rejected, not only idealism, which is always linked in one way or another with religion, but also the views—especially widespread in our day—of Hume and Kant, agnosticism, criticism, and positivism in their various forms; he considered that philosophy a "reactionary" concession to idealism, and at best a "shamefaced way of surreptitiously accepting materialism, while denying it before the world".¹⁴⁸ On this question, see, besides the works by Engels and Marx mentioned above, a letter Marx wrote to Engels on December 12, 1868, in which, referring to an utterance by the naturalist Thomas Huxley, which was "more materialistic" than usual, and to his recognition that "as long as we actually observe and think, we cannot possibly get away from materialism", Marx reproached Huxley for leaving a "loop-hole" for agnosticism, for Humism. It is particularly important to note Marx's view on the relation between freedom and necessity: "Freedom is the appreciation of necessity. 'Necessity is blind only insofar as it is not understood'" (Engels in *Anti-Dühring*). This means recognition of the rule of objective laws in Nature and of the dialectical transformation of necessity into freedom (in the same manner as the transformation of the uncognised but cognisable "thing-in-itself" into the "thing-for-us", of the "essence of things" into "phenomena"). Marx and Engels considered that the "old" materialism, including that of Feuerbach (and still more the "vulgar" materialism of Büchner, Vogt and Moleschott), contained the following major shortcomings: (1) this materialism was "predominantly mechanical", failing to take account of the latest developments in chemistry and biology (today it would be necessary to add: and in the electrical theory of matter); (2) the old materialism was non-historical and non-dialectical (metaphysical, in the meaning of anti-

dialectical), and did not adhere consistently and comprehensively to the standpoint of development; (3) it regarded the "human essence" in the abstract, not as the "complex of all" (concretely and historically determined) "social relations", and therefore merely "interpreted" the world, whereas it was a question of "changing" it, i.e., it did not understand the importance of "revolutionary practical activity".

Dialectics

As the most comprehensive and profound doctrine of development, and the richest in content, Hegelian dialectics was considered by Marx and Engels the greatest achievement of classical German philosophy. They thought that any other formulation of the principle of development, of evolution, was one-sided and poor in content, and could only distort and mutilate the actual course of development (which often proceeds by leaps, and *via* catastrophes and revolutions) in Nature and in society. "Marx and I were pretty well the only people to rescue conscious dialectics [from the destruction of idealism, including Hegelianism] and apply it in the materialist conception of Nature.... Nature is the proof of dialectics, and it must be said for modern natural science that it has furnished extremely rich [this was written before the discovery of radium, electrons, the transmutation of elements, etc.!] and daily increasing materials for this test, and has thus proved that in the last analysis Nature's process is dialectical and not metaphysical.¹⁴⁹

"The great basic thought," Engels writes, "that the world is not to be comprehended as a complex of ready-made things, but as a complex of processes, in which the things apparently stable no less than their mind images in our heads, the concepts, go through an uninterrupted change of coming into being and passing away ... this great fundamental thought has, especially since the time of Hegel, so thoroughly permeated ordinary consciousness that in this generality it is now scarcely ever contradicted. But to acknowledge this fundamental thought in words and to apply it in reality in detail to each domain of investigation are two different things.... For

dialectical philosophy nothing is final, absolute, sacred. It reveals the transitory character of everything and in everything; nothing can endure before it except the uninterrupted process of becoming and of passing away, of endless ascendancy from the lower to the higher. And dialectical philosophy itself is nothing more than the mere reflection of this process in the thinking brain." Thus, according to Marx, dialectics is "the science of the general laws of motion, both of the external world and of human thought".¹⁵⁰

This revolutionary aspect of Hegel's philosophy was adopted and developed by Marx. Dialectical materialism "does not need any philosophy standing above the other sciences". From previous philosophy there remains "the science of thought and its laws—formal logic and dialectics".¹⁵¹ Dialectics, as understood by Marx, and also in conformity with Hegel, includes what is now called the theory of knowledge, or epistemology, which, too, must regard its subject matter historically, studying and generalising the origin and development of knowledge, the transition from *non-knowledge* to knowledge.

In our times the idea of development, of evolution, has almost completely penetrated social consciousness, only in other ways, and not through Hegelian philosophy. Still, this idea, as formulated by Marx and Engels on the basis of Hegel's philosophy, is far more comprehensive and far richer in content than the current idea of evolution is. A development that repeats, as it were, stages that have already been passed, but repeats them in a different way, on a higher basis ("the negation of negation"), a development, so to speak, that proceeds in spirals, not in a straight line; a development by leaps, catastrophes, and revolutions; "breaks in continuity"; the transformation of quantity into quality; inner impulses towards development, imparted by the contradiction and conflict of the various forces and tendencies acting on a given body, or within a given phenomenon, or within a given society; the interdependence and the closest and indissoluble connection between *all* aspects of any phenomenon (history constantly revealing ever new aspects), a connection that provides a uniform, and universal process of motion, one that follows definite laws—these are some of the features of dialectics as a doctrine of development that is richer than the conventional

one. (Cf. Marx's letter to Engels of January 8, 1868, in which he ridicules Stein's "wooden trichotomies", which it would be absurd to confuse with materialist dialectics.)

The Materialist Conception of History

A realisation of the inconsistency, incompleteness, and one-sidedness of the old materialism convinced Marx of the necessity of "bringing the science of society ... into harmony with the materialist foundation, and of reconstructing it thereupon".¹⁵² Since materialism in general explains consciousness as the outcome of being, and not conversely, then materialism as applied to the social life of mankind has to explain *social* consciousness as the outcome of *social* being. "Technology," Marx writes (*Capital*, Vol. I), "discloses man's mode of dealing with Nature, the immediate process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations, and of the mental conceptions that flow from them." In the preface to his *Contribution to the Critique of Political Economy*, Marx gives an integral formulation of the fundamental principles of materialism as applied to human society and its history, in the following words:

"In the social production of their life, men enter into definite relations that are indispensable and independent of their will, relations of production which correspond to a definite stage of development of their material productive forces.

"The sum-total of these relations of production constitutes the economic structure of society, the real foundation, on which rises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the social, political and intellectual life-process in general. It is not the consciousness of men that determines their being, but, on the contrary, their social being that determines their consciousness. At a certain stage of their development, the material productive forces of society come in conflict with the existing relations of production, or—what is but a legal expression for the same

thing—with the property relations within which they have been at work hitherto. From forms of development of the productive forces these relations turn into their fetters. Then begins an epoch of social revolution. With the change of the economic foundation the entire immense superstructure is more or less rapidly transformed. In considering such transformations a distinction should always be made between the material transformation of the economic conditions of production, which can be determined with the precision of natural science, and the legal, political, religious, aesthetic or philosophic—in short, ideological forms in which men become conscious of this conflict and fight it out.

“Just as our opinion of an individual is not based on what he thinks of himself, so we cannot judge of such a period of transformation by its own consciousness; on the contrary, this consciousness must be explained rather from the contradictions of material life, from the existing conflict between the social productive forces and the relations of production.... In broad outlines Asiatic, ancient, feudal, and modern bourgeois modes of production can be designated as progressive epochs in the economic formation of society” (cf. Marx’s brief formulation in a letter to Engels dated July 7, 1866: “Our theory that the organisation of labour is determined by the means of production”).

The discovery of the materialist conception of history, or more correctly, the consistent continuation and extension of materialism into the domain of social phenomena, removed the two chief shortcomings in earlier historical theories. In the first place, the latter at best examined only the ideological motives in the historical activities of human beings, without investigating the origins of those motives, or ascertaining the objective laws governing the development of the system of social relations, or seeing the roots of these relations in the degree of development reached by material production; in the second place, the earlier theories did not embrace the activities of the *masses* of the population, whereas historical materialism made it possible for the first time to study with scientific accuracy the social conditions of the life of the masses, and the changes in those conditions. At best, pre-Marxist “sociology” and historiography brought forth an accumulation of raw

facts, collected at random, and a description of individual aspects of the historical process. By examining the *totality* of opposing tendencies, by reducing them to precisely definable conditions of life and production of the various *classes* of society, by discarding subjectivism and arbitrariness in the choice of a particular "dominant" idea or in its interpretation, and by revealing that, without exception, all ideas and all the various tendencies *stem* from the condition of the material forces of production, Marxism indicated the way to an all-embracing and comprehensive study of the process of the rise, development, and decline of socio-economic systems. People make their own history, but what determines the motives of people, of the mass of people, i. e., what gives rise to the clash of conflicting ideas and strivings? What is the sum-total of all these clashes in the mass of human societies? What are the objective conditions of production of material life that form the basis of all of man's historical activity? What is the law of development of these conditions? To all these Marx drew attention and indicated the way to a scientific study of history as a single process which, with all its immense variety and contradictoriness, is governed by definite laws.

Written in July-November,
1914

V. I. Lenin, *Collected Works.*, Vol. 21.
Moscow, 1964, pp. 50-57

From Philosophical Notebooks

From Conspectus of Hegel's Book *The Science of Logic*

Essentially, Hegel is completely right as opposed to Kant. Thought proceeding from the concrete to the abstract—provided it is *correct* (NB) (and Kant, like all philosophers, speaks of correct thought)—does not get away *from* the truth but comes closer to it. The abstraction of *matter*, of a *law* of nature, the abstraction of *value*, etc., in short *all* scientific (correct, serious, not absurd) abstractions reflect nature more deeply, truly and *completely*. From living perception to abstract thought, *and from this to practice*,—such is the dialectical path of the cognition of *truth*, of the cognition of objective reality. Kant disparages knowledge in order to make way for faith: Hegel exalts knowledge, asserting that knowledge is knowledge of God. The materialist exalts the knowledge of matter, of nature, consigning God, and the philosophical rabble that defends God, to the rubbish heap....

1) The determination of the concept out of itself [the thing *itself* must be considered in its relations and in its development];

2) the contradictory nature of the thing itself (*das Andere seiner**), the contradictory forces and tendencies in each phenomenon;

3) the union of analysis and synthesis.

Such, apparently, are the elements of dialectics.

One could perhaps present these elements in greater detail as follows:

* The other of itself.—Ed.

- 1) the *objectivity* of consideration (not examples, not divergences, but the Thing-in-itself).

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- 2) the entire totality of the manifold *relations* of this thing to others.
- 3) the *development* of this thing, (phenomenon, respectively), its own movement, its own life.
- 4) the internally contradictory *tendencies* (*and* #sides) in this thing.
- 5) the thing (phenomenon, etc.) as the sum

#

and unity of opposites.

- 6) the *struggle*, respectively unfolding, of these opposites, contradictory strivings, etc.
- 7) the union of analysis and synthesis—the break-down of the separate parts and the totality, the summation of these parts.
- 8) the relations of each thing (phenomenon, etc.) are not only manifold, but general, universal. Each thing (phenomenon, process, etc.) is connected with *every other*.
- 9) not only the unity of opposites, but the *transitions of every* determination, quality, feature, side, property into *every other* [into its opposite?].
- 10) the endless process of the discovery of *new* sides, relations, etc.
- 11) the endless process of the deepening of man's knowledge of the thing, of phenomena, processes, etc., from appearance to essence and from less profound to more profound essence.

*Elements
of
dialectics*

- 12) from co-existence to causality and from one form of connection and reciprocal dependence to another, deeper, more general form.
- 13) the repetition at a higher stage of certain features, properties, etc., of the lower and
- 14) the apparent return to the old (negation of the negation).
- 15) the struggle of content with form and conversely. The throwing off of the form, the transformation of the content.
- 16) the transition of quantity into quality and *vice versa*. ((15 and 16 are *examples* of the 9))

In brief, dialectics can be defined as the doctrine of the unity of opposites. This embodies the essence of dialectics, but it requires explanations and development.

Written in September-December, 1914

V. I. Lenin, *Collected Works*, Vol. 38, Moscow, 1961, pp. 171, 221-23

On the Question of Dialectics.

The splitting of a single whole and the cognition of its contradictory parts (see the quotation from Philo on Heraclitus at the beginning of Section III, "On Cognition", in Lassalle's book on Heraclitus) is the *essence* (one of the "essentials", one of the principal, if not the principal, characteristics or features) of dialectics. That is precisely how Hegel, too, puts the matter (Aristotle in his *Metaphysics* continually *grapples* with it and *combats* Heraclitus and Heraclitean ideas).

The correctness of this aspect of the content of dialectics must be tested by the history of science. This aspect of dialectics (e.g., in Plekhanov) usually receives inadequate attention: the identity of opposites is taken as the sum-total of *examples* ["for example, a seed", "for example, primitive communism". The same is true of Engels. But it is "in the interests of popularisation..." and not as a *law of cognition* (and as a law of the objective world).

In mathematics: + and -. Differential and integral.

In mechanics: action and reaction.

In physics: positive and negative electricity.

In chemistry: the combination and dissociation of atoms.

In social science: the class struggle.

The identity of opposites (it would be more correct, perhaps, to say their "unity",—although the difference between the terms identity and unity is not particularly important here. In a certain sense both are correct) is the recognition (discovery) of the contradictory, *mutually exclusive*, opposite tendencies in *all* phenomena and processes of nature (*including* mind and society). The condition for the knowledge of all processes of the world in their "*self-movement*", in their spontaneous development, in their real life, is the knowledge of them as a

unity of opposites. Development is the "struggle" of opposites. The two basic (or two possible? or two historically observable?) conceptions of development (evolution) are: development as decrease and increase, as repetition, *and* development as a unity of opposites (the division of a unity into mutually exclusive opposites and their reciprocal relation).

In the first conception of motion, *self*-movement, its *driving* force, its source, its motive, remains in the shade (or this source is made *external*—God, subject, etc.). In the second conception the chief attention is directed precisely to knowledge of the *source* of "*self*"-movement.

The first conception is lifeless, pale and dry. The second is living. The second *alone* furnishes the key to the "self-movement" of everything existing; it alone furnishes the key to the "leaps", to the "break in continuity", to the "transformation into the opposite," to the destruction of the old and the emergence of the new.

The unity (coincidence, identity, equal action) of opposites is conditional, temporary, transitory, relative. The struggle of mutually exclusive opposites is absolute, just as development and motion are absolute.

NB: The distinction between subjectivism (scepticism, sophistry, etc.) and dialectics, incidentally, is that in (objective) dialectics the difference between the relative and the absolute is itself relative. For objective dialectics there *is* an absolute *within* the relative. For subjectivism and sophistry the relative is only relative and excludes the absolute.

In his *Capital*, Marx first analyses the simplest, most ordinary and fundamental, most common and everyday *relation* of bourgeois (commodity) society, a relation encountered billions of times, viz. the exchange of commodities. In this very simple phenomenon (in this "cell" of bourgeois society) analysis reveals *all* the contradictions (or the germs of *all* the contradictions) of modern society. The subsequent exposition shows us the development (*both* growth *and* movement) of these contradictions and of this society in the Σ^* of its individual parts, from its beginning to its end.

* Summation.—Ed.

Such must also be the method of exposition (or study) of dialectics in general (for with Marx the dialectics of bourgeois society is only a particular case of dialectics). To begin with what is the simplest, most ordinary, common, etc., with **any proposition**: the leaves of a tree are green; John is a man; Fido is a dog, etc. Here already we have *dialectics* (as Hegel's genius recognised): the **individual is the universal** (cf. Aristoteles, *Metaphysik*, translation by Schwegler, Bd. II, S. 40, 3. Buch, 4 Kapitel, 8-9: "*denn natürlich kann man nicht der Meinung sein, dass es ein Haus (a house in general) gebe ausser den sichtbaren Häusern*," "οὐ γὰρ ὡς βελημεν εἶναι τινα οἰκίαν παρὰ τὰς τινας οἰκίας")*.

Consequently, the opposites (the individual is opposed to the universal) are identical: the individual exists only in the connection that leads to the universal. The universal exists only in the individual and through the individual. Every individual is (in one way or in other) a universal. Every universal is (a fragment, or an aspect, or the essence of) an individual. Every universal only approximately embraces all the individual objects. Every individual enters incompletely into the universal, etc., etc. Every individual is connected by thousands of transitions with other **kinds** of individuals (things, phenomena, processes), etc. *Here already* we have the elements, the germs of the concept of *necessity*, of objective connection in nature, etc. Here already we have the contingent and the necessary, the phenomenon and the essence; for when we say: John is a man, Fido is a dog, *this* is a leaf of a tree, etc., we *disregard* a number of attributes as *contingent*; we separate the essence from the appearance, and counterpose the one to the other.

Thus in *any* proposition we can (and must) disclose as in a "nucleus" ("cell") the germs of *all* the elements of dialectics, and thereby show that dialectics is a property of all human knowledge in general. And natural science shows us (and here again it must be demonstrated in *any* simple instance) objective nature with the same qualities, the transformation of the individual into the universal, of the contingent into the necessary, transitions, modulations, and the reciprocal connec-

* "for, of course, one cannot hold the opinion that there can be a house (in general) apart from visible houses".— *Ed.*

tion of opposites. Dialectics *is* the theory of knowledge of (Hegel and) Marxism. This is the “aspect” of the matter (it is not “an aspect” but the *essence* of the matter) to which Plekhanov, not to speak of other Marxists, paid no attention.

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Knowledge is represented in the form of a series of circles both by Hegel (see *Logic*) and by the modern “epistemologist” of natural science, the eclectic and foe of Hegelianism (which he did not understand!), Paul Volkmann (see his *Erkenntnistheoretische Grundzüge*,* S.)

<p>“Circles” in philosophy: [is a chronology of <i>persons</i> essential? No!]</p> <p>Ancient: from Democritus to Plato and the dialectics of Heraclitus.</p> <p>Renaissance: Descartes versus Gassendi (Spinoza?).</p> <p>Modern: Holbach-Hegel (via Berkeley, Hume, Kant). Hegel—Feuerbach—Marx.</p>
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Dialectics as *living*, many-sided knowledge (with the number of sides eternally increasing), with an infinite number of shades of every approach and approximation to reality (with a philosophical system growing into a whole out of each shade)—here we have an immeasurably rich content as compared with “metaphysical” materialism, the fundamental *misfortune* of which is its inability to apply dialectics to the *Bildertheorie*,** to the process and development of knowledge.

Philosophical idealism is *only* nonsense from the standpoint of crude, simple, metaphysical materialism. From the standpoint of *dialectical* materialism, on the other hand, philosophical idealism is a *one-sided*, exaggerated, *überschwengliches* (Dietzgen) development (inflation, distention) of one of the features, aspects, facets of knowledge into an absolute, *divorced* from matter, from nature,

* P. Volkmann, *Erkenntnistheoretische Grundzüge der Naturwissenschaften* Leipzig-Berlin, 1910, S. 35.—Ed.

** Theory of reflection.—Ed.

NB
this
apho-
rism

|| apotheosised. Idealism is clerical obscurantism. True. But philosophical idealism is ("*more correctly*" and "*in addition*") a *road* to clerical obscurantism *through one of the shades* of the infinitely complex *knowledge* (dialectical) of man.

Human knowledge is not (or does not follow) a straight line, but a curve, which endlessly approximates a series of circles, a spiral. Any fragment, segment, section of this curve can be transformed (transformed one-sidedly) into an independent, complete, straight line, which then (if one does not see the wood for the trees) leads into the quagmire, into clerical obscurantism (where it is *anchored* by the class interests of the ruling classes). Rectilinearity and one-sidedness, woodenness and petrification, subjectivism and subjective blindness—voilà the epistemological roots of idealism. And clerical obscurantism (=philosophical idealism), of course, has *epistemological* roots, it is not groundless; it is a *sterile flower* undoubtedly, but a sterile flower that grows on the living tree of living, fertile, genuine, powerful, omnipotent, objective, absolute human knowledge.

Written in 1915

V. I. Lenin, *Collected Works*, Vol. 38,
Moscow, 1961, pp. 359-63

From On the Significance of Militant Materialism

In addition to the alliance with consistent materialists who do not belong to the Communist Party, of no less and perhaps even of more importance for the work which militant materialism should perform is an alliance with those modern natural scientists who incline towards materialism and are not afraid to defend and preach it as against the modish philosophical wanderings into idealism and scepticism which are prevalent in so-called educated society.

The article by A. Timiryazev on Einstein's theory of relativity published in *Pod Znamenem Marksizma*¹⁵³ No. 1-2 permits us to hope that the journal will succeed in effecting this second alliance too. Greater attention should be paid to it. It should be remembered that the sharp upheaval which modern natural science is undergoing very often gives rise to reactionary philosophical schools and minor schools, trends and minor trends. Unless, therefore, the problems raised by the recent revolution in natural science are followed, and unless natural scientists are enlisted in the work of a philosophical journal, militant materialism can be neither militant nor materialism. Timiryazev was obliged to observe in the first issue of the journal that the theory of Einstein, who, according to Timiryazev, is himself not making any active attack on the foundations of materialism, has already been seized upon by a vast number of bourgeois intellectuals of all countries; it should be noted that this applies not only to Einstein, but to a number, if not to the majority, of the great reformers of natural science since the end of the nineteenth century.

For our attitude towards this phenomenon to be a politically conscious one, it must be realised that no natural science and no materialism can hold its own in the struggle against the onslaught of bourgeois ideas and the restoration of the bourgeois world outlook unless it stands on solid philosophical ground. In order to hold his own in this struggle and carry it to a victorious finish, the natural scientist must be a modern materialist, a conscious adherent of the materialism represented by Marx, i. e., he must be a dialectical materialist. In order to attain this aim, the contributors to *Pod Znamenem Marksizma* must arrange for the systematic study of Hegelian dialectics from a materialist standpoint, i. e., the dialectics which Marx applied practically in his *Capital* and in his historical and political works, and applied so successfully that now every day of the awakening to life and struggle of new classes in the East (Japan, India, and China)—i. e., the hundreds of millions of human beings who form the greater part of the world population and whose historical passivity and historical torpor have hitherto conditioned the stagnation and decay of many advanced European countries—every day of the awakening to life of new peoples and new classes serves as a fresh confirmation of Marxism.

Of course, this study, this interpretation, this propaganda of Hegelian dialectics is extremely difficult, and the first experiments in this direction will undoubtedly be accompanied by errors. But only he who never does anything never makes mistakes. Taking as our basis Marx's method of applying materialistically conceived Hegelian dialectics, we can and should elaborate this dialectics from all aspects, print in the journal excerpts from Hegel's principal works, interpret them materialistically and comment on them with the help of examples of the way Marx applied dialectics, as well as of examples of dialectics in the sphere of economic and political relations, which recent history, especially modern imperialist war and revolution, provides in unusual abundance. In my opinion, the editors and contributors of *Pod Znamenem Marksizma* should be a kind of "Society of Materialist Friends of Hegelian Dialectics". Modern natural scientists (if they know how to seek, and if we learn to help them) will find in the Hegelian dialectics, materialistically interpreted, a series of

answers to the philosophical problems which are being raised by the revolution in natural science and which make the intellectual admirers of bourgeois fashion "stumble" into reaction.

Unless it sets itself such a task and systematically fulfils it, materialism cannot be militant materialism. It will be not so much the fighter as the fought, to use an expression of Shchedrin's. Without this, eminent natural scientists will as often as hitherto be helpless in making their philosophical deductions and generalisations. For natural science is progressing so fast and is undergoing such a profound revolutionary upheaval in all spheres that it cannot possibly dispense with philosophical deductions.

Written on March 12, 1922

V. I. Lenin, *Collected Works*, Vol. 33,
Moscow, 1973 pp. 232-34

Notes

¹ *Cartesian materialism*—the doctrine of the followers of the materialist physics of René Descartes (in Latin—Renatus Cartesius).

The first complete edition of the work of P.J.G. Cabanis, *Rapports du physique et du moral de l'homme*, appeared in Paris in 1802. p. 21

² The *Jansenists*—named after the Dutch theologian Cornelius Jansen—represented an opposition trend among French Catholics in the seventeenth and early eighteenth centuries. p. 22

³ The first edition of John Locke's treatise, *An Essay Concerning Humane Understanding*, appeared in London in 1690. p. 23

⁴ *Nominalism* (from Latin *nomen*—name).

The nominalists were adherents of a trend in medieval philosophy which maintained that only individual things exist and that generality belongs to words. They criticised the traditional "realist" doctrine that universals or "ideas" have real existence above and independent of individual things. The conflict between nominalism and realism was part of the struggle between materialism and idealism that went on in medieval philosophy. p. 24

⁵ *Homoeomeriae*, according to the teaching of the ancient Greek philosopher Anaxagoras, are tiny qualitatively determined material particles which are infinite in number and variety, and form the primary basis of all that exists; their combinations constitute all the diversity of things. p. 24

⁶ *Sensationalism* (from Latin *sensus*—sensation)—a trend in philosophy the adherents of which consider sensations, perceptions, etc., to be the unique basis and source of all knowledge. Sensationalism proceeds from the principle that nothing is understood before it is felt as elaborated by John Locke in his treatise *An Essay Concerning Humane Understanding*, 1690. Sensualists were both materialists (John Locke, Etienne Bonnot Condillac, Claude Adrien Helvétius) and idealists (George Berkeley). Lenin wrote:

"Both the solipsist, that is, the subjective idealist, and the materialist may regard sensations as the source of our knowledge. Both Berkeley and Diderot started from Locke" (see p. 263 of this book). p. 25

- ⁷ *Deism*—a religious philosophical doctrine which recognises God as the impersonal but reasonable prime cause of the universe but denies his interference with nature and human life. p. 25

- ⁸ This refers to E.-B. Condillac's treatise *Traité des Systèmes*, etc., 1749. p. 26

- ⁹ The first edition of Condillac's *Essai sur l'origine des connaissances humaines* appeared anonymously in Amsterdam in 1746. p. 26

- ¹⁰ Claude Adrien Helvétius, *De l'homme, de ses facultés intellectuelles et de son éducation*. This work was first published in the Hague in 1773, after the author's death. p. 26

- ¹¹ La Mettrie's book, *L'homme machine*, published anonymously in Leyden in 1748, was burned and its author banished from Holland, whence he had emigrated from France in 1745. p. 26

- ¹² When the first edition of Holbach's *Système de la nature, ou des Loix du monde physique et du monde morale*, was published in 1770, the name of the author was given as J. B. Mirabeau, secretary of the French Academy who had died in 1760. p. 26

- ¹³ The first edition, in four volumes, was published in Amsterdam between 1763 and 1766. p. 26

- ¹⁴ *Physiocrats*—a trend in bourgeois classical political economy which arose in France in the 1750s.

Physiocrats advocated large-scale capitalist agriculture, abolition of class privileges and protectionism. They realised the need to abolish the feudal system, but wanted to accomplish this by peaceful reforms without detriment to the ruling classes and absolutism. The Physiocrats' philosophic views were close to those of the eighteenth-century French Enlighteners. p. 26

- ¹⁵ *Babouvism*—a variety of utopian, egalitarian communism, originated by the eighteenth-century French revolutionary Gracchus Babeuf. p. 27

- ¹⁶ *Theses on Feuerbach* were written by Karl Marx in Brussels in the spring of 1845 and are to be found in his *Notebook* for 1844-47. They were first published by Frederick Engels in 1888 as a supplement to his book *Ludwig Feuerbach and the End of Classical German Philosophy*. p. 29

- ¹⁷ Marx is referring to Proudhon's work *Système des contradictions économiques, ou Philosophie de la misère*, tomes I-II, Paris, 1846. p. 41

- ¹⁸ Marx refers to *Outlines of a Critique of Political Economy*, the first work on economics written by Frederick Engels. p. 44
- ¹⁹ A reference to *The German Ideology* written by Karl Marx and Frederick Engels (Marx and Engels, *Collected Works*, Vol. 5, Moscow, 1976, pp. 19-539). p. 45
- ²⁰ Karl Marx and Frederick Engels, *Manifesto of the Communist Party* (see Marx and Engels, *Collected Works*, Vol. 6, Moscow, 1975, pp. 477-519), Frederick Engels, "Speech on the Question of Free Trade" (see Marx and Engels, *Collected Works*, Vol. 6, Moscow, 1975, pp. 450-65). p. 45
- ²¹ Karl Marx, *The Poverty of Philosophy* (see Marx and Engels, *Collected Works*, Vol. 6, Moscow, 1975, pp. 105-212). p. 45
- ²² Marx is referring to his *Wage-Labour and Capital* (Karl Marx, *Wage-Labour and Capital*, Moscow, 1974). p. 45
- ²³ *The German Workers' Association* in Brussels was founded by Marx and Engels towards the end of August 1847 to further the political enlightenment of German workers residing in Belgium and to disseminate the ideas of scientific communism among them. The Association maintained contacts with Flemish and Walloon workers' societies.
The activities of the German Workers' Association in Brussels ceased soon after the February bourgeois revolution of 1848 in France because of arrests and deportation of its members by the Belgian police. p. 45
- ²⁴ *The New York Daily Tribune*—an American newspaper published from 1841 to 1924. Marx was a contributor to the paper from August 1851 to March 1862. Many articles for the newspaper were, at Marx's request, written by Engels. p. 46
- ²⁵ An ironical allusion to the Right-wing Hegelians, who occupied many chairs in German universities in the 1830s and 1840s. In their lectures they attacked representatives of a more radical trend in philosophy and gave a reactionary interpretation of the Hegelian doctrine.
Diadochi were generals in the army of Alexander of Macedonia who, after his death, fought bitterly with each other for the division of the Empire. p. 48
- ²⁶ See G. W. F. Hegel, *Wissenschaft der Logik*, Th. 1, Abt. 2, *Werke*, Bd. IV, Berlin, 1834, S. 15, 75, 145. p. 49
- ²⁷ Marx is referring to the journal *La philosophie positive. Revue*, published in Paris from 1867 to 1883. Its third issue, for November-December 1868, carried a brief review of the first volume of Marx's *Capital*, written by De Roberty, a follower of Auguste Comte's positivist philosophy. p. 54

- ²⁸ N. Sieber, *The Theory of Value and Capital of D. Ricardo in Connection with the Latest Additions and Explanations*, Russ. ed., Kiev, 1871, p. 170. p. 54
- ²⁹ The reference is to the article "Karl Marx's Viewpoint of Politico-Economic Criticism" written by I. I. Kaufman. p. 55
- ³⁰ This refers to the German philosophers Ludwig Büchner, Friedrich Lange, Eugen Dühring, Gustav Fechner and others. p. 57
- ³¹ Engels ceased work for the Manchester merchant house on July 1, 1869, and moved to London on September 20, 1870. p. 58
- ³² This is a reference to a letter from the German Social-Democrat Heinrich Wilhelm Fabian to Marx on November 6, 1880.
Engels speaks of $\sqrt{-1}$ in Chapter XII of Part I of *Anti-Dühring* (see pp. 80-81 of this book). p. 58
- ³³ According to Kant's *nebular theory* the solar system evolved from an initial nebula. p. 60
- ³⁴ The reference is to Engels' *Dialectics of Nature* and Marx's mathematical manuscripts. The manuscripts, consisting of more than 1,000 sheets, were written from the end of the 1850s to the early 1880s; they were partly published in the magazine *Pod Znamenem Marksizma* (Under the Banner of Marxism) No. 1, 1933. p. 60
- ³⁵ The reference is to the works of the Irish physicist Thomas Andrews (1869), the French physicist Louis-Paul Cailletet and the Swiss physicist Raoul Pictet (1877). p. 60
- ³⁶ The reference is, in the first case, to the platypus, and, in the second, evidently, to the archaeopteryx. p. 61
- ³⁷ According to the theory expounded by Virchow in *Cellular Pathology*, the first edition of which was published in 1858, the animal individual breaks up into tissue, the tissue into cellular territories, the cellular territories into cells, so that in the final analysis the animal individual is a mechanical sum of separate cells (R. Virchow, *Die Cellularpathologie*, 4. Aufl., Berlin, 1871, S. 17).
In speaking of the "progressive" nature of this theory, Engels alludes to Virchow's membership in the German bourgeois Progressive Party, of which he was one of the founders and prominent leaders. p. 61
- ³⁸ The *Alexandrian period* of science dates from the 3rd century B.C. to the 7th century A.D. Its name derives from the Egyptian city of Alexandria, on the Mediterranean, which was, in its day, a major centre of international trade. The Alexandrian period witnessed the rapid advance of mathematics, mechanics (Euclid, Archimedes), geography, astronomy, anatomy, physiology and other sciences. p. 64

- ³⁹ Matthew, 5:37 p. 65
- ⁴⁰ Engels calls Michelet the "wandering Jew of the Hegelian school" apparently because of his invariable adherence to Hegelianism of which he had only a superficial knowledge. p. 69
- ⁴¹ G. W. F. Hegel, *Encyclopädie der philosophischen Wissenschaften*, § 147, Addendum. p. 78
- ⁴² See *Mémoires pour servir à l'histoire de France, sous Napoléon, écrits à Sainte-Hélène, par les généraux qui ont partagé sa captivité, et publiés sur les manuscrits entièrement corrigés de la main de Napoléon*, Vol. I, compiled by General Count de Montholon, Paris, 1823, p. 262. p. 84
- ⁴³ Karl Marx, *Capital*, Vol. I, Moscow, 1974, pp. 714-15. p. 43
- ⁴⁴ Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 715. p. 86
- ⁴⁵ The expression "*determinatio est negatio*" is to be found in Spinoza's letter of June 2, 1674, to Jarich Jelles, in which it is used in the sense of "limitation is a negation". The expression "*omnis determinatio est negatio*" and its interpretation as "every determination is a negation" are to be found in Hegel's works, from which they have become widely known (see G. W. F. Hegel, *Encyclopädie der philosophischen Wissenschaften in Grundrisse*, Part I, § 91, Addendum; *Wissenschaft der Logik*, Book I, Section I, Chapter 2, Note to the paragraph on quality; *Vorlesungen über die Geschichte der Philosophie*, Vol. I, Part I, Section I, Chapter I, paragraph on Parmenides. p. 92
- ⁴⁶ An allusion to Molière's comedy *Le Bourgeois gentilhomme*, Act II, Scene VI. p. 93
- ⁴⁷ Engels is referring to Luther's choral "Ein feste Burg ist unser Gott" ("God is our firm stronghold"). p. 95
- ⁴⁸ It was on the day of his death, May 24, 1543, that Copernicus received a copy of his book, *De revolutionibus orbium coelestium*, in which he set forth the heliocentric system of the world and which had just come off the press. p. 96
- ⁴⁹ Eighteenth-century chemists attributed combustion to the presence in combustible bodies of phlogiston, a substance which those bodies were supposed to give off in burning. Since, however, it was known that metals heated in the air become heavier, the proponents of the phlogistic theory endowed phlogiston with a physically absurd negative weight. This theory was proved untenable by Lavoisier, the French chemist, who correctly explained the process of combustion as the reaction of a burning substance combining with oxygen. The useful part which the phlogistic theory played in its day is noted by Engels at the end of his "Old Preface to *Anti-Dühring*" (see 121 of this book). p. 97

- ⁵⁰ Kant's nebular theory, according to which the solar system evolved from an initial nebula, is expounded in the treatise *Allgemeine Naturgeschichte und Theorie des Himmels, oder Versuch von der Verfassung und dem mechanischen Ursprunge des ganzen Weltgebäudes nach Newtonischen Grundsätzen abgehandelt*, Königsberg and Leipzig, 1755.

The Laplacian hypothesis of the origin of the solar system was first expounded in the last chapter of the treatise *Exposition du système du monde*, Vols. I-II, Paris, 4th year of the French Republic (1796). p. 99

- ⁵¹ When working on *Dialectics of Nature* Engels used William Robert Grove's book *The Correlation of Physical Forces*, 3rd ed., London, 1855. p. 101

- ⁵² *Amphioxus* (the lancet fish)—a small fishlike animal, a transitional form between the invertebrates and the vertebrates; it breeds in a number of seas and oceans.

Lepidosiren (an Amazon mudfish) belongs to the order of the lung fishes or Dipnoi, which have both lungs and gills; it occurs in South America. p. 103

- ⁵³ *Ceratodus* (the barramunda)—a fish with both lungs and gills occurring in Australia.

Archaeopteryx—a fossil vertebrate, one of the oldest representatives of the birds, at the same time possessing reptilian features. p. 103

- ⁵⁴ In 1759 C. F. Wolff published his thesis "Theoria generationis" ("The Theory of Generation") refuting the doctrine of preformation and furnishing scientific proof in support of the theory of epigenesis.

Preformation implies that the adult organism is pre-formed in the germ cell. From the metaphysical point of view of preformism, which prevailed among the biologists in the seventeenth and eighteenth centuries, every part of the adult organism is already present in the germ cell in reduced form, so that development is purely quantitative growth of already existing organs, while development in the true sense, that is, new formation, or epigenesis, does not take place at all. The theory of epigenesis was advanced and substantiated by a number of outstanding biologists, from Wolff to Darwin. p. 103

- ⁵⁵ Charles Darwin's principal work, *On the Origin of Species by Means of Natural Selection, etc.*, appeared on November 24, 1859. p. 103

- ⁵⁶ *Protista*, are, according to Haeckel's classification, a vast group of protozoa, both unicellular and acellular, and forming a special, third kingdom of organic nature alongside the two kingdoms of multi-cellular organisms (animals and plants). p. 104

- ⁵⁷ *Eozoon canadense*—a fossil found in Canada, which was regarded as the remains of ancient primitive organisms. In 1878 German zoologist K. Möbius refuted the view of the organic origin of this fossil. p. 106

- ⁵⁸ Mephistopheles' words in Goethe's *Faust* (Part I, Scene 3). p. 108
- ⁵⁹ The Sixth World Industrial Exhibition was opened in Philadelphia on May 10, 1876. Germany was one of the forty exhibitors. It demonstrated that German industry was far behind that of other countries and that its guiding principle was "cheap but bad". p. 114
- ⁶⁰ See Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 29. p. 120
- ⁶¹ See Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 29. p. 121
- ⁶² The reference is to the treatises: Jean Baptiste Joseph Fourier, *Théorie analytique de la chaleur*, Paris, 1822, and Sadi Carnot, *Réflexions sur la puissance motrice du feu et sur les machines propres à développer cette puissance*, Paris, 1824. p. 121
- ⁶³ G. W. F. Hegel, *Encyclopädie der philosophischen Wissenschaften*, § 108, Addendum. In working on *Dialectics of Nature* Engels used the edition: G. W. F. Hegel, *Werke*, Bd. VI, 2. Aufl., Berlin, 1843, S. 217. p. 125
- ⁶⁴ G. W. F. Hegel, *Wissenschaft der Logik*, Book I, Section III, Chapter 2. Observation on "Examples of Nodal Lines of Measure-Relations, *natura non facit saltum*". In working on *Dialectics of Nature* Engels used the edition: G. W. F. Hegel, *Werke*, Bd. III, 2. Aufl., Berlin, 1841, S. 433. p. 125
- ⁶⁵ H. E. Roscoe und C. Schorlemmer, *Ausführliches Lehrbuch der Chemie*, Bd. II, Braunschweig, 1879, S. 823. p. 127
- ⁶⁶ The Periodic Law was discovered by D. I. Mendeleyev in 1869. In 1870-71, Mendeleyev gave a detailed description of the several missing members of the periodic system. He suggested using Sanskrit numerals to denote those elements (as, *eka*—"one"), prefixing each numeral to the name of the preceding known element, which was to be followed by the appropriate missing member of the same group. Gallium, the first element predicted by Mendeleyev, was discovered in 1875. p. 127
- ⁶⁷ See Note 46. p. 128
- ⁶⁸ This quotation is given in Starcke's book *Ludwig Feuerbach*, Stuttgart, 1885, S. 154-55. It is taken from Feuerbach's work *Die Unsterblichkeitsfrage vom*

Standpunkt der Anthropologie which was written in 1846 and published in Feuerbach's *Sämtliche Werke*, Bd. III, Leipzig, 1847. S. 331. p. 133

⁶⁹ See Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (pp. 163-73 of this book). p. 134

⁷⁰ *Compsognathus*—an extinct animal of the order of dinosaurs, belonging to the class of reptiles, but according to the structure of the pelvis and hind quarters closely related to birds.
On *Archaeopteryx* see Note 53. p. 136

⁷¹ Engels is referring to multiplication by budding or division among coelenterates. p. 136

⁷² G. W. F. Hegel, *Encyclopädie der philosophischen Wissenschaften*, § 135, Addendum. p. 138

⁷³ Op. cit., § 126, Addendum. p. 138

⁷⁴ Op. cit., § 117, Addendum. p. 139

⁷⁵ Op. cit., § 115. Note. Here Hegel says that the very form of judgment speaks of the distinction between the subject and the predicate. p. 139

⁷⁶ *Kismet*—in Moslem, chiefly Turkish, usage, means destiny or fate. p. 142

⁷⁷ This refers to Charles Darwin's *On The Origin of Species by Means of Natural Selection* (1859). p. 143

⁷⁸ Spinoza, *Ethics*, Part I, definitions 1 and 3, and theorem 6. p. 145

⁷⁹ See Note 51. p. 146

⁸⁰ The *Lothar Meyer curve* shows the relationship between the atomic weights of the elements and their atomic volumes. It was constructed by the German chemist L. Meyer and published in his article "Die Natur der chemischen Elemente als Funktion ihrer Atomgewichte" in 1870. p. 148

- ⁸¹ E. Haeckel, *Natürliche Schöpfungsgeschichte*, 4. Aufl., Berlin, 1873, S. 538, 543, 588; *Anthropogenie*, Leipzig, 1874, S. 460, 465, 492. p. 150
- ⁸² Nothing is in the mind which has not been in the senses—the fundamental tenet of sensualism. The content of this formula goes back to Aristotle. p. 151
- ⁸³ In 1833-34, Heinrich Heine published his works *Die romantische Schule* and *Zur Geschichte der Religion und Philosophie in Deutschland*, in which he put forward the idea that the German philosophical revolution, the culminating stage of which was Hegel's philosophy, was a prelude to the impending democratic revolution in Germany. p. 155
- ⁸⁴ See Hegel's *Philosophy of Law. Introduction*. p. 155
- ⁸⁵ See G. W. F. Hegel, *Encyclopädie der philosophischen Wissenschaften im Grundrisse. Erster Teil. Die Logik*. § 147, § 142. Zusatz. p. 155
- ⁸⁶ *Deutsche Jahrbücher für Wissenschaft und Kunst*—a literary and philosophical journal of the Young Hegelians published in Leipzig from July 1841 to January 1843. p. 161
- ⁸⁷ *Rheinische Zeitung für Politik, Handel und Gewerbe*—a daily published in Cologne from January 1, 1842. It was founded by representatives of the Rhenish bourgeoisie opposing Prussian absolutism. Some of the Young Hegelians contributed to it. In April 1842 Karl Marx began to contribute to the *Rheinische Zeitung* and in October of the same year became one of its editors. The government subjected the paper to strict censorship and on March 31, 1843, closed it down. p. 161
- ⁸⁸ The reference is to Max Stirner's *Der Einzige und sein Eigentum* which appeared in Leipzig in 1845. p. 161
- ⁸⁹ K. Marx and F. Engels, *The Holy Family, or Critique of Critical Criticism* (see Marx and Engels, *Collected Works*, Vol. 4, Moscow, 1975, pp. 5-211). p. 162
- ⁹⁰ The planet referred to is Neptune, discovered in 1846 by the German astronomer Johann Galle. p. 166
- ⁹¹ Engels is quoting Feuerbach's aphorisms. The quotation is taken from Starcke's book *Ludwig Feuerbach*, Stuttgart, 1885, S. 166. p. 167

⁹² See Note 49.

p. 168

⁹³ Reference is to David Friedrich Strauss' *Die christliche Glaubenslehre in ihrer geschichtlichen Entwicklung und im Kampfe mit der modernen Wissenschaft*, Bd. I-II, Tübingen-Stuttgart, 1840-41. Its second part, bigger in volume, is entitled *Der materiale Inbegriff der christlichen Glaubenslehre (Dogmatik)*.

p. 174

⁹⁴ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy* (see p. 165 of this book).

p. 196

⁹⁵ Frederick Engels, "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific* (see p. 181 of this book).

p. 196

⁹⁶ *Neo-Kantianism*—a trend in philosophy preaching subjective idealism under the slogan of a return to Kantian philosophy. It arose in the middle of the nineteenth century in Germany, where interest in Kantianism had increased. In 1865 Otto Liebmann's book *Kant and the Epigones* was published, each chapter ending with the call: "Back to Kant". Liebmann put forward the task of correcting Kant's "major error"—the recognition of "things-in-themselves". One of the early representatives of neo-Kantianism was Friedrich Albert Lange who tried to use physiology to substantiate agnosticism.

Later two main schools of neo-Kantianism were formed: that of Marburg (Hermann Cohen, Paul Natorp and others) and that of Freiburg or Baden (Wilhelm Windelband, Heinrich Rickert, etc.). The former tried to substantiate idealism by speculating on the successes of natural science, especially on the penetration of mathematical methods into physics; the latter counterposed the social sciences to natural sciences, seeking to prove that historical phenomena are strictly individual and not governed by any laws. They denied the objective existence of the material world and regarded as the object of knowledge not the laws of nature and society, but merely the phenomena of consciousness. In contrast to the agnosticism of the natural scientists, that of neo-Kantians was not "shamefaced materialism", but a variety of idealism for it asserted the impotence of science in regard to cognising and changing reality. The neo-Kantians openly attacked Marxism, counterposing to it "ethical socialism". In accordance with their theory of knowledge they declared socialism to be the "ethical ideal" of human social existence, an ideal to which mankind was striving, but which it could not attain. Lenin revealed the reactionary nature of neo-Kantianism and its connection with other trends in bourgeois philosophy (immanentism, Machism, pragmatism, etc.).

p. 196

⁹⁷ *Die Neue Zeit*—the theoretical journal of the German Social-Democratic Party, published in Stuttgart from 1883 to 1923.

p. 196

⁹⁸ The *Encyclopaedists*—a group of philosophers, natural scientists and writers of the French Enlightenment in the eighteenth century who combined to publish the *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers* (1751-80). The group was organised and led by Denis Diderot, whose closest assistant was Jean le Rond d'Alembert. Paul Henri Holbach, Claude Adrien Helvétius and Voltaire gave effective assistance in the publication of the *Encyclopaedia* and Jean Jacques Rousseau contributed to the first volumes. A wide range of specialists in various spheres of knowledge contributed to the *Encyclopaedia*. Though they held different views on scientific and political questions, they were united by their opposition to feudalism and the arbitrary rule of the Church, and by their hatred of medieval scholasticism. The leading part among the *Encyclopaedists* was played by the materialists, who actively opposed idealist philosophy. The *Encyclopaedists* were the ideologists of the revolutionary bourgeoisie and played a decisive part in the ideological preparation for the eighteenth-century revolution in France. p. 198

⁹⁹ See pp. 64, 69 of this book. p. 204

¹⁰⁰ *Revue néo-scholastique*—a theological-philosophical magazine founded by the Catholic philosophical society in Louvain (Belgium); it was published from 1894 to 1909. p. 211

¹⁰¹ See p. 70 of this book. p. 228

¹⁰² See pp. 157, 167 of this book. p. 228

¹⁰³ Lenin is referring to the literary portrait drawn by I. S. Turgenev in his prose poem "A Rule of Life". p. 229

¹⁰⁴ This refers to Bogdanov, Lunacharsky and their associates. p. 235

¹⁰⁵ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see p. 165 of this book). p. 237

¹⁰⁶ Lenin is referring to a character depicted by I. S. Turgenev in his novel *Smoke*, a pseudo-learned dogmatist. p. 237

¹⁰⁷ Frederick Engels. *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see pp. 165-66 of this book). p. 238

- ¹⁰⁸ Karl Marx, *Theses on Feuerbach* (see p. 29 of this book). p. 241
- ¹⁰⁹ Frederick Engels, "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific* (see p. 180 of this book). p. 244
- ¹¹⁰ Frederick Engels, "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific* (see p. 181 of this book). p. 247
- ¹¹¹ Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 59. p. 253
- ¹¹² Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see p. 165 of this book). p. 263
- ¹¹³ In the definition of sensationalism quoted by Lenin, Franck rightly regards Epicureanism as a variety of it, but he draws an incorrect distinction between Epicureanism and objective materialist sensationalism. In his conspectus of *Vorlesungen über die Geschichte der Philosophie* by Hegel, who likewise misunderstood and misinterpreted the Epicurean doctrine, Lenin demonstrated that Epicureanism was one of the forms of ancient Greek materialism. p. 267
- ¹¹⁴ Frederick Engels, *Anti-Dühring* (see p. 72 of this book). p. 270
- ¹¹⁵ Frederick Engels, *Anti-Dühring* (see p. 76 of this book). p. 271
- ¹¹⁶ See Marx's letter to Ludwig Kugelmann of December 5, 1868. p. 272
- ¹¹⁷ Lenin is referring to Karl Marx's *Theses on Feuerbach* (1845) and to the works by Frederick Engels: *Ludwig Feuerbach and the End of Classical German Philosophy* (1888) and the "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific*. p. 274
- ¹¹⁸ See p. 181 of this book. p. 274
- ¹¹⁹ Frederick Engels, *Anti-Dühring* (see pp. 64, 65-66, 70 of this book). p. 286
- ¹²⁰ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy* (see pp. 175, 178 of this book). p. 287

- ¹²¹ *Annalen der Naturphilosophie* (Annals of Natural Philosophy)—a journal of a positivist tendency, published by Wilhelm Ostwald in Leipzig from 1901 to 1921. Its contributors included Ernst Mach, Paul Volkmann and others.
p. 295
- ¹²² Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see pp. 163-67 of this book).
p. 296
- ¹²³ Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 67.
p. 300
- ¹²⁴ *Natural Science*—a monthly journal published in London from 1892 to 1899.
p. 307
- ¹²⁵ *The Philosophical Review*—an American journal of an idealist trend, founded by Jacob Gould Schurman. It began publication in 1892.
p. 308
- ¹²⁶ Frederick Engels, *Anti-Dühring* (see p. 78 of this book).
p. 312
- ¹²⁷ "The subjective method in sociology"—an unscientific idealist approach to historical processes which rejects objective laws of social development, reducing them to the arbitrary actions of "outstanding personalities". In the thirties and forties of the nineteenth century, adherents of the subjectivist school in sociology were the Young Hegelians Bruno Bauer, David Strauss, Max Stirner and others, who declared the people to be an "uncritical mass" that blindly follows "critically thinking personalities". Karl Marx and Frederick Engels in *The Holy Family*, *The German Ideology* and other works made a thorough and profound criticism of the views of the Young Hegelians. In Russia in the second half of the nineteenth century, the subjective method in sociology was represented by the liberal Narodniks (P. L. Lavrov, N. K. Mikhailovsky and others), who denied the objective nature of the laws of social development and reduced history to the actions of individual heroes, "outstanding personalities".
Marxism-Leninism exposed the fallacy of the subjective-idealist trend in sociology and created a genuinely scientific theory of social development, of the decisive role played by the masses in history and of the significance of the activities of individuals.
p. 315
- ¹²⁸ *Archiv für systematische Philosophie*—a journal of an idealist trend published in Berlin from 1895 to 1931, being the second, independent section of the journal *Archiv für Philosophie*. Its first editor was Paul Natorp. From 1925 the journal was published under the title *Archiv für systematische Philosophie und Soziologie*.
p. 316

- ¹²⁹ This discovery was made by James Clerk Maxwell. By generalising Michael Faraday's experimental results from the study of electromagnetic phenomena, he created the theory of the electromagnetic field, from which it followed that changes of the electromagnetic field are propagated with the speed of light. On the basis of his researches, Maxwell in 1865 concluded that light consists of electromagnetic vibrations. Between 1886 and 1889 his theory was confirmed experimentally by Heinrich Hertz, who proved the existence of electromagnetic waves. p. 319
- ¹³⁰ The study of radioactivity revealed the existence of a special kind of radiation: alpha-, beta-, and gamma-rays. In 1903, Ernest Rutherford and Frederick Soddy suggested that radioactivity was the spontaneous transformation of one chemical element into another. This was speedily confirmed by William Ramsay and Frederick Soddy, who discovered that helium was one of the products of the radioactive disintegration of radon (1903). Shortly afterwards it was discovered that helium was formed by the disintegration of radium and other radioactive elements showing alpha-radioactivity. This formation of helium was an important argument in favour of the theory of radioactive transformations, and could only be explained by supposing that alpha-rays are the nuclei of helium atoms. This was confirmed in 1909 by the experiments of E. Rutherford and T. Royds. p. 319
- ¹³¹ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see p. 168 of this book). p. 319
- ¹³² Frederick Engels, *Anti-Dühring* (see p. 70 of this book). p. 320
- ¹³³ The description of the concept of the mass given by Henri Poincaré and quoted by Lenin was in accord with the level of development of physics at that time. The development of the electronic theory that followed the discovery of the electron made it possible to explain the nature of the mass of the electron. Joseph John Thomson advanced the hypothesis that the actual mass of the electron is determined by the energy of the electromagnetic field (i.e., the inertia of the electron is due to the inertia of the field). The concept of the electromagnetic mass of the electron was introduced, and this mass was found to depend on the velocity of motion of the electron. The mechanical mass of the electron, however, like that of any other particle, was regarded as unchanging. The existence of the mechanical mass should have been revealed by experiments on the dependence of the electromagnetic mass of the electron on its velocity. However, these experiments, performed by Walter Kaufmann in 1901-02, unexpectedly showed that the electron behaved as if all its mass was of an electromagnetic nature. Hence it was concluded that mechanical mass, which was formerly regarded as an inalienable property of matter, had

disappeared from the electron. This gave rise to various kinds of philosophical speculations and statements about the "disappearance of matter", the fallacy of which was demonstrated by Lenin. The further development of physics (relativity theory) showed that mechanical mass also depends on the velocity of motion and that the mass of the electron cannot be reduced wholly to electromagnetic mass.

p. 321

- ¹³⁴ *L'année psychologique*—the organ of a group of French idealist psychologists, published in Paris from 1894. p. 326

- ¹³⁵ *Revue générale des sciences pures et appliquées*—a journal dealing with natural science, published in Paris from 1890. p. 328

- ¹³⁶ This refers apparently to mechanical mass, which classical physics regarded as an eternal and unchanging property of matter. p. 328

- ¹³⁷ The reference is to Akimov's speech at the Second Congress of the R.S.D.L.P. (1903) in which he opposed the Party programme put forward by *Iskra*. One of his arguments was that in the programme the word "proletariat" occurred as the object and not the subject of the sentence.

Iskra—the first all-Russia illegal Marxist newspaper, which was founded by V. I. Lenin in 1900 and played a decisive role in organising a revolutionary Marxist party of the working class. On Lenin's initiative and with his direct participation, the *Iskra* Editorial Board drafted a Party programme and prepared the Second Congress of the R.S.D.L.P. (1903). p. 338

- ¹³⁸ *Deutsch-Französische Jahrbücher*—an annual published in Paris in German and edited by Karl Marx and Arnold Ruge. Only the first, double number, was issued in February 1844. p. 354

- ¹³⁹ See Frederick Engels, "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific*. p. 355

- ¹⁴⁰ Lenin is referring to Engels' works *Anti-Dühring* (1878), *Ludwig Feuerbach and the End of Classical German Philosophy* (1888), "Special Introduction to the English Edition of 1892" of *Socialism: Utopian and Scientific*. p. 355

- ¹⁴¹ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see pp. 165-66 of this book). p. 356

- ¹⁴² *Zagranichnaya Gazeta (Gazette Etrangère)*—the weekly newspaper of a group of Russian emigrants, published in Geneva from March 16 to April 13, 1908. The newspaper carried propaganda of Machism and god-building (articles by A. Bogdanov and A. V. Lunacharsky).
 Lenin quotes a passage from A. V. Lunacharsky's *Sketches of Modern Russian Literature*, published in Nos. 2 and 3 of the newspaper. p. 361
- ¹⁴³ *Obrazovaniye (Education)*—a legal literary, popular-scientific, social and political monthly published in St. Petersburg from 1892 to 1909. p. 361
- ¹⁴⁴ Lenin wrote his article "*Three Sources and Three Component Parts of Marxism*" for the 30 anniversary of Karl Marx's death. It was published in *Prosveshcheniye* No. 3, 1913. p. 364
- ¹⁴⁵ The reference is to Engels' works: *Ludwig Feuerbach and the End of Classical German Philosophy* and *Anti-Dühring*, and to the *Manifesto of the Communist Party* written by Karl Marx and Frederick Engels. p. 365
- ¹⁴⁶ See p. 20 of this book. p. 371
- ¹⁴⁷ See Frederick Engels, *Anti-Dühring*, Moscow, 1975, pp. 58, 76. p. 371
- ¹⁴⁸ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see pp. 163-64 of this book). p. 372
- ¹⁴⁹ Frederick Engels, *Anti-Dühring* (see pp. 58, 66 of this book). p. 373
- ¹⁵⁰ Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy* (see pp. 157, 175-76 of this book). p. 374
- ¹⁵¹ Frederick Engels, *Anti-Dühring* (see p. 68 of this book). p. 374
- ¹⁵² Frederick Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, Chapter II (see pp. 170-71 of this book). p. 375
- ¹⁵³ *Pod Znamenem Marksizma*—a philosophical and socio-economic journal. It was founded to spread the ideas of militant materialism and atheism, and was published in Moscow from 1922 to 1944. p. 386

Name Index

A

- Adler Friedrich* (1879-1960)—Austrian Social-Democrat reformist; advocate of empirio-criticism in philosophy; sought to "supplement" Marxism with Machian philosophy.—253, 350
- Akimov (Makhnovets), Vladimir Petrovich* (1872-1921)—Russian Social-Democrat, one of the ideologists of Economism—an opportunist trend among Russian Social-Democrats at the turn of the century.—338
- d'Alembert, Jean le Rond* (1717-1783)—French mathematician and philosopher, inconsistent materialist.—199, 200
- Anaxagoras of Clazomenae (Asia Minor)* (c. 500-428 B.C.)—Greek materialist philosopher.—24
- Aristotle* (384-322 B.C.)—Greek philosopher and scientist whose works embrace nearly all spheres of contemporary knowledge; vacillated between materialism and idealism.—63, 74, 116, 381, 383
- Arnauld, Antoine* (1612-1694)—French philosopher, supporter of Descartes' theory of cognition.—22
- Augustine, Saint (Sanctus Aurelius Augustinus)* (354-430)—Christian theologian and idealist philosopher.—142
- Avenarius, Richard* (1843-1896)—German philosopher, subjective idealist, formulated main pro-

positions of empirio-criticism, which revived the subjective idealism of Berkeley and Hume.—185, 189-91, 191, 201, 202, 203, 205, 210-13, 214, 215-22, 225-32, 233, 249-50, 252, 262, 263, 264, 273, 280, 282, 283, 288-89, 291, 293, 312, 314, 356, 359, 361, 362

B

Bacon, Francis (*Baron Verulam, Viscount St. Albans*) (1561-1626)

—English philosopher, naturalist, historian and statesman, founder of English materialism.—24, 25, 64, 118

Baer, Karl Ernst (1792-1876)—

naturalist, founder of embryology; known also as a geographer; worked in Germany and Russia.—103

Bakunin, Mikhail Alexandrovich (1814-1876)—Russian revolution-
 ary and writer, an ideologist

of anarchism.—161, 173

Bauer, Bruno (1809-1882)—

German idealist philosopher, one of the prominent Young Hegelians, author of works on the history of Christianity.—161, 163, 173

Baumann, Julius (1837-1916)—

professor of philosophy at Göttingen University (from 1869); his views were an eclectic mixture of subjective idealism and materialism.—316

- Bayle, Pierre* (1647-1706)—French sceptical philosopher; criticised religious dogmatism.—23
- Bazarov, V. (Rudnev, Vladimir Alexandrovich)* (1874-1939)—Russian philosopher and economist; advocated "God-building" and empirio-criticism in the period of reaction (1907-10); one of the main revisionists of Marxism from Machian positions.—185, 186, 188, 222, 223, 224, 225, 226, 227, 235, 243, 244, 246-52, 253-54, 277, 308, 362
- Becher, Erich* (1882-1929)—German philosopher. In his earlier works Becher was close to, as Lenin put it, "a shamefaced and incompletely thought-out materialism", he criticised the subjective idealist views of Ernst Mach and Wilhelm Ostwald; later he became an idealist.—316
- Becquerel, Antoine Henri* (1852-1908)—French physicist, author of works on optics, electricity, magnetism, photochemistry, electrochemistry and meteorology; discovered radioactivity (1896).—318
- Beesley, Edward Spencer* (1831-1915)—British historian and philosopher who popularised Auguste Comte's ideas in Britain and translated his works into English.—355
- Bel'tov, N.*—see *Plekhanov, G. V.*
- Bentham, Jeremy* (1748-1832)—English sociologist and theoretician of utilitarianism.—28
- Bentley, J. M.* (born 1870)—American psychologist and philosopher.—308
- Berkeley, George* (1685-1753)—British subjective idealist philosopher.—186-90, 191-96, 198, 199, 201-02, 205, 206, 207, 210, 214, 215, 224, 226, 232, 241, 244, 245, 250, 255, 258, 263, 264, 265, 267, 308, 316, 338, 350, 384
- Berman, Yakov Alexandrovich* (1868-1933)—Russian Social-Democrat, lawyer and philosopher; his philosophical views were an eclectic mixture of metaphysical materialism and pragmatism; he wrote a number of philosophical works attempting to revise dialectical materialism.—235, 314, 348
- Bismarck, Otto* (1815-1898)—statesman and diplomat in Prussia and Germany; forcibly united Germany under Prussian hegemony. First Chancellor of the German Empire (1871-90); introduced the Anti-Socialist Law (1878).—276
- Block, Maurice* (1816-1901)—French statistician and economist, representative of vulgar political economy.—54
- Bogdanov, A. (Malinovsky, Alexander Alexandrovich)* (1873-1928)—Russian Social-Democrat, philosopher, sociologist, economist and physician. He sought to evolve his own philosophical system known as "empiriomonism" (a variety of Machian subjective-idealist philosophy disguised in pseudo-Marxist terminology).—185, 186, 190, 211, 213-14, 229-31, 235, 248, 258, 259, 260, 261, 262-63, 268-69, 270-71, 272, 273, 279, 281-82, 297-98, 310, 311, 312, 330, 331, 336, 337, 338, 340, 341, 342, 343, 353, 359, 363
- Boguski, Jozef Jerzy* (1853-1933)—Polish physicist and chemist. In 1875-76 he was Mendeleev's assistant, studying the resiliency of gases.—77
- Böhme, Jakob (Bohemus, Jacobus)* (1575-1624)—German artisan and mystic philosopher.—24
- Boltzmann, Ludwig* (1844-1906)—Austrian physicist. His works on the theory of irradiation as well as his profound treatises on the kinetic theory of gases and statistical interpretation of the second principle of thermodynamics, which dealt a heavy blow to the idealist theory of the "heat death of the universe",

were a great contribution to the development of physics. He advocated mechanistic materialism.—331

Boyle, Robert (1627-1691)—English chemist and physicist. In 1662, jointly with R. Townley he discovered the inverse relationship between the volume and the pressure of air. Later this became known as Boyle's law.—76, 77, 271

Brunetière, Ferdinand (1849-1906)—French literary critic.—344

Bruno, Giordano (1548-1600)—Italian thinker; developed Copernicus' doctrine of the structure of the Universe; was burnt at the stake by the Inquisition for refusing to renounce his views.—96

Büchner, Friedrich Karl Christian Ludwig (1824-1899)—German philosopher, one of the main advocates of vulgar materialism; a physician.—48, 117, 168, 210, 334, 355, 372

C

Cabanis, Pierre Jean Georges (1757-1808)—French physician, philosopher and politician; one of the forerunners of vulgar materialism.—21

Cabet, Étienne (1788-1856)—French writer, prominent representative of utopian communism.—28

Calvin, Jean (1509-1564)—one of the leaders of the Reformation, the founder of Calvinism.—96, 142

Carnot, Nicolas Léonhard Sadi (1796-1832)—French engineer and physicist, one of the founders of thermodynamics.—121, 344

Carstanjen, Friedrich—Swiss philosopher, follower of Mach, disciple of Richard Avenarius.—283

Carus, Paul (1852-1919)—American philosopher, subjective idealist and mystic.—341, 361

Cauwelaert, Jan France van (born 1880)—Belgian lawyer and statesman. In 1905-07 he published a number of philosophical articles of an idealist nature in the journal *Revue néo-scolastique*.—211

Chernov, Viktor Mikhailovich (1876-1952)—one of the leaders and theoreticians of the Socialist-Revolutionary Party. In his articles directed against Marxism, he tried to prove Marx's doctrine inapplicable to agriculture.—185, 235, 236, 237, 238, 239, 240, 241, 244, 248, 253, 265, 270, 273, 310, 315

Clausius, Rudolf (1822-1888)—German physicist known for his works on the theory of thermodynamics and on the kinetic theory of gases; formulated the second law of thermodynamics (1850).—344

Cohen, Hermann (1842-1918)—German idealist philosopher, mathematician, founder of the Marburg school of neo-Kantianism.—237, 347

Colding, Ludwig August (1815-1888)—Danish physicist and engineer.—131

Collins, Anthony (1676-1729)—English deist philosopher, follower of John Locke.—25

Comte, Auguste (1798-1857)—French philosopher and sociologist, founder of positivism.—355

Condillac, Étienne Bonnot (1715-1780)—French sensualist philosopher, deist, Catholic clergyman.—22, 25, 199

Copernicus (Kopernik), Nicolaus (1473-1543)—Polish astronomer, author of the heliocentric theory of the Universe.—96, 99, 166

Cornelius, Hans (1863-1947)—German philosopher, subjective idealist.—361

Coward, William (1656-1725)—English physician and deist philosopher.—25

Cuvier, Georges (1769-1832)—French naturalist, zoologist and palaeontologist; author of the unscientific theory of cataclysms.—101

D

Dalton, John (1766-1844)—English chemist and physicist who developed atomistic ideas in chemistry.—102, 116

Darwin, Charles Robert (1809-1882)—English naturalist, founder of evolutionary biology.—103, 108, 132, 143, 170, 177

Democritus of Abdera (c. 460-370 B.C.)—Greek materialist philosopher, one of the founders of the atomistic theory.—22, 24, 116, 266, 384

Descartes, René (Lat.—*Renatus Cartesius*) (1596-1650)—French dualist philosopher, mathematician and naturalist.—20, 21, 22, 26, 63, 71, 81, 97, 102, 116, 166, 168, 199, 384

Dézamy, Théodore (1803-1850)—French writer, prominent representative of the revolutionary trend in utopian communism.—28

Diderot, Denis (1713-1784)—French materialist philosopher, writer and art theoretician. The *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers* (1751-80) was published on his initiative and under his guidance.—26, 63, 172, 198, 199, 200, 201, 209, 210, 250, 263

Dietzgen, Eugen (1862-1930)—son of Joseph Dietzgen and publisher

of his works. He described his philosophy as "naturmonism" and alleged that it combined materialism and idealism.—256-57

Dietzgen, Joseph (1828-1888)—German worker, Social-Democrat, philosopher who arrived independently at the fundamental propositions of dialectical materialism.—175, 185, 254, 256, 257-58, 271, 272, 275, 287, 291, 329, 334, 357-58, 359, 361, 362, 384

Diner-Dénes, Joseph (1857-1937)—Hungarian journalist, sociologist and art critic; Social-Democrat.—318-19

Diogenes Laertius (3rd. cent. A.D.)—Greek historian of philosophy and compiler of a vast work on ancient philosophers.—117

Dodwell, Henry (c. 1700-1784)—English deist philosopher.—25

Draper, John William (1811-1882)—American naturalist and historian.—111, 145

Duhem, Pierre Maurice Marie (1861-1916)—French physicist, author of a number of works on the history of physics, who advocated Mach's theory of knowledge.—215, 325, 342, 348, 349, 350, 351

Dühring, Eugen (1833-1921)—German philosopher and economist whose philosophical views were an eclectic mixture of positivism, metaphysical materialism and idealism. Dühring's views, which found support among a section of German Social-Democrats, were criticised by Engels in his book *Anti-Dühring*. *Herr Eugen Dühring's Revolution in Science*. Lenin also repeatedly criticised Dühring's eclectic views.—58, 69, 70, 71, 76, 79, 81-83, 85, 86, 87, 89, 91, 93, 113, 114, 120, 204, 217, 268, 269, 271, 300, 301, 302, 310, 355, 365

Duns Scotus, John (c. 1265-1308)—Scottish scholastic philosopher, nominalist.—23

Dupuis, Charles François (1742-1809)—French philosopher in the period of Enlightenment.—26

Dürer, Albrecht (1471-1528)—German Renaissance painter.—95

E

Einstein, Albert (1879-1955)—German physicist, author of the theory of relativity.—386

Engels, Frederick (1820-1895).—44-45, 185, 195-96, 204, 205, 210, 215, 217, 224, 227, 228, 232, 235, 236, 237, 238, 239, 240, 241, 243, 244, 245, 246, 247, 248-54, 258, 259, 263, 264, 268, 269, 270, 271, 272, 273, 274, 275, 278, 282, 285, 286, 287, 288, 289, 291, 292, 295, 296, 299, 300, 301, 307, 308-14, 318, 319, 320, 322, 323, 329, 330, 331, 334, 337, 348, 349, 353, 354, 355-56, 357, 361, 362, 365, 371, 372, 373, 374, 375, 381

Epicurus (c. 341-270 B.C.)—Greek materialist philosopher, follower of Democritus.—22

Euclid (late 4th-early 3rd cent. B. C.)—Greek mathematician.—96

Eulogius (Georgievsky, V.) (born 1868)—the bishop of Lublin from 1902.—276

Ewald, Oskar (pseudonym of *Friedländer*) (born 1881)—Austrian neo-Kantian philosopher.—231

F

Fechner, Gustav Theodor (1801-1887)—German naturalist and idealist philosopher; follower of Schelling's philosophy, tried to reconcile idealism and religion with the spontaneous materialist nature of his scientific discoveries.—355

Feuerbach, Ludwig Andreas (1804-1872)—German materialist philosopher. Despite its limited contemplative nature, Feuerbach's materialism served as one of the theoretical sources of Marxist philosophy.—20, 23, 29, 30, 31, 48, 120, 131, 133, 134, 162, 163, 165, 166, 167, 168, 170, 171, 173, 185, 210, 215, 224, 225, 226, 227, 236, 237, 241, 242, 253, 254, 255, 256, 258, 267, 274, 277, 278, 283-84, 285, 288, 289, 292, 297, 299, 301, 343, 354, 357, 361, 365, 370-72, 384

Fichte, Johann Gottlieb (1762-1814)—German philosopher, subjective idealist.—198, 218, 222, 277, 278, 280

Fourier, François Marie Charles (1772-1837)—French utopian socialist.—27

Fourier, Jean Baptiste Joseph (1768-1830)—French mathematician who did research in algebra and mathematical physics.—121

Franck, Adolf (1809-1893)—French idealist philosopher, co-author of a philosophical dictionary. In his work, *Le communisme jugé par l'histoire* (1849), he came out against the communist doctrines of his time.—267

Frank, Philipp (born 1884)—neopositivist philosopher and physicist.—295

Fraser, Alexander Campbell (1819-1914)—British philosopher, follower of Berkeley and publisher of his works.—187, 192, 193, 194, 195, 196

Frederick William III (1770-1840)—King of Prussia (1797-1840).—155, 158

Frederick William IV (1795-1861)—King of Prussia (1840-1861).—161

G

Galen, Claudius (c. 130-c. 200)—Roman physician, naturalist and

- philosopher, follower of Aristotle. He studied anatomy and physiology and laid the foundations for investigating blood circulation.—73
- Galle, Johann Gottfried* (1812-1910)—German astronomer, who in 1846 discovered the planet Neptune on the basis of Le Verrier's calculations.—166
- Gassendi, Pierre* (1592-1655)—French materialist philosopher, adherent and advocate of Epicurus' atomistic theory and ethics; also known for his works on astronomy, mathematics and mechanics.—22
- Gay, Jules* (1807-after 1876)—French utopian communist.—28
- Gerhardt, Charles Frédéric* (1816-1856)—French chemist, together with Laurent, defined the concepts of the molecule and the atom.—82
- Goethe, Johann Wolfgang* (1749-1832)—German writer and thinker, also known for his works on natural science.—159, 169
- Grove, William Robert* (1811-1896)—English physicist and lawyer.—101, 146
- Grün, Karl* (1817-1887)—German petty-bourgeois writer, one of the principal exponents of "true socialism" in the mid-1840s.—162, 225, 354
- Guizot, François Pierre Guillaume* (1787-1874)—French historian and statesman; virtually directed the home and foreign policy of France from 1840 to 1848.—43
- H**
- Haeckel, Ernst Heinrich* (1834-1919)—German biologist, adherent of materialism in natural science.—59, 149, 150, 209
- Hartley, David* (1705-1757)—English physician and materialist philosopher.—25
- Hartmann, Eduard* (1842-1906)—German idealist philosopher, irrationalist and mystic.—117
- Haym, Rudolf* (1821-1901)—German historian of philosophy and literature.—224, 284
- Hegel, Georg Wilhelm Friedrich* (1770-1831)—German philosopher, objective idealist.—20, 26, 34, 35, 43, 47, 48, 49, 50, 54, 56, 57, 59, 60, 63, 67, 69, 78, 81, 83, 85, 93, 116, 117, 119, 120, 122, 123, 125, 127, 137, 138, 139, 143, 145, 148, 149, 150, 151, 154-56, 157-60, 163, 164-66, 167, 169, 171, 173-76, 178, 181, 224, 237, 263, 264, 273, 311, 316, 355, 356, 371, 373, 374, 378, 381, 383, 384, 387
- Heine, Heinrich* (1797-1856)—German revolutionary poet.—123, 155
- Helfond, O.I.* (1863-1942)—a physician, one of the authors of the revisionist collection *Studies in the Philosophy of Marxism* (1908).—287, 288
- Helmholtz, Hermann Ludwig Ferdinand* (1821-1894)—German physicist and physiologist, inconsistent materialist.—59, 325, 326, 331
- Helvétius, Claude Adrien* (1715-1771)—French materialist philosopher.—22, 26, 28
- Heraclitus of Ephesus* (c. 540-480 B.C.)—Greek materialist philosopher, one of the founders of dialectics.—64, 381, 384
- Hering, Ewald* (1834-1918)—German physiologist known for his works on the physiology of the sense-organs. An idealist philosopher, he advocated the dualist theory of psychophysiological parallelism according to which the psychical and physiological processes take place in the brain in parallel and independently of each other.—310
- Herschel, William* (1738-1822)—English astronomer.—100

Hertz, Heinrich Rudolph (1857-1894)—German physicist. Between 1885 and 1889 he experimentally proved the existence of electromagnetic waves and studied their properties.—331

Hibben, John Grier (1861-1933)—American idealist philosopher whose main works deal with problems of logic.—339

Hobbes, Thomas (1588-1679)—English materialist philosopher.—22, 24, 25, 166

Holbach, Paul Henri Dietrich (1723-1789)—French materialist philosopher.—26, 384

Hönigswald, Richard (1875-1947)—German neo-Kantian philosopher.—186

Houllevigue, Louis (1863-1944)—French physicist.—326

Hume, David (1711-1776)—Scottish subjective idealist philosopher, agnostic; historian and economist.—145, 165-66, 186, 195, 196, 197, 198, 215, 236, 237, 239, 240, 241, 243, 244, 245, 247, 250, 252, 253, 263, 264, 273, 277, 285, 288, 289, 291, 292, 294, 295, 296, 299, 307, 309-10, 323, 329, 350, 355, 384

Huxley, Thomas Henry (1825-1895)—English naturalist; a close associate of Charles Darwin and populariser of his theory; inconsistent materialist.—198, 232, 245, 355, 356-57, 372

I

Im Thurn, Everard Ferdinand (1852-1932)—British colonial official, traveller and anthropologist.—164

J

James, William (1842-1910)—American philosopher and psychologist; subjective idealist;

one of the founders of pragmatism.—359

Joule, James Prescott (1818-1889)—English physicist who studied electromagnetism and heat and determined the mechanical equivalent of heat.—101, 131, 344

K

Kant, Immanuel (1724-1804)—founder of classical German philosophy. Kant's theory of knowledge is characterised by a contradictory combination of idealism and elements of materialism. This is reflected in the recognition of objectively existing "things-in-themselves".—48, 60, 66, 99, 100, 103, 119, 156, 165, 166, 169, 171, 181, 189, 196-98, 222, 237, 238, 239, 240, 241, 243, 247, 248, 252, 253-54, 255, 257, 263, 264, 273, 275, 285, 288, 291, 294, 295, 296, 298-99, 302, 306, 307, 308, 313, 316, 339, 343, 355, 372, 378, 384

Kautsky, Karl (1854-1938)—one of the leaders of the German Social-Democratic Party and the Second International. Originally he was a Marxist, but later deserted Marxism and became an ideologist of Centrism.—237

Kekulé, Friedrich August (1829-1896)—German chemist.—116

Kepler, Johann (1571-1630)—German astronomer; discovered the laws of planetary motion on the basis of Copernicus' doctrines.—59, 97

Kirchhoff, Gustav Robert (1824-1887)—German physicist; made a great contribution to the development of science by his research in electrodynamics and other branches of physics. In 1859, in collaboration with the German chemist R. W. Bunsen, he laid the foundations for spectral analysis.—59, 325, 331

Kleinpeter, Hans (1869-1916)—Austrian philosopher, subjective idealist.—316, 326

Kotlyar, G. A.—translator of philosophic literature.—205

Kugelmann, Ludwig (1830-1902)—German Social-Democrat, friend of Karl Marx, participant in the 1848-49 revolution in Germany, member of the First International. He helped to publish and distribute Marx's *Capital*. Between 1862 and 1874 corresponded with Marx informing him about the state of affairs in Germany.—272, 355

L

Laas, Ernst (1837-1885)—German positivist philosopher.—237

Lamarck, Jean Baptiste Pierre Antoine (1744-1829)—French naturalist and as forerunner of Darwin founder of the first comprehensive theory of evolution in biology.—103, 169

Lametrie (La Mettrie), Julien Offray de (1709-1751)—French physician and materialist philosopher.—21, 26

Lange, Friedrich Albert (1828-1875)—German philosopher, one of the first neo-Kantians.—237, 343, 344, 347, 355

Langevin, Paul (1872-1946)—French physicist. His principal works deal with ionisation of gases, magnetism and acoustics; he took an active part in elaborating the quantum theory and especially the theory of relativity. Holding materialist philosophical views, Langevin opposed an idealistic interpretation of the results attained by contemporary physics.—328, 332

Laplace, Pierre Simon (1749-1827)—French mathematician, astronomer and physicist; independently of Kant he developed and substantiated mathematically

the hypothesis that the solar system originated from gaseous nebula.—67, 99, 100, 105, 119, 180

Larmor, Joseph (1857-1942)—English physicist and mathematician. His most important works are on electronic theory.—325

Lassalle, Ferdinand (1825-1864)—German petty-bourgeois writer and lawyer; one of the founders of the General Association of German Workers (1863). He started the opportunist trend in the German working-class movement.—82

Laurent, Auguste (1807-1853)—French chemist who, together with Gerhardt, defined the concepts of the molecule and the atom.—82

Lavoisier, Antoine Laurent (1743-1794)—French chemist. Like M. V. Lomonosov he established the principle of the conservation of weight of substances during chemical transformations. He explained the process of combustion and refuted the phlogistic theory. In philosophy, Lavoisier advocated the materialist views of the French Enlighteners.—102, 121, 320

Law, John (1671-1729)—Scottish economist and financier; Director-General of Finance in France (1719-20); notorious for his activity in issuing paper money, which led to crushing bankruptcy.—22

Leclair, Anton von (b. 1848)—Austrian philosopher, subjective idealist, representative of the immanent school.—304, 362

Lecoq de Boisbaudran, Paul Emile (1838-1912)—French chemist who in 1875 discovered gallium, an element predicted by Mendeleev.—127

Leibniz, Gottfried Wilhelm (1646-1716)—German physicist and philosopher, objective idealist.—20, 22, 26, 87, 97

- Leonardo da Vinci* (1452-1519)—Italian painter and encyclopaedist of the Renaissance.—95
- Le Roy, Henry* (1598-1679)—Dutch physician and philosopher, founder of the materialist school of Descartes' followers.—21
- Lesevich, Vladimir Viktorovich* (1837-1905)—Russian positivist philosopher, associated with the liberal Narodniks in the 1880s and 1890s.—315
- Lessing, Gotthold Ephraim* (1729-1781)—German writer, critic and philosopher, one of the prominent 18th century Enlighteners.—57
- Leucippus* (c. 500-440 B.C.)—Greek materialist philosopher, father of the atomistic theory.—116
- Le Verrier, Urbain Jean Joseph* (1811-1877)—French astronomer and mathematician. In 1846, independently of Adams, he computed the orbit of the then unknown planet Neptune and determined its position.—128, 166
- Lévy, Albert*—professor of philosophy at Nancy University (France).—242-43
- Liebig, Justus* (1803-1873)—German scientist, one of the founders of agrochemistry.—58, 334
- Liebknecht, Wilhelm* (1826-1900)—one of the founders and leaders of the German Social-Democratic Party; friend and associate of Marx and Engels.—113, 248
- Liebmann, Otto* (1840-1912)—German neo-Kantian philosopher.—237
- Linnaeus, Carolus (Linné, Carl von)* (1707-1778)—Swedish botanist who classified plants and animals.—68, 97-98
- Locke, John* (1632-1704)—English materialist philosopher, author of the sensualist theory of cognition.—21, 23, 25, 64, 118, 193, 263
- Lodge, Oliver Joseph* (1851-1940)—English physicist, an idealist mystic philosopher.—328
- Lopatin, Lev Mikhailovich* (1855-1920)—Russian idealist philosopher, preached spiritualism and believed that one of the "vital problems" of philosophy was to explain the "immortality of the soul"; he regarded the soul as a creative basis possessing free will.—343, 361
- Lorentz, Hendrik Anton* (1853-1928)—Dutch physicist with materialist views who resolutely opposed every manifestation of idealism in physics.—325
- Lucka, Emil* (1877-1941)—Austrian writer and Kantian philosopher.—296, 316, 317
- Lunacharsky, Anatoly Vasilyevich* (1875-1933)—professional revolutionary, prominent Soviet statesman and public figure.
In the period of reaction (1907-10), Lunacharsky departed from Bolshevism, began to preach "god-building" and joined the anti-Party *Vperyod* group. Lenin revealed the fallacy of Lunacharsky's views and criticised them.—219, 220, 311, 312, 360, 361, 362, 363
- Luther, Martin* (1483-1546)—prominent figure in the Reformation, founder of Protestantism (Lutheranism) in Germany.—95, 96
- Lyell, Charles* (1797-1875)—English chemist and geologist.—101

M

- Mach, Ernst* (1838-1916)—Austrian physicist and philosopher, subjective idealist, one of the founders of empirio-criticism; in the theory of knowledge he revived the views of Berkeley and Hume.—185, 186, 189, 191, 197, 201, 202, 203, 206, 207, 208, 209, 210, 211, 214, 215, 217, 218, 219, 221, 227, 228, 231, 233, 240, 243, 244, 245, 246, 247, 248, 250-51, 252, 262, 263, 264, 265, 266, 273, 274, 275, 276, 277, 281,

- 282, 288, 289, 290, 291, 293, 296, 301-303, 307, 310, 312, 314, 315, 316-17, 322, 324, 325, 336, 340, 342, 343, 348, 349
- Machiavelli, Niccolo* (1469-1527)—Italian statesman historian and writer.—95
- Mädler, Johann Heinrich* (1794-1874)—German astronomer.—99, 104, 110
- Malebranche, Nicolas de* (1638-1715)—French idealist philosopher.—20, 22, 26
- Malpighi, Marcello* (1628-1694)—Italian biologist and physician, one of the founders of microscopic anatomy, discovered capillary blood circulation (1661).—73
- Mandeville, Bernard de* (1670-1733)—English writer, moralist and economist.—27
- Marx, Karl* (1818-1883).—50, 51, 54-56, 58-60, 81, 82-84, 85-86, 120, 162, 173, 174, 204, 210, 215, 224, 235-36, 241, 242, 243, 254, 272, 273-76, 279, 283, 288, 289, 292, 309, 314, 322, 330, 331, 337, 347-48, 353, 355, 357, 362, 364-69, 370-75, 382, 384, 387
- Maxwell, James Clerk* (1831-1879)—Scottish physicist, known for his research on optics, the kinetic theory of gases and electricity. He was a materialist, but his materialism was mechanistic and inconsistent.—325, 331
- Mayer, Julius Robert* (1814-1878)—German naturalist, one of the discoverers of the law of conservation and transformation of energy.—101, 131, 344
- Mendeleev, Dmitry Ivanovich* (1834-1907)—Russian chemist who in 1869 discovered the periodic law.—77, 127
- Mendelssohn, Moses* (1729-1786)—German deist philosopher.—57
- Menshikov, M. O.* (1859-1919)—Russian reactionary journalist.—266
- Meyer, Julius Lothar* (1830-1895)—German chemist who studied primarily problems of physical chemistry.—148
- Michelet, Karl Ludwig* (1801-1893)—German idealist philosopher; an Hegelian.—69
- Mill, John Stuart* (1806-1873)—English philosopher and economist, one of the prominent representatives of positivism.—245, 281
- Moleschott, Jakob* (1822-1893)—Dutch scientist, one of the principal exponents of vulgar materialism.—48, 167-68, 210, 372
- Montalembert, Marc-René* (1714-1800)—French general and engineer; invented a new fortification system that was widely used in the 19th century.—95
- Morgan, Conway Lloyd* (1852-1936)—English biologist, psychologist and philosopher. At the beginning of his career he was a materialist, but later abandoned his materialist views.—307
- Müller, Johannes Peter* (1801-1858)—German naturalist and author of works on physiology, comparative anatomy, embryology and histology; he investigated the central nervous system and the sense-organs.—343

N

- Nägeli, Karl Wilhelm* (1817-1891)—German botanist, opponent of Darwinism, agnostic.—114
- Napier, John* (1550-1617)—Scottish mathematician, inventor of logarithms.—97
- Napoleon I Bonaparte* (1769-1821)—Emperor of the French (1804-14 and 1815).—75, 83, 84, 180, 268, 269, 273, 279, 306
- Newton, Isaac* (1642-1727)—English physicist, astronomer and mathematician, founder of

classical mechanics.—21, 59, 66, 68, 97, 98, 99, 100, 303, 321, 344

O

Oken, Lorenz (1779-1851)—German naturalist and philosopher of nature.—103

Ostwald, Wilhelm Friedrich (1853-1932)—German naturalist and idealist philosopher. Author of the "energetic" theory, a variety of "physical" idealism; divorced energy from matter.—213-14, 297, 298, 322, 336, 337, 338-40, 341, 360

Owen, Robert (1771-1858)—British utopian socialist.—28, 30

P

Pearson, Karl (1857-1936)—British mathematician, biologist and idealist philosopher.—214, 215, 232, 233, 281, 282, 290, 291, 307, 308, 327, 336, 342, 345, 359

Pellat, Henri (1850-1909)—French physicist, known for his works on electricity.—328

Petzoldt, Josef (1862-1929)—German subjective idealist philosopher, disciple of Ernst Mach and Richard Avenarius. He rejected materialism as a philosophical trend and proposed an a priori principle of "unique determination" as a substitute for the law of causality.—190, 205, 216, 218-22, 225, 265, 273, 283, 291, 292-94, 312, 314, 361, 362

Philo Judaeus (c. 25 B.C.-50 A.D.)—Jewish Hellenistic philosopher, head of the Alexandrian school.—381

Pillon, François (1830-1914)—French neo-Kantian philosopher, disciple of Charles Renouvier, a prominent representative of neo-Kantianism in France.—197

Plato (c. 427-347 B.C.)—Greek philosopher, objective idealist.—225, 266, 384

Plekhanov, Georgi Valentinovich (Bel-tov, N.) (1856-1918)—prominent figure in the Russian and international working-class movement, the first propagandist of Marxism in Russia. Following the Second Congress of the R.S.D.L.P. (1903) Plekhanov preached reconciliation with opportunists and later became a Menshevik. In the period of reaction (1907-10), Plekhanov opposed attempts to revise Marxism from Machist positions. V. I. Lenin gave a high appraisal of Plekhanov's philosophical works and of his role in disseminating Marxism in Russia, but at the same time he sharply criticised Plekhanov for his departures from Marxism and for his gross political errors.—185, 186, 188, 222, 223, 224, 227, 235, 236, 238, 241, 246, 248, 258, 259, 260, 277, 281, 319, 381, 384

Poincaré, Henri (1854-1912)—French mathematician and physicist. His philosophical views were close to Machism. Poincaré denied the objective existence of matter and objective regularity in nature.—195, 215, 294-95, 306, 320, 321, 324-25, 331, 342, 345, 348, 349, 359, 360

Priestley, Joseph (1733-1804)—English chemist and materialist philosopher.—25, 121

Proudhon, Pierre Joseph (1809-1865)—French writer, vulgar economist and sociologist; one of the founders of anarchism.—41, 45, 173

Ptolemy, Claudius (2nd cent.)—Greek mathematician, astronomer and geographer, author of the geocentric theory of the universe.—96

Pyrrho (c. 365-275 B.C.)—Greek philosopher, founder of ancient scepticism. Pyrrho denied the possibility of cognising objective truth and preached departure

from practical life and complete indifference to it.—277

Pythagoras (c. 517-497 B.C.)—Greek mathematician and idealist philosopher.—150

R

Ramsay, Sir William (1852-1916)—British chemist and physicist.—351

Regnault, Henri Victor (1810-1878)—French physicist and chemist who studied the properties of gases and vapours.—76, 77

Rehmke, Johannes (1848-1930)—German idealist philosopher, one of the representatives of the immanent school.—343

Renan, Ernst (1823-1892)—French philologist, historian of Christianity and idealist philosopher.—173

Renouvier, Charles (1815-1903)—French eclectic philosopher, headed neo-criticism in philosophy; educated as a mathematician.—197

Rey, Abel (1873-1940)—French positivist philosopher, inconsistent and instinctive materialist on questions of the natural sciences; advocated Mach's theory of knowledge.—321, 322, 323, 324, 325-26, 328, 331-32, 333, 344, 345, 347, 350

Ricardo, David (1772-1823)—English economist, one of the major representatives of classical bourgeois political economy.—366

Riehl, Alois (1844-1924)—German neo-Kantian philosopher.—237

Righi, Augusto (1850-1921)—Italian physicist, known for his work on electricity and magnetism; an instinctive materialist in philosophy.—326, 327, 328, 331

Robinet, Jean Baptiste René (1735-1820)—French materialist philosopher.—26

Roscoe, Henry Enfield (1833-1915)—English chemist, author of a number of chemistry manuals.—127

Rousseau, Jean Jacques (1712-1778)—French Enlightener, democrat, deist philosopher.—63, 172

Ryle, Reginald John (1854-1922)—English naturalist. His article "Professor Lloyd Morgan on the Grammar of Science", in which he defended Pearson's idealist views, was published in the journal *Natural Science* No. 6, 1892.—308

S

Saint-Simon, Claude Henri (1760-1825)—French utopian socialist.—67

Schelling, Friedrich Wilhelm Joseph (1775-1854)—German idealist philosopher. At the beginning, he was a follower of Fichte; later he became the author of an objective idealist "philosophy of identity".

Towards the end of his career, Schelling was an official ideologist of Prussia and preached a religious and mystic "philosophy of revelation".—354

Schiller, Friedrich (1759-1805)—German poet and dramatist.—171

Schleiden, Matthias Jakob (1804-1881)—German botanist. In 1838 he advanced the theory that new cells spring from old ones.—131

Schopenhauer, Arthur (1788-1860)—German idealist philosopher who advocated voluntarism, irrationalism and pessimism.—117, 316

Schorlemmer, Karl (1834-1892)—German chemist, adherent of dialectical materialism.—127

Schubert-Soldern, Richard (1852-1935)—Professor of Philosophy at Leipzig University, represen-

- tative of the so-called immanent philosophy; contributed to the *Zeitschrift für immanente Philosophie*, a German reactionary journal.—217, 226, 304, 362
- Schulze, Gottlob Ernst* (1761-1833)—German idealist philosopher, follower of David Hume. In the history of philosophy he is known as Schulze-Aenesidemus (from the name of the Greek sceptic philosopher whom he described in his main philosophical work).—277, 278, 309, 310
- Schuppe, Wilhelm* (1836-1913)—German subjective idealist philosopher, head of the so-called immanent school.—218-19, 226, 249, 304, 362
- Schwann, Theodor* (1810-1882)—German biologist who, in 1839, formulated his cellular theory of the structure of living organisms.—131
- Schwegler, Albert* (1819-1857)—German theologian, philosopher, philologist and historian.—267
- Secchi, Angelo* (1818-1878)—Italian astronomer, director of the Rome Observatory; known for his studies of the sun and the stars.—104, 109, 110
- Senior, Nassau William* (1790-1864)—English vulgar economist.—275
- Servetus, Michael (Miguel Serveto)* (1511-1553)—Spanish scientist of the Renaissance, a physician; made a number of important discoveries on blood circulation.—96
- Sextus Empiricus* (2nd cent. A.D.)—Greek philosopher and physician, prominent representative of ancient scepticism.—277
- Shchedrin (Saltykov-Shchedrin, Mikhail Yevgrafovich)* (1826-1889)—Russian satirical writer.—388
- Sieber, Nikolai Ivanovich* (1844-1888)—Russian economist, one of the first to popularise Marx's economic works in Russia.—54
- Smith, Adam* (1723-1790)—British economist, one of the major representatives of classical bourgeois political economy.—37, 52, 366
- Smith, Norman Kemp* (1872-1958)—British idealist philosopher close to neo-realism.—232
- Spinoza, Baruch (Benedictus)* (1632-1677)—Dutch materialist philosopher, atheist.—20, 23, 26, 57, 63, 92, 99, 384
- Stallo, John Bernard* (1823-1900)—American philosopher and physicist. At the beginning of his career he advocated Hegelian idealism, but later became an empirio-critic.—348, 349
- Starcke, Carl Nikolaus* (1858-1926)—Danish philosopher and sociologist.—134, 166, 171, 172, 173
- Stein, Lorenz* (1850-1890)—German lawyer and historian, vulgar economist.—375
- Stirner, Max (Schmidt, Johann Caspar)* (1806-1856)—German philosopher, Young Hegelian, one of the ideologists of anarchism.—161, 173
- Strauss, David Friedrich* (1808-1874)—German philosopher and writer, one of the prominent Young Hegelians and author of the book *Life of Jesus*.—161, 163, 173
- Struve, Pyotr Bergardovich* (1870-1944)—Russian economist and writer.—362

T

- Thomson, William, Lord Kelvin* (1824-1907)—British physicist. He did a considerable amount of work on mathematical physics and also studied thermodynamics, electrical engineering and magnetism; held materialist views.—153, 325

Timiryazev, Arkady Klementyevich (1880-1955)—Russian physicist.—386

Treviranus, Gottfried Reinhold (1776-1837)—German naturalist and philosopher of nature, one of the first advocates of the idea of evolution in animate nature.—59

Turgenev, Ivan Sergeyevich (1818-1883)—Russian writer.—229, 237

U

Ueberweg, Friedrich (1826-1871)—German philosopher whose views were close to materialism.—317

V

Valentinov, Nikolai (Volsky, Nikolai Vladislavovich) (1879-1964)—Russian Machian philosopher. Sought to revise Marxist philosophy and "supplement" it with the subjective idealist views of Mach and Avenarius.—185, 201, 226, 235, 310, 326, 327, 330, 331

Virchow, Rudolf (1821-1902)—German naturalist and politician; founder of cellular pathology, one of the founders and leaders of the Progressive Party.—61, 115

Vogt, Karl (1817-1895)—German naturalist, vulgar materialist; author of a number of works on zoology, geology and physiology.—48, 59, 117, 168, 210, 372

Volkman, Paul (1856-c. 1938)—professor of theoretical physics at Königsberg (from 1894); held eclectic philosophical views and fought against materialism.—296, 384

Volney, Constantin François (1757-1820)—French Enlightener, deist philosopher.—26

Voltaire (François Marie Arouet) (1694-1778)—French writer, deist philosopher and historian.—22, 172

W

Ward, James (1843-1925)—English psychologist, idealist philosopher and mystic.—232, 359, 361, 362

Willy, Rudolf (1855-1920)—German Machian philosopher, disciple of Richard Avenarius.—211, 216, 219-20, 221, 222, 225, 233-34, 294

Wöhler, Friedrich (1800-1882)—German chemist. He was the first to synthesise organic compounds from inorganic substances.—132

Wolff, Caspar Friedrich (1733-1794)—naturalist, one of the founders of the theory of evolution; worked in Germany and Russia.—103

Wolff, Christian (1679-1754)—German idealist philosopher and metaphysician.—48, 99, 118, 143

Wundt, Wilhelm Max (1832-1920)—German idealist philosopher and psychologist, one of the founders of experimental psychology.—216, 231, 289, 317

Y

Yushkevich, Pavel Solomonovich (1873-1945)—Russian Social-Democrat, Menshevik; adherent of positivism and pragmatism in philosophy; sought to revise Marxist philosophy and replace it with "empirio-symbolism", a variety of Machism.—185, 186, 193, 235, 294, 295, 296, 297, 300, 318, 330, 331, 340, 342, 363

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