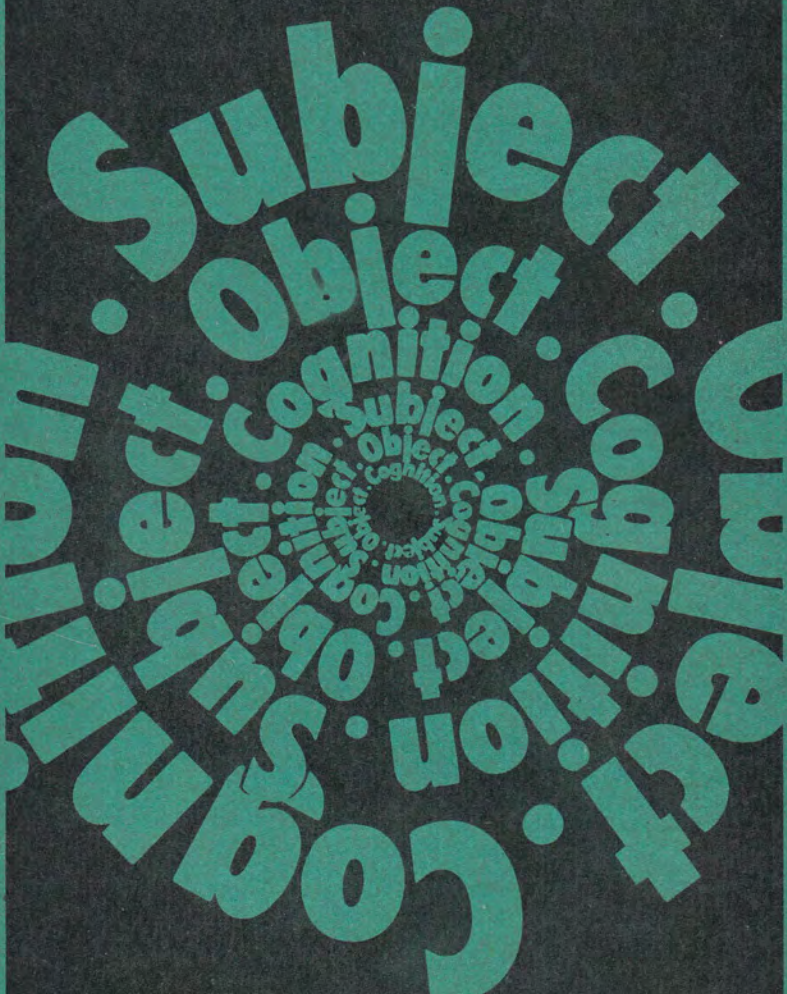
V.A. Lektorsky

SUBJECT OBJECT COGNITION



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PREFACE TO THE ENGLISH EDITION

A great interest is shown in recent English and American literature on epistemology and the philosophy of science in the problem of the development of knowledge, of the socio-cultural conditions for scientific cognition, and the possibility and fruitfulness of the so-called realistic interpretation of scientific knowledge. I believe that the reader abroad is not always fully aware that the view of knowledge in general and scientific knowledge in particular as historically developing, the orientation at studying cognition in a socio-cultural context, and perception of knowledge as reproduction of objective reality are not something entirely new to Marxist philosophers. These approaches express the most significant traits of the Marxist study of knowledge and cognition. It is important to note that the interpretation of these problems in Marxist philosophy is essentially different from those of other philosophical trends. Here I have made an attempt at a Marxist presentation of these problems at the present level of their development. In all cases, of course, I offer my own interpretation and solution of the problems considered. At the same time I endeavour to take into account the results obtained by other Soviet scholars (e. g.,in the philosophical interpretation of psychological data in terms of the so-called theory of activity).

I believe that the critical analysis from the Marxist positions of the conceptions of some influential modern English and American philosophers, methodologists, and historians of science (P. W. Bridgman, Th. K uhn, W. Quine, K. Popper, and others) will be of some interest to the reader of the English edition.

I would like to point out a growing interest of the Soviet researchers today in the study of problems of knowledge with due reference to the data of the special sciences about cognition and at the same time in a broad worldview, socio-cultural, and historical context, in terms of the dialectics of subject and object, of the object-related practical and cognitive activity. I assume that the nearest future will see further publications on the subject. In any case, I intend to continue the studies begun in this book.

V. Lektorsky

Moscow
November 1982

INTRODUCTION

We are all aware that man is not only a practically acting being but also a cognizing one.

Recording this fact is no problem. Problems do arise, however, as soon as we attempt to understand what cognition and the cognitive relation are and what are the properties of the specific product of human activity that we call knowledge.

These questions necessarily emerge with the very first attempts of theoretical interpretation of reality and man's place in it. Formulation and discussion of worldview problems at the theoretical level assume a conscious attitude to the abstractions used, and an understanding of what is genuine knowledge as opposed to false wisdom, that is, mere claim to knowledge.

The terms "to know" and "knowledge" are used in several distinct senses in everyday language. For instance, one may speak of "knowledge" as ability to do something ("I know how to use this instrument", "I know how to build a house").

We also speak of "knowledge" in the sense of ability to recognise an object or person ("I know Moscow well", "I have known this person for twenty years").

Finally, "knowledge" is taken to mean a product of human activity which characterises (and characterises correctly) a certain state of affairs in reality: the presence of certain properties in definite objects, the existence of some relations, the realisation of certain events or processes, etc. ("I know that such and such things occur").

It should be noted that analysis of the last type of knowledge has been given preferential treatment ever since men started musing on what knowledge is — and that happened almost at the same time as philosophy appeared. And that is quite understandable, for it is this type that includes theoretical knowledge (though certainly not only theoretical knowledge) which was both the result of philosophers' activity and the subject of their cogitation. But can the specificity of the last type of knowledge be understood in isolation from the other two?

In particular, what is the relation between knowledge as understanding the content, structure, properties, and relations of the given object, and knowledge in the sense of ability to reproduce this object in human activity, including practical activity?

This question, along with others, kept arising throughout the history of philosophical thought, and various trends and schools in philosophy endeavoured to answer them.

Contemplation of the structure of the cognitive relation leads to the conclusion that it is specified by a certain type of connection between the cognising man (the subject of cognition) and the object cognised (the object of cognitive activity). If I assert that I know something about something else, that implies my simultaneous realisation of the following: first, that my knowledge relates to some object that does not coincide with that knowledge, that is external with regard to it; second, that this knowledge belongs to me, that it is I who implement the process of cognition; third, that I claim to express an actual, or real, state of things in knowledge and can support that claim by some procedure for substantiating knowledge.

Stating these points immediately gives rise to a number of questions. For instance, what is the object of knowledge and what is its nature? Can the cognising subject be the object of cognition himself, and if so, in what sense? How is it possible to know the object that is external relative to the subject and at the same time to be conscious of the subject himself as the "focus" of cognitive activity? And in general, what is "I"? Is it man's body or something else? What are the modes of substantiating knowledge, the norms and standards which permit to distinguish between that which corresponds to reality and illusion or empty "opinion"? Do such norms and standards exist? If they do, in what way are they substantiated, in their turn? Can unconscious knowledge exist, i.e., the kind of knowledge where I do not realise that I know something? Does knowledge of something coincide with its understanding? Finally, what are the mechanisms of the cognitive process? What is the actual interaction between the two terms of the cognitive relation, subject and object (if this interaction does exist at all, of course)?

It should be stated that for a long time all these questions, which have been discussed in all their aspects since antiquity, were analysed in philosophy (in its special branch termed "epistemology") largely on the basis of studying the features of such systems of knowledge which were embodied, on the one hand, in everyday knowledge ("common sense"), and on the other, in philosophy itself as the first form of theoretical reasoning (some philoso-

phers also included mythology among the systems of knowledge under analysis). True, science also existed in antiquity, first of all as one of the branches of mathematics, geometry. Contemplation of the specificity of the cognitive process in mathematics had from the outset a substantive impact on the modes of formulation and discussion of many epistemological problems. But science became an independent kind of theoretical activity distinct from philosophy only in the 17th century, that is, with the emergence of experimentally based natural science. From that moment, scientific knowledge, its structure, content and potential, as well as the modes of its substantiation and correlation with everyday knowledge, became, along with other questions, the subject of careful consideration by philosophers. It is thus impossible to understand the specific traits of the epistemological conceptions of Descartes and Kant, which had a significant effect on the development of philosophy, unless one takes into account their relation to contemporary science, of which classical mechanics was a model or paradigm.

At the same time, the epistemological cogitations of the scientists specialising in the particular areas of knowledge were not typical then; they sometimes appeared irrelevant to what they did as professionals. Science is, of course, an area of human activity specialising in obtaining or producing knowledge. However, questions as to what science is, what the ways of substantiating it, the standards of cognitive activity, etc. are, at one time seemed to many natural scientists and specialists in the particular fields of knowledge to be abstruse and even probably scholastic, and in any case not at all obligatory for success in scientific work.

Undoubtedly, every scientist knew that the knowledge he obtained pertained to real objects existing outside this knowledge and independent of it (that is to say, he shared the attitudes of so-called spontaneous materialism). The existence of the objective domain of knowledge was not problematic. As for the standards to be met for the result of the scientist's activity to be included in the system of scientific (experimental or theoretical) knowledge, they were more or less spontaneously assimilated in mastering the content and the research methods of the accepted theories (in the first place of the model theories that served as research paradigms), in learning to handle apparatus and measuring instruments, to process experimental data, interpret device readings, etc. The question of substantiation of the standards themselves did not, as a rule, arise.

The situation changed radically at the turn of this century, when the problematic nature of the foundations of classical natural science (including mathematics) became apparent. As is well known, an all-sided Marxist analysis of the revolution in natural science was given by Lenin in his famous book *Materialism and Empirio-Criticism*. Later, Marxist philosophers made a considerable contribution to the study of this phenomenon. We shall not dwell in detail on the essence of the revolution in natural science, referring the reader to available literature.[1]

Let us note merely that changes in the modes of theoretical reasoning and methods of comparing different scientific theories in the wake of the scientific revolution at the beginning of the present century, substantively changed the attitude of workers in the special sciences to epistemological problems. There is literally not a single creator of any major scientific theory in the 20th century who would not endeavour to provide an epistemological substantiation of his special scientific constructions, often raising in the process general questions about the nature of cognition, criteria of knowledge, etc. It is even said that the epistemological problem of the correlation between subject and object, which was for a long time mostly of interest for philosophers, becomes at this time one of the cardinal problems of specialised scientific knowledge as well.

This circumstance is largely due to the actually increased complexity of the relation of scientific knowledge to the corresponding system of objects. The point is that any cognitive process assumes the use of certain mediators between the cognising subject and the cognised object. In pre-scientific cognitive practice, this role was performed, first of all, by the labour implements, by all objects created by man for man and embodying certain socio-cultural values (that is, actually the whole of man-made "second nature", the artificial environment), and finally various sign-symbolic systems (in the first place the natural language) and various conceptual formations expressed in these systems and terms of these systems. In science, added to this are, on the one hand, a system of devices and measuring instruments, and on the other, the totality of theories standing in certain relations to one another, which are expressed in artificial, specially constructed languages along with the natural language. In these days the system of such mediators in science has become so complicated and their relations to one another and to the object cognised so far from elementary that in some cases a special study is required to single out the objective domain of a

[1] See Notes at the end of the book.

theory and to ascertain its objective meaning. In the process, it becomes apparent that the choice of one type of mediators over another (that is, the choice of a definite type of apparatus, modes of description of the research results, frames of reference, etc.) is not indifferent for the objective meaning of the knowledge obtained but essentially affects the singling out of certain aspects of the objective reality that is cognised. Because of this, man himself, as a being constructing apparatus and systems of theoretical knowledge, comes to the attention of specialists in those sciences which deal with nature rather than man.

It was especially noticed, among other things, that the specific physical, psychical, and other traits of man as the cognising being affect the nature of the research instruments used. It should be pointed out in this connection that objective interpretation of scientific knowledge and establishment of its objective meaning is not merely the product of idle philosophical curiosity but a necessary element of scientific work, a condition of successful implementation of a given research programme.

The establishment of significant and essential elements of the cognitive relation and the discovery of an intimate connection between epistemological contemplation and success in the special sciences have in some cases entailed certain losses of philosophical nature. The reasons for that are numerous, one of them being that some major Western scientists who tackle general philosophical problems (and the interrelation between subject and object in the cognitive process is one of them) do not always possess the necessary philosophical training and a knowledge of the scientific philosophy of dialectical materialism. The need for determining the place of the subject in the production of knowledge is sometimes idealistically interpreted as elimination of the distinction between subject and object, as the impossibility of conceiving of objective reality outside its realisation, etc.

In any case, many important and interesting epistemological deliberations of modern Western scientists need a thorough Marxist philosophical analysis for separating their rational meaning from idealistic irrelevancies.

Let us now cite just a few instances of the discussion of the epistemological problem of the subject-object relationship by specialists in the sciences.

Thus, in studying the objects of classical physics one could either ignore the effect of the research instruments on them or take this effect into account in processing the information about the events under study. But in the methodology of quantum mechanics, physical objects are considered in their interaction with the measuring devices, which significantly affect the behaviour of the objects of study.[2] The mode of describing an individual quantum phenomenon is essentially dependent on the class (inner structure) of the measuring devices used for localising this phenomenon in space-time. Accordingly, "the unambiguous account of proper quantum phenomena must, in principle, include a description of all relevant features of the experimental arrangement".[3] The well-known Soviet physicist V. A. Fok writes, that "the result of interaction between an atomic object and a classically described device" is "the basic element" constituting "the subject-matter of physical theory".[4] A number of prominent modern Western physicists (including even such scientists as Werner Heisenberg) inferred from this circumstance that in quantum mechanics the distinction between the cognising subject and the cognised object is obliterated.

Furthermore, the problems of substantiating mathematics, which became very acute in connection with the discovery of set-theoretical paradoxes early in this century, called to life one of the trends in the philosophy of mathematics — intuitionism, which offered a mode of handling the question of the permissible objects of mathematical discourse.

"In [classical mathematics], the infinite is treated as *actual* or *completed* or *extended* or *existential*. An infinite set is regarded as existing as a completed totality, prior to or independently of any human process of generation or construction and as though it could be spread out completely for our inspection. In [intuitionist mathematics], the infinite is treated only as *potential* or *becoming* or *constructive*.".[5] Intuitionists created new mathematics, including the theory of the continuum and set theory. This mathematics does not use actual infinity as an object of discourse. At the same time it contains concepts and rules that are absent in classical mathematics.

Intuitionists base their conception of the nature and meaning of mathematical discourse on certain philosophical assumptions that intricately interweave attainments of mathematical thought and their idealistic interpretations. Thus, in the view of Heyting, there is for mathematics "no other source than an intuition, which places its concepts and inferences before our eyes as immediately clear".[6] This intuition, existing as it were before mathematical language and discursive logical reasoning, coincides at the same time with a specific activity of consciousness. As Brouwer remarks in passing, "mathematics is more an

activity (*Tun*) than a theory".[7] Activity, in its turn, coincides, in his view, with intuitive consciousness of time, so that the objects of mathematics exist only in human consciousness.

Finally, let us cite the so-called conception of ontological relativity propounded quite recently by Willard Quine, a major American specialist in symbolic logic and the philosophy of logic and mathematics. Quine started out directly from problems in the foundations of mathematics, discovering that defining the essence of the objects of a given mathematical theory assumes translation of this theory into another language with a different system of objects, and drawing the conclusion that it is this translation that determines its ontology. He formulates the proposition that one can describe the ontology of a given theory (that is, characterise its objects) not absolutely but only relatively, i.e., relatively to another theory which is the model of the given one. Quine ascribes to this proposition a significance greater than the purely mathematical, believing that it is extremely important for understanding the nature of theoretical knowledge in general.[8]

The development of special scientific knowledge now spotlights other aspects of the problem of the relationship of the subject and the object of cognitive activity. We refer here to the rapid growth of special sciences studying certain forms and mechanisms of the cognitive process (these sciences are sometimes termed "the sciences of man").

Psychology, undoubtedly, belongs among them.

Psychological thinking goes back quite a few centuries, and psychology as an independent science based on experiment is at least a hundred years old. The concepts of "subject", "object", "consciousness", "self-consciousness" and others have long been fundamental in psychology. As a rule, psychologists borrowed their understanding of the fundamental significance of the relation between subject and object and of the nature of the cognitive process from various philosophical conceptions.

One of the distinctive features of modern psychology is an attempt at extensive experimental investigation of the cognitive process by the methods of the special sciences. Such branches of this science as the psychology of perception and the psychology of intelligence have obtained significant results in the last few decades. The so-called cognitive psychology commences to develop, which endeavours to take a new approach to the study of cognitive processes through studying their integration in complex structures formed in the framework of a definite cognitive task.

The conception of the genesis of the mechanisms of

cognitive activity worked out in detail by the well-known Swiss psychologist Jean Piaget has attracted considerable attention. Offering a theoretical interpretation of his experimental data, Piaget claims to have solved the basic epistemological problems. He studies various structures of which subject and object are component elements, and analyses the connections between intellectual and object-related practical activity.

Linguists, ethnolinguists, cultural anthropologists, and psycholinguists still debate with some animation the Sapir-Whorf hypothesis of linguistic relativity that gained wide currency in the late 1940s.

The starting point of the hypothesis is that we cannot be fully conscious of reality without the help of language, the latter being not only a secondary means of solution of some special problems of communication and thinking but also a mode of constructing our world.

Noam Chomsky, a well-known American linguist and author of the generative transformation model in linguistics, propounded a critique of the behaviourist, empiricist theory of language learning. Chomsky believes that this theory does not take into account a number of important aspects of the language, such as the creative character of language using; the existence of an abstract generative structure of language ("the deep structure"); the universal character of certain elements of language structure. To explain these aspects of language, Chomsky postulates the existence of certain fundamental psychological structures —the subject's innate ideas, consciously reviving certain elements of Cartesian epistemological conception.[9]

Let us finally point out the rapid development of scientology as a special interdisciplinary area of study whose goal is investigation of science by the methods of the special sciences. Scientology studies not only the economic, sociological, socio-psychological, and communication aspects of scientific activity but also the process of production and transformation of scientific knowledge. There are beginnings of a rapprochement between scientology and certain aspects of studies in the history of science. Of special interest in this connection is the book *The Structure of Scientific Revolutions*[10] by Thomas Kuhn, an American specialist in the history of science, which met with considerable response. On the basis of theoretical analysis of extensive historical-scientific materials, the author discloses the important role for scientific research of the so-called paradigms, that is, theories accepted as model ones in the given scientific community at a given time along with their characteristic methods of specifying and

solving scientific problems and modes of comprehending empirical facts. Kuhn places special emphasis on the collective nature of scientific activity, pointing out that an individual scientist cannot be regarded as an adequate subject of scientific activity. Kuhn draws far-reaching conclusions from his conceptions, mostly of epistemological and methodological nature. That is precisely the area where the untenability of certain elements of his theory becomes particularly apparent. In Kuhn's view, there are no logical transitions between the separate paradigms (he likens them to different worlds in which researchers live). The paradigms are incommensurable, which produces gaps between the various fundamental theoretical conceptions in science. Thus, certain aspects of Kuhn's theory warrant relativist and subjectivist conclusions.

We have cited here only some examples of the discussion in the modern special sciences of fundamental epistemological problems in the interpretation of knowledge and cognition and of the subject-object relation, that is, of the kind of problems that a hundred years ago were believed by most scientists to be the exclusive domain of professional philosophers.

It appears important and fruitful in this connection to compare the implications for general epistemology of the development of modern special sciences with the traditions of formulation and discussion of these questions that took shape in the history of philosophy as a special discipline. Indeed, these problems that have relatively recently become of immediate concern to specialists in the various sciences, have a long history of discussion in philosophy, where different general types of their specification and analysis have been established and tested, a whole series of fundamental difficulties of epistemological research revealed, and ways found (in Marxist philosophy) for fruitful work in this area.

At the same time the development of modern special sciences, and in the first place the sciences of knowledge, provides material for drawing important conclusions of a general epistemological nature, posing new problems before philosophy or throwing light on some new aspects of old problems. One such problem, now again attracting attention, is the question of the nature, status, and methods of epistemological research itself.

A number of scientists, including Piaget, Quine, and some structuralists, believe that epistemology has lost its right to exist as a special philosophical discipline irreducible to the sum total of the data of the special sciences of cognition. All problems pertaining to understanding cognition are solved, in this view, either in psychology or in semiotics or in the general theory of formal structures.

One of the propositions which we shall endeavour to substantiate in the present work is as follows. Epistemology does indeed change its forms and certain methods that have traditionally taken shape in philosophy. The relation of scientific epistemology to special scientific knowledge also changes. The essence of these changes has been analysed by the founders of Marxist-Leninist philosophy which has formulated the basis of a scientific epistemological conception adequate to the development of human cognition. At the same time the fundamental problems in epistemology do not disappear, and the nature of this theory as a special philosophical discipline irreducible to the sum total of scientific knowledge remains unchanged.

Proceeding from the fundamental works of the classics of Marxism-Leninism and generalising the experiences of modern science, Soviet philosophers have made in the past twenty years a considerable contribution to the study of the nature and specificity of the cognitive relation. A whole series of studies have been devoted to the analysis of the place of cognition among other forms of reflection; many works have studied the general nature of the links between cognition and practical activity; great attention has been given to the forms of the activity of the subject in reflecting reality; some works analysed the problem of the interrelationship of the individual and the social in cognition; the relation of the object and the subject-matter of knowledge has been investigated; many works have inquired into the interrelation of the subjective and the objective in the development of knowledge.[11] A considerable number of works deal with the dialectics of the subject and the object in cognition in connection with the analysis of the philosophical problems arising in the development of the modern natural sciences. These works focus on the relationship between the object and the instruments of research, the nature of physical reality, and the objectivity of natural scientific knowledge.[12] Finally, a number of significant aspects of the cognitive relation have been considered in connection with the discussion of the philosophical problems of psychology, such as the interrelations of activity and consciousness, the role of object-related practical activity in the genesis of perception, the nature of the so-called cognitive actions, and the problem of the ego.[13]

The present work attempts, first, to sum up the studies in this field of both the author himself[14] and of other Soviet specialists in epistemology, and, second, to analyse a

number of aspects of the given problem that are of a general and fundamental nature and at the same time have not been sufficiently studied in Soviet literature.

We shall try to specify and consider here the main types of conceptions of the cognitive relation, of the subject-object relationship, i.e., the various modes of formulation and discussion of the basic epistemological themes. Our objective is a clear formulation of those conditions of studying this problem which ensure the fruitfulness and scientific quality of the theoretical quest on the basis of the dialectical-materialist epistemology and at the same time accord with the specificity of the cognitive situation created by the development of modern science.

We begin our analysis of the cognitive relation with a critique of the modes of formulation of the problem characteristic of pre-Marxian and present-day non-Marxist, bourgeois philosophy. Our investigation in this part of the work has a double significance. First, it fixes those modes of epistemological analysis which necessarily lead the research into a *cul-de-sac*, generating contradictions between the philosophical conception and the real facts of cognition and consciousness as well as internal contradictions in the epistemological conception itself. The identification and discarding of the methods of studying the cognitive relation which do not ensure the construction of a genuinely scientific epistemology help to outline more precisely the specific approach to the analysis of cognition which is characteristic of Marxist-Leninist epistemology.

In our critique of the pre-Marxian and non-Marxist theories of knowledge we have endeavoured to carefully separate the actual facts of cognition, with which these theories juggle, from the false interpretation imposed on these facts. As for the interpretations, we believed it necessary to take most careful stock of the arguments used in these theories and to analyse them critically in detail, in order to specify precisely the fundamentally false moves of philosophical reasoning that are responsible for the untenability of these epistemological studies.

An investigation of the methods of inquiry into the cognitive relation characteristic of the pre-Marxian and non-Marxist theories of knowledge has another significance as well. These epistemological approaches are often reproduced abroad in one form or another by specialists in the various sciences (in psychology, in the discussion of the philosophical problems of physics, in studying the foundations of mathematics, etc.). A critical analysis of these types of perception of the cognitive relation of subject and object, therefore, proves to be of great importance for correct philosophical interpretation of many branches of modern scientific knowledge.

The first chapter of the first part critically analyses the interpretation of the cognitive relation as a relation between two physical systems. This conception is characteristic of metaphysical materialism. The basic weaknesses of metaphysical materialism compel its representatives to make concessions to subjective idealism on a number of essential points. In the past, the conception of the subject-object relation as a relation of two physical systems was on the whole materialistic, although it did contain some elements of subjectivism, while in present-day bourgeois philosophy this conception of cognition is formulated, as a rule, in the framework of subjective idealism, only occasionally including elements of mechanistic materialism (Russell). We also consider in a critical light further modifications of this scheme of the cognitive relation produced by the introduction in it of a naturalistically interpreted subject's activity: Piaget's genetic epistemology and Bridgman's operationalism. Prominent specialists in their respective fields (psychology and physics), these scientists established a number of facts essential for understanding the process of cognition. Their attempts at philosophical interpretation of these facts, however, do not go beyond the first type of conception of the cognitive relation, which predetermines serious defects in their epistemological constructions.

The community in the basic understanding of the subject-object relation in cognition justify bringing under one heading the epistemological conceptions which differ in other respects (unlike Locke or Russell, Piaget and Bridgman are not professional philosophers; Piaget is inclined towards mechanistic materialism with elements of subjectivism, and Bridgman, to subjective idealism with certain elements of materialism).

The second chapter of the first part contains critical analysis of a type of understanding of cognition that is extremely influential in bourgeois philosophy—one which endeavours to explain the essence of cognition by analysing the structure of individual consciousness. This conception of cognition was first clearly expressed by Descartes and later developed by various schools of subjective idealistic epistemology. This approach is of special interest in the study of the cognitive relation in transcendentalist conceptions (Kant, Fichte, Husserl's phenomenology). The main problem of the epistemological conceptions proceeding from the interpretation of cognition considered here is one of substantiating knowledge. In the course of its discussion, a number of important epistemological issues are

considered: the interrelation of consciousness and knowledge, knowledge of the world and knowledge of self, the structure of the act of reflexion, the interrelation between the ego and the other subjects in the process of cognition. All these questions, however, are interpreted in a fundamentally erroneous way: the real facts of cognition and consciousness which subjective-idealist epistemologists encounter are mystified. The present book considers in detail all those defects of subjectivist epistemological conceptions which make a scientific study of the cognitive relation impossible. Besides, it is shown that all these defects are rooted in the fundamentally erroneous understanding of the cognitive relation itself as one that is determined by the structure of a self-contained individual consciousness.

It should be noted that in the first and second parts of the book we do not pursue the goal of a maximally comprehensive analysis of all those non-Marxist conceptions that could be included under the general epistemological viewpoints under analysis. Our choice of the objects of criticism is guided by a desire to specify and analyse those modes of expression of the epistemological positions considered which, on the one hand, represent their classical form, and on the other, are widespread in modern Western philosophy, affecting also specialists in the various sciences. Thus, the first two chapters are by no means a "historical introduction" to the rest of the work.[15]

These traits of the critical analysis determine the fact that the order in which the conceptions are criticised does not always coincide with the sequence of their emergence in the history of philosophy.

To a considerable extent the materials critically analysed here (e.g., some aspects of Husserl's epistemology, the epistemology of Sartre) are considered from Marxist positions for the first time. Besides, we endeavoured to specify those aspects of the epistemological conceptions of Descartes, Kant, and Fichte which have not yet attracted the attention of Marxist philosophers.

The second part of the monograph studies the specific traits of the interpretation of the cognitive relation in the system of scientific, that is, Marxist-Leninist, epistemology, and outlines the prospects which open up in this approach for the analysis of a number of fundamental problems now discussed in terms of the dialectical-materialist conception of subject, object, and cognition in works on the methodology of science, scientology, and psychology.

The work shows that the dialectico-materialist interpretation of the cognitive relation does not only permit an answer to questions that confound non-Marxist epistemolo-

gy, or provide a scientific explanation of the real facts which bourgeois philosophers encounter and are unable to grasp the meaning of. Marxist-Leninist conception of cognition opens up fundamentally new horizons of epistemological studies, posing before epistemology tasks and problems that are impossible in the type of epistemology that is traditional for bourgeois philosophy.

We undertake a detailed analysis of the basic position of the Marxist-Leninist interpretation of the cognitive relation between subject and object, a position that involves a fundamental recognition of the unity of reflective, object-related practical and communicative activity and a recognition of social mediation and the historical nature of cognition. The dialectico-materialist epistemology provides the basic principles for working out a number of problems raised by the development of the modern special sciences and of scientific epistemology itself. Many of these questions have not been considered in Marxist epistemological literature at all or else have not been studied comprehensively enough; then again, they were studied in aspects different from those analysed in the present work. This applies to the role of object standards in the formation of sensory knowledge, the interrelation of the objective and operational components in the system of knowledge, of different types of links between ideal and real objects, the interrelations of "alternative" conceptual systems and corresponding objects, the connection between continuity and discontinuity of cognitive experiences, the correlation of substantiation and development of knowledge, the relationships between knowledge, self-consciousness, and reflexion, between explicit and implicit knowledge, the relations of individual and collective subjects of cognition, of the status and specific traits of scientific epistemological research, its relations to the specialised sciences of cognition, etc. Analysis of these problems is linked up with the philosophical interpretation of the materials of a number of special disciplines (the psychology of perception, cognitive psychology, ethnolinguistics, scientology, the history of science, formal logical analysis of scientific theories, etc.). Side by side with elaborations of the positive views on the problems considered, a critical analysis is undertaken of some modern non-Marxist conceptions erroneously interpreting the epistemological problems which have arisen from the development of modern science – the conceptions of Kuhn, Sapir and Whorf, Quine, Popper, and others. Some of them (e.g., Quine's theory of ontological relativity) are analysed for the first time from Marxist positions. The second part also contains a critical analysis of the con-

ception of cognition which was formulated on an objective idealistic basis by Hegel. Hegel came closest to understanding a number of important features of the dialectics of subject and object in cognition but, remaining an idealist, he could not formulate a scientific epistemology.

The monograph substantiates a number of propositions which, in the author's view, follow from the specificity of the Marxist-Leninist conception of the nature of cognition and are essential for further study of problems in scientific epistemology.

In particular, these include the following propositions:

1) The conception of the subject as a material being and the recognition of the importance of the subject's material activity in cognition is necessary but in itself is insufficient for a scientific treatment of the cognitive relation. A limited naturalistic interpretation of the subject's practical and cognitive activity cannot stand up to subjectivism. A scientific conception of the cognitive relation implies a consistent defence of the unity of reflection and activity. But that in its turn only becomes possible if the subject himself and his activity are understood as socio-culturally and historically conditioned, if it is recognised that the subject's object-related and cognitive activity is mediated by his relation to other subjects.

2) Human cognition as the highest form of reflection of reality assumes not only the subject's conscious attitude to the object but also a conscious attitude to himself. Elementary forms of knowledge (e.g., perception) are accompanied by a realisation of the place of the individual subject in the system of the spatio-temporal relations of the objective world. Scientific activity is only possible where cognition encompasses the objects under study and where, furthermore, there is a realisation of the modes and norms of cognitive activity inherent in the collective subject.

3) A scientific epistemology is a special kind of reflexion about knowledge, one that purports to find out the necessary conditions of any knowledge, to single out universal cognitive norms. One of the important specific features of this theory is that the characteristics of actually existing knowledge are reflected in it in close unity with ascribing definitive norms of cognitive activity. The general image of cognition and science created by epistemology is itself included in the actual course of cognition, restructuring it in certain respects.

It is up to the reader to judge whether the author has coped with his task. The author will gratefully accept any critical suggestions inspired by a desire to deepen the discussion of the problems studied in the book.

Part One

CONCEPTIONS OF THE COGNITIVE RELATION IN NON-MARXIST EPISTEMOLOGICAL THEORIES

Chapter 1

INTERPRETATION OF COGNITION AS INTERACTION OF TWO NATURAL SYSTEMS

The epistemology of metaphysical materialism starts from a premise that is entirely correct: reality is understood as a system of material structures connected in definite ways by certain relations and actual dependences. This conception emphasises that both subject and object must be considered as definite interconnected material systems. It is correctly noted that the subject is not some supramaterial being outside the objective real world but is included in the objective reality itself. "Subject" and "object" are distinctions within this reality. Therefore both the interactions of subject and object and the processes within the subject are objectively real.

In metaphysical materialism, however, these correct materialist premises are combined with assumptions which drive the study of some fundamental epistemological questions into a *cul-de-sac*, and also compel one to make serious concessions to subjectivism on some points, abandoning the materialist theory of reflection. We refer here to the interpretation of the subject as a purely natural physical body or biological being interacting with the world of material objects according to natural laws, laws given by nature. This conception of the interrelation between the cognizing subject and the cognized object is unacceptable in a scientific, dialectical and materialist, epistemology.

Let us try to point out the fundamental defects of interpretation of cognition as interaction of two natural systems.

1. INTERPRETATION OF KNOWLEDGE AS THE RESULT OF A CAUSAL EFFECT OF THE OBJECT ON THE SUBJECT

Already in antiquity, the view is formed that the knowledge of an object results from a causal impact of the ob-

ject on the subject. True, that action is interpreted in an original way: an "image" of the object is separated or "emanates" from it and floats in the space between the object and the subject; getting into the subject, the image assumes the quality of knowledge.

The philosophy of the New Times lends a different shape to a basically similar conception of the mechanism of origin of knowledge. In terms of the ideas of classical mechanics, which had taken shape by that time, only material physical bodies can affect one another, the only qualities immediately inherent in the bodies being density, extension, and form. There can be no question of "emanation" of "images". Bodies can leave only material traces of impact in each other. The result of the physical impact on the sense organs (whether it be direct impact, as in the case of tactile impressions, or a mediated one, as in the case of vision) is sense perception — the primary and basic kind of knowledge. All other kinds or types of knowledge are, in one way or another, derivative from perception. Therefore to discover its mechanism would in fact mean to discover the essence of knowledge, of the cognitive relation in general.

Here is how one of the classical adherents of such conceptions, the English philosopher John Locke, reasoned: "... Simple ideas [that was the term Locke used for what is now called sense perception — *V. L.*] are not fictions of our fancies, but the natural and regular productions of things without us, really operating upon us; and so carry with them all the conformity which is intended, or which our state requires; for they represent to us things under those appearances which they are fitted to produce in us; whereby we are enabled to distinguish the sorts of particular substances, to discern the states they are in, and so to take them for our necessities, and apply them to our uses. And this conformity between our simple ideas and the existence of things is sufficient for real knowledge."[1]

It is by the specific formations arising in the subject himself, by the "ideas" or sense perceptions, that man judges of the really existing objects. The relation of the system of interconnected perceptions to the real objects reminds one of the relation of a map to the actual landscape. The map is not the terrain itself. At the same time a man who can read the map will clearly understand the interrelations of the real objects in the area described by the map.

The argument seems clear and logical. The development of modern neurophysiology indeed describes a great many dependences characterising causal chains that form in the external objects, then pass through man's senses and further to the brain. These descriptions take into account the laws of diffusion, reflection and diffraction of light in the case of vision, the specificity of the spread of sound oscillation in the case of hearing, the structure of the retina, the laws of excitation of the conductor nerves, etc. It is important to emphasise that modern studies have established that the cortex plays an exceptionally important role in the process of perception. Where a certain centre (visual, auditory, etc.) is damaged, the corresponding perception process is disrupted.

Neurophysiological studies undoubtedly have an immense significance for disclosing the material mechanisms of perception, and a great deal will have to be done in this direction. The question, however, is whether these studies by themselves are sufficient to understand perception as a special kind of knowledge, and whether the neurophysiological data can be interpreted in the theory of perception which we have briefly outlined here and which has been termed in philosophy representationism.

Let us note that in representationist terms, not all that exists in perception corresponds to the features of actually existing objects. Since the natural sciences, and in the first place physics, do not use the concepts of colour, taste, smell, etc., the corresponding properties of perception, the upholders of this view believe, should be regarded as emerging through the object influencing the subject rather than inherent in the actually existing objects (characterised by the concepts of extension, density, quantity, form, motion, etc.). Thus the theory of the so-called primary and secondary qualities is formulated, a theory that was presented in clear form by Locke and still has some supporters. The "primary" qualities of our perceptions (perception of spatial relations between objects, their size, etc.) reproduce more or less precisely the real properties of the objects themselves. As for the "secondary" qualities, they do not reproduce the properties of objects existing outside us, although they have objective causes. The "secondary" qualities, though not fully subjective and illusory, are thus more subjective than the "primary" ones.

Let us now consider the logic of the representationist conception. This will enable us to see its weak points.[2]

(1) Let us begin with the fact that the very division into "primary" and "secondary" qualities is extremely shaky. It is true, of course, that the natural sciences do not use such concepts as colour, taste, smell, etc. (although these sciences might, of course, use concepts correlative with those of colour, taste, and smell — e.g., the concept of electromagnetic wave length). Neither does such a science

as neurophysiology resort to the concepts of colour and taste, explaining the mechanism of perception through description of various spatial arrangements of the conductor nerves and brain centres and also studying the frequency of propagation of excitation along the nerve paths. The so-called secondary qualities do not appear as objects of neurophysiological analysis, for they cannot in principle be introduced into the system of physical interaction. But the question arises then, where do they emerge and in what "space" do they exist? We can no longer be satisfied with the answer that they emerge "in the process" of the object operating on the subject, for analysis of this process in terms of interaction between natural bodies does not make use of a concept pertaining to these "qualities".

The assertion also appears unconvincing that the "primary" qualities, as distinct from the "secondary" ones, reproduce more or less precisely the properties of real objects. The subjective element in the perception of colour, in gustatory senses and others is rather prominent. But the element of subjectiveness is always present in the perception of spatial forms and relations of actual objects, too. In some cases this subjectiveness is so great that it necessarily produces various illusions of perception that have been studied in detail in modern psychology. In everyday life, however, it is correctly believed that perception of spatial forms of things is on the whole objective. Why then is subjectiveness ascribed to the perception of sound, colour, smell, etc.? It is correct that the conceptual picture of the world drawn by the natural sciences does not include colours, sounds, or smells. But it does not include many of the spatio-temporal interrelations fixed in material bodies which from the standpoint of pre-scientific "common sense" are necessary attributes of the objective, real world. If we should accept that only those characteristics of reality actually exist which are expressed in the concepts of the modern natural-scientific theories, we arrive at the conclusion that not only properties corresponding to "secondary" qualities are non-existent, but so are the objective correlates of the "primary" qualities, for that which we perceive as things more or less distinctly localised in space and time is, in terms of modern physics, merely a complex agglomeration of processes on the quantum mechanical level. In this case, our ordinary notions of space, time, and localisation of objects no longer work. The ordinary perception of external objects including both "secondary" and "primary" qualities will here appear as something that does not accord with their nature, as a consequence of the specific structure of our sense organs and of the fact that

our body size is on the macroscale.

But doesn't this assumption take us too far along the path of subjectivism?

Let us point out finally that the other assumption on which the division of perceived qualities into "primary" and "secondary" is based is open to criticism. We mean ascribing some fundamental affinity between the result of impact of the "primary" qualities of the object on the sense organs and the qualities themselves. As shown by neurophysiological research, the processes that take place in the nervous system at the moment of perception have, as a rule, no external similarity to the phenomena that are the objects of perception.

(2) It follows from the "causal theory" of perception that the subject is directly concerned with the "traces" of the object's impact on the perceiving apparatus rather than with the object itself. The subject "transports outside", as it were, the features or "qualities" of these "traces", "projecting" them onto the real object and ascribing them to the object itself, although not all of them are actually inherent in the latter.

It is not clear, however, just why the subject necessarily ascribes to the object qualities that are not characteristic of it, and how it does so. The mechanism of projection is impossible to understand in terms of action of one physical system on another.

(3) Then there is this puzzle: how can the subject "read", i.e., perceive the "imprints" or "traces" of the action of the object on his perceiving apparatus?

Indeed, according to the given conception, all perception is necessarily mediated by the sense organs and the nervous apparatus. What are the sense organs that can perceive the "imprints" given in the apparatus itself that realises the process of perception? Even if we assume that such special "sense organs" do exist, that is no solution of the problem, for in these "sense organs" there must be some new "imprints" which again have to be "read" by someone, etc. And who is that "someone" reading the imprints? The subject? But the basic premise of this conception is that the subject is a physical body, a natural material system, which cannot exist somewhere in its own nervous apparatus reading imprints in its own brain.

The only way out is to recognise that the process of perception of "imprints" in the perceiving system is fundamentally different from the perception of external objects and that the former process is realised directly, without sense organs or "reading" the corresponding traces. However, that would mean rejecting the view that the origin of

sense perception as a special kind of knowledge can be fully and exhaustively interpreted in terms of action of one physical system upon another.

(4) Consistent adherence to this conception inevitably entails subjectivistic conclusions contradicting the materialist theory of reflection. Here is one of them. The "causal" theory of perception postulates that direct perception is characteristic of processes in the subject's receiving apparatus and can be correlated with the real object in a very mediated manner. The actual processes during perception may be disclosed by studying the work of analysers and the brain and nerve structures. If we follow the logic of this conception, we shall have to accept that the physiologist studying the work of the brain does not, in actual fact, deal directly with that brain but only with his own, for any object is accessible to the scientist only through the "imprints" in his own brain, which "symbolise" external reality rather approximately, being similar to that reality only in some respects. Bertrand Russell, an adherent of the "causal" theory of perception, draws this conclusion, insisting that it is a mistake to assume "that a man can see matter. Not even the ablest physiologist can perform this feat. His percept when he looks at a brain is an event in his own mind, and has only a causal connection with the brain that he fancies he is seeing."[3]

Following the path of subjectivism, Russell, unlike Locke and other metaphysical materialists, includes the "causal theory" of perception within the framework of a subjective idealistic philosophical conception. That which was a concession to subjectivism in metaphysical materialists, becomes the nucleus of Russell's epistemology.

(5) Let us finally point out an essential circumstance that is hard to explain, if one regards perception as simple causal action of one physical system on another. We refer to the fact that perception always assumes realisation of percepts and their inclusion (in the process of perception itself) in some category of objects, which is expressed in understanding the object perceived.Understanding means a certain activity of the subject, manifested, among other things, in different objective interpretations and perceptions of one and the same action of the object on the subject's receptive apparatus. The objective interpretation of reality takes place in the framework of a certain system of objective "standards". Perception thus has definite normative features.

Generally speaking, it is those features of perception which have to do with its conscious and normative character that are least amenable to interpretation in terms of

causal impact of one physical system upon another. The need to view perception as a special structure, a phenomenon of consciousness rather than a simple "imprint", has come up in other cases, e.g., when we spoke of the problem of localising the sensual image, explaining the mechanism of "projection", etc. Most supporters of the "causal" theory of perception recognise, in one way or another, that the chains of natural causation in the subject's receptive apparatus result in the emergence of a specific phenomenon that cannot be directly understood and explained in the concepts of mechanics, physics, chemistry, and other natural sciences — the phenomenon of sensual image consciously realised by the subject (that is Russell's position). This recognition, however, means in fact a rejection of the interpretation of the cognitive relation as merely a special type of connection between two physical systems.

Let us stress that critique of the "causal" conception of perception does not at all mean rejecting the idea that the subject is in some respects indeed a complex natural system, that the object does indeed act on the sense organs of the cognizing subject, and that cognition is in general impossible without this action.

Then again, it is impossible to ignore the enormous mass of material accumulated by neurophysiology. The task lies, apparently, in a philosophical-theoretical interpretation of that material.

2. THE THEORY OF COGNITIVE "EQUILIBRIUM" BETWEEN SUBJECT AND OBJECT

Some modern adherents of the interpretation of the cognitive relation as a special type of interaction between two natural systems believe that the defects of epistemological conceptions criticised in the previous section are not determined by cognition being regarded as a purely natural process but by a one-sided view of the subject-object interaction: the action of the object on the subject is studied but the reverse action of the subject on the object is not. In this connection it is believed that proper attention to the subject's own activity in the analysis of cognition, in particular to his external material activity, would allow to overcome the fundamental shortcomings of the epistemological conception of metaphysical materialism: the normative nature of cognition, for instance, will then be explained. It should be stressed that the activity the necessity of studying which is asserted is in this case understood in

the spirit of natural philosophy, as a purely natural characteristic of a specific body — the cognizing subject. This approach to the analysis of activity is quite acceptable to the adherents of this view. In fact, it does not in principle go beyond the interpretation of the cognitive relation as a natural interaction of a special type. Although its adherents analyse some cognitive problems with greater discrimination and precision than Locke and the other theoreticians who stressed the one-sided action of the object on the subject, it is still in principle impossible to construct an adequate epistemological conception in the framework of a modernised naturalist model of cognition. The theoreticians who interpret the subject's cognitive activity in a naturalistic fashion, either stick to the positions of metaphysical materialism or accept the standpoint of subjective idealism, or even assimilate both of these positions.

An illustration of this conception of the cognitive relation is the system of the so-called genetic epistemology of Jean Piaget, one of the most prominent Western psychologists. "Genetic epistemology", which is extremely influential abroad, has arisen as an attempt to philosophically interpret the extensive results of experimental and theoretical psychological studies carried out by Piaget and his collaborators during several decades. In analysing "genetic epistemology", we shall endeavour to separate the actual facts discovered by Piaget (we shall return to these facts, characterising important aspects of the process of cognition, in our positive inquiry into the problem) from his theoretical interpretation, which is largely untenable in its philosophical aspects.

Two features distinguish the approach of the Swiss psychologist. First, he recognises the subject's active role at all levels of the cognitive process, beginning with perception and ending with complex intellectual structures. This activeness of the subject is expressed in the transformation of the object, in the fact that the latter can only affect the subject in the course of his activity, which varies in character at different intellectual levels. Second, the cognitive relation is interpreted in the framework of the system-structural approach: various cognitive formations are viewed as integral structures; and the subject-object relation itself is regarded as a special type of system in which subject and object are mutually "balanced".

The main ideas of the operational conception of intelligence (as Piaget refers to his psychological theory) are as follows:

1. Intelligence is defined in the context of behaviour,

that is, of specific exchange (interaction) between the external world and the subject.

"...Unlike physiological interactions, which are of a material nature and involve an internal change in the bodies which are present, the responses studied by psychology are of a functional nature and are achieved at greater and greater distances in space (perception, etc.) and in time (memory, etc.) besides following more and more complex paths (reversals, detours, etc.)."[4] According to Piaget, intelligence is a definite form of the cognitive aspect of behaviour, whose functional purpose is the *structuring of relations between environment and the organism*.

2. Intelligence, just as all the other biological processes and functions, is of *adaptive* nature, in Piaget's view. Adaptation is in this case understood as equilibrium between assimilation (of the given material by the existing systems of behaviour) and accommodation (of these schemes to a definite situation). Adaptation may obviously vary quite extensively in its nature. It may be material, with equilibrium attained by "interpenetration between some part of the living body and some sector of the external environment",[5] or functional, which is not reducible to such material interpenetration (or exchange). A most important element in this understanding of the nature of intelligence is the assertion of the *specifically functional* nature of adaptation in the intellectual sphere.

3. Cognition realised by intelligence is not, according to Piaget, a static copy of reality. To cognize an object means to act on it, to reproduce it dynamically, and that is why the essence of intelligence lies in its *active* nature. Psychical and, consequently, intellectual life begins "with functional interaction, that is to say from the point at which assimilation no longer alters assimilated objects in a physico-chemical manner but simply incorporates them in its own forms of activity (and when accommodation only modifies this activity)".[6]

4. Intellectual activity is *derivative* from the subject's material actions; its elements, or operations, are *interiorised* actions which prove to be operations in the proper sense of the word only if they are mutually coordinated, forming *reversible*, *stable*, and at the same time *mobile integral structures*.

5. These integral structures may differ essentially both in the degree of their reversibility and the nature of mobility, and in their being related to a given sphere of objects. Moreover, other cognitive functions (for example, perception) are also characterised by structural organisation. The problems of genetic affinity between cognitive functions

(and behaviour as a whole) and the specificity of intelligence are solved by Piaget in the following manner. Intelligence "is an extension and a perfection of all adaptive processes. Organic adaptation, in fact, only ensures an immediate and consequently limited equilibrium between the individual and the present environment. Elementary cognitive functions, such as perception, habit and memory, extend it in the direction of present space (perceptual contact with distant objects) and of short-range reconstructions and anticipations. Only intelligence ... tends towards an all-embracing equilibrium by aiming at the assimilation of the whole of reality and the accommodation to it of action, which it thereby frees from its dependence on the initial *hic* and *nunc*."[7] Hence the principle of *genetic deduction* of the intellectual operations, the reverse side of this principle being the impossibility of indicating the strict boundaries of intelligence: the latter has to be defined only "by the direction towards which its development is turned".[8]

Thus intelligence is, according to Piaget, a special form of interaction between subject and object, specific activity which, being derivative from external object-related activity, emerges as the totality of interiorised operations mutually coordinated and forming reversible, stable, and at the same time mobile integral structures. Intelligence, says Piaget, may be defined "in terms of the progressive reversibility of the mobile structures" or, which is the same, as "the state of equilibrium towards which tend all the successive adaptations of a sensori-motor and cognitive nature, as well as all assimilatory and accommodatory interactions between the organism and the environment".[9]

Piaget's psychological and epistemological conception thus proves to be derivative from his interpretation of the interrelation between the organism and the environment, showing distinct biological orientation. We shall later see that Piaget endeavours to interpret the biological processes of assimilation and accommodation, in their turn, in terms of a physical and mechanistic theory of equilibrium.

The core of the genesis of intelligence is, according to Piaget, the formation of logical thinking, ability for which is neither innate nor preformed in the human mind. Logical thinking is the product of the subject's growing activity in his relations with the external world.

Piaget singled out four basic stages in the development of logical reasoning: sensori-motor, pre-operational intelligence, concrete operations, and formal operations.[10]

I. Intellectual acts at the stage of *sensori-motor intelligence* (up to the age of two) are based on coordination of movements and perceptions and do not involve any notions. Although sensori-motor intelligence is not yet logical, it "functionally" prepares logical reasoning proper.

II. *Pre-operational intelligence* (between two and seven years) is characterised by well-formed speech, notions, interiorisation of action in thought (action is replaced by some sign: word, image, or symbol).

At the stage of pre-operational intelligence, the child is not yet capable of applying an earlier acquired scheme of action with constant objects either to remote objects or to definite sets and quantities. The child does not yet have reversible operations and the concepts of retaining applicable to actions at a level higher than sensori-motor actions.

III. At the stage of *concrete operations* (between eight and eleven), different types of intellectual activity that have appeared during the previous period finally reach a state of "mobile equilibrium", that is, they become reversible. At the same time, the basic concepts of retention are formed, the child is capable of concrete logical operations. He can form both relations and classes out of concrete things. But the logical operations have not yet become generalised. At this stage children cannot construct correct speech independently of real action.

IV. At the *formal operations stage* (between 11-12 and 14-15) the genesis of intelligence is completed. The ability to reason hypothetically and deductively develops at this stage, and the system of operations of propositional logic is formed. The subject can equally well operate with both objects and propositions. The emergence of these systems of operations shows, in Piaget's view, that intelligence has been formed.

Although the development of logical reasoning forms an important aspect of the genesis of intelligence, it does not fully exhaust this process. In the course and on the basis of formation of operational structures of varying degrees of complexity, the child gradually masters the reality surrounding him. "During the first seven years of life [write Piaget and Inhelder] the child gradually discovers the elementary principles of invariance pertaining to the object, quantity, number, space and time, which lend his picture of the world an objective structure."[11] The most important components in the interpretation of this process, as suggested by Piaget, are (1) dependence of the analysis of the reality as constructed by the child on his activity; (2) the child's spiritual development as a growing system of invariants mastered by him; (3) development of logical rea-

soning as the basis for the child's entire intellectual development.

Piaget's psychological and logical conception was the concrete material on which the conception of "genetic epistemology" developed.[12]

Piaget believes that the numerous attempts at constructing a scientific epistemology in the past have been fruitless, because they proceeded from a static standpoint.

Piaget's "genetic epistemology" substantiates the existence of a "dialectical connection" between the subject and the object, the indivisibility of the subject S and the object O. It is, writes Piaget, from the interaction $S \rightleftharpoons O$ that action, the source of cognition, follows. The starting point of this cognition is neither S nor O but the interconnection $\rightleftharpoons$, characteristic of action. It is on the basis of this dialectical interaction that the object and its properties gradually come to light—through decentration, which frees cognition from external illusions. Starting from this interaction $\rightleftharpoons$, the subject discovers and cognizes the object, organising actions in a consistent system constituting the operations of his intellect or reasoning.[13]

The development of cognition, Piaget believes, leads to the subject's knowledge of the object becoming increasingly more invariant relative to the changing conditions of experience and the subject's position relative to the object. On this path the author of "genetic epistemology" arrives at the idea of applying the theory of invariants (in particular, of the mathematical theory of groups) to the study of the processes of cognition. Piaget presents in mathematical form the cognitive entities taking shape at various stages in the development of intelligence as different structures, namely, as algebraic groups (and groupings), order structures, and topological structures. From Piaget's standpoint, the invariant of a transformation group in an intellectual structure is knowledge about the object itself, about its own properties, irrespective of any particular reference frame in which these properties are discovered. The reversibility of operations in the intellectual structures is directly linked with the presence of invariants in them.

In Piaget's theory, invariance of knowledge about an object relative to some subjective "perspective" is ensured by the actual interaction of subject and object, connected with the subject's action and quite unambiguously defined by the properties of the object itself which exists objectively and actually. In Piaget's discussion of this problem, materialism as the basic philosophical premise of his conception stands out particularly clearly.

The appearance of stable and reversible operational

structures does not, of course, mean, in Piaget's view, that situations of instability cannot henceforth arise at all in the subject's knowledge. Knowledge is always knowledge of an external object, whose properties are inexhaustible: it presents to the subject ever new aspects and poses ever new problems. When Piaget points out the growth in the stability of knowledge of the object in intellectual development, he has in mind, first of all, the formation of reversible structures of intellectual operations, that is, of *logical* instruments which permit the subject to solve those tasks which reality poses before him. Inasmuch as Piaget believes that the solution of tasks is based on well-formedness of operational structures permitting to solve classes of problems of the same type, the growth in the stability of intelligence structures also indicates a growth in the stability and invariance of the subject's knowledge as a whole.

But it is a well-known fact that, however important the invariance criterion may be as an indicator of the objectiveness of knowledge, it is not the only or the main criterion, and that becomes quite clear at the highest stages of the development of cognition, particularly in the construction of scientific knowledge.

It is this variety of forms which the invariance criterion can assume, and its derivation from other, more fundamental criteria, that are not taken into account in Piaget's works. He singles out mostly those aspects of the formation of invariant knowledge of the object which may be adequately described by the available mathematical apparatus and, in the first place, by group theory. The proposition concerning the role of reversibility of operations as a means of attaining invariant knowledge is also derived by Piaget from group theory. But if one takes into account the diversity of forms which invariance of knowledge assumes, one will have to admit that reversibility of cognitive operations is not apparently the kind of universal indicator of objectiveness of knowledge which Piaget believes it to be.

Attempts to solve the problem of objectiveness of knowledge with the help of the invariance concept are numerous in the foreign literature on epistemology and the methodology of science. Thus Max Born, one of the prominent modern physicists, points out in his discourse on the nature of "physical reality" that the concept of invariant of a group of transformations is a key to the concept of reality not only in physics but also in any aspect of the world.

"Invariants are the concepts of which science speaks in the same way as ordinary language speaks of 'things', and

which it provides with names as if they were ordinary things."[14] Most measurements in physics, Born believes, do not pertain to objects themselves but to their projections on other objects. "The projection ... is defined in relation to a system of reference... There are in general many equivalent systems of reference. In every physical theory there is a rule which connects the projections of the same object on different systems of reference."[15]

However, the attempts to identify construction of objective knowledge with establishment of the object's invariant characteristics run into serious philosophical difficulties. The apparatus used by the physicist during experiments function in this aspect as quite real physical bodies interacting with other bodies according to objective laws, so that the results of interaction, just as, generally speaking, the properties arising from the relation of one object to other objects, the so-called projections, must exist objectively and really. Besides, invariance is not an absolute characteristic of a given property, being established only in a definite system of relations, and that which is invariant in one system may be non-invariant in another, to say nothing of all possible systems. Thus, the theory of invariants cannot have that fundamental epistemological significance which Piaget and other researchers abroad ascribe to it.[16]

Piaget's "genetic epistemology" endeavours to link up the theory of invariants with the theory of equilibrium. Here the fundamental philosophical weakness of Piaget's conceptions comes to light most clearly.

Piaget believes that the emergence of invariants in the structure of intelligence (and, consequently, the appearance of reversible operations) is directly connected with mutual balancing of operations and, as a result of this, with the subject-object equilibrium. The theory of equilibrium must therefore provide a key to understanding intellectual development. Equilibrium is interpreted by Piaget as the maximum magnitude of the subject's activity compensating for certain external changes, rather than as balance of forces in the state of rest.

In building the model of subject-object equilibrium on the analogy of the equilibrium between a physical system and its environment, and later on the analogy of the equilibrium of the biological organism with the environment, Piaget cannot deduce from this model the specific properties of the kind of "equilibrium" between subject and object and is therefore compelled to introduce these properties into his system from the outside, in apparent discord with his own basic model.

In mechanics, a closed system is believed to be in equilibrium if the sum of all possible types of work within the system equals zero.

Using the term "equilibrium" in his theoretical arguments, Piaget at first understood it in the sense that is close to the above. The subject-object system (and by "object" he means, first of all, that part of the subject's environment with which he directly interacts, practically and cognitively) may be regarded as being in equilibrium if the sum of all possible interactions between the subject and the object equals zero (that means that the subject can always perform an action reversing the first action thus regaining the original situation). The external equilibrium between the subject and the object is ensured by establishing an equilibrium within the operational structure: the existence in this structure of an operation that is the reverse of the basic one gives precisely this effect that the sum of all possible operations within the structure equals zero.[17]

It soon turned out, however, that Piaget's analogy between equilibrium in a mechanical system and equilibrium in the structure of intellectual operations is extremely imprecise. First, the mechanical principle deals with a closed system, that is, one that is isolated from the influence of the environment, whereas the whole purpose of the "balancing" of intellectual operations of which Piaget speaks is the attainment of stability of the knowledge about the object relative to the mutable experience. In other words, Piaget deals with an "open" rather than "closed" system. Second, it came to light that in physics itself system equilibrium is only rarely expressed by the above principle. In the more general cases of system equilibrium, considered, e.g., in thermodynamics, there is a minimum of potential energy in the system (which is conditioned by the attainment of the most probable state by the system). Mechanical equilibrium proves to be only a special case of the more general equilibrium state. In recent years, a number of physicists and mathematicians (I. Prigozhin and others) have generalised the concept of equilibrium to include "dynamic equilibrium". It proved to be possible to apply the mathematical theory of dynamic equilibrium of a system to the study of "open systems", i.e., systems exchanging matter and energy with the environment. Some biologists have made attempts to apply the theory of dynamic equilibrium to the study of living organisms as "open systems".

Piaget speaks of "balancing" operations within a cognitive structure, believing this "balance" attainable due

to complete reversibility of operations. Endeavouring to get rid of teleology in explaining the inner trend of the subject's actions towards mutual balancing, Piaget aims at constructing his conception on the basis of the physical theory of equilibrium. As we know, the tendency of a closed physical system towards the most probable state is explained by the action of statistical laws, without any reference to hidden goals. However, equilibrium in physical systems is very often achieved by attaining some irreversible state rather than by increasing the reversibility of processes within the system.

Finding it impossible to deduce from the physical model of equilibrium cognitive "equilibrium" of subject and object, which is of fundamental importance for his psychological and epistemological conception, Piaget was compelled to stress more and more the *specific* character of psychical equilibrium.

Piaget believes it necessary to distinguish between "instrumentally possible" and "structurally possible" operations. The former operations are those which the subject himself regards at a given moment as possible, that is, as operations he might perform. Although from the standpoint of the subject himself "instrumentally possible" operations are not those actually performed by him, an outsider (e.g., the psychologist studying the given person) may regard them as real, for the subject's contemplation of his possible actions is just as real a psychological process as an external activity. "Structurally possible" are those operations of the subject which he himself does not regard at the given moment as possible (or he may even be unaware of his ability to perform them) but which he is nevertheless capable of performing, for he has at his disposal an objectively formed operational structure including these operations. The basis of all operations of the subject is thus "structurally possible" operations, coinciding in fact with the operational structure itself. Piaget asserts that in the intellectual operational structure the equilibrium of actual and possible changes is expressed in a manner quite different from a physical system. While in the intellectual structure there exist "instrumentally possible" operations that are mediating links, as it were, between real and possible changes, in a physical system there can only be a sharp dichotomy between real and possible changes. So the analogy between intellectual and physical equilibrium cannot be taken very far.

Analysis of the actual "equilibrium" between the subject and the object in the process of cognition led Piaget to a recognition of such characteristics of this equilibrium

which can in no way be deduced from the model of equilibrium of a physical system or a biological organism. Referring to "instrumentally" and "structurally" possible operations, Piaget is compelled to speak of *consciousness*, of *contemplation* by the subject of his possible actions and of other specifically psychical states as the necessary component of the subject-object equilibrium.

Recognising the insufficiency of the physical theory of equilibrium for understanding the subject-object equilibrium, Piaget demonstrated, in fact, the weakness of his own epistemological stand, although he failed to work out a conception that would adequately explain the facts which he analysed.

Characteristically, when Piaget had to define the concept of "reversibility" of an action (i.e., the concept of operation, for an operation is a reversible action), he could not restrict himself to pointing out the connection between reversibility and the possibility of performing an action in two opposite directions and had to indicate the importance of *realisation* of the fact that the action remains the same as it is performed in either of the directions.[18] Naturally, the concept of reversibility cannot be defined in this way in physics.

Piaget admits that the reversibility of intellectual operations of which he speaks has nothing to do with the reversibility of actual physical processes. Thus, speaking of the formation of the concept of time, he remarks that reversibility of time does not mean for the subject that actual physical time can flow in the opposite direction (actual time is irreversible) but merely the fact that the subject can mentally proceed not only from the previous moment of time to the subsequent one but also from the subsequent to the preceding (i.e., he can not only perform the operation $A \rightarrow B$ but also the operation $B \rightarrow A$), *realising*, however, that the actual sequence of moments does not change (i.e., A precedes B). "Constructing time ... is an excellent example of joint action of the reversible processes of the subject and the irreversible processes of the object," remarks Piaget.[19]

Thus Piaget fails to deduce in the framework of his conception the normative character of cognitive structures without resorting to the phenomena of consciousness, those phenomena whose study cannot be carried out by interpreting the subject-object interrelations in terms of mechanics, physics, and biology, and thus does not accord with the fundamental approach of "genetic epistemology". It proves impossible to explain objectiveness of knowledge and other fundamental characteristics of cognition by the

theory of "balancing" the subject and the object interpreted as bodies given by nature.

3. THE VIEW OF COGNITION AS AN ENSEMBLE OF THE SUBJECT'S PHYSICAL OPERATIONS

According to Piaget, the subject's activity serves as a means of reproducing the characteristics of the real object in the system of knowledge; in the view of other adherents of the naturalistic model of cognition, who focus on the subject's active character, it is in general impossible to regard the existence of a real object of cognition as independent of the subject's activity. Cognition is in this case no longer treated as reflection but merely as an ensemble of the subject's individual external actions or operations. Adherents of these conceptions formulate a number of naturalistic, metaphysical-materialistic premises as their starting point (both the subject and the object being included in the structure of natural reality, and the subject's actions or operations being interpreted as physical, or material), ending with constructing systems of subjective-idealistic epistemology.

Here belongs the epistemological and methodological conception of operationalism that was rather influential until recently among Western philosophers and natural scientists. Operationalism takes into account a very important characteristic of the cognitive process, namely the fact that in this process man introduces certain artificially created objects between himself and the cognized object: devices, measuring instruments, etc. Let us note that this fact is not duly appreciated in Piaget's theory. However, the objects or "mediators" used in cognition are regarded in operationalism as fundamentally the same as the rest of the natural bodies. That these objects are produced by man, not nature, and that they are included in a system of socio-cultural ties, is of no great epistemological significance for this conception.

The main ideas of operationalism were formulated by P. W. Bridgman, a well-known American physicist.

Bridgman drew attention to the fact that the special theory of relativity not only changed essentially our views of the world but also necessitated a new approach to a number of logical and epistemological problems involved in the interpretation of the mathematical formalisms used in physics and in specifying the meaning of physical concepts. "It was a great shock to discover that classical concepts, accepted unquestioningly, were inadequate to meet the actual situation, and the shock of this discovery has resulted in a critical attitude toward our whole conceptual structure."[20]

In thinking about the logical meaning of the procedures applied by Einstein in defining the basic concepts of the special theory of relativity, Bridgman concluded that despite the generally held view that most concepts of classical physics characterise the properties of objects, of things, the actual meaning of physical concepts lies in an ensemble of experimental operations or, to be more precise, in an ensemble of measurement procedures. Bridgman reasons, for instance, that we evidently know what "length" is if we can determine the length of a concrete object. To do so, we have to perform certain physical operations. "The concept of length is therefore fixed when the operations by which length is measured are fixed: that is, the concept of length involves as much as and nothing more than the set of operations by which length is determined. In general, we mean by any concept nothing more than a set of operations: *the concept is synonymous with the corresponding set of operations.*"[21] If the concept is "mental, as of mathematical continuity, the operations are mental operations". Bridgman indicates here that "we must demand that the set of operations equivalent to any concept be a unique set"[22] (i.e., only *one* set of operations corresponds to each concept).

In this connection, Bridgman continues, it is easy to show that such concepts of classical physics as "absolute time" or "absolute simultaneity" are devoid of meaning, for there are no physical operations that could be used to ascribe the absolute time predicate to some event.

If we take into account that the operations to which a physical concept is equivalent are *actual* physical operations, the conclusion is inevitable in operationalism that concepts can only be defined in the range of actual experiment, becoming meaningless in regions as yet untouched by experiment. Therefore, Bridgman believes, we cannot express any assertions about these domains. And if we do make these assertions, we must regard them us conventionalised extrapolation, of the looseness of which we must be fully conscious, and the justification of which is in the experiment of the future.

Thus, before the emergence of the special theory of relativity, it was believed that any two events A and B possessed this property with regard to the time of their realisation, that A takes place either before B or after it or simultaneously with it. This assertion seemed to be a sim-

ple description of the behaviour of objects given in experience. But the experience itself which this assertion claimed to describe was very narrow. When the range of experience was broadened, and research became concerned with bodies moving at high velocities, the untenability of the concept of simultaneity used by classical physics was discovered.

Einstein showed, Bridgman writes, that the operations which permitted the statement of simultaneity of two events involved measurement by an observer, so that simultaneity is not an absolute property of the two events but one involving the relation of the two events to the observer, the subject, his frame of reference, the velocity of these events relative to the observer's frame of reference.

Bridgman makes further specifications in his methodological conception using a detailed operational analysis of the concept of length as his proving ground.

He asks this question: by what operations do we measure the length of any concrete physical object? The measurement of the objects of ordinary experiment is effected by a procedure which is crudely described as follows. A rod is used as the measure of length; it is imposed on the object in such a way that one of the ends of the rod coincides with one of the ends of the object, then the position of the second end of the rod is marked on the object, after which the rod is moved along the line that is the continuation of its previous position in such a way that the first end of the rod coincides with the previous position of the second end. This procedure is repeated until the second end of the object is reached. The number of separate applications of the rod is called the length of the object in this case.

Bridgman points out that the operation described here, which appears so simple, is in actual fact very complex. It is necessary to satisfy a whole series of conditions to really measure the length of an object. Thus we must be certain that the temperature of the rod is normal, one at which the length of given objects is usually measured, otherwise we would have to introduce correctives in the results of our measurements to account for the effect of the temperature changes. If we measure the vertical length of an object, we have to account for the influence of the gravitation forces on the length of the measuring rod. Finally, we must be certain that the measuring rod is not a magnet and is not affected by electric forces. All of these conditions are usually taken into account by the physicist who makes measurements with some concrete aim in view.

However, Bridgman continues, in operational analysis we must go even further in determining the conditions of measurement and specify *all the details* relevant to the movement of the rod in measurement: e.g., the precise path of the rod in space, its velocity and acceleration. In practice, when objects of ordinary experience are measured, these conditions are neglected. And that is quite understandable, for in ordinary experiment variations of these conditions do not affect the end result.

But we must recognise, Bridgman asserts, that experiment is always subject to errors, and that extending the boundaries of experiment and increasing the precision of measurement may reveal that the conditions that now seem to leave the result of measurements unaffected actually seriously affect it. "In *principle* the operations by which length is measured should be *uniquely* specified. If we have more than one set of operations, we have more than one concept, and strictly there should be a separate name to correspond to each different set of operations."[23]

If we want to measure the length of a moving object, the operations applied will be different. At first glance, it will appear enough to climb on the object and repeat the procedure that was used in measuring the length of the object at rest. In actual fact the situation is somewhat more complicated. A full specification of the operations employed assumes several additional conditions. In what way shall we overtake the object with the measuring rod in our hands? Shall we first overtake the moving object and then try to jump on it, or shall we await the moment when the object approaches us? If the object moves rather fast, one obviously cannot jump on it directly from an immovable support, and we shall have to use some special device, such as a moving automobile.

Since operations applied by Einstein for defining the concept of length, are different from the operations used for measuring length in ordinary experience, Einstein's "length" does not mean the same as the "length" of ordinary experience. These are *different concepts*, although they do have some features in common: where the velocity of the moving body relative to the measuring system reaches zero, the operations of measuring the moving object coincide with those applied in measuring the length of the object at rest.

Bridgman's epistemological thinking on the nature of surrounding reality is directly connected with the essence of operational analysis.

An analysis of the logical meaning of this concept allows Bridgman to conclude that the attribute of physical reality

is ascribed to those concepts which may be defined by *different* sets of physical operations *independent* of each other.

We bear in mind that the main idea of operationalism is that each set of operations essentially corresponds to one concept only. If two (or more) sets of operations independent of each other yield the same results, we may, from the operationalist standpoint, conditionally identify the differing concepts corresponding to different sets, regarding them as one concept to which the status of physical reality is ascribed. Such a concept appears as an invariant relative to different sets of operations or as an expression of some correlation between different sets of physical phenomena. At the same time we should not forget, Bridgman insists, that the identification of the results of different sets of measurements is, to a certain degree, conditional, being justified by the available measurements only; future experiments may reveal discrepancies in the results of measurements belonging to different sets, and in this case a single concept will have to be "split" into two or more, that may or may not have the status of physical realities.

We thus see that the basis of operationalism is emphasis on the uniqueness of the experimental procedures performed by the experimenter, the need for singling out all the physical operations in defining concepts. Continuing this line of reasoning, Bridgman quite logically infers that, strictly speaking, each operation is unique, being implemented by the given single individual at a given time and place. The operations must not be generalised, as there is no method to guarantee the future of such generalisation.

But if one accepts these theoretical premises, the conclusion is inevitable that not only non-operational but also operational definitions of concepts are in fact impossible. A. C. Benjamin, an American researcher in operationalism, remarks: "Another operation, however similar to the first, must be a different one since it will be distinguished at least by spatial or temporal location. Two measurements of the length of a given object, even if the results are the same, can be distinguished. Now if a concept is always to be defined by an operation, and each operation is a particular, the concept itself takes on the particularity of its mode of definition. Not only will there be a difference between the tapeline length of a field and the triangulation length (even if the measured values are the same), but there will be a difference in *meaning* between all individual tapeline lengths of the field (again, even though the measured values are the same)."[24] But concepts defined in this way are devoid of any cognitive value at all, for they es-

sentially cease to be concepts, which must, as is well known, capture something that different situations have in common. This taking one of the basic premises of operationalism to its logical end comes into a decisive contradiction with the statement of Bridgman himself that physical operations in terms of which definitions of concepts are given must be *repeatable* and always realisable. Moreover, Bridgman writes: "Operational definitions, in spite of their precision, are in application without significance unless the situations to which they are applied are sufficiently developed so that at least two methods are known of getting to the terminus."[25]

It might be assumed that this contradiction in the foundation of the conception could be eliminated by assuming that each concept is synonymous to a set of repeatable operations rather than to one single operation. It is easy to see, however, that introducing a set of operations does not eliminate the main logical difficulty. Any two operations are similar in some points and different in others. Unifying a series of operations in a single set (or a single class) synonymous to the meaning of some concept implies, in the first place the singling out of some general feature or property inherent in all these operations and not definable by an operational mode (operational definitions thus necessarily assume the existence of some characteristics interpreted non-operationally). Then again, the existence of a criterion is assumed which indicates the degree to which the operations must be similar to form a single set (depending on the required degree of similarity, different sets of operations may be specified to which different operationally defined concepts will correspond). Inasmuch as operationalism is in principle incapable of indicating such a criterion, its basic methodological assertion that different concepts correspond to different sets of physical operations proves to be untenable. Indeed, why can we in one case include different operations in a *single* set, correlating with one and only *one* concept, while other occasions, different sets of operations (even if they are expressed in identical or similar results) are said to characterise *different* concepts? Then, if we sometimes refer, for practical convenience, different sets of operations to one concept, why can this reference be regarded merely as a temporal procedure, pragmatically convenient but methodologically unjustifiable?

A necessary methodological correlate of Bridgman's position is subjective idealism.

The Logic of Modern Physics contains, along with subjectivist general philosophical assertions, some statements

in the spirit of natural-scientific materialism.[26] In Bridgman's later works the subjective-idealist position following from operationalism is realised more clearly and implemented quite consistently. In his book *The Nature of Physical Theory* he defends undisguised solipsism: "It seems to me that as I have stated it, the solipsist position, if indeed this be the solipsist position, is a simple statement of what direct observation gives me, and we have got to adjust our thinking so that it will not seem repugnant."[27]

In one of his works Bridgman argues that there is no operation to prove that the universe arose more than five minutes ago, "for any of our methods of proof are things that we do *now*".[28]

But the most significant circumstance that has determined the rejection, becoming evident now, of operationalism as a methodology and an epistemology by the wide circles of scientists abroad is not so much the self-contradictory nature of operationalism as the wide gap between the operationalist recommendations and the actual course of the development of science, a gap that became obvious and clearly realised in the 1940s and 1950s. In the 1930s it was sometimes stated that operationalism is something generally accepted in physics,[29] whereas at present the conviction is widespread that operationalism is very far from understanding the real problems of scientific methodology.

The fact is that scientists prefer to use the so-called open concepts in the actual practice of scientific cognition, i.e., concepts whose significance relative to an experimental situation is not fully defined (since it is impossible to fully exhaust all these situations beforehand). As for operational definitions, they characterise closed concepts, for they fix the meaning of concepts only for some definite conditions.

The gist of the matter is that the so-called open concepts, with which science mostly operates, function within the framework of systems of theoretical knowledge. Operations of measuring certain magnitudes have a meaning in these frameworks, characterised by definite premises, ontological assumptions, and modes of specifying a definite aspect of objective reality. In other words, the measurement operations, far from being capable of specifying the meaning of scientific concepts, do not, as a rule, exist in isolation. As for the fundamental question of the standards and *norms* to which production and evaluation of theoretical knowledge (and knowledge in general) is subordinated, it cannot in principle be solved in an operationalist framework, as has been said above.

Most participants at the 1954 symposium on the Present State of Operationalism[30] came to the conclusion that "if the rule of operationalist caution is strictly and consistently applied, physics must reduce to a mere record of isolated data".[31]

The question naturally arises, if operationalism as an epistemology and general methodology of science must be rejected, does that mean that the technique of operationalist analysis has absolutely no rational content?

We have noted already that, although most concepts of science cannot be defined in terms which fix the results of measurement (and it is in this sense that operational definitions are understood in strict operationalism), these definitions still have a certain significance. They are used when a general non-operational definition indicating the specific properties and relations of the concept defined has not yet been worked out. "We may not be able to give a general answer to such questions as 'What is length?', 'What is causality?', 'What is simultaneity?', etc. But, as long as we can, in most concrete cases, determine length and simultaneity through measuring operations, as long as we can determine the position of the body at a time t_2 from its position at t_1 and the momentum lent to it, we can say that the words 'length', 'simultaneity', and 'causality' have quite a definite unambiguous meaning,"[32] writes D. P. Gorsky.

An "operational definition" is not a definition in the proper sense of the word but a formulation of the empirical conditions of application of a theoretical concept, one and the same theoretical concept amenable to several empirical interpretations through different "operational definitions".

Evaluating the significance of operationalism for the methodology of science in general, we conclude that Bridgman's emphasis (following Einstein) on linking up theoretical constructs with experimental operations was not without a foundation, although the nature of this link was given a fundamentally erroneous interpretation in operationalism.

"Bridgman's operationalism", [remarks V. S. Shvyrev], "reflected in a distorted form the indubitable fact of the methodology of natural science that the establishment of the meaning of ... theoretical concepts ... implies fixing certain empirical dependences between experimentally reproduced situations and the consequences, also empirically fixed, of these operations."[33]

As we see, the significance of the technique of operational analysis is not very great. This technique may only be fruitfully used if the meaning of the measurement

operations and the nature of their reference to some scientific concept are already given, that is to say, if there already exist certain systems of knowledge characterising the state of affairs in the objective world independent of the subject and his operations. Any elementary measurement operation already presupposes the singling out of the objective magnitude or parameter which is to be measured, as well as "incorporation" of the results obtained into the system of relations between the mathematical objects (the result of measurement being expressed in mathematical form). As for the norms of obtaining and evaluating the systems of the very knowledge correlated with objects, this question is insoluble from the positions of operationalism as an epistemological and methodological conception. In other words, one cannot arrive at an understanding of the nature of knowledge and the character of the cognitive relation within the framework of this conception.

We have endeavoured to show that the naturalistic interpretation of the cognitive relation between subject and object as a kind of interaction between two natural systems, leaves a number of fundamental epistemological problems unsolved, regardless of the share of activity ascribed to each of the poles of interaction. Here belong questions of the interpretation of the nature and character of the norms of acquiring and evaluating knowledge, and those of the place and role in the cognitive process of such a specific structure as consciousness.

Starting out from metaphysical materialism, the adherents of the naturalist model of cognition are compelled to make inevitable concessions to subjectivism, siding, in some cases, entirely with subjective idealism and giving up the materialist theory of reflection.

Let us once again note that revealing the untenability of the epistemological conceptions formulated by the supporters of the naturalist interpretation of cognition, in no way signifies ignoring the real facts that are given a false interpretation in these conceptions (some of them were discovered by the upholders of the conceptions criticised here).

Indeed, man as the cognizing subject has a body liable to the action of mechanical, physical, chemical, and biological laws. This and other factors have a definite bearing on the mechanisms of implementing cognition. The whole point is, however, that man's characteristic as a subject acting and cognizing in a specifically human manner cannot be understood from the natural specific features of man's body. It proves impossible to interpret the fundamental

and most essential traits of the cognitive relation within the mode of presentation of the subject-object problem discussed in this chapter.

It is all evidently a question of philosophical and scientific theoretical interpretation of the facts described and of evaluation of their significance for epistemological research.

Chapter 2

THE INTERPRETATION OF COGNITION AS DETERMINED BY THE STRUCTURE OF CONSCIOUSNESS

1. THE PROBLEM OF SUBSTANTIATING KNOWLEDGE AND "RADICAL" REFLEXION

Widespread in pre-Marxian and particularly in modern non-Marxist philosophy are conceptions which endeavour to solve the fundamental problems of epistemology starting from the premise that cognition is determined by the structure of individual consciousness. The latter is treated as a completely autonomous phenomenon, dependent on nothing else and determined by nothing else. Clearly these conceptions express the positions of subjective idealism.

These idealistic conceptions exploit the real problems that cannot be passed over in silence in analysing the cognitive relation. It is a question, first and foremost, of the norms and standards functioning in cognition and permitting to distinguish between knowledge and absence of knowledge. In other words, the reference here is to the problem of substantiating knowledge, which is a pivotal one for the subjectivist idealistic conceptions to be analysed in this chapter. These conceptions do not merely proclaim the need for starting out from the traits of individual consciousness in studying cognition. They propound a system of arguments to prove that only adopting the subjectivist idealistic stand in epistemology can solve the problem of substantiating knowledge, and that any other philosophical interpretation of knowledge and cognition fails to cope with this problem. These conceptions are not only influential in bourgeois philosophy: they also exert a great influence on specialists in the sciences (mathematics, psychology, etc.). All of this compels us to analyse in detail the arguments of the principal adherents of this interpretation of the cognitive relation, to show the untenability of their reasoning and to clearly separate the real problems of epistemology, the true facts of cognition and consciousness (the representatives of the conceptions criticised here encountered a number of such facts) from their idealistic, false interpretation.

Let us, first, tackle the problem of substantiation of knowledge itself.

If knowledge is a specific formation inherently possessing the property of truth, that is, correspondence to the objectively real state of things, there must obviously exist some norms or standards permitting to judge whether we do indeed deal with knowledge, and to separate knowledge from ignorance.

If we have such standards at our disposal, we shall be able to make judgements concerning the degree of truth of all those specific products of human activity which claim to be knowledge; in other words, we shall evidently be able to show the falseness of the claims of some of them and at the same time to finally confirm others in their status of knowledge. The task, consequently, consists in singling out the normative constituents of any knowledge.

Let us take into account that the very formulation of the problem of substantiating knowledge implies a critical attitude to various existing kinds of knowledge, beginning with the current opinions of "common sense" and ending with theories of the special sciences and philosophical constructions. Not one of the various kinds of knowledge regarded outside of special epistemological analysis can lay claims to absolute truth merely because it is now believed to be true—that is a necessary premise of the approach to the problem discussed here. And that means allowing the possibility that epistemological research will result in recognising the insufficient substantiation not only of certain propositions of "common sense" but also of some propositions and probably whole branches of theoretical knowledge. Indeed, the discussion of the problem of substantiating knowledge in the history of philosophy was necessarily accompanied by rejection of the justifiability of a number of theoretical constructs that for a long time were regarded as generally accepted (consider, e.g., Kant's rejection of the whole range of the problems of rationalist ontology in the 17th and 18th centuries). The study of the foundations of certain scientific disciplines, which became so vital in the 20th century, also necessarily involves recognising the justifiability of some modes of specifying problems and methods of discourse, and rejecting others (of precisely this nature are the arguments between different trends in the foundations of mathematics and the modern debate concerning the interpretation of quantum mechanics). The theoretical activity in substantiating a given scientific discipline, including as it does analysis of the modes of reasoning and evaluation of knowledge in

this area, assumes, as a rule, not only solving special questions pertaining to the given science but also, to some extent or other, investigating some general philosophical problems. It is therefore not accidental that the problems of the foundations of mathematics are often referred to as the "philosophy of mathematics", while problems in the meaningful interpretation of modern physical theories are included among the "philosophical questions of physics". At the same time, the general problem of substantiation of knowledge as posed in philosophy has certain features distinguishing it from substantiation of the special sciences.

In philosophy, it is not knowledge of a given type that is substantiated but any knowledge in general regardless of its concrete content, that is, criteria are sought which permit to distinguish between knowledge and ignorance in any given case.

In this connection we would like to draw attention to the fact that, in discussing a very real and fully justifiable problem of substantiation of knowledge, the adherents of the approach to the cognitive relation analysed in this chapter proceed from two premises which appear to them quite natural but actually predetermine the subjectivist nature of their epistemological conceptions. This is, in the first place, the metaphysical notion of the existence of standards which permit once and for all to separate genuine knowledge from error, to draw a sharp boundary between knowledge and absence of knowledge, and to single out "in pure form" some systems of "absolute" knowledge that could be used as the foundation for the entire system of scientific theories. The epistemological conceptions considered here are also based on another assumption: since the problem of substantiation of knowledge implies a critical attitude to certain kinds of it, the problem itself was interpreted as the need to reject the reliance on the results of the special sciences or the propositions of pre-scientific "common sense" in the philosophical analysis of the cognitive relation between subject and object. In other words, since the degree of substantiatedness of scientific knowledge is to be determined through philosophical analysis, a philosophical investigation of knowledge cannot assume certain propositions of the special sciences to be truths substantiated in themselves (it assumes them only as its subject-matter, just as the propositions of "common sense" and philosophical theories). That means that the field of philosophy which is concerned with this problem, i.e., epistemology, must be understood as a specific sphere of theoretical activity

fundamentally different from all kinds and types of special scientific knowledge, that is, as a field where the data of the special sciences cannot be used. (Thus the approach to the study of cognition analysed here differs in its attitude to the special sciences from the approach considered in the first chapter: the latter, as we remember, presupposed wide use of the data of mechanics, physics, biology, physiology, and other sciences.)

We must agree that the task of cognition consists in overcoming errors and obtaining true knowledge. Epistemological reflexion about knowledge indeed plays an important role in the solution of this problem. It is also true that positing the problem of substantiation of knowledge implies a critical attitude to certain areas of existing knowledge. At the same time, the view that "pure" or "absolute" knowledge can be established is false, and so is the assertion that in substantiating knowledge we must ignore all the facts of the special sciences. In the second part of the present work we shall characterise an approach to the substantiation of knowledge which does not accept these false premises, namely, Marxist-Leninist epistemology.

The question of substantiation of knowledge was first formulated, in classical form, by Descartes. The positing of this problem and its acuteness were largely due to the specific traits of the socio-cultural and scientific situation in which Descartes' theoretical activity took place, a situation which was characterised, on the one hand, by the emergence of the bourgeois mode of production (and thus by a growing acuteness of individual self-consciousness) and, on the other hand, by the emergence of the science of the New Times which set itself in sharp opposition to the scholastic tradition. On the whole, however, Descartes' theoretical arguments transcend the concrete historical situation, for the mode of analysis which he accepted proved to be archetypal and was many times reproduced with various modifications in western bourgeois philosophy.

The starting point of Descartes' reasoning is his distrust for the cultural tradition: "I learned not to believe too firmly anything of which I was only persuaded by an example or custom."[34] "As soon as my age permitted me to be free of the supervision of my tutors, I abandoned the study of letters entirely... resolving not to seek any other science but that which I could find in myself or in the great book of the world..."[35]

For philosophy "had been cultivated by the most excellent minds that ever lived for many centuries, and yet there was not a single thing in it which could not be dis-

puted and consequently which would not be doubtful...";[36] that was Descartes' formulation of the proposition which was later repeated by numerous philosophers who tackled the problem of knowledge. And further: "As for the other sciences, since they borrowed their principles from philosophy, I judged that it was impossible to construct anything that would be solid on such infirm foundations."[37]

Thus the question here is one of a radical attempt to substantiate the entire system of theoretical knowledge.

Where could one look for the solution of this problem?

Descartes starts out from the premise that only that should be taken as true which is cognized as such quite obviously, that is to say, it appears to the mind so clearly and distinctly that there is no reason to call it in question.

But can we trust our sense perceptions? They often deceive us. Thus towers which seem round from a distance prove to be rectangular at close quarters, while giant statues at the top of these towers seem small if looked at from below. Errors may result not only from the evidence of our external senses but also from that of the internal ones. "...For is there anything more intimate and interior than pain? And still, I have heard on several occasions from persons who had their arms or legs cut off that it sometimes seemed to them that they felt pain in the parts that had been cut off, which gave me reason to believe that I could not be certain that any of my limbs is ailing though I should feel pain in it."[38]

True, one can believe that there are things with regard to which our senses can hardly deceive us. For instance, it can hardly be doubted that I am sitting here behind this table, informally dressed, holding this paper in my hands, etc. "And how could I negate that these hands and this body are mine? Perhaps, only then when I compare myself to these insensates..."[39] It may very well turn out, however, that all this is merely my dream. "Stopping to consider this idea, I see so clearly that there are no conclusive features or sufficiently unquestionable marks by which it would be possible to distinguish neatly between being awake and sleeping, that I am quite astounded; and my astonishment is such that it can nearly persuade me that I am asleep."[40]

At the same time, our mind faces such clear and distinct propositions concerning the elementary and universal things studied in arithmetic and geometry (these propositions pertain to the extension of corporeal things, their configuration, magnitude, number, time, etc.), that they

cannot be doubted. Arithmetic, geometry, and similar sciences are not concerned about the actual existence in nature of the objects that they study. At the same time, these sciences contain something indubitable and reliable. "For whether I sleep or stay awake, two and three joined together always form the number five, and the square will never have more than four sides."[41]

But can we not allow, Descartes continues, that God or better say some evil spirit, just as cunning as he is powerful, used all his art to deceive me? In this case, however, the sky, air, earth, colours, sounds, all external objects will be mere illusions and dreams.

"And then, as I judge sometimes that the others err, even in things which they believe to know with the greatest certainty it may be that he wanted that I should be mistaken each time that I add two and three, or count the number of the sides of a square, or judge about things that are even easier, if one can imagine something easier than that."[42]

Thus, Descartes concludes, one may doubt even mathematical proofs.

But is there anything certain, in general? Descartes believes that the original and basic certainty lies in the idea of myself as something existing. "There is no doubt, however, that I exist, if he deceives me; and let him deceive me as he will, he will never make it so that I shall not exist as long as I think myself to be something... This proposition: *I am, I exist*, is necessarily true each time I pronounce it or conceive it in my mind."[43]

One can doubt anything, but I cannot doubt that I, the doubter, exist, insists Descartes.

"So, we have so much repugnance to conceiving that that which thinks does not exist at the same time as it thinks, that, notwithstanding all the most extravagant suppositions, we shall not prevent us from believing that this conclusion: *I think, therefore I exist*, is true, and consequently is the first and the most certain conclusion presenting itself to him who conducts his thinking in an orderly manner."[44]

Thus, the idea of my existence, self-consciousness, is the most reliable and indubitable truth, asserts Descartes. My essence is thinking, he believes, i.e., "everything that takes place in us in such a way that we perceive it immediately by ourselves".[45] (Thinking thus includes not only understanding but also desire and imagination, that is, all those psychical processes that are accompanied by self-consciousness.) Descartes believes that I therefore cannot deduce my existence from the facts which are

expressed in such representations as "I see", "I walk", etc., for the content they render is not absolutely unproblematic: "I may myself believe that I see or walk, although I have not opened my eyes or budged from my place; for this sometimes happens when I sleep, and might even happen to me even if I had no body."[46] It is quite different when I have in mind only the "consciousness that is in me, which makes me believe that I see or walk..." In the latter case, "the conclusion is so absolutely true that I cannot doubt it".[47]

Man believes, Descartes continues, that he perceives actually existing objects through his sense organs, but their reality can well be doubted. At the same time, there can be no doubt that it seems to me that I perceive them. "In any case, it is certain at least that it seems to me that I see, that I hear, and that I feel warmth."[48] "For if I conclude that wax is or exists, from seeing it, it is certainly much more evident that I am, or exist myself, from the fact that I see it. It is quite possible that what I see is not in fact wax; it may also happen that I have no eyes even to see anything; but it cannot so happen that when I see or when I think that I see (which I do not distinguish), I that think am not something."[49]

It is important to stress that from Descartes' point of view my existence and my thinking are not just two properties equally belonging to reasonable substance (*res cogitans*). That substance itself is a certain unity of the activity of thinking and its product, the reasoning "I", so that when activity ceases, "I" itself ceases to exist, too. "*I am, I exist*: that is certain; but how long? As long as I think; for it may so happen that if I should cease to think I would at the same time cease to be or exist."[50]

Thus, according to Descartes, self-consciousness, the idea of one's own existence, is characterised not only by clarity and distinctness, i.e., immediate obviousness, but also by the greatest certainty.

But what is to be done about recognising the actual existence of the world external relative to consciousness? Are there any convincing instruments for proving it?

At this point in his arguments Descartes is compelled to invoke God, for his system possesses no other instruments for the solution of this question. Descartes endeavours to persuade the reader that present in consciousness is a clear and distinct idea of an all-perfect being, that is, God, whose existence follows from his very essence. This being cannot be a deceiver, Descartes continues. And that means that everything that is conceived clearly and distinctly, must be true, that is, it must pertain

to a really existing object.

Now, Descartes concludes: "I no longer think verily that I must admit with temerity all things which the senses seem to teach us, but I do not think either that I must generally doubt them all."[51] "At least it is to be avowed that all the things which I conceive in them clearly and distinctly, that is to say, all the things, generally speaking, that are comprised in the subject-matter of speculative geometry, are really in them."[52]

Let us single out certain fundamental points in Descartes' reasoning that are important for our subsequent analysis.

First of all, Descartes believes that the knowledge by the subject of the states of his own consciousness in their relation to "I" is something different from the knowledge of external objects. From his standpoint that means that the subject has direct access to the subjective sphere, whereas the knowledge of external bodies is only something mediated. For this reason, although cognitive activity in ordinary experience is directed, first of all, at external material objects, and although the role of the subjective world and its characteristics usually remain in the background, as it were, Descartes believes that logically it is the cognition of subjective states in connection with the "I" that produces them that is the simplest matter. (Let us note that it is this point of Descartes' reasoning that served as the starting point for empiricist introspectionist psychology.)

Let us further take into account that Descartes links substantiation of knowledge with the degree to which it is assimilated in reflexion. He insists that precisely that knowledge is the genetic and logical starting point of any other which has been most thoroughly reflected upon, that is, contains not only an indication of its object but also a reference to the conditions of its own obviousness and certainty. It is this knowledge, in Descartes' view, that is contained in the proposition "I think, therefore I exist" which must, in his opinion, be made the foundation of the entire system of knowledge.

An important element of Descartes' conception is the thesis that the subject, the thinking "I", does not exist side by side with his activity but is its product and at the same time permanent condition, that is, it exists only insofar as the activity of thinking is realised (and is in a certain sense even implied by that activity).

Finally, let us point out Descartes' fundamental distinction between judgement about objective reality and positing the reality itself. Precisely these fundamental ele-

ments of the Cartesian conceptions were assimilated by later idealistic philosophy in its attempt to solve the problem of substantiation of knowledge.

Let us critically analyse some of these attempts and also Descartes' reasoning.

In Descartes' view, only those propositions fully satisfy the criteria of clarity and distinctness whose content is correlated with the act of subjective reflexion. For instance, mathematical propositions are only clear and distinct to the extent to which we do not ascribe an objectively real meaning to them (that is, we consider the properties of a triangle without going into whether triangles exist in reality). In principle, Descartes believes, sense perception can also be clear and distinct but only if we correlate it solely with the states of our consciousness (i.e., include it in the act of self-consciousness) ignoring the question of the objectiveness of its meaning. It is easy in ordinary life to neglect the objective meaning of mathematical propositions; mathematics is therefore, in Descartes' view, an absolutely reliable science and a model of science in general. It is extremely difficult to apply this operation to sense perceptions, therefore sciences based on the sense organs' data are far from the ideals of strict science. To be more precise, they can approach these ideals only to the extent to which they can be mathematised. Sense perceptions, Descartes believes, are often clear but they are rarely distinct ("I call clear that which presents and manifests itself to an attentive mind; ...[I call] distinct that which is so precise and different from everything else that it does not contain in itself anything that does not appear manifest to him who properly considers it... For example, when someone feels strong pain, the consciousness that he has of that pain is clear in his view, and yet it is not always distinct, for ordinarily he confuses it with the false judgements which he makes about the nature of that which he believes to take place in the wounded part...").[53]

These arguments confirm the rationalist nature of Descartes' epistemological conception.

But can we agree that the act of cognition of the states of one's own consciousness, that is, the act of subjective reflexion, is a means of obtaining the most obvious and indubitable assertions, without departing from the positions of empiricism in epistemology?

This possibility, far from being excluded logically, actually proved to be one of the principal ways of the development of metaphysical empiricism in West European philosophy—a path on which empiricism becomes subjective idealist phenomenalism.

Attempts at cardinal solution of the philosophical problem of substantiation of knowledge through subjectivist interpretation of the sense data took a most sophisticated and technically elaborate form in the doctrine of the "sense data" which was the subject-matter of lively debate in English and American philosophical literature in the first half of the present century.

The adherents of this doctirne (which in different variants developed within the philosophical systems of neorealism, critical realism, and logical positivism) tried to combine the view that obvious and directly given knowledge expresses, in one way or another, the subject's reflexion about himself, with the assumption that experience contains knowledge about really existing objects, and not merely to combine these propositions but to deduce the latter from the former without invoking God, unlike Descartes. With this aim in view, certain specific objects, "sense data", the knowledge of which is intuitive and indubitable, were postulated to be the results of reflexion about the content of perception.

Here is a typical mode of introducing "sense data" as objects of epistemological study: "When I see a tomato there is much that I can doubt. I can doubt whether it is a tomato that I am seeing, and not a cleverly painted piece of wax. I can doubt whether there is any material thing there at all. Perhaps what I took for a tomato was really a reflection; perhaps I am even the victim of some hallucination. One thing however I cannot doubt: that there exists a red patch of a round and somewhat bulgy shape standing out from a background of other colour-patches, and having a certain visual depth, and that this whole field of colour is directly present to my consciousness."[54]

It is these colour-patches, sound tones, etc. that are regarded as "sense data". Importantly, they are not identified with sense perceptions. The "sense data" are ascribed the status of objects of a special kind while sense perceptions are the result of direct, intuitive knowledge of these objects. The elementary process underlying any cognition is regarded as special "sensing", direct perception of the "sense data" in the act of directly grasping their content. At the same time, the "sense data" are not material things either, for possession of certain "sense data" is no guarantee yet of the actual existence of the material object to which they will prove to pertain. Each cognizing subject has his own private "sense data" different from the "sense data" of another person.

H. H. Price, one of the well-known theoreticians of this conception, thus describes the main characteristics of "sense

data": (1) They are individuals, not universals. (2) They are not substances, for they are created *ex nihilo* and return *in nihil*; they depend for their existence, origin and properties on the state of the person sensing. (3) They may be regarded as events, but they are not phases of material things. (4) They are not phases of the conscious subject, for they are in some respects constituents of the surfaces of extra-cerebral physical objects existing in this sense "at a long distance from the skull". (5) Hence, unlike other events, they seem to be phases of no substance and inhere in none; they are thus neither mental nor physical.[55]

This description shows the paradoxical nature of the objects postulated. The attempt at reconciling the thesis of immediate, intuitive, unquestionable nature of grasping the "sense data" (a thesis which compels the theoreticians of this conception to emphasise the private character of these specific objects, their dependence on the cognizing subject) with the view that in actual experience we deal with physical, material objects rather than with the subject's states, induced the theoreticians to ascribe incompatible features to the "sense data".

Indeed, what is a real material object and how does knowledge of it arise in the opinion of the supporters of this conception?

A material object is nothing but a definite ensemble, class, or family of "sense data", reply these theoreticians. This family consists both of actual "sense data" existing at a given moment (which, as we have been told already, are created *ex nihilo* and return *in nihil*) and of an infinite number of possible "sense data" which are not actually present in the sense field at the present moment but can become real under definite conditions. There was a debate among the adherents of this conception as to whether the status of real existence should be ascribed to potential "sense data".

Potential "sense data" are linked with actually existing ones by definite dependences arranged in series. All "sense data", both actual and potential, pertaining to the given material object, are divided into two subclasses: those which characterise the "real" or "standard" features of the given object vs. those which constitute its distorted form, its "appearance". A round object will from a certain angle be perceived as an elliptical one, while a red-coloured object in unusual lighting will look black, etc. On these grounds the "sense data" pertaining to the given material object were divided into "nuclear" and "non-standard".

Analysing the logic of such reasoning, we observe, first of all, that recognising the dependence of the "sense data"

on the subject and his states is apparently incompatible with ascribing these "data" to the material objects themselves which exist objectively and really ("at a long distance from the skull"); we even observe here an attempt at reducing the latter to an ensemble of "sense data". Indeed, it is well known that the clarity and detail with which my consciousness perceives the various sense qualities of an object depend on the concentration of my attention, on my absorption in the procedure of considering the aspects of the given object. Moreover, a close scrutiny of the object may reveal some properties which have previously been unnoticed. But that means that the act of generation of "sense data", which are regarded as existing "at a long distance from the skull", is determined by the subject's awareness!

It also proves untenable that "sense data" as objects *sui generis* are discovered by reflexion about experiences, about sense perception. Sense perception is always directed, in one way or another, at actually existing material objects. These objects include, among others, mirror images, artificial presentation of some object, etc. It is a different matter that the subject may err in the process of perception, taking one object for another, e.g., a mirror image of the given object or its cleverly made lookalike for the object itself. The subject may erroneously assess the conditions of perception of an object, so that numerous illusions arise, which are analysed in detail in the modern psychology of perception. (Hallucinations are different from perception, including illusory perceptions, not only in that there is no real object corresponding to it but also in its own subjective mode.) Errors of perception are thus quite possible and occur not infrequently. It is important to stress, however, that, first, perception is always aimed at real material objects rather than at "sense data", and second, that ordinary practice always has quite definite methods permitting to separate erroneous perceptions and illusions from those to which real perceptions correspond. Of course, in practical experience tasks have to be solved which involve qualities and sensual aspects of objects (colours, spatial forms, sounds, etc.) regarded as special objects by the theoreticians of modern empiricism. But the point is that a knowledge of these aspects is derivative from the knowledge of real objects as a whole. In other words, in real experience the dependence is the reverse of that assumed in the conception analysed here. "Sense data" as objects *sui generis*, neither material nor psychical, and the corresonding elementary cognitive process of "sensing" are by no means introduced into the epis-

temological conception as a result of analysing the structure of genuine sense experience (as claimed by the authors of the doctrine) but postulated as a mode of solving the problem of substantiating knowledge on the basis of accepting the thesis about the existence of immediate and unquestionable knowledge containing a reference to the cognizing subject.

The very task of identifying and reidentifying those aspects of objects which were hypostatised as "sense data" (i.e., the task of defining whether we deal with one and the same single colour shade, the given individual note, etc., rather than simply with two similar individual representatives of one and the same colour or sound as a sense universal), can only be solved if the sense properties referred to are correlated with material objects instead of being regarded as independent essences. Only by solving the task of identification and reidentification of material objects (and that task has a definite mode of solution in experience) can we identify and reidentify the separate sense aspects and qualities of the objects. Thus we can assert that we contemplate precisely the given colour spectrum rather than a similar copy of the same sensual "kind" only if we correlate it with that material object in which it inheres, e.g., the given picture, distinguishing this object from all the others (we distinguish the original from its copy or reproduction or clever imitation). We can assert with certainty that we hear the same performance of a symphony (this question may arise if we are compelled to stop listening for a while) only if we can reidentify the material source of sound and the real objective situation, that is, if we discover that we are hearing the same musicians, see the same conductor, sit in the same concert hall, etc. Thus, if "sense data" existed as independent objects, they could be neither identified nor reidentified. In this case, however, they could not form the foundation of experience.

Let us now analyse the question of whether propositions about material objects can be deduced from the propositions about actual and potential "sense data". This doctrine in its linguistic version, developed by logical positivists, asserts that an utterance about a material object is equivalent to a set of utterances about "sense data" (actual and potential).

Let us take into account, however, that this set is infinite, for it must include indications of all possible conditions (the point of view, the position, the conditions of lighting, etc.) under which the given object will be observed. Each condition will characterise "sense data" that

are somewhat different from all the others. But elements of an infinite set cannot be enumerated in finite time, while the procedure of identification and reidentification of material objects is, in actual experience, carried out rather quickly and, as a rule, without mistakes.

Let us further consider that utterances about material objects are characterised by a specific indeterminateness and openness with regard to the possible sets of "sense data" which are assumed to be relevant to them. Thus, the statement "There is a car in the garage" does not specify anything about the car's colour, size, shape, style, make and so on. Hence if we start to draw up a "sense-datum" analysis of the content of this utterance we shall quickly come to the conclusion that there are a great many variants of this analysis, and whatever variant we should choose, we have no guarantee that the choice was made correctly (e.g., we may include "red sense data" in our set, and the car may prove to be blue, and so on).[56]

The most essential objection to the analysis of the meaning of utterances in "sense-datum" terms is that this analysis cannot in fact be implemented in pure form even if we accept the task as meaningful. Explicating the content of an utterance about a material object in "sense-datum" terms necessarily includes a reference to both an observer and the conditions of observation. Both assume the concept of material objects (the subject is not, of course, a material object only, but it is this quality that is essential in this case, that is, the fact that he can change his position relative to other objects, move among them, etc.). Thus, from the standpoint of the conception here analysed the utterance "There is a car in the garage" means: "If the observer enters the garage and performs certain actions (e.g., turns his head in a given direction, moves his hands in a given manner, etc.), he will have the following set of 'sense data'." It is important to note that this analysis implies a normal functioning of the observer's sense organs.[57]

Naturally, the concepts of the observer, his sense organs, action, the place of observation, direction of observation, etc., characterise definite material objects, their relations, states, processes in which they participate, etc. Thus an attempt to give an analysis of the meaning of utterance only in terms of "sense data" is unsuccessful, for it is impossible to avoid using terms pertaining to material objects in the analytic sentence. All attempts by the adherents of the "sense-datum" conception to evade this fundamental difficulty have been fruitless.

Let us point out another paradox to which this doctrine

leads. Supposing I know that you have a magnet hidden in your pocket. If I stand at your side, compass in hand, the needle of the compass that should point north will deviate affected by the hidden magnet. This fact is easily explainable in terms of material objects and their causal connections. However, if I adhere to the "sense-datum" conception, I must make the strange conclusion that actual events (the actual "data" pertaining to the behaviour of the compass) are conditioned by merely potential ones (the "sense data" pertaining to the hidden compass).[58]

It thus proved impossible to substantiate the real sensual experiences to which, in the empiricists' view, all cognition is ultimately reducible, by the doctrine of the "sense-data", essences of a special kind having a private nature and dependent on the subject. The concept of material object independent of the individual observer is a necessary characteristic of experience directed at the external world, the kind of characteristic that can in no way be reduced to some ensemble of "sense data".

2. TRANSCENDENTAL SUBJECT, EMPIRICAL SUBJECT. THE CONCEPTION OF SELF-CERTAINTY OF TRANSCENDENTAL CONSCIOUSNESS AS GUARANTEE OF THE OBJECTIVENESS OF KNOWLEDGE

Does recognising the independence of the material object from individual consciousness signify a rejection of the attempt itself of substantiating knowledge through assertion of the self-certainty of knowledge or some subjective structures connected with it? The experiences of philosophy throughout its history show that it is not obligatory. There are epistemological conceptions in bourgeois philosophy which try not to make the mistakes characteristic of subjectivist empiricism, of the "sense-datum" doctrine, and at the same time to substantiate knowledge through fundamental recognition of the specific and autonomous nature of subjectiveness. It is stressed in this case that any cognitive experiences have such constitutive links (stipulating the presence in experience of physical objects with a definite correlation and subordination of the various aspects of these objects, of causal chains, of spatio-temporal arrangement of objects and events, etc.) which cannot be reduced to "sense data", to some chance empirical filling of experience or mere physical impact of an external object on the cognizant

subject's sense organs. The structure of experience is objective in nature, assert the adherents of this approach, and it does not depend on the individual observer, individual subject, his states and "sense data".

At the same time a fundamentally important step is taken in the interpretation of the subject himself: the subject is split, as it were, into two distinct constitutive strata, the individual and transcendental subjects. As regards the first, the objective structure of experience is believed to be independent of it. At the same time, this structure, the norms and criteria applied in the cognitive process, are rooted in the properties of the transcendental subject. This approach, which came to be termed transcendentalism, is thus a kind of reformulation of Descartes' programme of analysing cognition. Various types of transcendentalism differ from each other in their treatment of the possibility itself of discovering the transcendental structure of experience and, consequently, the possibility of solving the problem of substantiation of knowledge.

One of the most influential conceptions of this type in modern bourgeois philosophy is Edmund Husserl's transcendental phenomenology. It should be noted that of all the transcendentalist doctrines, phenomenology is the closest to Descartes in the formulation of tasks and in the search for the methods of epistemological research. Husserl endeavours to analyse transcendental consciousness by applying a specific procedure which he calls a phenomenological description of what is given to consciousness with the greatest obviousness and self-certainty.

Husserl believes that any cognition of reality is founded on direct, intuitive knowledge identified in phenomenology with perception. The latter, however, is not understood at all in the spirit of philosophical empiricism. Sense perception and direct perception are not synonymous in Husserl's philosophy. First, Husserl singles out various types of direct perception and the corresponding experiences of obviousness, pertaining not only to physical objects but also to states of consciousness, not only to individual objects but also to their essences, "eidoses", or universals (the so-called immediate insight into essence). Second, Husserl asserts that perception of physical objects, or "external perception", is by no means reducible to a given ensemble of sensual components, the "sense data", but always includes certain non-sensual elements or layers characterising the schema of the given kind of objectiveness.

Substantiation of knowledge in transcendental phenomenology is reduced to singling out the acts of cognition whose objects are experienced quite obviously,

that is, are actually and immediately given to consciousness. The other aspect of the solution offered is separation of the actually given from that which is not actually given. The point is, Husserl argues, that in ordinary cognition as it factually occurs, the actually given, i.e., immediately grasped, is mixed with what is not actually given, what is added in thinking, assumed or supposed ("imagined", in Husserl's terminology). Certainly that which is not given actually but merely assumed is linked in a definite way with what is given quite obviously. However, this link is not of the sort to warrant certain expectation that future experience will ensure the "implementation" of experiential components that are purely "imaginary" at the given stage (i.e., it will provide corresponding data experienced with certainty).[59]

For instance, if I perceive a house, I obviously perceive at the given moment only the givenness to me of the side of the house that directly faces me. At the same time, the very act of my perception includes the assumption of the existence of the house's other sides and the *possibility* for me to see these sides provided I move in a certain manner round the house. (That is exactly what the representatives of the empirical conception analysed above called the "possible sense data".) Without assuming the possibility of obtaining corresponding obvious entities, the act of perception itself would be impossible. It may so happen, however, that in moving round the house I shall discover that its back wall is destroyed by some catastrophe, that consequently it is no longer a house in the proper sense of the word, and that the dwellers have left it. In this case my original perception of the given object as a normal house will prove to be erroneous, and expectations of corresponding obvious entities connected with the given object, unrealised.

Thus, the assumption in the act of perception itself of some individual object being a thing of a given kind, in this case "a house" (its perception "against the horizon" of a definite kind of objectiveness, as Husserl puts it), proved to be unsatisfied by the corresponding individual certainties. The individual object, "this house", was not given to consciousness with complete certainty. It is, however, important to emphasise, Husserl continues, that the very act of assumption, the act of "opinion" about the given individual object, is given to consciousness with certainty. The perception of the individual object as a house proved to be unrealised, but the very act of such and such orientation of consciousness, in this case orientation at perception of the given object as a house, is fully

obvious to the consciousness.

From Husserl's standpoint, a "material thing always remains incompletely and one-sidedly open. This involves the possibility of disappointment, that is, the possibility that in new 'perspectives' the thing will not prove to be identical to itself. A material thing always reveals itself relatively, so that doubt about its actual being is not excluded, and its being thereby manifests itself as accidental. The being of a material thing is never considered other than along with the consideration of the possibility of its non-being. We shall never be able to assert with full certaintiy, that is, apodictically, that this table actually exists because I actually and directly see this colour and this figure."[60]

The fact, however, is given to consciousness with full apodictical obviousness that it performs at a given moment the acts of such and such orientation, assuming, "opining" something. One can doubt the being of the external world but one cannot doubt the being of consciousness itself, the being of self, Husserl repeats Descartes' train of thought.

As we orientate our consciousness at direct perception, at experiencing its acts with apodictical certainty, ignoring the question whether actual objects correspond to these acts (i.e., performing in Husserl's terms the *epoche* procedure, that is, refraining from asserting the actual existence of the corresponding objects), we are dealing, from the standpoint of transcendental phenomenology, with a special kind of object—"pure consciousness , and with a special act of direct comprehension, intuitive grasping of this object—transcendental reflexion.

Husserl underlines the fact that ordinary experience, with which everyday practice has to do, and the special sciences, proceed from the actual existence of the world of material objects. That is the so-called natural attitude of consciousness. Transcendental reflexion, whose task is finding out apodictical certainties (and that is the only way to solving the problem of substantiation of knowledge, Husserl believes), is forced to abandon the "natural" attitude of ordinary consciousness, that is, it has to perform the *epoche* procedure.

But "transcendental reduction" and *epoche* are not enough for substantiating knowledge, Husserl believes. To achieve that goal, "eidetic reduction" is also needed.

Knowledge of certain objective givenness always assumes direct grasping not only of individual givenness but also of the substantive, necessary connections, of object structures. Individual certainty itself is given only in the

framework of "horizon" of essential ("eidetic") dependences. Substantiation of knowledge is therefore, first of all, establishment of these dependences which determine the possibility of any concrete experience pertaining to the comprehension of individual real objects. In other words, the answer to the question "How is knowledge possible?" assumes, first of all, the establishment of the essences, the "eidoses" of all the various types of "thingness" with which experience has to deal.

"Eidoses" in transcendental phenomenology are not the same as concepts, although they appear very close at first glance, for concepts, too, characterise the essence of objects. "Eidoses" are not cognitive, logical constructions but rather meanings and essential structures of various types of thingness, which are given, in Husserl's view, directly, intuitively, within a specific attitude of consciousness. They exist prelingually, although they may be expressed in language, too. However, language is incapable of fully expressing all their shadings, for first, it is the instrument of reasoning rather than of direct contemplation, and second, it is inseparable from the "natural", ordinary attitude of consciousness. The task of phenomenological description is exceptionally difficult, both because of the difficulty of performing the act itself of intuitively grasping the "eidoses", an act assuming a rejection of the "natural" attitude of consciousness, and because of the impossibility of describing precisely in language the results of transcendental reflexion; it therefore proves necessary to resort to metaphors, hints, allegories, and other modes of oblique rendering of meaning, including the invention of new verbal constructions.

The types and kinds of "eidoses" are assumed to be varied and irreducible to one another in transcendental phenomenology. They include the "eidoses" of separate kinds of physical objects (a "table", a "chair", a "house", etc.); such "eidoses" as "physical object", "number", "figure", "perception", "reasoning", etc.; such "eidoses" which phenomenalist empiricists would refer to as "sense universals": "redness", "blueness", "colouredness", "loudness", etc.

Thus for Husserl, genuine knowledge essentially coincides with experience, with direct perception of the corresponding objective givenness (it is another matter that perception itself, as we have said, is interpreted very broadly, with various types of perception singled out, etc.).

In Husserl's view, thinking taken by itself does not give true knowledge but only knowledge in a tentative sense of the term, "figurative" or "symbolic" knowledge, one that is derived from and dependent on genuine,

experiential knowledge. Although thinking is necessarily woven into the flow of experience and scientific activity is impossible without it, overestimating the significance of thinking at the expense of underestimating the fundamental role of the intuitions lying at its basis leads cognition into a *cul-de-sac*, insists Husserl.

Let us pay special attention to this point in transcendental phenomenology, for the view of knowledge as being very close, if not identical, with a certain mode of immediately grasping the object essentially characterises all the varieties of substantiation of knowledge undertaken in the bourgeois philosophy of the New Times. The trend of thinking leading to this understanding of the problem of substantiation is very simple. Indeed, if purely cognitive knowledge is derivative in nature, its premises are obviously different, for they would otherwise be themselves conditioned and substantiated. They cannot therefore fail to be, to some extent or other, given immediately and intuitively.

What are the modes of discovering the "eidoses", that is, the possibilities of experiential knowledge? They include transcendental eidetic reflexion, the experience of consciousness of a special type, inner perception realised without the mediation of the sense organs and directed at "pure consciousness" itself. Husserl believes that "eidoses" are usually not given in consciousness in pure form, being merged, as it were, with certain individual certainties. Transcendental consciousness takes up the "eidetic" attitude, which permits it to separate an "eidos" from its concrete, individual exemplification and grasp it directly as such ("intuitive insight into the essence"). It is in principle enough to have one copy, one individual embodiment of some "eidos" to grasp the "eidos" itself; e.g., transcendental eidetic reflexion about the act of perception of the given house is enough to discover the "eidos" of houses in general. In practice, however, this procedure is difficult to realise, if not at all impossible, Husserl has to concede. He therefore suggests a special technique for "eidetic description" which he worked out. Proceeding from an actual instance of assuming the given object to be associated with the given meaning (e.g., the meaning of "house"), we start freely fantasising, varying the exemplifications of the given meaning, the given "eidos". We discover something invariant in these exemplifications, something that cannot be eliminated as long as we continue to "imagine" objects associated with the given meaning. That invariant will be the "eidos" of the objective givenness. "Eidetic analysis", in Husserl's view,

permits to single out the structures of experience, and in the first place, the necessary a priori connections independent of any concrete accumulation of experience. This, in its turn, enables one to construct apriori "regional ontologies" corresponding to various types of objective givenness and specifying the "horizons" of cognitive activity both in the sphere of pre-scientific knowledge and in the diverse scientific disciplines.

Fundamentally important for Husserl is the circumstance established in transcendental reflexion that consciousness is always aimed or intentionally directed, as Husserl puts it, at some *thing*, at some *object*. This object need not necessarily be a material individual thing, it may also be an ideal "essence", "eidos", a universal, or acts of consciousness itself. The object may exist really, and then it may not be real but merely "imagined" in the acts of consciousness. If transcendental reflexion reveals "eidoses" that are not related to a certain "material ontology" but characterise the nature of consciousness itself; if, for instance, the object is the "eidos" of "perception in general", the act of perception in this case may not actually exist as a subject of reflexion but be merely "imagined" in the free variation in fantasy of various copies of perception associated with the meaning of perception in general. In this case the act of perception, being an object of intentional analysis, is irreal, while the act of transcendental reflexion directed at this object, pertains to the reality of consciousness, continues Husserl. Thus, the possibility of real or irreal existence obtains not only for such objects as material bodies but also for such potential objects of transcendental reflexion as acts of consciousness. As for the "eidoses" that are either included among the material bodies, or else are formal (logical and mathematical) "eidoses", or the "eidoses" of consciousness itself, they have a special ideal existence in transcendental consciousness, for, as distinct from the real events which "happen", "eidoses" cannot "happen": their existence is inseparable from the existence of transcendental consciousness itself. It is important, according to Husserl, that consciousness is in any case objective, it is objectively oriented. Each act of consciousness assumes the existence of two poles, the intentional *object* of some kind and the *subject* himself implementing the act of consciousness, of "I", the *ego*. The object lies outside consciousness, for it is transcendental relative to the intentional act, and at the same time it is in another respect immanent to consciousness, for it is assumed or "imagined" by consciousness, while the question of the existence of reality corresponding to the

given intentional object always remains open, Husserl believes.

Thus, the specificity of organisation of consciousness, from the standpoint of transcendental phenomenology, is expressed in its *subject-object* structure. The subject-object relation is only inherent in consciousness and expresses the links between its different poles. It would be absurd and meaningless to try to model this relation in terms of some physical bodies or systems, Husserl believes, for the components of this relation (the intentional act, the intentional object, the subject implementing these acts) characterise only "pure consciousness" and would be inconceivable without it.

The so-called natural attitude proceeds from the existence of both the "I" and the world of real objects external with regard to me. The "I" in this case refers to a concrete corporeal individual endowed with the psyche, with consciousness. However, since the act of transcendental reduction assumes temporary removal from consideration of the real existence of the world of material objects, Husserl reminds us, the question of the existence of my body also remains open. Transcendental reflexion has to do only with "pure consciousness". The latter is formed of intentional acts with corresponding intentional objects. If I perform, however, not only transcendental but also "eidetic" reduction, setting myself the goal of discovering the "eidoses" of certain material and formal objects as well as the "eidoses" of consciousness itself, Husserl insists, I reveal and directly grasp the essence of "pure consciousness" itself, namely the Transcendental Ego as underlying all these "eidoses" and intentional acts, as constituting the meanings of all the objective givennesses. The object correlative to the Transcendental Ego is the "eidos of the world" as the horizon of all possible types and kinds of objects. It is the Transcendental Ego that implements the acts of transcendental reflexion, Husserl believes. Therefore, when the latter is directed at the Transcendental Ego itself, it coincides, as it were, with itself, having itself for an object of its own reflexion. In this case, "absolute reflexion" is realised, "absolute knowledge" is attained which underlies all knowledge and is the supreme instance of substantiating cognition in general. The whole of transcendental phenomenology can therefore be regarded as "egology", a doctrine of the Transcendental Ego. It is the knowledge of subjective being that underlies any knowledge, Husserl believes, stressing the need for "looking towards" the subject.[61]

Thus from Husserl's viewpoint, reflexion and self-cogni-

tion underlie knowledge and experience. That knowledge is the most adequate which coincides with absolute reflexion, absolute self-cognition, that is, the kind of knowledge which knows that it knows, being fully cognizant of both its own object and its own being and those procedures by which it is attained. Let us pay special attention to this important point of transcendental phenomenology.

Let us further single out certain traits of the Transcendental Ego as Husserl understands it. It must not be viewed as a kind of supraindividual essence unifying various concrete consciousnesses and, still less, different corporeal individuals (the way Hegel presents the Absolute Subject). Of course, at the level of transcendental reflexion directed at the Transcendental Ego, Husserl believes, there is no question of difference between concrete individual consciousnesses (and in this sense no question of difference between "me" and "thou"), for in this case it is a matter of finding the "eidos" of consciousness itself. But the main thing, from the standpoint of transcendental phenomenology, is that the Transcendental Ego is grasped as a result of a definite type of *my* reflexion directed at *my* own consciousness. The Transcendental Ego proves to be the deep formative basis of my consciousness and, consequently, the basis of myself. The ordinary language, which is in the power of the "natural" attitude, Husserl believes, is capable in this case, too, to lead into error, for I can speak of "myself" as of a concrete corporeal individual, with a characteristic figure, gait, facial expression, as of the unique individual life of consciousness with its unique "biography", a specific attitude to its past and future, and finally as the supreme instance of all cognitive activity and of all intentions, that instance which exists before any individual psychological biography (and in this sense before any individual "I") and at the same time underlies it. It is this supreme instance that is the Transcendental Ego which, as is clear from the above, is also I myself residing in me, not somewhere else. There is no access to the Transcendental Ego other than through a special type of analysis of my own consciousness.

Let us now go back to the assertion of the subject-object structure of consciousness—a thesis characteristic of phenomenology. The intentional object in Husserl's interpretation is not something ephemeral and purely individual (as we have indicated already, that is the way phenomenalist empiricists interpret such "special objects" of consciousness as "sense data"), for it is always given "on the horizon" of some "eidos" or other, within the framework of certain essential, necessary object structures

(and in the case of transcendental eidetic reflexion the object may also be a pure "eidos"). In this connection Husserl criticises empirical introspectionism which prevailed in West European psychology for two centuries. Following a definite interpretation of Descartes' philosophy and combining this interpretation with empiricist propositions, adherents of introspectionism believed the task of psychology to be, above all, the discovery of empirical dependences between the data of consciousness which are interpreted, first, as purely individual "events" in the consciousness field, and second, as purely subjective data, whose relation to the objects must be completely eliminated for the sake of purity of inquiry. Husserl shows (and he is quite right on this score) that analysis of the subjective, of consciousness, is impossible outside its relation to the object (its intentional orientation at the object, as Husserl puts it). Husserl also insists that the data of consciousness are not purely individual events but facts included in certain stable and necessary structures. Meanwhile, if one regards the task of psychology to be the description of individual facts in the field of consciousness and establishment of their empirical dependences, it will have to be recognised that the act of self-consciousness, of empirical introspection, interferes in the flow of psychical life, distorting the purity of the object studied (for self-consciousness is also included in the life of consciousness) and thereby preventing the realisation of that very goal that is set before it. This criticism was traditionally levelled at introspectionist empiricist psychology. Husserl believes, however, that psychology must not set itself goals characteristic of introspectionism. The task of psychology indubitably consists in studying subjective reality, consciousness, and in this connection psychology is close to transcendental phenomenology, although in the former the study of consciousness must be carried out from a somewhat different angle than in the latter (the question of the relation of phenomenological psychology and transcendental phenomenology is a special theme which we shall not touch upon here). The study of subjective reality is certainly inconceivable outside of acts of self-consciousness, Husserl believes. But the procedure of self-consciousness, he continues, must be carried out as phenomenological reflexion aimed first of all at discovering the "eidoses" of consciousness rather than as empirical introspection. Traditional introspectionist psychology has not attained any considerable results, he thinks, precisely because it followed from the very first a wrong path determined by a false understanding of the subject-matter and

methods of research. It was not due to but in spite of its general approach that it did obtain certain results.

Husserl believes that the discovery of the subject-object structure of consciousness also helps to overcome Descartes' dualism with its characteristic orientation at establishing "purely subjective" structures outside their objective correlation.

As can be seen from the above, Husserl's phenomenology touches on a number of real problems in the analysis of cognition and consciousness. Let us point to some of them only insofar as they are important for the present study. As we have pointed out already, he stresses quite correctly the impossibility of studying the subjective, consciousness, without taking into account its objective correlation (its "intentional orientation"). Husserl correctly shows some fundamental weaknesses of introspectionist empiricist psychology, of the epistemological conception of subjectivist empiricism. He also states quite rightly that consciousness is an object of a special kind, and that its cognition must differ in some respects from cognition of a material object external with regard to consciousness (for I have "an internal access", as it were, to my consciousness). It is also true that a definite connection exists between the cognition of an external object and the fact of correlating knowledge to the cognizing subject, that is, the fact of self-accounting, self-consciousness, self-reflexion. It should also be pointed out that within the framework of transcendental phenomenology and phenomenological psychology both Husserl and his disciples described a great number of facts pertaining to the work of consciousness. Certainly these facts require critical evaluation, for their description by phenomenologists exists within the framework of a false conception (we shall dwell on this point somewhat later), but at the same time they may be taken into account and re-interpreted in those disciplines which in one way or another deal with the analysis of consciousness: psychology, psychiatry, esthetics, epistemology, etc.

However, with reference to Husserl's general epistemological conception, to his solution of the problem of substantiation of knowledge, the untenability of transcendental phenomenology must be stated quite definitely. Let us discuss this point in greater detail.

We must recall that Husserl proceeds from the fundamental division into what is and what is not actually given to consciousness. Only the former, he believes, is accompanied by the experience of self-certainty, which is proclaimed in transcendental phenomenology to be an indication of genuine, actual existence of the corresponding objective givenness. We all know, however, that experiencing some fact or event as evident is by no means a guarantee of its actual existence. All illusions of perception show, for instance, that we can perceive something that actually does not exist as evident and indubitable.

Husserl fully realises this fact. He therefore indicates that phenomenological self-certainty is not identical to subjective psychological confidence. The former is, as he says, attained through a special attitude of consciousness, through special procedures of transcendental reflexion.

The latter, in Husserl's view, can also exist when consciousness assumes intentional objects to which no reality corresponds; it is here that perception illusions arise.

Let us ask this question: does transcendental phenomenology offer a method for distinctly separating subjective confidence from the experience of certainty? Husserl sees such a method in transcendental reflexion (assuming *epoche*, "transcendental" and, in some cases, "eidetic" reduction, etc.). But how are we to find out that we have performed all the operations required by transcendental reflexion? This can only be ensured by attaining the result of this reflexion, Husserl answers, that is, by the emergence of a specific experience of self-certainty. We thus find ourselves in a vicious circle.

Husserl himself has to admit that in the process of phenomenological description it is in practice very difficult to separate "pure" transcendental experience of evidence from subjective psychological phenomena that look like it. The development of his conception was therefore continually accompanied not only by specification of descriptions already carried out but also, in some cases, by essential modifications. As for Husserl's followers, they often "saw" quite different things as "self-evident". Let us also add to this the assertion, characteristic of phenomenology, that ordinary language cannot render precisely the data experienced, so that even where the doctrine's requirements are satisfied, there is no guarantee of adequate expression of the results of analysis. All of this makes it practically impossible to indicate any clearcut criteria which will permit to state that the necessary purity of phenomenological research has been attained. But if that is the case, there is much room for arbitrariness and subjectivism. Husserl therefore has to concede that a pure description of the data of transcendental consciousness is not so much an actual result of existing phenomenological studies but rather a kind of ideal goal towards which they must strive. That goal, Husserl believes, is conditioned by the very formulation of the problem of substantia-

tion, assuming the existence of such knowledge in which the corresponding object is given immediately, intuitively and self-evidently.

Thus the assertion of experiencing self-certainty as true indication of objective reality is based not so much on factual analysis of cognition and consciousness as on definite assumptions about the nature of the problem of substantiation of knowledge and the possible ways of its solution, those very same assumptions of non-Marxist epistemological conceptions of which we spoke at the beginning of this chapter. But why should we take the assumptions themselves to be justified?

The method, suggested by Husserl, of free variation in imagination of different expressions for the given meaning for determining their invariant, or "eidos", is an attempt at overcoming subjectivism in phenomenological description. This method was intended to ensure some kind of generally valid technique for analysis of consciousness. It is easy to see, however, that this method is fundamentally the same as ordinary empirical generalisation through comparing individual objects. Why must the results of such generalisation be viewed as apriori entities of consciousness rather than as what they actually are—expressions of finite empirical experience?

Generally speaking, the procedure itself to which Husserl refers as transcendental reflexion appears doubtful on several significant counts. First of all that applies to *epoche*, that is, refraining from judgement about the existence of the objects of the material world. Of course, situations sometimes arise in our experience when we cannot say with certainty whether we actually deal with the object which appears to us as really existing or whether that is no more than appearance, an error of perception. It is essential, however, that, first, situations of this kind are not very frequent; second, that there are always means of ascertaining the nature of perception, that is, of establishing whether it is illusory or genuine; and third, that the experiential distinction between illusion and reality is based on a well-founded conviction of the actual existence of at least the overwhelming majority of the objects given us in perception. Thus the "natural" attitude of consciousness taking the existence of the material world for granted is not at all naïve; on the contrary, the belief in the universality of the situation of uncertainty about the reality of the object of perception is unfounded. The assertion of phenomenology that the existence of the objects of the material world (of all the material objects in general, rather than of particular objects of this world)

is never given with complete certainty, is the result of a false preconception and not of analysis of actual experience. This attitude is closely linked with the desire for establishing the conditions of "absolute knowledge". The latter is said to be attained when knowledge of the object coincides with reflexion about knowledge itself, which, in Husserl's view, occurs in transcendental reflexion.

But can "absolute knowledge" alone be viewed as genuine? What grounds have we for disclaiming the status of real knowledge (and that is what Husserl insists on) for the results of cognitive activity both in the sphere of everyday experience and in the domain of various scientific disciplines studying empirical facts? Would it not be more correct to correlate, on the contrary, our ideal model of knowledge with actual samples of knowledge obtained in the actual cognitive process? Let us state in this connection that those examples of apriori "absolute knowledge" which Husserl cites (the truths of logic and mathematics, the so-called regional ontologies, that is, phenomenological descriptions of "eidoses" that are said to underlie the scientific disciplines) have failed the test of the development of science in the 20th century, as far as their apriori and absolute quality is concerned. That is the point where the fundamental defect is revealed not only of Husserl's phenomenology but also of all kinds of transcendentalism as a mode for substantiating knowledge. We shall have occasion to return to this question.

Finally, let us consider the assertion of the Transcendental Ego's existence, the supreme substantiating proposition of phenomenology. This assertion is obtained, as we have seen, as a result of transcendental reflexion. But the procedure of transcendental reflexion, involving *epoche* and the singling out of a special object, "pure consciousness", is very doubtful, as we have said. Therefore the attempts to separate the ego as a unity of consciousness and material corporeality from the ego as "pure" individual consciousness, and the latter, from the Transcendental Ego, appear to be unconvincing. As for the statement that all referential meanings, just as all individual subjects (i.e., I myself and other sentient beings) are constituted by myself as the Transcendental Ego, it cannot but lead to the most odious form of subjective idealism, so completely compromised—to solipsism, hard as Husserl might try to dissociate himself from it. Although Husserl insists on the impossibility of analysing the subjective, of analysing consciousness, outside its objective correlation, that is not enough to overcome Cartesian subjectivism, for the intentional object is viewed as existing in the framework of

transcendental consciousness and as constituted by the latter, while the existence of real objective givenness corresponding to the intentional object is assumed to be irrelevant to transcendental phenomenology.

But can the basic premises of transcendentalism in substantiating knowledge be retained while such obvious weaknesses of phenomenology are discarded as its appeal to the subjective experiences of self-certainty unsupported by any other procedures that would be more convincing logically? In other words, are there such variants of solving the problem of the possibility of knowledge which endeavour to take a more logical path remaining at the same time in the fundamental framework of transcendentalism?

Let us consider the epistemological conception of Fichte as an attempt to provide this kind of solution.[62]

Fichte starts from propositions which appear to be similar to those of phenomenology. He sets himself the task of transforming transcendental philosophy, the doctrine of the possibility of cognition in general and of scientific cognition in particular, into an "evident science",[63] pointing out that the theoretical doctrine of science (*Wissenschaftslehre*) "presupposes the possibility of freedom of inner contemplation".[64] The foundation of knowledge, Fichte insists, must be found as something absolutely first, something that cannot be either proved or defined.

Starting from the facts of empirical consciousness, and then mentally discarding everything that is accidental, and leaving only that which can no longer be separated from consciousness (that is, performing a procedure which somehow reminds one of Husserl's transcendental reflexion), Fichte arrives at Descartes' proposition "I am" as the supreme fact underlying all others. This proposition "must probably be assumed without any proof, although the whole doctrine of science is busy proving it".[65]

Fichte's train of thought then reveals fundamentally new elements. He asserts that the self-consciousness of the Transcendental Ego, expressed in the proposition "I am", is not simply the product of direct inner perception of a certain evidence (as Husserl would have said) but the result of the *activity* of determining the indeterminate. Self-consciousness must be understood not simply as intuitive grasping of the object given, as it were, to the intentional act from the outside, but as mental positing of the object itself and at the same time as reflexion about the product of this positing, the reflexion (which appears as only one of the moments of a complex procedure of self-consciousness) is by no means reduced to mere contemplation of givenness, constituting the strenuous

activity of analytically breaking down the posited givenness. Thus the Transcendental Ego is not simply a given object, as it appears to Husserl, but a kind of unity of activity and its product, or "act-action". The Pure Ego does not exist outside of the activity of self-consciousness directed at it (let us recall a similar point in Descartes' reasoning): "The ego *posits itself*, and it *is* only thanks to this self-positing; and vice versa: the ego *is*, and it *posits* its being, only due to its own being.— It is simultaneously the agent and the product of action; the source of activity and that which emerges as the result of activity; act and action are one and the same; and that is why *'I am'* is the expression of an act-action..."[66]

Fichte insists that the ego outside the activity of self-positing and self-reflexion is nothing, it simply does not exist. But it is precisely the active nature of the Absolute Ego, which compels it to strive towards an ever greater degree of self-determinateness (resulting from action upon itself), that further leads to the necessity of opposing to it the non-ego, which, on the one hand, delimits the ego, and on the other, exists in the framework of the Absolute Ego, being posited by the latter. The ego becomes an object in its own right for itself only with the opposition of ego and non-ego, states Fichte, that is, with the appearance of an object external with regard to the ego. It is only through the non-ego that the ego becomes something, i.e., that of which something may be said. That ego which exists in the framework of the opposition to non-ego is no longer an Absolute Subject but an empirical one, for it is restricted by an object external to it. While the pure activity (act-action) of the Absolute Ego does not assume any object, "turning back on itself", the definition of the ego as an empirical subject ("descending" from the Absolute Subject to the empirical one) reveals the mutual mediation of ego and non-ego as the law of consciousness: *"no subject, no object; no object, no subject"*.[67] Thus, while the original proposition "I am" appears as something immediately given and certain, the activity of self-consciousness necessarily leads to its self-mediation, to the generation of a whole series of positings and contrapositings which, in Fichte's view, logically follow one from another. To this mediating activity of self-consciousness corresponds the reflective activity of the theoretical doctrine of science, in which the proposition is formulated that the activity of the ego can only be mediated, and "there can be no unmediated" activity at all.[68] The abstract moments of these positings and contrapositings of the Pure Ego following from each other are logical

categories (reality, negation, causality, interaction, etc.) expressing the necessary connections and dependences of experience and making knowledge possible. The reflexion of the theoretical doctrine of science singles out the categorial dependences of knowledge.

Attention should be paid to the following traits of the epistemological conception analysed here, which will be of importance in our further inquiry.

According to Fichte, self-consciousness and self-cognition are not just passive immediate grasping of some given object but always an excursion *beyond the boundaries* of the immediate, an attempt to define, to interpret the latter (any elementary consciousness already contains in it an element of thinking, Fichte believes).

The ego, the pure consciousness, is not a ready-made object from the outset, it *becomes* such, being *objectified* as it becomes the object of its own self-cognizing activity.

Hence the ego as my own object is in a certain sense a result of creation, of constructing (positing).

To the extent to which the ego becomes the object of its own activity and reflexion, contrapositing itself to the non-ego, it becomes different from what it originally was, dialectically *changing* and developing itself. In other words, the object of self-cognition is the product of its own activity, not in the sense, however, that it is a certain fabrication of consciousness, an arbitrary fiction, but in the sense that the ego as an object appears as the result of the necessary unfolding and dialectical mediation of what originally emerged as the purely immediate indentity I=I. Self-cognition and reflexion assume the exteriorisation and objectification of what was at first purely internal and subjective, directly merging with itself as a "fact of consciousness": "I am".

Generally speaking, the definition and unfolding of the essence of what appears to be directly given and evident, reveals a complex system of the activity of consciousness hidden behind it, Fichte affirms.

In these arguments, Fichte grasps in a speculative idealistic form some moments of cognitive activity to which we shall recur in our positive discussion of the problem. It is easy to show, however, that the Fichtean conception does not solve the problem of substantiation of knowledge either.

Fichte correctly states that the necessary condition of cognition is determining the indeterminate, mental mediation of what originally appeared as purely immediate; he also notes correctly that these conditions are relevant not only to the cognition of objects external to the subject but also to the cognition of the subject himself. He cannot prove, however, with any degree of convincingness, that the required determination of the indeterminate, equivalent to the construction of experience, must be realised precisely in those categorial forms of which his *Wissenschaftslehre* treats. In other words, he cannot deduce apriori the essential dependence of any knowledge on the acts of positing and contrapositing of the Pure Ego, as he claims. In fact, Fichte's *Wissenschaftslehre* assumes a number of categorial links characterising the available empirical experience, as well as the traditionally accepted laws of formal logic (the laws of identity, contradiction, etc.). Thus the assertion that the self-positing of the Pure Ego ("I am") underlies all knowledge and its substantive apriori dependences; an assertion central to his conception, remains an assurance without proof or support.

Furthermore, we do not touch here on the fact that acceptance of Fichte's Absolute Ego as the centre constituting knowledge and objective reality leads to the *cul-de-sacs* of idealistic subjectivism, just as Husserl's Transcendental Ego.

3. THE FACT OF KNOWLEDGE AND THE TRANSCENDENTAL INTERPRETATION OF THE CONDITIONS OF ITS POSSIBILITY

However, can one remain in the framework of transcendentalism without claiming to deduce the substantive dependences of knowledge from the fact of self-consciousness "I am I"? In this case the philosopher is forced to set himself the task of establishing the conditions of the possibility of knowledge by logical analysis, by breaking down and making a preparation of knowledge that actually exists and is recorded both in the truths of everyday consciousness and in the propositions of the special sciences. Clearly, in this approach to knowledge, the relation between knowledge and self-consciousness has to be understood in a way different from that of Husserl and Fichte.

This possibility was realised in Immanuel Kant's "critical" transcendental epistemology.[69]

Kant does not at all discuss the question "Is knowledge possible?", and in this his philosophy differs significantly from, let us say, that of Descartes. One of the fundamental premises of Kantian epistemology is that knowledge is not only possible but also real, it actually *exists*. In other words, Kant faces the *fact* of knowledge, as neo-Kantians later put it. He believes this knowledge to be expressed

at any rate in the special scientific disciplines relating to pure mathematics and pure (i.e., theoretical) natural science. The main preoccupation of his epistemology is finding out *how* mathematics and pure natural science are *possible*, that is, how knowledge is possible in general. Kant proceeds from the existence of indubitable and recognised product of cognitive activity, of scientific knowledge, endeavouring to reconstruct the logical conditions of its production through analytically breaking it down; that is to say, he proceeds from the study of the result to revealing the possibilities of its generation.

From the Kantian standpoint, this approach is justified by the fact that, while the existence of pure mathematics and pure natural science is beyond doubt, the assertion of the reality of metaphysics as true knowledge is extremely problematic. Finding out the universal conditions of the possibility of knowledge could not only provide an answer to the question of whether or not metaphysics is possible: should the answer prove to be affirmative, the methods of working in this area most fruitfully might be discovered, Kant believes.[70]

Moving towards the realisation of this task, Kant arrives at the conclusion that experience as knowledge of objectively existing things independent of the given empirical individual and the states of his consciousness implies at the same time continual references to the subject. These references are of twofold nature. First, it is the singling out of the objectiveness of experience and the distinguishing of the processes fixed in it from subjective associations, from the accidental flow of representations, etc. that signify constant (actual and potential) correlation of the world of objects and the processes of consciousness. Second, the unity of experience itself implies the unity of consciousness. The latter circumstance is especially important, Kant believes. The unity of objective experience would be impossible, in his view, if the flow of objective experience could not be continually accompanied by a certain act of self-consciousness in the form of recognising the identity of the ego to which experience belongs (this act is, according to Kant, expressed in the assertion "I think").

The objectiveness of experience is inseparable from the existence in it of various dependences, including necessary ones. The object is an embodiment, as it were, of a certain rule for linking up various sense impressions. The flow of objective experience presents an internally coherent picture of necessary interaction of all its components; there is a certain continuity about this flow, that is, the subsequent state necessarily follows from the previous one. If

there were "gaps" in experience, that is, if subsequent events did not follow from the previous ones according to obligatory rules, we would have no grounds to believe experience to be objective, Kant affirms; instead we would be forced to describe it as a subjective connection between associations, that is, as pertaining to individual consciousness rather than the world of material objects. At the same time any experience is *my* experience, that is, it belongs to me as the person experiencing it; there is no experience that would be nobody's. Let us now assume, Kant argues, that the ego as the subject of experience retains no identity, that is, that it can entirely disappear as one ego and be reborn as another having nothing in common and no links with the former.

In this case, experience itself must change, for its relevance to the ego is a necessary characteristic of experience, as we have just recognised, and if the ego becomes different, so does experience. But if there is no connection between the first and the second egos, there is no connection between the first and second experience either. That means that there are "gaps" in the flow of experience. In this case, experience itself is therefore subjective and not objective. It follows, Kant concludes, that a necessary condition of the objectiveness of experience is the self-consciousness of the ego as identical to itself in the assertion "I think", which potentially accompanies the flow of experience (in Kant's view, the act of self-consciousness "I think" does not have to accompany experience in actuality; the objectiveness of the latter merely implies constant possibility of this self-consciousness).[71]

Individual empirical self-consciousness, enabling us to distinguish between the subjective connection of associations and the objective dependences between the things external with regard to this self-consciousness, Kant calls subjective unity of consciousness. As for the unity of consciousness which makes possible, in his view, the objectiveness of experience itself, it is termed in Kantian philosophy objective unity of self-consciousness or transcendental unity of apperception, and is distinguished from the former in principle.[72]

The subjective unity of self-consciousness has to do with the flow of individual representations, characterising the "internal sense". The manifold given in the internal sense is also ordered in a certain manner (the rules of this ordering are determined by the apriori form of time), although this ordering is not objective, that is, it is different from types of order in the world of external objects existing in the forms of space and time and given

to the subject through the "external sense". The subjective unity of self-consciousness is extremely specific. As distinct from the unity pertaining to objective ("external") experience, the former does not characterise any constant substance remaining identical to itself under the various changes of its states. Kant therefore believes that it is impossible to reveal, through the internal sense, the necessary dependences and rules of succession of sense impressions which would permit the construction of an object of cognition in its own right. The objects of external sense given not only in the forms of time but also in those of space (the latter thus appearing in Kant's epistemology as the necessary condition of objectiveness) assume apriori categorial schemes as their substantive basis, schemes on which to develop theoretical ("pure") natural science. As for the objects of inner sense, they are not objects in the strict sense of the term, for states of consciousness are unstable, indefinite, and ephemeral. Of course, they are also ordered in a certain manner—in temporal forms. This ordering, however, cannot create the possibility of a theoretical ("pure") science about the phenomena of individual consciousness. Psychology, in Kant's view, is only possible as an empirical descriptive science stating accidental links in the subjective flow of representations and, in principle, incapable of using the methods of mathematics (in Kant's view, true science must speak the language of mathematics).

More than that, inner experience is not only devoid of some essential features of external experience, those that permit the latter to be the basis of theoretical science—it is also impossible without external contemplation. Determination of time, which is a form of ordering internal experience, exists only through implementation of the flow of time in certain spatial processes, that is, in processes involving given material objects. "...It is possible to perceive a determination of time only by means of a change in external relations (motion) to the permanent in space; (for example, we become aware of the sun's motion, by observing the changes of its relation to the objects of this earth). But this is not all. We find that we possess nothing permanent that can correspond and be submitted to the conception of a substance as intuition, except *matter*... It follows, that this I has not any predicate of intuition, which, in its character of permanence, could serve as correlate to the determination of time in the internal sense—in the same way as impenetrability is the correlate of matter as an empirical intuition."[73]

A highly important consequence follows from this,

namely, "internal experience is itself possible only mediately and through external experience".[74]

Kant regards this consequence as a direct refutation of "the *problematical* idealism of Des Cartes, who admits the undoubted certainty of only one empirical assertion (*assertio*), to wit, *I am*".[75] Idealism "assumed [writes Kant] that the only immediate experience is internal, and that from this we can only *infer* the existence of external things. But, as always happens, when we reason from given effects to *determined* causes, idealism has reasoned with too much haste and uncertainty, for it is quite possible that the cause of our representations may lie in ourselves, and that we ascribe it falsely to external things. But our proof shows that external experience is properly immediate, that only by virtue of it—not, indeed, the consciousness of our own existence, but certainly the determination of our existence in time, that is, internal experience—is possible."[76]

From Kant's viewpoint, that means that where it is a question of concrete individual consciousness, of the subjective, we cannot regard it in the spirit of Husserl as "pure consciousness" but must necessarily correlate it with those processes which are implemented by material objects or bodies. True, Husserl also speaks of the need for correlating any subjective act with the object at which this act is directed. But Husserl speaks only of the intentional object, that is, the object which exists in the framework of transcendental consciousness and does not have to be real. In principle, therefore, Husserl does not go beyond the boundaries of the Cartesian position at this point. Kant's approach to the problem is fundamentally different: the consciousness of self, the "internal sense", must be mediated by the consciousness of external objects, of real material things. Kant certainly realises that not always does representation of external things signify their actual existence, as the facts of illusions, hallucinations etc. show, that is, precisely those facts which form the starting point of the assertions of Husserl and Descartes on the "certainty" of the givenness of consciousness to itself and the "uncertainty" of the givenness of external objects to consciousness. But Kant writes that the illusions, hallucinations, etc. "are themselves created by the reproduction of previous external perceptions, which ... are possible only through the reality of external objects... Whether this or that supposed experience be purely imaginary, must be discovered from its particular determinations, and by comparing these with the criteria of all real experience."[77]

Now, what has Kant succeeded in showing? First, that empirical self-consciousness (the "inner sense") necessarily

assumes perception of external objects independent of the given individual consciousness. Second, that the unity and coherence of objective experience also signify the unity and coherence of the cognizing subject (this fact is termed the "objective unity of self-consciousness" in Kantian epistemology). Third, that the cognitive relation to the external object is also necessarily accompanied by a relation to the cognizing subject, that is, by different forms of self-consciousness.

However, Kant makes a further step in propounding a thesis which does not follow from the above assertions but is presented as their logical consequence. He formulates the proposition that objective unity of self-consciousness, or the transcendental unity of apperception, is the *basis* of the objective unity of experience. The proposition "I think" is declared to be the supreme foundation of any knowledge,[78] and Kant thereby actually reverts to Descartes, and that after criticising him for "problematic idealism".

True, on this point, too, Kant's position is essentially different not only from that of Descartes, but also from the position of Husserl and Fichte. For Kant the proposition "I think" (just as the proposition "I exist"), being an expression of a special kind of consciousness, or rather self-consciousness, does not, however, express knowledge. A necessary condition of knowledge, according to Kant, is the givenness of the corresponding object in experience; that is to say, knowledge and experience coincide. True, experience itself is not understood by Kant as something purely immediate at all: his position here is opposed both to empiricism and phenomenology. Nevertheless, synthesising immediate sense components is a condition of experience. Where this does not occur, there is no experience and, consequently, no knowledge.

For this reason, to take an example, the apriori categories of intellect by themselves do not contain knowledge (and no "substantive insight" into their content in the sense of Husserl is possible). They can be thought of, that is, their content may be analytically broken down, but that will not be knowledge, that will not be cognition.

Thus Kant separates thinking from cognition and consciousness from knowledge. The proposition "I think" expresses an act of self-consciousness. But that is not knowledge, for the object corresponding to it, the thinking ego, is not given in any experience. The subject of transcendental apperception cannot become the object of itself. It can only be thought of or somehow symbolically hinted at: "...This unity is nothing more than the unity

in *thought*, by which no object is given; to which therefore the category of substance—which always presupposes a given intuition—cannot be applied. Consequently, the subject cannot be cognized. The subject of the categories cannot, therefore, for the very reason that it cogitates these, frame any conception of itself as an object of the categories."[79]

It is important to note that the Transcendental Ego which, in Kant's view, underlies the whole experience, cannot be directly grasped in the framework of his system. Kant merely suggests that we logically deduce it as a kind of otherworldly entity of a "thing-in-itself".

Even if empirical reflexion (the subjective unity of self-consciousness) is not, from Kant's standpoint, knowledge in its own right, since its objects, given in the internal sense, are devoid of a number of traits of real objects with which external experience deals, transcendental reflexion (the transcendental unity of self-consciousness) is not regarded as knowledge at all. (Let us recall that for Husserl it is precisely transcendental reflexion that is an expression of "absolute knowledge".) According to Kant, the Transcendental Ego is absolutely outside experience. As for empirical self-consciousness, that is merely the Transcendental Ego appearing to the empirical subject as a "thing-in-itself".[80]

This means in fact that Kant fails to substantiate knowledge through transcendental self-consciousness. He is himself compelled to admit that there are no instruments for passing on from the latter to the former within the framework of finite, actually existing experience. Husserl's method for implementing this transition through "direct insight" into some "certainties" is unacceptable to Kant: the Königsberg philosopher believes that "certainty" in no way guarantees the actual existence of the corresponding object.[81]

"Deduction" of apriori forms of any knowledge from the activity of the Transcendental Ego (Fichte's method) is also impossible for him, for in Kant's view the ego as the basis of knowledge cannot be the object of experience and of knowledge, being a fundamentally extra-experiential "thing-in-itself". There can be even less possibility of substantiating knowledge through empirical (subjective) self-consciousness. The latter, as we know, implies the existence of the world of material objects, and a knowledge of them is itself substantiated thereby, far from being the basis of knowledge. Besides, the empirical ego, as Kant emphasises, cannot be a guarantee of the universality and necessity of the characteristics of any knowl-

edge precisely due to the empirical and accidental nature of the processes inherent in it.

That is why Kant's only way out is to assure his reader that the transition from the transcendental unity of apperception (regarded as the supreme basis of any knowledge) to constituting experience (that is, on the one hand, the world of objects appearing to finite consciousness as "empirically real", and on the other, the corresponding kinds of knowledge) is realised in certain otherworldly spheres, "behind the back" of empirical consciousness, as it were. This transition, called transcendental synthesis, expresses the self-activity of the Transcendental Ego.

The transcendental unity of apperception therefore appears in two forms, according to Kant. Its profound essence is expressed in its self-activity, that is, in the work of transcendental synthesis. It is the *synthetic* unity of transcendental apperception that is the supreme foundation of cognition. As for the consciousness of the identity of the cogitating subject, given to each empirical individual as the self-realisation "I think", it appears only as a reflection of the spontaneous activity of the Transcendental Ego, characterising not so much that activity as its result—the identity of the ego with itself (I=I). Kant suggests that the latter should be called the *analytical* unity of transcendental apperception.

But, insofar as the finite empirical individual has no direct access to the Transcendental Ego but merely to a chink through which bits of its activity can be grasped in the self-realisation "I think", the Transcendental Ego itself is given extremely contradictory characteristics in Kantian philosophy. On the one hand, it is considered as a kind of deep force in myself, and here Kant's views have something in common with Husserl's and Fichte's. But the Transcendental Subject is also declared to be a thing-in-itself, a kind of otherworldly entity. Here it appears as something that is not only in me but also outside me, as "consciousness in general", as an objective structure underlying all individual consciousnesses. The Transcendental Subject should in this aspect be referred to as "We" rather than "I" (and Kant often does so). In other words, Kant's subjective idealism is not at this point without some traits of objective idealism.

Thus, in substantiating knowledge Kant tried, first of all, to proceed from analysis of the characteristics of the final product of cognitive activity—knowledge—to reconstructing the logical conditions of its generation. Not only certain propositions of "common sense" but, above all, the results of mathematics, of contemporary mathematical natural science (classical mechanics), and the results of formal-logical studies, were chosen as the samples of knowledge that served as the reference points. Theoretically separating and analytically investigating these various kinds and types of knowledge, Kant singles out certain structures and invariants in knowledge that was actually available to him, and which characterised a definite period in the development of consciousness. In this way he obtains some results that are not merely of historical interest. But substantiation of the universality and necessity of these results was only possible, from Kant's standpoint, through correlating them with the activity of the Transcendental Subject, with the transcendental unity of self-consciousness. It is this task that Kant fails to solve, for his system has no logical instruments for expressing the spontaneous activity of the Transcendental Ego. Therefore Kant's epistemological conception, being indubitably subjective-idealistic, cannot nonetheless be regarded as "egology", unlike the transcendentalist systems of Fichte and Husserl. Kant established a number of important moments in the study of cognition and consciousness. But the problem of substantiation of knowledge is not solved in his conception either; nor can it be solved here, for his conception remains idealistic.

Thus we see that the attempts to substantiate knowledge and fathom the nature of cognition relying on the postulate about the existence of a special kind of knowledge, indubitable, certain and directly pertaining to "pure consciousness" prove unavailing. The so-called radical reflexion about "pure" consciousness ("turning to look at the subject", as Husserl puts it) cannot substantiate the objectiveness of experience and, moreover, cannot even guarantee in its framework the actual reality of other cognizing individuals ("other egos"). Neither is the question of the nature of the ego and of the modes of comprehending it solved. The transcendentalist version of the subjective-reflective procedure for substantiating knowledge, postulating the a priori nature of definite structures and norms of everyday and special scientific knowledge, contradicts the development of modern scientific knowledge.

4. THE CONCEPTION OF THE "LIFE WORLD" AND THE UNIQUENESS OF THE PLACE OF THE EMPIRICAL SUBJECT IN THE STRUCTURE OF EXPERIENCE

There are other influential variants of the idealistic solution of the problem of substantiating knowledge in mod-

ern bourgeois philosophy. The empirical subject, that is, a special kind of unity of consciousness and corporeality, is regarded as the substantiating instance, rather than the Transcendental Subject interpreted in its isolation from the world of real material objects, from the empirical corporeal individual and the community of other such egos. On this path, an attempt is made to establish the necessary dependences of knowledge and experience.

These approaches to understanding cognition are a departure from transcendentalism. They do not, however, constitute a rejection of the interpretation of cognition as determined by the structure of individual consciousness. Consciousness is merely understood not as the "pure" consciousness of a "pure" individual ego but in its organic links with corporeality and its inclusion in the network of interactions with other subjects. The rejection of the all-too manifest subjectivism of the philosophical conceptions based on "pure" consciousness does not yet signify breaking away from idealism. This last circumstance predetermines the untenability of those attempts to solve the problem of substantiation of knowledge which we shall here consider.

The interpretation of the subject outlined here is characteristic of the late works of Husserl. Opposing the everyday, pre-scientific and extra-scientific "life world" (*Lebens-Welt*) to the objectified world of mathematicised science, Husserl endeavours to prove that the scientific-theoretical attitude to life is derivative in its essential dimensions from the immediate, "life-oriented" attitude to the world which is characteristic of the *Lebens-Welt*.

At the same time, the philosopher believes, science has a tendency (and it is inalienably inherent in the scientific-theoretical form of cognition itself) to separate itself from the "life" sources, to forget about them, as it were, and to undertake constructions that are rooted in the "life world" and not in the pre-theoretical meaningful givennesses. This path, that is, the path of formalistic objectivism, inevitably leads cognition into *cul-de-sacs*, to paradoxes, to a crisis in its foundations, and this, in Husserl's view, is characteristic of the whole of contemporary European science (these statements date from the 1930s). The only way towards substantiation of science (and the crisis of its foundations is at the same time the crisis of the whole of European culture), and towards substantiation of cognition in general, is through finding the real sources of science and recovering the thread that binds the latter to scientific-theoretical cognition. The conditional, restricted, and dependent nature of the scientific

spirit of "pure objectiveness" will thus be demonstrated, depriving objectivism and scientism closely associated with it of the status of a universal worldview orientation. The immediate "life world" underlying all human modes of relation to reality, including scientific-theoretical cognition, is, in Husserl's view, marked by a specific unity of the objective and the subjective, the source of unity lying in the subject, the unity itself being "centred" on the individual empirical ego.

Indeed, continues Husserl's argument, what is given to the empirical subject in the first place is the subject itself as the individual ego with the consciousness and unique body inherent in it.

All the necessary relations of experience are determined precisely through the properties of the individual subject. It is well known, for instance, that objective experience implies the existence of a generally significant network of spatial relations which determines the mutual arrangement of material objects (let us recall that for Kant the forms of spatial dependences, as distinct from temporal ones, are mostly modes of expression of the objective nature of experience). But in what way is the spatial structure of experience formed?—asks Husserl.

The principal spatial meanings are "here" and "there". "'Here' is the place where I with my body am, or, to be more precise, it is my body. What is 'there'? 'There' defines itself through 'here'. If there is no 'here', there is no 'there'. 'There' is 'not-here' that can become 'here'. 'There' is understood as a potential 'here', it is understood in terms of 'here'. 'There' defines itself relative to 'here', that is to my body. 'There' defines itself depending on the extent and the manner in which it is transformed into 'here'. 'There' is 'remote' if it is hard to transform it into 'here'; it is 'close' when it is easily transformed into 'here'... What is, in concrete terms, the transformation of 'not-here' into 'here', that is, the attainment of 'there'? 'There' is the place where not-my body is, or rather, it is not-my body. Therefore the transformation of 'there' into 'here', that is, the attainment of 'there', signifies the transformation of not-my body into mine, into a continuation of my body... The transformation of not-my body into a continuation of my body therefore means its transformation into my instrument. But the condition of transforming some body into my instrument is its transformation into a continuation of my body, that is, its attainment in the sense of my body's simple contact with it. 'Contact' is here meant in the broadest sense of the word. Seeing with an eye constitutes a special kind of this contact."[82]

If we ignore this relation of "here" and "there" to the individual subject, any distinction between them will lose its meaning, states Husserl.

The relations between "in front" and "behind", "on the right" and "on the left", "higher" and "lower", are defined in a similar way, that is, on the basis of the possibility of transformation of "there" into "here", he believes.

"In front" is that which is before my face, "behind" that which is at my back and to which I must turn in order to attain it; "higher" is that which is above my head, "lower", that which is under my feet, etc. If we ignore the relation of these differences to different parts of my body and the possibilities of attaining them, the differences themselves will disappear. If there were no differences between the parts of my body, there woud be no differences between "in front" and "behind", "on the right" and "on the left", etc.

Further Husserl analyses the stages in the "objectification" of spatial relations, that is, the stages of abstracting them from those initial dependences of origin which connect them with the individual subject and the subject's body. One of these stages consists in transferring, as it were, the point of reference, that is, "here", from my body to some other (which originally emerged as existing "there"), and in defining the spatial relations of other things, starting from the latter (which does not coincide with my own) e.g., we say that the river is not far from the house, that one object is to the right of another, etc. In this case we define the spatial relations between things regardless of our body, as it were, ignoring it. However, it is important to bear in mind, Husserl points out, that it only became possible because we tentatively identified ourselves, our body, with that body which we chose as the starting point of defining spatial relations, putting ourselves in imagination in place of that body, since for the bodies taken as such, that is, outside their relation to the subject with its body, there are no relations like "on the right" or "on the left", "close" or "far", etc. But that means, Husserl believes, that "objective" spatial relations between things are ultimately determined through my body, through me as the subject.

Further steps in the "objectification" of space involve the use of certain universal standards for measuring length, that is, of some special objects which are manufactured specifically for expressing the spatial relations between objects. In this case, we can know, through communication, even distances that we cannot observe directly. Using

universal standards can consolidate the illusion of independence of the spatial relations of objects from the subject and its body. However, Husserl continues, the standard of measurement is not only chosen as such by the subject but is constituted in its spatial properties only through its relation to the subject's body, that is, through the "here/there" relation.

The "objectiveness" of space, he explains, "does not lie in the independence of spatial meanings from the subject but in their equal repetitiveness. I can, in principle, repeat the position which I once assumed relative to a definite thing, and then the spatial meaning of the latter will be repeated. I can, in principle, repeat the position occupied by another subject relative to some thing, and then again the spatial meaning of the latter will be repeated. Objectiveness lies precisely in this repetition of meanings; it should be remembered, however, that repetition of meanings depends on the repetition of the positions of the subject."[83]

As we see, from Husserl's viewpoint, "objectiveness" of space assumes the existence of other empirical subjects and my definite relation to these subjects. In general, the objectiveness of experience, Husserl indicates, implies its intersubjectivity, that is, its universal significance for all the other subjects.

But what does "another subject" mean?

Another subject, Husserl believes, is constituted in the same way as the spatial dependences of experience are constituted by their relation to me. Among the bodies surrounding me there are those that are similar to mine in the mode of their functioning. If I were at the place where such a body is, it might serve me and my conscious intentions. (Thus the subject is for Husserl not just a body of a special kind but a unity of consciousness and corporeality.) In this way, on the analogy with myself, the meaning of "another subject" is formed which, as distinct from myself, is not given me directly but is only constituted by myself.

The body of another subject, on the one hand, belongs to my world, for it is constituted by myself, while on the other hand it belongs to the world of that other subject. Therefore my world must coincide with his world. This world, common to ourselves and all the other subjects and having a meaning common to all, is the "objective" world. In other words, the objectiveness of the world consists, according to Husserl, in its universal significance, that is, in the universal meaning it has for any subject, rather than in its independence from the subject.

According to Husserl, scientific-theoretical cognition, concerned with finding and analysing invariants of various measurements, and later of invariants of these invariants, abstracts from the determination of the measurements by the nature of the standards chosen which, in their turn, are constituted by their relation to the individual subject with its body. Identifying the invariants established by science with the objective world, this mathematicised science interprets objectiveness as complete independence from any subject whatever. The fundamental fact is forgotten, Husserl believes, that the meaning of the objectiveness of the world is constituted by the subject and is determined relative to it and to its body. (The universal significance of the world, its intersubjectivity itself, ultimately depends on myself as the individual subject, Husserl states, for the other subject is also constituted by myself, in my experience.) Carried away by the ideal of falsely conceived objectivity, mathematicised science succumbs to the sin of scientism, inevitably ending in a crisis of its own foundations. The only way out of this crisis is establishment of the meaning of the individual subject as the centre of the universe—thus ends Husserl his discussion of this theme.

Let us try to analyse these arguments and see if they are well grounded. Husserl starts from the fact (which he regards as primary givenness) that the individual subject is given to itself with its consciousness and body. The primary spatial meaning of "here" is determined, in his view, by its connection with this subject. As for the meaning of "there", which belongs to something that lies outside the subject and its body, it is, in Husserl's opinion, constituted or defined depending on the meaning of "here", namely as something that can become "here", that can be attained by the subject coming into direct contact with its body. It is easy to show, however, that this analysis is inadequate even by the criteria of phenomenological description. The point is that "here" already subsumes "there", these meanings being mutually dependent. It is true that "there" can be transformed into "here", can become "here". It is also true that "here" is "not-there". In other words, the meaning of "here" implies the meaning of "there". It is just as true that "here" is "there" from the standpoint of another subject or, generally speaking, from another reference point. If there is no dependence of this second kind for the subject, there is no meaning of "here" for it either. The "here/there" relation implies equal role of both of its poles.

Of course, the elementary "here/there" spatial relation includes a reference to the individual subject, for the

"here" meaning has sense only for that subject. At the same time, the meaning of "here" includes from the beginning the fact that it is "there" from another viewpoint, from another position, while "there" is that which exists outside the subject and its body. Therefore the reference to the individual subject in the "here/there" relation does not mean constituting that relation as depending on the subject and its body but a realisation (with varying degrees of clarity) of the incorporation of the empirical subject in a certain network of objective spatial relations appearing for it at the given point as the meaning of "here".

Husserl shows the dependence of the relations "above/below", "in front/behind", "on the left/on the right", etc. on my body and differences between its parts. It can be conceded that these meanings have a certain anthropomorphic colouring, implying as they do a reference to the subject and the various parts of the subject's body. However, the subject's body itself exists as a special type of object for it only if it appears as included in an objective network of relations, including spatial relations, with other bodies, both material things and the bodies of other subjects. For me to realise the various parts of my body (including those which I do not see under ordinary conditions: face, head, back, etc.) as forming a certain unity, belonging to one and the same object, I must possess the faculty of perceiving my body from the outside, as it were, from the standpoint of another subject, that is to say, as spatially localised and existing in certain relations with other bodies. In other words, constituting the "in front/behind" and other meanings already assumes the existence for the subject of a definite network of elementary objective spatial relations and is merely superimposed on this network, so to speak, far from determining the latter, as Husserl insists.

In other words, the subject may conceive of itself as being in the place of some other object and take this other object as a reference point for determining distance, e.g., for determining the "close/far" relations, only if it is simultaneously capable of conceiving of its body as replaceable by any other body as the determinant of spatial dependences.

Husserl points to the connection between the objectivity of space and the possibility of repeating the position taken up by the subject relative to a certain thing. But the conception of the possibility of repeating the subject's spatial position already assumes the existence for the subject of an objective network of spatial relations that lends

sense to the taking up of a certain position, just as it implies the objective meaning of the subject's body and spatial localisation.

It is of course true that the introduction of universal standards or scales for measuring spatial relations and, later, the establishment of invariants of these relations at the stage of scientific-theoretical cognition, mark the discovery of increasingly more general dependences of the objective world, accompanied by abstraction from those connections which include in these dependences a certain empirical subject or group of such subjects (a sociocultural community). A transition is necessary, however, to the study of more general types of dependences and not stages of "objectification" of the original, purely "subjective", meanings, as Husserl would have it. Any experience, however direct and "life-like" it might be, always includes a distinction between my subjective stream of consciousness and the objective system of dependences between material objects, if it lays a claim to cognitive significance. Therefore, however great the differences between scientific-theoretical cognition and those forms of pre-theoretical relation to the world which Husserl calls the "life world" (and these differences undoubtedly do exist and are of fundamental significance in certain aspects), all kinds of the cognitive relation are inevitably aimed at the world of objects existing independently from consciousness, that is, they are inevitably guilty of the "sin of objectivism", as Husserl puts it, which in the philosopher's view predetermined the crisis of the foundation of modern European science.

The attempt to place the subject in the "centre" of the cosmos and to deduce the objectiveness of the world from the characteristics of the individual subject was not a success, for the subject proves to be included in a certain system of objective dependences from the very outset.

Let us consider yet another element of Husserl's analysis. We may recall that the objectiveness of the world is, for Husserl, identical with its intersubjectivity, that is, universal significance of its meanings for any subject. The latter implies the existence of another subject, apart from myself. But this other subject is originally constituted by myself, that is, it exists as a definite product of my cognitive experience, it exists in my experience and is understood "on the analogy" of myself. That means that when Husserl takes up the standpoint of the other and starts cogitating about the body of this other subject, along with myself and my body, also existing in the experience of that other, it should be remembered that, in the framework of his philosophy, the other subject cannot in principle be equipollent with myself, being ultimately constituted by myself, whereas I with my body am given to myself directly and am the true starting point of constituting all the dependences of experience. And that means that the thesis of Husserl's philosophy of the intersubjectivity and universal significance of the world actually proves to be fictitious, and that in the final analysis Husserl cannot escape from the circle of solipsism which he himself drew.

5. THE INTERPRETATION OF COGNITION AS CONDITIONED BY THE INDIVIDUAL CONSCIOUSNESS AND, AT THE SAME TIME, MYSTIFYING THE ESSENCE OF THE LATTER. THE EGO, "THE OTHERS", AND THE WORLD OF OBJECTS

Any attempt to understand the specific features of knowledge is bound to take into account the fundamental facts—that the empirical subject is necessarily included or incorporated in the world of material objects existing independently of it and of its consciousness, and that the other subjects are not less real than myself, and cannot be regarded as products of my experience only.

There is a conception in modern Western philosophy which endeavours to take these fundamental facts into account within the scope of an originally interpreted phenomenology and at the same time to link up the fundamental traits of knowledge and of the cognitive relation with the specific characteristics of the individual empirical subject. This attempt is undertaken by Jean-Paul Sartre, a prominent modern French phenomenologist and existentialist, in his main philosophical work *Being and Nothingness.*[84]

Let us point out from the beginning that epistemological problems, the question of substantiation of knowledge, are not the focal points of Sartre's analysis, although he offers his solution of these questions. The relation between subject and object is considered in his works within the framework of a definite conception of consciousness and man. But Sartre's interpretation of the relation between consciousness and knowledge is of interest for our discussion.

The starting point of his cogitations is recognition of the existence of two realities: of the objective material

being which he refers to as Being In-Itself, and consciousness, or Being For-Itself. The former exists by itself and does not need the latter. The latter is, however, impossible without the former, for it has no content at all, is absolutely empty, transparent, open both to the external world and to itself, is, in a word, a "nothingness", a "hole" in Being In-Itself, a hole which has no density at all and continually needs to be filled. However, precisely because consciousness is a kind of "gap" in material being, it is excluded, as it were, from the action of all the substantive connections and dependences, and is absolutely free. Consciousness is thus not just emptiness filled with content given from the outside but a being of a special kind, a centre of free activity.

The content provided by Being In-Itself does not determine the activity of consciousness but merely serves as a kind of pretext for it, a bridgehead for its unfolding. However, since this activity is not determined by content given from the outside and is at the same time devoid of its own inner content, it is essentially a negation of any sort of dependence. It is in negation that the freedom of consciousness is expressed, according to Sartre.

At the same time Sartre states that consciousness does not exist outside the material world, outside Being In-Itself. In his view, consciousness cannot be similar to Kant's or Husserl's Transcendental Subject, first, because it is included, as it were, in the world of material objects, though not being an object itself (Sartre criticises in this connection Husserl's doctrine of transcendental reduction, of *epoche*), and second, because it factually, empirically exists in definite concrete situations and is connected with the body of a given empirical subject.

Moreover, in a certain sense consciousness, Being For-Itself, coincides with the body of the empirical subject and is indistinguishable from it. The reference here is to that aspect which, in Sartre's view, specifically characterises the basic, original perception by the individual of his own body and which is fundamentally different from the way I and my body are perceived by another subject. In the primary, original experience, Sartre argues, I do not perceive myself as an object. The eye does not see itself. I do not see my face. I cannot conceive of myself as an object among other objects. Objects are something that exists outside myself and belongs to the material world, to Being In-Itself. However, I must receive certain sense perceptions from the movements of my own body. At any rate, that is what psychology says. The assertions of scientific psychology, Sartre says, proceed from the existence

of my body as a material object among other objects, connecting my definite experiences with processes in my body understood in this way. But the essence of the matter is, according to Sartre, that the individual's body is not given him in the basic primary experience as an object, and he therefore cannot in principle connect any processes in his consciousness with his body understood as an object (he cannot in principle localise any sense perceptions, e.g., the sensation of pain; he cannot associate his experiences with his own physical state, etc.). At the outset, the individual is given only the world of external material objects and himself as different from these objects, as consciousness, as Being For-Itself. To the extent in which experiences have a certain "density", they pertain to external objects. For instance, if I sense resistance in acting upon an external object, the resistance itself is not perceived as connected with the action of my hand characterising my subjective experience, one that is "in me", but as pertaining to the objective properties of the external objects and expressing their traits, in this case the measure of their resistance. Pain is not something localised in me either, but that which expresses the properties of some objects under definite circumstances. As for my body, in its primary and basic sense it, first, determines the factuality of my consciousness, that is, the concrete objective situation in which I find myself (in particular, it determines "where" exactly I am), and second, it functions as the possibility and the mode of the activity of my consciousness, of Being For-Itself, essentially coinciding with the latter.[85]

Thus Sartre has an original conception of consciousness which does not coincide with the widely accepted one. Consciousness or Being For-Itself, writes Sartre, is not the same as the psyche or the subjective world characterised by certain processes, connections, dependences, complicated mechanisms, special types of relations between conscious and unconscious phenomena etc., a world that is the subject-matter of special studies in scientific psychology. Consciousness, Being For-Itself, is in principle apsychological. The emergence of a special subjective world is, according to Sartre, a consequence of objectification of consciousness and expresses a distorted conception of the basic and primary characteristics of Being For-Itself and at the same time the ontological fact of the degradation of consciousness itself.

As we see, far from relying on the assertions of scientific psychology, Sartre endeavours to prove the dubiety of some of its basic abstractions and assumptions. Like

Husserl, he insists that phenomenological description does not imply any scientific results, and that it is science that has to reckon with the results of phenomenological analysis rather than vice versa. (Among other things, Sartre's understanding of the world of material Being In-Itself does not coincide with the natural-scientific doctrine of matter, as we have had occasion to see above.)

Let us now consider the following important point of Sartre's reasoning. That relation between Being In-Itself and Being For-Itself of which we spoke above is, for him, not only the basic and primary point but also an expression of the true essence of their relations, the essence which is under usual circumstances fenced off, put away, hidden, distorted by various circumstances. For this reason, for instance, when the subject is capable of localising the feeling of pain in some part of his body, when he scrutinises the world of his experiences and correlates them with the past and present events of his life, when he follows the development of his own thought and controls this process, in all these cases, says Sartre, the genuine characteristics of consciousness, of Being For-Itself, are distorted.

Consciousness as "nothingness" does not coincide with the psychical life of the empirical ego but underlies the latter, being hidden in its depth. (It is important to note that from Sartre's standpoint the situation where consciousness proves to be something lying deeply in the foundation of the individual ego, of his psychical life, reveals the ontological fact of distorted expression of the true nature of consciousness. It is a question of the situation as it is, rather than of our distorted understanding, for consciousness has neither depth nor essence of any kind.) On the one hand, consciousness determines the entire course of the psychical life of the ego, the whole of the individual subjective biography, while on the other hand, it is not only different from that biography but is also distorted by it. At the same time consciousness, according to Sartre, is not the Transcendental Ego in the sense of Husserl, either: first, because it is factual and not transcendental, coinciding as it does with the subject's body understood in a certain manner; second, any ego, including the Transcendental Ego, has a certain inner definiteness, density, certain content. Consciousness is entirely devoid of such content, it is absolutely empty. Therefore it is not the ego, concludes Sartre.

Ordinary subjective life necessarily assumes reflexion. Reflexion is only possible on condition that its object exists and catches the subject's inner eye. True consciousness, Being For-Itself, Sartre believes, is absolutely transparent, it is a complete vacuum which the inner eye pierces without stopping anywhere or being reflected by anything. Therefore self-consciousness, the relation of the subject to itself which is characteristic of consciousness (and this relation is continually realised, Sartre believes, for consciousness clearly distinguishes itself from the outset from the world of things-in-themselves) is not reflexion. Consciousness is in principle pre-reflexive, in Sartre's view.

Reflexion emerges together with its object, the ego, and in a certain sense produces the object itself. Sartre points out the important fact which also played a fundamental role in the philosophical system of Fichte and which we shall later analyse on the positive plane. The fact is that individual reflexion aimed at consciousness does not simply find before itself a ready-made object in the shape of the ego and its states but, being an activity of a certain kind, acts on its object, changes it, reconstructs and in a certain sense creates it.

For Fichte, this positing of oneself as the Absolute Subject in the form of one's own object was the kind of determination of the indeterminate which was not only involved in the shaping of the ego and the contrapositing of ego to non-ego but which also revealed the inner essence of the Absolute Subject. For Sartre, the positing of the ego as the object of reflexion and the coming of the latter on the scene does not in any way reveal the nature of consciousness. Moreover, Sartre believes that at the stage of reflexion the purity of consciousness is distorted and consciousness itself degraded. At the same time, according to Sartre (and here there is another difference between him and Fichte), there is no Transcendental or Absolute Ego, the ego can only be empirical, expressing as it does the unique traits of the given individual person distinguishing him from all the other egos. Let us note that consciousness, Being For-Itself, is, according to Sartre, also individual in a sense, so that different empirical subjects have different consciousnesses. However, if the ego expresses a certain density, a unity of an individual biography, and the subject's personal traits, consciousness or Being For-Itself is in itself empty and impersonal. Therefore different consciousnesses differ from each other merely as different centres of free activity, as structureless points of activity included in different factual situations. Of course, in our experience we distinguish between consciousnesses on the basis of their connections with different individual egos. But this differentiation does not characterise the metaphysical distinctions between consciousnesses, so to speak.

Thus, according to Sartre, the ego as an expression of the unity of the subject's psychical life does not express the essence of consciousness and even distorts it, to a certain extent. The ego may be said to be "invented" by the subject—with the essential reservation that this "invention" is realised in constant contacts and communication with other subjects. The positing of the ego is an attempt to introduce determinateness into the fundamentally indeterminate life of consciousness, to lend consciousness density and substantionality, making it its own object.

At the same time, according to Sartre, consciousness is continually inclined towards substantivisation, precisely because it is void and needs to be filled. However, it endeavours to fill itself, to acquire content, in such a way, as not to lose its primary faculty, that of the activity of free negation, the activity of desubstantivisation. In other words, consciousness endeavours to turn itself into a kind of synthesis between Being In-Itself and Being For-Itself, which is impossible because of the mutually exclusive characteristics of the two. Therefore the reification of self by consciousness, acquiring features of a certain ego, is accompanied by continual attempts to sublate that reification. This sublation, however, is not expressed in reverting to the purity and "contentlessness" of true Being For-Itself but in constant positing of ever new definitenesses of consciousness as a succession of the characteristics of the ego inherent in it. Man's personality is something subject to changes. The ego is not equal to itself, argues Sartre against the formula of Descartes, Kant, and Fichte.[86] Inasmuch as consciousness cannot acquire any final objective image in the shape of a certain ego, one cannot say what it is. Consciousness is that which it is not, and it is not that which it is, asserts Sartre.

Sartre therefore separates in principle the cognitive relation which implies the existence of the object, from the act of self-consciousness pertaining to being that is in principle unobjectifiable, Being For-Itself. We remember that Kant also separates cognition, the relation of the subject to the object, from self-consciousness, the relation of the Transcendental Subject to itself, insisting that the latter is not given in experience and therefore cannot be an object of knowledge. However, for Kant the Transcendental Subject exists as an otherworldly, transcendental entity, as a thing-in-itself, which, although it is not an object of knowledge, can still be conceived of. For Sartre, consciousness, Being For-Itself, does not know itself, cannot be the object of its own cognition precisely for the

reason that it has no essence and is devoid of any depth.

For the present, we shall put off the analysis of Sartre's understanding of the external world, concentrating now on Sartre's interpretation of the process of self-cognition, of reflexion. Reflexion is, in Sartre's view, to some extent fictitious, for it is incapable of grasping the true nature of consciousness. This fictitiousness does not mean, however, that it has no object of its own or that it does not express its specific features. Such an object is always present: that is the individual ego, and reflexion is adequate to that object (Sartre criticises in this connection the doctrine of the unconscious in its Freudian version).[87] The point, however, is that the object (the ego and its states) emerges together with reflexion, is its result, and does not express the true nature of consciousness. (Sartre critically assesses both introspective psychology and Husserlian phenomenological psychology.)

How does reflexion emerge? It appears as a result of a relation to another subject. The given individual consciousness by itself, outside a relation to other consciousnesses, is incapable of generating reflexion, insists Sartre in opposition to the philosophical tradition represented by Descartes, Kant, Fichte, and Husserl, and one has to admit that he is much closer to the truth at this point than the tradition.

The other subject, Sartre believes, is just as real as myself, and cannot be regarded as simply the result of my constitutive activity, contrary to what Husserl thought. At the same time, according to Sartre, my conviction in the existence of another consciousness is by no means based on cognition (no cognitive procedures will ever convincingly prove the existence of somebody else's consciousness, Sartre affirms), but is a kind of primary ontological givenness, of the same type as the givenness of the external objective world to our consciousness. However, what is directly given to me is the existence of somebody else's consciousness itself but not the possibility of penetrating that consciousness. Different consciousnesses are in principle separated and cannot merge with one another. Besides, the other consciousness is given in my experience as connected with the body of another subject. This body appears as a material object localised in space and adjacent to and interacting with other material objects. Though cognition of external actions, the reactions of this other subject's body conditioned by external stimuli, as well as of the nervous processes taking place in this body, does have some meaning, it does not at all characterise, Sartre believes, the free consciousness of the other subject

which actually underlies all its actions. (Sartre adds a critique of psychological behaviourism to the critique of introspective psychology.)

Thus the body of another subject appears in my experience as an object of a special kind, as it does not appear to the other subject itself, just as my body is not originally an object for me, being merged with my own consciousness. It is precisely the fact that another consciousness appears in my experience as inseparably linked with an object of a special kind, the body of another subject, that compels me to treat the other subject generally as an object of a special kind, unique in its physical and psychological characteristics, and to "insert" the conscious processes "in" that body, that is, to constitute a special "world of the subjective life of consciousness", a world of psychical processes existing in definite relations with the material corporeal processes. At the same time the relation to the other person compels me to recognise myself as "another" for that other subject (that recognition is attained in the process of communication with the latter) and to ascribe myself all the characteristics which the latter has in my experience. And that means that consciousness begins to treat itself in the same way as another treats it, that is, as a subject possessing a body in the shape of a material object localised in space and endowed with psychical experiences placed "within" that body. The subject comes to distinguish these experiences and their course from the course of the objective processes of the external world, positing the unity of its psychical life as a special object, the ego. The objectification, the reification of self as a person, as the ego, thus implies the other person's view, a view of self from the outside, from the standpoint of the possible "another". It is in this connection that reflexion emerges, being, according to Sartre, the product of communication with other subjects.

The process of objectification of consciousness, of transforming it into the ego as the object of another consciousness, and later of the subject itself, goes through several stages. At one of them consciousness merely feels itself the object of another subject but does not fully know itself in this capacity. This happens when the given Being For-Itself feels itself the object of scrutiny on the part of another (the problem of "scrutiny" has an important ontological meaning in Sartre's philosophy). Only as a result of communication with another can consciousness, through language, objectify itself to the end and generate reflexion. The individual subject, therefore, which sees itself in the mirror and is at the same time deprived of the

possibility of communication, cannot in principle recognise itself in the mirror image (this image merely appears to it as a strange play of external objects), for it does not exist for itself as an object outside of communication with others.

For Sartre, objectification of consciousness through a relation to another is an indication of the ontological degradation of Being For-Itself.

My ego does not express my true nature, Sartre believes. Although consciousness internally gravitates towards objectification, although it performs this objectification itself and is responsible for it, it appears as something imposed by the external relation to other consciousnesses, by the process of communication. The relation to another does not follow logically from the nature of Being For-Itself. That other consciousnesses apart from my own exist is a real and fundamental fact, but it is metaphysically accidental. A situation is conceivable in which my consciousness would exist in solitude, Sartre believes.[88] I do not know myself, for my reflexion pertains only to the external integument of my consciousness, an integument existing as the ego. At the same time I have, in principle, an access to my consciousness and a capacity for directly grasping it in the form of a non-objectifying pre-reflective act of self-consciousness. As for the other, according to Sartre, I do not know his true depth, for I deal only with his external visage, but moreover, unlike in my own case, I have no possibility at all to penetrate his consciousness from the inside, for, to perform that feat, I must be in his place, whereas different consciousnesses are individual, they are metaphysically distinct. The other is given in my experience as an expression of a certain individual consciousness which is just as real as my own. At the same time I can grasp or comprehend the other only as a body, as a material object endowed with the psyche, Sartre insists; the conditions of the problem predetermine in this case the impossibility of solving it. Meanwhile, the tendency of Being For-Itself towards substantivisation, towards meaningful filling is also necessarily connected with the desire for merging or fusing with another consciousness. The impossibility of the latter predetermines the tragedy of individual existence.

Now, what about the cognition of the external world, of Being In-Itself; how does Sartre solve the problem of substantiation of knowledge?

The world of objective material things pertaining to Being In-Itself is given to consciousness directly, he believes. In terms of content, the cognitive or subject-object

relation is entirely determined by the external object, for consciousness by itself is empty. Only "nothingness" separates it from the world of external objectiveness. However, this distinction between cognition and the external world is at the same time fundamental for it means that consciousness, being a "nothingness", can never simply merge with the world of objects or merely absorb their content. The cognitive relation of consciousness to material being necessarily includes the element of negation that is inherent in consciousness. This negative activity of consciousness coincides, according to Sartre, with the primary, basic characteristics of time. The objective spatial relations of material objects inherent in Being In-Itself necessarily appear in the cognitive process in the forms of time, so that time itself, which originally coincided with Being For-Itself, is "spacified" acquiring the characteristics of objectiveness. The interaction of the spatial and temporal features of experience produces various forms of the necessary structural organisation of knowledge (types of causal dependence, constancy of the objects of knowledge relative to the flow of time, etc.). It is these fundamental features of the cognitive relation that underlie any knowledge, including scientific knowledge. To find out the invariant characteristics of experience, science constructs a certain system of abstract or ideal objects. But these objects are, according to Sartre, essentially fictitious, being in themselves devoid of content and performing a purely pragmatic function. The meaning of scientific-theoretical knowledge is determined by the primary cognitive relation of consciousness to Being In-Itself, although science itself forgets about it, claiming to discover the hidden essence of things that is not immediately given in primary cognitive experience.[89]

As we see, Sartre endeavours, in the final analysis, to deduce the fundamental properties of knowledge from the specific characteristics of individual consciousness and its relation to the world of objects.

In Sartre's view, however, scientific-theoretical cognition does not know the true properties of Being In-Itself, dealing merely with abstract invariant relations between objects.

The primordial, pre-scientific and pre-theoretical relation of consciousness to Being In-Itself grasps the characteristics of the objects themselves, but no cognitive act may be directed at consciousness and its relations, including cognitive ones, since consciousness is in principle unobjectifiable. That means, according to Sartre, that the problem of substantiation of knowledge cannot be the object of theoretical inquiry, that is to say, epistemology in the traditional sense of the term is impossible. The primary specific properties of knowledge are not found through cognitive research of a special kind of objects but comprehended through phenomenological non-objectifying insights into consciousness and its relations with Being In-Itself.

Speaking more precisely, however, the establishment of the dependence of the fundamental characteristics of cognition and knowledge on the features of consciousness does not, according to Sartre, solve the problem of substantiation even if this solution is to be sought for on the path of phenomenological insight and not of cognitive research. Indeed, in his view consciousness is devoid of essence or depth. It therefore has no foundation and cannot serve as a foundation for anything whatever. In general, the problem of substantiation of anything (knowledge, values, norms of activity, etc.), Sartre insists, only emerges at the level of "human reality", expressing the vain tendency of Being For-Itself to "take root" in something, to acquire density, substantiality, self-confidence. This problem is insoluble, Sartre believes, because of the fundamental properties of Being For-Itself. For this reason, the fundamental structural characteristics of knowledge do not express substantiation of knowledge by something but rather "absence of its substantiation", that is, the important fact that, being conditioned in its content by the world of external objects, knowledge is at the same time a relation of consciousness, that is, it is "suspended from nothingness", as it were, hanging in a vacuum. The necessary connections of cognitive experience always express, in one way or another, the temporal flow of events, while time directly characterises consciousness and its intrinsic negativeness.

The fact that Sartre rejects the problem of substantiation of knowledge and, in general, epistemological inquiry in its traditional form, does not mean that he regards theoretical analysis of cognition as impossible. On the contrary, his conception does not exclude such an analysis (directed, e.g., at establishing the logical structure of knowledge, the mechanisms of its origin, various methods of theoretical investigation, the modes of verification of knowledge, etc.). Sartre merely insists on the impossibility of theoretical, cognitive investigation of the very essence of the cognitive relation, of the fundamental meaningful characteristics of knowledge, of the problem of substantiation of knowledge, that is, of those problems which have always been the concern of epistemology as a

philosophical discipline. Those problems of cognition and knowledge which are not philosophical in nature can be, according to Sartre, the subject-matter of specialised scientific investigation.

Let us now consider more closely Sartre's conception of the interrelations between subject and object.

Sartre proceeds from the immediate givenness of consciousness to itself in the act of non-objectifying self-consciousness. Even before it reifies itself as the ego, before it is included in relations with other consciousnesses, before the act of elementary reflexion emerges, consciousness already distinguishes itself from the world of external objects, elementary cognitive experience being expressed in the intentional orientation at the latter. As this starting point of Sartre's analysis lacks substantiation, his conception as a whole proves to be basically defective.

We have no grounds for distinguishing self-consciousness pertaining to "pure", non-objectified consciousness, from ordinary reflexion aimed at the individual ego as an object. In any case, the experience of the consciousness of an adult gives no grounds for this differentiation. (The facts of the development of the child's psyche will be discussed somewhat later.) Moreover, the very emergence of consciousness as a unified centre of psychic life, as a certain individuality distinguishing it from other consciousnesses, implies that its states are related to the activity of a certain object that is my body (though not identified with this activity). The very differentiation between consciousnesses, the possibility of their individuation, assumes their correlation with the bodies of different subjects included in objective relations with other things.

Sartre agrees that distinguishing myself as the ego from the others implies a relation to myself as an object of a special kind connected with other material objects and other egos appearing before me as other objects. In his view, however, the true individuality of my consciousness is not expressed in the ego but in the very fact of the existence of a pure structureless point—Being For-Itself.

But pure consciousness as something absolutely empty and contentless indeed proves to be "nothingness", though not in the sense of Sartre, who not only ascribes absolute emptiness to consciousness but interprets it at the same time as a special kind of being, as a metaphysical reality, as a centre of activity: it proves to be "nothingness" in the sense of absolute fiction. Structureless and contentless consciousness devoid of any properties or qualities cannot in principle be individualised. Consciousnesses interpreted as "nothingness" must merge, they must be "glued

together". But in this case Sartre's fundamental philosophical premise falls—the assumption of uniqueness of separate consciousnesses, of the impossibility of one consciousness penetrating another.

Let us consider in this connection the development of child psychology, which provides additional arguments for a critical evaluation of Sartre's conception.

As we have seen, consciousness distinguishing itself from the external world is, according to Sartre, the starting point of experience which does not assume a relation of consciousness to other persons and their consciousnesses. But there are grounds to believe (and psychological data confirm this opinion) that the individual who does not treat himself as an object of a special kind included, on the one hand, in the world of material objects and, on the other, in the world of interpersonal relations, does not possess consciousness and self-consciousness, that is, simply does not distinguish himself from the rest of reality. But that means also that cognitive experience itself is not in this case fully endowed with the features of unity and continuity which Kant believed, with every justification, to be indications of its objectiveness.

Indeed, objectiveness of experience implies that the subject is at least capable of distinguishing those of its features which are produced by the action of the external objects themselves from those which are caused by the subject, that is, those which are conditioned, on the one hand, by changes of its position relative to certain objects (its movement, changes in viewpoint, the perspective of perception, etc.), and on the other hand, by changes in the states of consciousness. But the existence of this faculty in the subject means that he can conceive of himself as a special object possessing consciousness, that is, he can perform an act of elementary self-cognition. It also means that to the extent in which self-consciousness and self-cognition are absent in the subject (and there are no grounds for distinguishing between them, as we have endeavoured to show), cognitive experience cannot retain its unity and continuity, that is, it cannot be viewed as fully objective.

Jean Piaget, whose works on the psychology of intellectual development and genetic epistemology were discussed in the first chapter, singles out different stages in the development of the child's cognitive structure on the basis of the results of experimental studies. At the beginning, at the stage of the so-called sensori-motor intellect, the child is absolutely unconscious of itself as an object and, consequently, as a subject. For this reason the objects sur-

rounding him do not retain in his experience their constant relation to one another and their own constant characteristics independent of the flow of experience itself (such as size, volume, weight, etc.).

The object disappearing from the perception field (e.g., when the child looks away or when one object obstructs the view of another) does not exist for the child, it "disappears absolutely", as it were. Cognitive experience is thus discontinuous. Grown-ups are perceived by the child as merely particularly active objects, sources of pleasure and punishment.[90]

This stage in the development of cognitive structures recorded in Piaget's studies has, as we see, certain similarities with the initial experience of which Sartre writes. The latter also stresses that initially consciousness does not realise itself as an object, neither is it aware of its body as an object and cannot therefore constitute a special subjective world of consciousness distinct from the objective connections between objects given in experience: it cannot, for instance, localise the sensations coming from the various parts of its own body but merges as it were with the latter. However, there is a fundamental difference between the views of Piaget and Sartre in the interpretation of that experience. As opposed to Sartre, Piaget insists that at the first stages of intellectual development the subject is incapable of perceiving himself reflexively, so that his consciousness does not exist either objectively or subjectively. That means that not only the difference between the subject's consciousness and his body is non-existent for the subject (that fact is also recognised by Sartre), but neither is its difference from the world of external objects (which Sartre does not recognise). At the first stages of intellectual development, the subject merges, as it were, with the world of external objects in his own experience. It is for this reason that the objects of experience do not appear here as things yet, that is, as something different from the subject (whereas for Sartre Being In-Itself is immediately given to consciousness as the world of objects).

Another important circumstance should be noted. For Sartre, the initial cognitive experience underlies the entire subsequent development of cognition determining the content and meaning of all the types, kinds, and structures of knowledge including scientific-theoretical knowledge. But Piaget shows that the development of cognition in individual psychical evolution implies complete restructuring of the intellectual mechanisms which took shape at the first stages; thus it absolutely cannot be understood from the latter alone.

At the same time it would be quite wrong to interpret the characteristics of the initial stages of intellectual development established by Piaget as a kind of "experimental confirmation" of the proposition of philosophical subjectivism that what is given to the subject initially is the subject himself and the states of his consciousness, and not the world of objective things. The subject is from the very beginning of the development of the psyche objectively included in definite relations with external objects and other men. Although subjectively these things do not initially appear before him as objects, and other persons as subjects, only a knowledge of the development mechanisms of these objective relations, in which man is included immediately after birth, enables one to explain the development of consciousness. As for the form in which the subject perceives the objective relations indicated here, its knowledge cannot by itself explain the nature of the successive changes of the cognitive structures. On the contrary, the subjective form itself can and must be explained from the system of objective relations. Finally let us point out that at the initial stages of intellectual development the subject is not given either the world of objects or the subject himself, the states of his consciousness. Therefore that picture of the initial cognitive relation which philosophical subjectivism outlines is completely at variance with the actual data of cognitive experience.

Piaget shows that the development of cognitive structures from non-reversible to reversible intellectual operations (see Chapter 1) includes a change in the child's psychological relations with adults. At the initial stage these structures are "centred", that is, they offer no possibility for distinguishing between the immediately given standpoint and the objective relations of things. "Centring" necessarily implies also that imitation of the adult, who appears as an absolute authority, is the main mechanism of the child's involvement in socio-cultural experience. The stages of cognitive development characterise the phases of consecutive "de-centring" of the intellectual structures, that is, achieving the view of oneself from the outside, as it were. But simultaneously that means a change towards complete reversibility of relations with adults. In other words, the child begins to treat the adult as in principle his equal, as another subject. The adult's authoritarian pressure gives way to intellectual exchange and cognitive cooperation. It therefore becomes possible for the child to treat himself fully as an ego, that is, a being like any other.

Thus what Piaget calls complete reversibility of intellectual operations necessarily includes the subject's reflexive

relation to himself.

The fundamental features of the emergence of individual reflexion were formulated on the philosophical plane by Marx: "In a sort of way, it is with man as with commodities. Since he comes into the world neither with a looking glass in his hand, nor as a Fichtean philosopher, to whom 'I am I' is sufficient, man first sees and recognises himself in other men. Peter only establishes his own identity as a man by first comparing himself with Paul as being of like kind. And thereby Paul, just as he stands in his Pauline personality, becomes to Peter the type of the genus homo."[91]

Thus the subject's relation to himself as the ego is necessarily mediated by his relation to another. Reflexion is not born as a result of the inner needs of "pure", isolated consciousness, as Descartes, Fichte, and Husserl believed, but in interpersonal relations, as a complex product of the development of a system of communications. At the same time it would be wrong to interpret the words of Marx quoted above in the sense that the individual first recognises the other as a subject, another ego, and only after that begins to treat himself as a subject, on the analogy of that other. In actual fact there is mediation of dual kind: the individual not only perceives himself on the analogy with the other—he perceives, at the same time, the other on the analogy with himself. In other words, the ego and another ego emerge simultaneously and necessarily presuppose one another. This fact is, by the way, clearly recorded in Piaget's studies.

Let us emphasise that we use in this context only experimental facts obtained by Piaget, and certain concrete psychological generalisations. As for the general epistemological and psychological conception of that author, according to which the development of intellectual operational structures is determined by inner, "spontaneous" maturing of the subject's schemes of activity, its substantive critique was given in the first chapter.

Let us also note that the theory of gradual "de-centring" of the cognitive structures developed in Piaget's latest works must not be confused with his early propositions concerning the overcoming of the child's initial intellectual "egocentrism" in the course of development. We know that the thesis about "egocentrism" was sharply criticised by the Soviet psychologist L. S. Vygotsky.[92] He correctly reproached Piaget for choosing wrongly the starting point of the investigation: the individual only gradually becomes involved in the system of social relations, essentially modifying his cognitive instruments in the process. Vygotsky

insisted that no such independence of the individual in his original state from society and his subsequent socialisation existed at all.

Piaget now recognises the correctness of much of Vygotsky's criticism.[93] All three stages in intellectual development, Piaget insists, are stages in the process of socialisation: "..Human intelligence is affected by the action of social life on all levels of development, from the first day of life to the last".[94] The whole point, however, is, Piaget believes, that the influence of society varies at different stages of intellectual development. The stages in the process of "de-centring" characterise only the phases in the gradual sublation of the primacy of the direct viewpoint incapable of changing the given cognitive perspective. The early stages in intellectual development are better referred to as "centrism" rather than "egocentrism", Piaget points out. This change in Piaget's position on a number of questions, although it makes his conception more sophisticated, permitting a more precise description of some facts, particularly those which interest us most of all in this section, does not of course signify any radical reorientation of his philosophical and psychological theory as a whole.

Mutual assimilation apparently begins with identification of the subjects' actions. In insisting that the attitude to self as an object is alien to the very nature of consciousness, Sartre, as we remember, pointed out that in the initial cognitive experience man does not perceive even his own body as an object: the eye does not see itself, man cannot look at his own face, etc. But Sartre fails to see that there are parts of the body which are simultaneously perceived both "from within" as something belonging to the given being, and "from without" as objects incorporated in the world of material objects. These are the organs with which I perform actions with things and which enable me to move in the object world—my hands and my legs. Outwardly, they look just as the corresponding parts of another man's body. In the course of joint activity of one person with others (in the first place, of an adult and child), the actions of different individuals are apparently identified and then individuals as wholes are mutually likened, that is, the ego and another ego take shape simultaneously.

What we have said here about the mutual mediation of my attitude to myself and to the other does not entail my self-consciousness and my cognition of another person being in principle identical. Indeed, individual reflexion implies the view of oneself from the standpoint of another, as it were. At the same time I always know something

about myself which is not directly accessible to the other: I have perceptions, experiences, memories that are only given to the act of my reflexion and can be concealed from everybody else (I can, for instance, even conceal pain). Thus I have direct "inner access" to the states of my consciousness. This important real fact was recorded and philosophically interpreted by the adherents of subjectivist and transcendentalist philosophical conceptions. Indeed, I can only judge of the subjective states of another in an indirect way—either by observing his actions or receiving his own information about himself. In either case the possibility of error or deceit is not ruled out. It is important to note, however, that the very nature of self-consciousness, of individual reflexion, is such that its emergence necessarily implies a fundamental likeness between what I perceive in myself "from within" and that which is or may be perceived by another subject within himself. Of course, that other may conceal from me certain states of his consciousness, just as I can do with my consciousness. That does not, however, exclude the fundamental identity of the mechanisms of our psychical life, while the actual process of communication assumes as a premise of its success the attainment of mutual understanding in most cases. My subjective states are directly given me in the act of self-consciousness, in a way in which they cannot be given to another, but I realise them in forms which are not my personal property but are inter-individual in nature. In other words, the act of subjective reflexion presupposes, on the one hand, an object which is directly accessible to me only (my subjective states), and on the other, such instruments of cognitive fixation of this object which subsume "any other" person (i.e., that which would be realised by that other if he had a direct access to the states of my consciousness).

Thus Sartre's proposition that there is no access to the consciousness of another subject is at variance with the actual data of interpersonal communication, expressing, in fact, the thesis of "pluralistic individualism": according to Sartre, a multitude of consciousnesses exists, each of them closed in itself and incapable in principle of penetrating the others.

Thus cognitive experience which has the characteristics of objectiveness, that is, experience assuming the subject's conscious relation to the world of objects, necessarily includes the subject's reflective relation to himself and distinguishing his own body from all the other objects, as well as differentiation between changes in the state of consciousness and the objective changes in the world of things.

The subjective experience expressed in the act of self-consciousness and self-cognition is different from the objective experience pertaining to the world of external objects. But these are not simply two series of experience existing independently from each other and following parallel paths, as it were. As we have tried to show, both of these series presuppose and mediate one another. Subjective experience only becomes possible as a result of a relation to oneself as an object included in the network of objective relations with things and other persons. In their turn, the external things emerge before the subject as a world of objects independent of him and of his consciousness only when the first elementary act of self-consciousness appears.

The subject realises not only his inclusion in an objective network of relations but also the uniqueness of his own position in the world. The latter manifests itself, first, in his body occupying a place in the system of spatio-temporal connections which is not taken up by any other subject, and second, in the fact that only he has "inner access" to his own subjective states. The objective fact of the uniqueness of this position, just as the subjective realisation of this fact, is assumed by the very structure of experiential knowledge (any attempt to apply theoretical knowledge to the description of the data of experience also assumes this fact). As we have seen, however, this circumstance has nothing to do with "centring" the world around the individual subject, a thesis which Husserl endeavoured to substantiate in his later works.

Let us note in this connection that some epistemological conceptions of the empiricist variety current in modern bourgeois philosophy, criticising the Cartesian thesis ("I exist" as the supreme substantiation of any knowledge), often deny any serious cognitive significance to the act of individual self-consciousness. Thus A. J. Ayer insists that the proposition "I exist" does not in fact say anything about me, being devoid of any content, it does not identify me with any object (Ayer stresses in this respect that this assertion is different from the statement that there exists a person of such and such a sort). The utterance "I exist", the English empiricist believes, may be likened to simply pointing to an individual object without words. This pointing, as we know, does not carry any information. Besides, he believes that there can be knowledge that is not accompanied by self-consciousness.[95]

But self-consciousness, as we have endeavoured to show, is impossible without reference to oneself as a definite object possessing specific unique characteristics and in-

cluded in a network of objective relations. The act of individual self-consciousness itself can only emerge due to the existence of certain meaningful dependences of experience (subjectively one may not, of course, be immediately aware of all these dependences, but implicitly they are always present). The relation to oneself as the ego thus includes a whole system of connections of knowledge. Descartes, Fichte and Husserl were therefore right in asserting that the act of self-consciousness and reflexion implicitly assumes the fundamental characteristics of knowledge. Their error lay elsewhere: in the attempt to interpret the specificity of knowledge and of the cognitive process by analysing the act of reflexion, a "pure" self-conscious ego. The real dependence is directly the reverse: the emergence of the ego and of its self-consciousness and reflexion must be understood as a result of the formation of cognitive experience, as a consequence of the development of definite objective relations of the given subject to the world of material objects and other persons.

The fundamental error of transcendentalism and subjectivism lies in their assumption that knowledge of one's own existence is more indubitable than knowledge of the existence of the external world. In reality, the most elementary act of self-consciousness always implies recognition of the world of external objects independent of consciousness and connected by stable relations.

Thus the attempts to substantiate knowledge undertaken within the framework of philosophical subjectivism, and to interpret cognition as determined by the structure of individual consciousness, could not in principle be successful.

That does not mean that the adherents of the conceptions considered in this chapter have not established any real facts about the cognitive relations of subject and object. In our critical analysis we have pointed to the most important of these facts. Summing up what has been said in this chapter, we can say that philosophical subjectivists exploit for their purposes, first, the specificity of the nature and functioning of the subject's consciousness (the existence of direct "inner access" to the states of one's consciousness, self-consciousness as the necessary feature of the objectiveness of experience, etc.) and, second, the normative characteristics existing in any knowledge.

Idealistic juggling with these facts of cognition and with the real problems arising in epistemological research makes an adequate interpretation of the cognitive relation impossible. Philosophical subjectivists inevitably find themselves in blind alleys because of the very mode of specifying the initial cognitive relation between subject and object. Understanding the fundamental properties of knowledge and cognition assumes an essentially different interpretation of the subject-object connections.

We have not analysed here the conceptions of cognition developed in the framework of objective-idealistic systems. As is well known, the most thorough investigation of the problem of cognition in the spirit of objective idealism is to be found in the philosophy of Hegel, who succeeded in establishing a number of important aspects of the cognitive relation and in revealing many elements of the dialectics of the cognizing subject and the cognized object. At the same time Hegel, being an idealist, thoroughly mystified the essence of the matter. Hegelian philosophy does not view cognition as determined by the features of individual consciousness but as an expression of the specific mode of existence of the Absolute Spirit embodied, in particular, in the objective forms of human culture. Because of the nature of the real problems exploited by the Hegelian conception of cognition, we shall criticise the latter in the second part of the monograph, in direct connection with a positive analysis of the problem.

In our critical analysis of Sartre's conception of consciousness and knowledge we came to recognise the important role played in the cognition of an external object by the relation of the individual subject to other persons and to culture created by them and embodied in objects. A solution to the problems with which we are concerned should be sought for in the framework of an interpretation of the subject and objects which can take these fundamental facts into account. Such a solution of this problem is possible in the framework of the Marxist-Leninist approach to cognition as the socially mediated and historically developing activity of reflexion.

Part Two

THE MARXIST APPROACH: COGNITION AS SOCIALLY-MEDIATED HISTORICALLY DEVELOPING ACTIVITY OF REFLECTION

Marxist analysis of the problem of the cognitive relation starts with a recognition of the basic fact that cognition is *reflection* of the objective reality existing independently of consciousness, that the cognizing and cognizant subject himself is a natural being included in the objective reality, and that cognition is a function of the brain as a specific highly organised material system, and presupposes the action of the external objects on man's sense organs.

These propositions are shared by all materialist conceptions, and Marxist-Leninist philosophy as the highest form of materialism includes them in its theory.

But we have seen (in Chapter 1 of Part One) that acceptance of these propositions is not by itself sufficient for a comprehensive and adequate understanding of the specificity of human cognition and knowledge. Human cognition is a reflection of a special type, and explanation of its properties requires substantive additions to the epistemological conception propounded by pre-Marxian materialism, the additions being of a kind to radically transform this conception without taking it beyond the framework of materialism but, on the contrary, making it more flexible and at the same time more consistent, that is, dialectical.

The task that we shall here attempt to solve will be to demonstrate the fruitfulness of the mode of interpreting cognition, the cognitive relation between the subject and the object, which is suggested by Marxist-Leninist philosophy. Our goal is to outline, from the positions of dialectical materialism, the principal directions in the solution, on the one hand, of those problems that emerged in the history of philosophical thought, and on the other, of questions actively discussed in connection with the development of modern science, the latest data of psychology, scientology, and logical and methodological studies.

Marxist-Leninist philosophy assumes cognition to be a socially mediated, historically developing activity of reflection. Cognitive reflection, object-related historical activity and communication are regarded in their dialectical unity. "Idea, image, and consequently, consciousness and thought in general," writes S. L. Rubinstein, "cannot be accepted as an independent term of the epistemological relation. Behind the relation of an idea or image to a thing, of consciousness or cognition to being, there is another relation, the relation of man, in whose cognitive activity the image or idea arise, to being which he cognizes."[1] The epistemology of dialectical materialism contains a key to the real facts of cognition and consciousness which metaphysical-materialistic and idealistic conceptions have been unable to explain scientifically. Moreover, Marxist-Leninist philosophy opens up fundamentally new horizons of epistemological inquiry, posing problems that have not been discussed in previous epistemological conceptions. It radically changes the nature of epistemology, its methods and relation to the special sciences.

Chapter 1

REFLECTION, OBJECT-RELATED PRACTICAL ACTIVITY AND COMMUNICATION

1. SENSORY INFORMATION AND OBJECT-RELATED KNOWLEDGE

To begin with let us state that the results ("traces") of the action of an object on human sense organs, though constituting a reflection of an external object, in no way represent knowledge: they are not directly included in the cognitive relation and, being merely its necessary premise, cannot be characterised as *cognitive* images (they are physical images). "It is a mistake to consider psychical formations as completely identical to the nervous physiological mechanisms. The subjective image is undoubtedly specific and irreducible to the nervous model."[2]

Indeed, these "traces" carry obviously redundant information, which cannot, because of its redundancy, be a reference point for the subject in an objective situation. For instance, if we should allow that the visual system does not in some way transform or organise retinal images (i. e., the "traces" of the action of light rays on the retina) but merely transfers them from one place to another recording them in some storage mechanism, this system will conduct about a million counts of brightness in 0.1 sec. In a few minutes the number of such counts would reach a magnitude of the order of several thousand million, exceeding the number of neurons in the cortex.[3]

Therefore a sensory system which has no methods for transforming the information received, for transforming the result of the action of an external object on it, remains blind, having no criteria for discerning useful signals against the background of noise.[4] The cognitive image carrying knowledge about an object contains precisely that information, and only that information, which is vitally necessary to the subject as a concrete individual and a representative of society.

But the relation between objective knowledge specific for cognition and, in particular, sense perception, on the one hand, and sensory information, on the other, is not

reduced merely to discarding a certain part of the latter with the aid of a system of filters. Objective knowledge is by no means poorer on the content plane than sensory impressions, and in some respects is essentially richer, for we perceive objects in terms of properties the knowledge of which is not directly contained in the sense data.

As Marx pointed out, a most important feature of perception is that it does not carry information about excitation in the nervous apparatus as a result of the action of the object on the sense organs but about the really existing *object* itself, the object that is outside the perceiving subject. For example, "the light from an object is perceived by us not as the subjective excitation of our optic nerve, but as the objective form of something outside the eye itself."[5]

"To perceive a chair," says Pierre Janet, "means to see an object in which one may sit, and to perceive a house, as von Weizsäcker put it even more forcefully, does not mean to see an image that the eye caught but, on the contrary, to recognise an object that can be entered! "[6] V. S. Tyukhtin indicates that on the one hand, the image is connected with the material substratum, and on the other, what is given in the image is the content of the object and not of the nervous substratum. "The paradox of the unity of these two aspects is insoluble merely on the basis of the principles of physical causality, but it can be explained if the features of objectness and anticipation are viewed as a special *functional* property of highly organised living systems.... That means that the content of the signal is separated from its form (the material substratum) functionally rather than in an anatomical, physiological, physical or chemical way."[7]

The mutual relations of the subject and the object perceived by him change almost continually, both as a result of changes in the position of the object and of man's movements. Naturally, this cannot fail to lead to constant changes in the character and configuration of the "traces" of the object's action on the sensory system. If the image of the object were entirely determined by these "traces", we simply would be unable to single out that object as an independent reality. In ordinary conditions, however, the object is perceived as independent from the concrete conditions of perception and from the act itself (the phenomenon of "constancy of perception" known in psychology). Human speech is also perceived in this way. The following observation was made in the attempts at artificial reproduction of speech. When speech is transformed into light impulses in a special apparatus, it turns out that

speech sounds appearing as identical under ordinary conditions, prove to be different in their physical characteristics, whereas others, which we perceive as different, leave identical visible traces.[8]

Thus cognition is object-oriented and determined from the very outset, in its most elementary manifestations. The attempts of representatives of classical empiricism as well as modern "sense data"-oriented theoreticians, to present certain elementary subjective experiences uncorrelated with material objects as the initial elements and at the same time units of knowledge, lead to insoluble paradoxes in epistemology and, moreover, directly contradict the available results of scientific psychology.

Of course, knowledge of objects does not emerge at once in the course of ontogenetic and phylogenetic development. It is important, however, in this connection to bear in mind the following two circumstances. First, where there is no objective knowledge, sense perception does not exist either, and consequently, neither does knowledge in the proper sense of the word: in this case, sensory information, among other things, serves as the basis for behaviour orientation. Second, the emergence of perception, that is, of objective knowledge, cannot be understood only on the basis of sensory information or of any other kinds of reflection which do not reproduce the objective characteristics of reality.

James Gibson, a prominent American psychologist, distinguishes two kinds of vision, only one of which is perception, that is, knowledge in the proper sense. "If you look out of the window," he writes, "there beyond is an extended environment of ground and buildings or, if you are lucky, 'scenery'. This is what we call the *visual world*. It is the familiar, ordinary scene of daily life, in which solid objects look solid, square objects look square, horizontal surfaces look horizontal, and the book across the room looks as big as the book lying in front of you... Next look at the room not as a room but, insofar as you can, as if it consisted of areas or patches of coloured surface, divided up by contours... If you persist, the scene comes to approximate the appearance of a picture. You may observe that it has characteristics somewhat different from the former scene. This is what will here be called the *visual field*. It is less familiar than the visual world and it cannot be observed except with some kind of special effort."[9]

In analysing the differences between the visual field and the visual world, Gibson observes that the visual field is limited (approximately 150° to 180°) and is

oval-shaped, whereas the visual world has no boundaries and stretches behind one's head as well as before the eyes.

The visual field is clear and distinct in the centre, its indeterminateness growing towards the boundaries. The visual field shifts as the eyes pass on from one point of fixation to another, whereas the visual world is stable.

The visual world is always oriented along the gravitational vertical, whereas the visual field is oriented in relation to its boundaries. Changing the position of the observer, e. g., his inclination by 90°, changes nothing in the orientation of his visual world, while in the visual field the horizontals will now become verticals. The visual world is constant. In the visual field, projection relations obtain. In the visual world, the three-dimensional depth forms of objects are perceived, while in the visual field, projection forms. At the same time, although the visual field is projectional, in the words of Gibson "it is never flat, like a surface on which a picture is painted or projected; that is, it is never wholly depthless. Nor is it lacking in the character of being *outside* of us, in externality."[10]

According to Gibson, the visual field does not underlie the visual world at all. The two kinds of vision are alternative, emerging as a result of two different attitudes of consciousness. With the ordinary consciousness attitude in perception, the subject confronts the visual objective world. The other attitude is artificial in nature, expressing the civilised man's chronic habit of regarding the world as a picture.

A group of Soviet psychologists, who studied under A. N. Leontyev the formation of perception under unusual conditions, gave a somewhat different interpretation of these facts.[11]

In a series of experiments, retinal images were distorted by means of special optical devices (using the pseudoscope, inverting the retinal projections). As a result, the objective image of perception and its sensuous texture were brought completely apart. These experiments showed that under definite conditions the sensuous texture of the image without an objective interpretation may be directly presented to the subject (true, under these conditions the subject, strictly speaking, does not have a knowledge of the world, he is almost incapable of orientation in it); moreover, they have showed that the formation of the perceptual image necessarily presupposes a certain activity with the sensuous texture. But there are certain grounds to believe that the sensuous texture is close to what Gibson called the visual field.

Gibson's rejection of the connection between the sen-

sory field, sensation and perception is entirely unjustified. At the same time his opinion about a qualitative difference between perception and the sensory field is quite correct.

Under ordinary conditions the sensuous texture of the perceptual image (corresponding to the visual field) is not realised by the subject. At the stage of ontogenesis when an adequate objective vision of the external world has not yet been formed, the visual world is not yet present in the subject's experience and, more than that, the visual field does not exist for his consciousness either. The qualities pertaining to the visual field (colours and their shades, the mutual arrangement of various contours, etc.) are realised only to the extent in which they are included in the visual world, that is, the world of real objects.

John Ruskin, the outstanding art critic and theoretician, anticipated the findings of the impressionists as he wrote: "The whole technical power of painting depends on our recovery of what may be called the *innocence of the eye*; that is to say, of a sort of childish perception of these flat stains of colour, merely as such, without consciousness of what they signify,—as a blind man would see them if suddenly gifted with sight."[12] But under ordinary conditions the stains of colour cannot be realised as such, outside their objective interpretation and correlation. A blind person suddenly recovering sight after a successful operation (and cases like that are well authenticated in modern science) cannot see anything at first, for he can only see in a conscious, objective manner, and that has to be learnt.

A grown-up person to whom the sensuous texture of the visual image becomes accessible (as a result of a special kind of reflective attitude of consciousness or through application of special technical devices distorting the usual retinal projection of an object) always realises the unnaturalness of such a situation and cannot get rid of the feeling of *irreality* of the picture given to his consciousness.

The experiments of Soviet psychologists permit yet another conclusion of great importance for understanding the cognitive specificity of perception. The perceptual image of an object is not only constant in relation to the continually changing conditions of perception and to a certain extent independent of the sensuous texture: it carries in its content structure the conception of the world as existing amodally, that is, *objectively*, independently of our sensory modalities—visual, tactile, etc. As became particularly clear in the studies of perceptive activity through inversion of the visual image, the formation of the perception image assumes existence in consciousness,

as an element of the latter, of an amodal, objective *world scheme*, which may exist in the texture of any modality or in the form of certain mnemonic schemes. The perceived world is a form of the existence of the world scheme in a certain modality. It is essential that the world scheme also includes *the body scheme* as its component, and the perceptual image is formed only through the correlation of the perceived world with the amodal world scheme through the body scheme.[13]

Perception as a kind of cognition thus assumes comprehension, understanding, interpretation of what is seen. This interpretation is a certain kind of activity. Indeed, identical sensory data may correspond to extremely diverse real objects.

The process of perception always presupposes choosing (the choice being in a sense debatable) of an interpretation of sensory data which appears most probable in a world of real objects. Perception builds something like *object-hypotheses*. I act in accordance with my perception of the properties of the physical object, a table, rather than with the sensation of a brown spot that is in my eye when I look at the surface of the table.

The object is perceived as a result of a complex process of comparing sensory information with those standards of objects that are recorded in memory. This process may involve errors.[14]

The process of perception is continual solution of tasks of a special kind, a special kind of thinking, "visual thinking", as specialists in the psychology of perception now describe it.[15]

Let us formulate the epistemological significance of what has been said above in clearer terms.

We should take into account, first of all, that from the standpoint of Marxist epistemology, the difference between perception and thinking does not at all consist in that the former is purely direct while the latter, a mediated kind of knowledge, as was traditionally accepted in philosophical empiricism. Cognition is oriented from the outset towards objects, and the singling out in the external world of objects, of real things assumes cognitive activity, adopting certain assumptions and hypotheses which are later verified in sensory and real activity. The development of modern psychology gives concreteness to these fundamental philosophical assumptions.

Sense perception or, as Lenin referred to it, "living perception"[16], differs, of course, from abstract reasoning. Under ordinary conditions, what is consciously realised by the subject is merely the result of perceptual activity, the

object image, while the activity of construction of this image is not given, it is reduced and concealed from consciousness. But thinking, which deals in abstractions, implies detailing of the activity of constructing the object image and a conscious control of its realisation (although by no means everything is realised in abstract thinking, but that is a separate problem). To the subject himself, perception therefore appears as direct givenness of the object and is distinguished from thinking precisely by that criterion. Another important distinction is that knowledge provided by perception assumes existence of objective meaning in a given sensuous texture or sensory modality. Both the number of sensory modalities and their characteristics, just as, to a considerable degree, the properties of the sensuous texture, are determined by the concrete historical circumstances of the emergence and development of the biological species *Homo sapiens*. This determination is not, of course, accidental: the receptive organs, both in number and capacity, have always coped with providing the *Homo sapiens* with the information which was initially required for orientation in the environment, in the world of relatively stable macrobodies, in a definite narrow circle of activity. But man's specificity consists precisely in going beyond the biologically determined kinds of activity.

This entails the emergence of cognition in the precise sense of the word just as the appearance of the need for cognizing such real objects, their properties and relations, which cannot in general affect man's receptive system. Cognition of this kind became possible owing to the development of thinking which uses a system of special artificially constructed objects: symbols, signs, diagrams, schemes, models, etc., for establishing the properties of those objects which exist independently of the subject. (Let us note that thinking need not necessarily be expressed in the form of verbal signs: it may also be realised through a special kind of operation upon objects.)

As we have seen, the referential meaning of the perceptual image does not stand in a one-to-one relation to sensory information, it is in some respects poorer than that information, and in others, considerably richer. This circumstance is explained by the fact that the objective meaning of the image and, consequently, the specifically human cognition, as distinct from sensory information, does not emerge in biological evolution but in socio-historical development through practical activity. The subject can perceive those aspects of objects which do not act on his sense organs. At the same time there are object meanings which cannot in principle be incorporated in a sensuous texture and cannot therefore be sensually perceived. These referential meanings are reconstructed by a special type of thinking, one that consciously operates with abstractions.

The limitations of perception arising from its distinctive properties (the subjective immediacy, the unconscious nature of interpretation) are the source of possible contradictions between perception and understanding of the object (it would be more precise to say, between two different levels of understanding—in terms of perception and of abstract thinking). Thus the moon is perceived as a disc some 30 cm in diameter at a distance of about a kilometre and a half. All humans apparently perceive the size of and distance to the moon in an approximately the same way, erring by a factor of one million. Such examples are numerous.

In this context, however, it is more important to stress the similarities rather than the differences between perception and thinking, those similarities which permit to refer to the former as a kind of "visual thinking", an activity of solving tasks in object recognition.

The Marxist epistemological position is opposed to both metaphysical materialism and gnoseological empiricism, which in its fully developed form inevitably becomes subjectivist and idealistic. It is at the same time interesting to compare this position with the transcendentalist interpretation of cognition.

We recall that, according to Kant and Husserl, cognition never deals with subjective perceptions but with objects (it is a different question how the objects themselves are understood, what ontological status is ascribed to them by these philosophers). Let us note, though, that for Husserl, the intentional object, which may in certain cases coincide with the real one, is given immediately, with apodictic certainty, and knowledge of that object cannot in principle be a result of the subject's constructive activity (the act of intentional orientation at the object is, according to Husserl, the act of grasping some certainty). The theoretical objects with which science deals are not, in fact, genuine from the standpoint of phenomenology, they do not characterise adequate knowledge but merely play the role of auxiliary conceptual constructions. Kant's position on this point appears at first glance essentially different. Kant insists that the object given in experience, and knowledge of that object, are in fact a result of the creative activity of the Transcendental Subject, a product or synthesis of perceptions. Let us observe, however, that for Kant, too,

a referential meaning can exist in the form of knowledge only insofar as it is incorporated or included in some sensuous texture. The subject possesses knowledge, Kant points out, only insofar as the object of knowledge is given in sensory experience (for this reason, experience and knowledge essentially coincide, in Kant's view). Knowledge and thinking are therefore sharply contrasted: Kant believes that attempts to acquire knowledge through thinking, that is, knowledge of those objects that cannot be given in experience, inevitably lead to insoluble antinomies. That does not mean that one cannot cogitate of the given objects. However, one cannot know anything definite of them, Kant believes, for any knowledge is a synthesis of a manifold, and that synthesis is in his view only possible in experience.

In reality, the relation between the referential meaning and the sensuous texture is not at all reducible to a mere "synthesis" of varied sensations by means of objective content: many sensations are discarded, contradictions may arise between objective content and certain sensory impressions, and in this case the latter are not noticed, they are not realised. The main point is, however, that a referential meaning can be included in the system of knowledge also in such cases when it is not directly incorporated in sensory experience. In other words, pure knowledge is also possible of such objects which cannot be directly given in human experience. Modern microphysics, on the one hand, and cosmology, on the other, deal with such objects (which, according to Kant, cannot in principle be the subject-matter of knowledge).

In classical epistemology, substantiation of knowledge involved postulating such kinds of knowledge which themselves do not require substantiation, those in which the object is grasped more or less directly. This is true not only of the various systems of empiricism, which found such knowledge in metaphysically interpreted sensations or "sensory data", but also of transcendentalist philosophy. Therefore the search for the "immediately given" and its differentiation from deduced and constructed knowledge have always been one of the most important tasks of pre-Marxian and non-Marxist theories of knowledge.

Dialectical materialism emphasises that it is not any knowledge that can be objective, or object-related, asserting at the same time that different levels of knowledge deal with real objects, although at different levels different types of objects and their aspects are reflected (the development of modern psychology and theoretical natural science confirms and specifies this thesis). "Cognition is

the eternal endless approximation of thought to the object," V. I. Lenin writes. "The *reflection* of nature in man's thought must be understood not 'lifelessly,' not 'abstractly,' **not devoid of movement, not without contradictions**, but in the eternal **process** of movement, the arising of contradictions and their solution."[17] Of course, not all theoretical objects with which scientific thinking deals, can be correlated with actually existing objects directly and unambiguously. Real objects exist, however, which can only be reflected through abstract reasoning and cannot be directly given to the subject in sensory experience.

But that means that the classical problem of pre-Marxian epistemology, the problem of substantiation of knowledge, must not only be solved in a new manner but it must also be formulated in a new way. That means that the most important task of scientific epistemology is not the singling out of immediately given entities, the certainties of knowledge, but the discovery of universal referential meanings and norms of the objectiveness of knowledge, the study of the modes of formation, development, and change of these norms and, solution on this path, of the problem of interrelation of knowledge and the objectively existing reality.

2. ILLUSIONS AND REALITY

The view that the true properties of reality are grasped as a result of direct impact of the object on the subject, or in the form of some kind of "fusion" of the subject and the object, and that the distortions, errors, and illusions are wholly explained by the fact that the subject is not passive enough in following the "objective givenness", introducing something of himself in the cognitive process (either of his physical and physiological nature or of the activeness of consciousness), was deeply rooted in pre-Marxian epistemology. It was of course a long established fact that perception may be deceptive, that it can lead to error in understanding the meaning of certain objective situations, yet it was never doubted that from the practical viewpoint it in most cases yielded correct knowledge. At the same time attaining truth through abstract thinking was in one way or another linked up in classical philosophy with the act of direct, passive grasping (Plato's "intelligent vision" of ideas, intellectual intuition of the rationalist philosophers of the 17th and 18th centuries; Husserl's direct "insight into the essences", etc.), that is, it

was understood on the analogy of passively interpreted perception. Thus the question of the subject's activeness and passiveness in the cognitive process was closely linked with one of the focal philosophical problems widely debated since antiquity—the problem of the relation between reality and appearance or illusion.

The modern psychology of perception provides a wealth of material to support the philosophically important proposition that the results ("traces") of the impact of the external object on the sense organs are not at all enough to distinguish between reality and illusion, for, as we have said already, different configurations of these traces may correspond to most diverse real objects. The singling out of real objects from the sensory information through imposing certain object-hypotheses on the latter is ensured not only by the subject's cognitive activity but also by the object-hypotheses themselves having been tested in practical activity (collective or individual) and indicating those aspects of the real objects which are essential precisely for that activity. When the subject encounters some objects previously unknown to him in his practical activity, or familiar objects in unusual situations, objects viewed from unusual angles, an *illusion* arises: one perceives something that does not actually exist. (We ignore here those perception distortions which result from sensory receptors being tired or from their adaptation to prolonged or intense stimulation.) Although in this case sensory information coming from the object may be completely undistorted and can be fully taken into account, it may prove entirely insufficient for eliminating the illusion and establishing the real object. In other words, illusion is in this case by no means the result of the subject's activity but merely a consequence of the activity being inadequate to the objective situation.

Adalbert Ames, an American psychologist, has performed the following experiment. Three peepholes are made in a screen through which one can look with one eye at each of the three objects displayed in the distance. Each of them is perceived under the given conditions as a chair. But when we look at the three objects from another angle, we discover that only one of the objects is indeed a chair. The other two are extremely strange objects which can nevertheless produce from a certain angle the same projection on the retina as a real chair. (One of the objects is not even one coherent object but a variety of wires extended in front of a backdrop on which is painted what we took to be the seat of the chair.) Thus only one of the chairs which we see in this experiment is a real chair, while

the other two are illusions.[18]

The illusion arises because of all the interpretations possible (of all the object-hypotheses) corresponding to the given retinal patterns, the subject unconsciously chooses the one which accords best of all with his practical experience. Man continually handles chairs and does not as a rule encounter those strange objects which Ames demonstrated. All kinds of illusions are as a rule quickly dispersed in common practice: as distinct from the artificial conditions of laboratory experiment, in real life the subject does not just look at a given object from one position, and with one eye at that, but continually shifts his position, moving and acting vigorously, practically using various objects and creating new ones. All of this ensures quite sufficient conditions for correlating knowledge with real objects, singling out a fleeting perceptual image as an illusion and separating it from impressions corresponding to real objects. A stick immersed in water seems broken. The illusion in this case is not due to distortion of sensory information: the objective circumstances are such that the physical image of the stick on the retina cannot be different here; we know that the light refraction angles are different in the air and in water. The impression of the unusual arises here because in ordinary practice we do not deal with objects in two mediums simultaneously, in water and in air, so that our object-hypothesis cannot correct the distortion of the projection of the stick on the retina, as it is done by the subject perceiving the size and form of objects seen from different angles ("constancy of perception"). But once one starts handling that same stick (and that usually happens when it is not half in the air and half under water), one perceives it as straight, i. e., as it actually is.

Thus the objective properties of objects perceived are singled out in practical activity in accordance with the tasks of that activity. E. H. Gombrich, the well-known art critic and specialist in the psychology of the perception of painting, remarks in his account of the Ames experiments with chairs that a hypothetical man from Mars who is used to furniture of the same kind as the strange objects demonstrated by Ames rather than our ordinary chairs, would perceive the latter as the familiar arrangements of wires (in any case, that would be his original perception, until he found out that chairs are real objects of our world).[19] But it is exactly this circumstance, that is, the intimate links between perception and the immediate practical needs, that conditions not only the strong but also the weak points of perception. Practice does not simply

compel us to perceive the real characteristics of objects. The narrow limitations of practice may be the source of stable mass illusions that cannot be eliminated, such as the impression of the immobility of the Earth and the motion of the Sun. The conscious reflective cognition operating with abstractions ignores the urgent needs of practice and endeavours to discover the essential characteristics of objects irrespective of their appearance in a concrete situation. That does not mean that theoretical thinking in general isolates itself from the tasks of practice, opposing itself to the latter: it only means that thinking is an instrument for finding out the necessary characteristics of objects and at the same time the essential dimensions of practice itself. This ensures the possibility of action under conditions which appear unusual and unfamiliar in terms of available experience. When scientific astronomy dispelled the illusion of the Sun's movement and immobility of the Earth (this illusion nevertheless persists in the perception of a person as long as that person remains on the Earth, for it fully accords with the ordinary practice of taking the Earth for a frame of reference), the possibility was thereby established, in the most abstract form, of future unusual and novel practice—that of space flights, which provides a fresh view of the mutual motions of the Sun and the Earth.

Although in principle theoretical thinking is capable of establishing the object's proper, real characteristics, it may under certain conditions persist in reproducing stable illusions. Theoretical thinking (mostly in the social sciences) may be closely linked with a narrow, restricted practice of a definite kind persistently thrusting on the subjects the perception of apparent aspects of reality only. Of this nature is, for instance, the well-known phenomenon of "commodity fetishism" discovered by Marx, which is a mass objective illusion inevitably shared by the proponents of the capitalist system of social relations and reproduced by the vulgar bourgeois political economy.

Marx was able to overcome this illusion theoretically only because he accepted the position of the proletariat's revolutionary practice, which went beyond the activity in the framework of the bourgeois mode of production, assuming as it did a radical transformation of the latter.

Of special interest are the perception illusions in which the perceptive image to some extent or other *directly contradicts* sensory data, partially rejecting them. This happens when the image of an object corresponding to sensory data is too extraordinary and deviates from common practice. A suitable example here is the perception

of the image of a head turned inside out, e. g., of the inner surface of a casting mould or of a plaster mask. Such an illusion expresses not only the weakness but also the strength of perception. The perception hypothesis in principle behaves in the same way with regard to sensory "facts" as theory with regard to the facts of science.

However, the replacement of one perception hypothesis by another, is, as a rule, a more difficult matter, than the replacement of scientific theories or even paradigms, for perception object-hypotheses are too intimately connected with ordinary human practice. In this connection, the problem of perception of unusual objects arises, which is particularly acute today when man has created a world of supercomplex technical apparatus often behaving differently from the ordinary bodies of everyday experience. Let us emphasise once again one of the most important features of the cognitive relation. On the one hand, what is given to the subject in the act of cognition is the really existing object and not his own subjective sensations. The objective image is not realised as a specific thing requiring special activity of objectification or projecting for its correlation with the external object. On the other hand, cognition necessarily assumes a realisation of the difference between the subject and the object cognized and, consequently, a realisation of the *difference* between the objective image belonging to the subject and the actual object itself. True, under ordinary conditions, when cognition is directed at the external object rather than the subjective world, the realisation of the subjective relevance of the objective image belonging to the subject is, as it were, at the periphery of consciousness, while the centre of the consciousness field is occupied by the real world of external objects. In this case, the objective image is "transparent", as it were, to the object presented in it. However, even when consciousness is oriented at the world of one's own inner experiences (and that orientation is secondary, derivative from the orientation at the external world), the object (in this case the state of consciousness) and the subject of cognition do not merge, being separate from one another.

The subject may be involved in cognizing objects of at least three kinds: objects external not only with regard to his consciousness but also to his body; his own body (reference here is to my body only, and not to the body of another subject); and finally, his consciousness. Cognition which deals with the objects of the first kind is primary, basic, and determining all the other types of knowledge. This cognition necessarily presupposes the presence

in consciousness of an objective world scheme incorporating also the scheme of the subject's body as occupying a definite objective spatial-temporal position in the world among other objects. (If the subject does not realise the objective position of this body in the world, he cannot orient himself in the objective medium.) Cognition of one's own body, on the one hand, assumes that some of its states are given to the subject "from within" (through proprioceptive reception), and on the other hand, it is based on the realisation of the body being incorporated in the objective network of the world's connections in which the subject's body itself acts as one of the objects.

Thus the objective knowledge that I can pass on or communicate to other persons presupposes the existence of objects external with regard to my body and independent of it, and incorporation of my body in an objective network. As for the knowledge of the states of my consciousness, it only proves possible because I can view myself as if I were some other person, which implies not only the existence of that other person outside myself but also joint activity with him. (That does not exclude the existence of such shades in the realisation of my inner experiences which are rather hard to express externally and to communicate to someone else.) And that means that the realisation of the subjective states of consciousness presupposes objective knowledge as the necessary basis and would be impossible without it.

Let us imagine that all objects of cognition are created, as it were, by the act of consciousness and do not exist outside cognition. It may appear that this hypothetical picture corresponds to the world of inner experiences of a child at the early stages of the development of the psyche, when objective perception of reality has not yet been formed and differentiation between the subjective and the objective is non-existent. But this view is unfounded. First, the early stages of the development of the psyche contain the possibility and the necessity of the subject's subsequent conscious differentiation between his subjective states and the world of objects; second, the hypothetical picture of creation of objects by the very act of their cognition presupposes the realisation and recognition of the primacy of the subject and the derivative nature of objects, whereas in fact the baby does not originally realise even himself as a subject, far from realising the existence of objects.

It is not hard to show the impossibility of the situation assumed here, for even the subjective states of consciousness cannot be fully determined by the cognitive activity

aimed at them, although the relation between subject and object in the process of reflexion is characterised by certain difficulties, which we shall later discuss. The states of consciousness and the subject's body certainly do not exist independently of the subject himself. But their cognition, as we have stressed above, is only made possible by the subject realising himself as incorporated in the objective world, that is, a world filled with real objects and other subjects existing outside and independently from him. Most of the objects and other subjects are independent of the given subject both in their origin and their existence. (Some of them are independent of him in their existence but dependent on him in their origin: these include, first, the objects created by man, and second, his children.) If the objects were "tied" to the subject and "followed" his movements and actions, the cognitive relation would simply be impossible.

This fundamental characteristic of cognition should be borne in mind, in particular, in discussing the philosophical implications of the modern theories of quantum mechanics. Both in the physical and the philosophical literature one can come across statements to the effect that the distinction or boundary between subject and object is obliterated in cognizing the objects of the microworld, and that man in this case deals with the cognition of his own action on the object of knowledge. These arguments are sometimes linked up with the dialectical materialist doctrine of the unity of the subject and the object, with the Marxist thesis of the active, practical nature of cognition. In reality, the philosophical significance of the cognitive situation in quantum physics lies in the discovery of a fundamentally new type of real objects possessing properties sharply distinguishing them from the ordinary objects of the macroworld, and in the need for taking into account the conditions of observation in describing experimental results. At the same time quantum mechanics provides no grounds for the assertion that the boundary between subject and object is eliminated. The point is that the conditions of observation referred to here are quite objective. The macro-devices and micro-objects exist outside the subject. The subject conducting the experiment and recording the apparatus measurements may in principle be replaced by an automaton.

Of course, man also cognizes the products of his own creativity. But that is only possible insofar as these products (e. g., the world of technology, cultural artifacts, scientific theories, works of art, etc., in the form of signs and symbols) function in the externally objective mode,

that is, outside the subject's body. In any case, the process of cognition, of conscious reflection of the object, cannot coincide with the process of creating it. (Cognition itself is always creative in nature, but we have in mind here only the reproduction of the cognized object in the system of knowledge and not its creation.)

3. COGNITION AND OBJECT-RELATED PRACTICAL ACTIVITY

We have already pointed out the role of referential meanings, cognitive norms, and object-hypotheses in the process of cognition, stressing the fact that these norms do not simply emerge in the course of the object affecting the sense organs but control the choice and transformation of sensory information in shaping the object's image. The question naturally arises as to the nature and origin of these norms. Aren't the transcendentalists right in asserting that cognitive standards and norms are inherent in the subject's consciousness and should be understood as a result of analysis of the latter?

The philosophy of dialectical materialism posits that cognition in all its forms, beginning with perception, based on definite standards and objective norms, is formed in the subject's practical activity involving material objects. It is not passive reception but practical transformation of the objective environment that is the starting point of man's attitude to the world.

"The chief defect of all previous materialism (that of Feuerbach included)," wrote Marx, "is that things [*Gegenstand*], reality, sensuousness are conceived only in the form of the *object, or of contemplation*, but not as *sensuous human activity, practice*, not subjectively. Hence, in contradistinction to materialism, the *active* side was set forth abstractly by idealism—which, of course, does not know real, sensuous activity as such."[20]

"... But men do not at all begin with 'standing in this theoretical relation to the *things of the outer world*'. As any animal, they begin with *eating, drinking*, etc., thus not with 'standing' in some relation but with *active behaviour*, with mastering certain things of the outer world through action and thereby satisfying their needs."[21]

Lenin stressed repeatedly that Marxism made practice the basis of its epistemology. "... The world does not satisfy man and man decides to clange it by his activity."[22] "... A full 'definition' of an object must include the whole of human experience, both as a criterion of truth

and a practical indicator of its connection with human wants."[23]

The connection between perception formation and the subject's activity involving objects is now widely recognised in psychology.

Thus, Piaget's studies show the incorporation of perception in more general schemes of object-directed activity—sensori-motor schemes, in the case of a baby.

The first stage in the development of sensori-motor schemes of behaviour (of sensori-motor intellect) is marked, according to Piaget, by the use of innate sensori-motor mechanisms which are adapted to the properties of objects (their form, size, etc.). At this stage, only a finer differentiation of stimuli may take place but not perception of objects.

The second stage (beginning with the second month of the child's life), or the stage of primary reactions, is marked by repetition of accidental actions yielding a positive result. At this stage of development, the object appears to the child as a direct continuation of an action.

At the third stage (the stage of secondary circular reactions, which lasts between the third and the ninth months), the primary reactions come to be applied to new objects. A number of new types of behaviour emerge: visual adaptation to slow movements (the child, following a moving object, continues to follow the trajectory after the disappearance of the object), repeated grasping at one and the same place, recognition of the whole object from its visible part, overcoming obstacles interfering with perception (the child pulls away a piece of cloth thrown over his face) and applying varied actions to one and the same object.

However, although the child returns to the original action directed at an object in a definite place, there is no searching yet for an object that disappeared except for continuing an action once begun along the same trajectory. Although children pull away a piece of cloth from their face, they never attempt taking it off an object that was covered in their presence. Piaget believes that it is at this stage that the objectness of perception emerges.

The fourth stage (between nine months and a year) is the stage of coordinating the schemes of action already acquired and their application to new situations. Systematic investigation of new objects begins, connected as it were with discovery of their purpose (scrutinising, swinging, shaking, pressing, sticking into the mouth, throwing, etc.). The child actively searches for the object which dis-

appears before his eyes but does not take into account the object's movements going on right before his eyes. The object is a reality for the child, but a reality at a definite place in the presence of a definite action.

At the fifth stage (between the end of the first and the middle of the second year) the child discovers new patterns of action through active experimenting. Actions are performed involving the use of auxiliary implements, the simplest instrumental actions. In searching for a concealed object, the child begins to take into account the consecutive movements of the visible object, looking for it in the place where it was hidden last.

Finally, the sixth stage (beginning with the middle of the second year) signifies the transition from sensori-motor experience to imagining the results of the child's own actions, on the one hand, and to imagining objects and their movements, on the other. At this stage, the child learns to take into account several consecutive movements of the object in searching for it even though the object is invisible during these movements (after being shown to the child, it is moved in a closed fist or box).[24]

"Implicitly, perception models, in a way, reality both present and future, and also the future states of the object trasnformed by man,"[25] points out A. M. Korshunov.

The works of Soviet researchers have shown that initially perception processes are formed and develop as integral components of practical activity, and the overall effect of this activity as a whole consists in establishing the features of the observed situation. The practical object-oriented activity develops the operations of singling out and analysing the features of a thing. As the child's activity becomes more complex, and he faces more difficult cognitive tasks, the limitations of a purely practical study of the object and the need for special perceptive actions come to light. However, perceptive actions too are at the first stages externally similar to actions with things. This similarity is observed even in the case of distant receptors which do not come in direct contact with things.[26]

At the same time the realisation that cognitive norms and operations are formed in the subject's practical activity with material objects is not enough to understand the nature and modes of functioning of the norms of cognition. Marxist philosophy posits that practical activity itself must be understood in its specifically human characteristics, namely, as joint or collective activity in which each individual enters into certain relations with other persons; as mediated activity in which man places between

himself and an external, naturally emerging object other man-made objects functioning as instruments or implements of activity; and finally, as historically developing activity carrying in itself its own history.[27] The socially functioning man-made objects mediating various kinds of his activity (beginning with implements of labour, including objects of everyday use, and ending with sign-symbolic systems, models, diagrams, schemes, etc.) play not only an instrumental but also a most important cognitive role. In the objects cognized, man singles out those properties that prove to be essential for developing social practice, and that becomes possible precisely with the aid of mediating objects carrying in themselves reified socio-historical experiences of practical and cognitive activity.[28] Mastering a socially functioning man-made object, the child begins to single out in external objects, first, those features and characteristics which are essential for the activity with the aid of the given instrument, the given man-made object, and second, those traits in which they are similar to the objects accumulated through human activity. In other words, the instrumental man-made objects function as objective forms of expression of cognitive norms, standards, and object-hypotheses existing outside the given individual. The mastering by the individual of these norms, social in their genesis, permits their functioning as structure-forming components of cognition. It is in the course of this mastering of norms in practical activity with external objects that the objectness of perception is formed. This fundamental fact was discounted by Piaget, who made a great contribution to the study of the links between the process of perception and the development of forms of object-oriented activity but viewed the development of cognitive structures as entirely dependent on progressive changes in the relations of equilibrium between the individual and the external environment.

In studies by Soviet psychologists relying on the basic tenets of Marxist philosophy about the nature and ways of formation of cognitive norms, the hypothesis was advanced and later experimentally confirmed that the instruments for performing perceptive actions are systems of the objects' sensuous qualities singled out and recorded in social experience, which, mastered by the child, function as standards, or "units of measurement", in the perception of the varied phenomena of reality. Systems of sensuous qualities are singled out in various kinds of human activity (the colours of the spectrum, geometrical forms, etc.) which "quantify" in a definite manner the corresponding aspects of reality.[29] That means, for instance, that a clear

perceptual distinction between a circle and an oval (and a singling out of these forms in the objects of nature) is derivative from their different functioning in object-oriented activity. Retinal images of a circle and an oval may not differ very much, and their perceptual differentiation is essentially conditioned by the practice of operating with man-made objects used as standards in perceptive activity.

As we know, from the standpoint of Gestalt psychology the singling out of the circle in the objects perceived by the subject is one of the striking examples of the action of inner structural (in fact, innate) laws of all cognition. Gestalt psychologists believe that the main law determining perception of form is the law of *Prägnanz*—the tendency of the image of perception to assume "good form"—symmetrical, closed, and simple (the circle is an example of such a symmetrical and simple form). Underlying the law of *Prägnanz* is, in the view of these theoreticians, the trend towards establishing an equilibrium between the physical processes in the subject and those in the objects external with regard to the subject. Aware that systems with a minimum of potential energy are the best balanced physical systems, Gestalt psychologists endeavour to show that the most characteristic features of these systems are simplicity and symmetry.[30] However, in the case of the singling out of the circle by the perceiving subject, modern psychology provides grounds for the assertion that this process is mediated by assimilation of socially formed perceptual standard. Indeed, the subject is more inclined to single out such simple forms as the circle than others in the objects perceived. But this is explained, first of all, by the special role of such forms in human object-oriented activity, which is in its turn conditioned by certain objective properties of these forms.

As Marx pointed out, "the eye has become a *human* eye, just as its *object* has become a social, *human* object—an object made by man for man. The *senses* have therefore become directly in their practice *theoreticians*... The *forming* of the five senses is a labour of the entire history of the world down to the present."[31]

Thus the implementation of the act of cognition as a specifically human reflection or reproduction of the object's essential characteristics presupposes not only the subject's handling the object but also man's creation (the social man rather than a natural individual, that is man in cooperation with other individuals) of a definite system of "artificial" objects mediating the process of reflection and carrying cognitive norms and standards in themselves.

These mediating objects, acting as instruments of cognition, have a certain specificity. On the one hand, their purpose is to enable the subject to reflect in cognition the characteristics of objects existing independently from them. On the other hand, the mediators themselves are objects with specific features of their own, possessing internal connections, assuming definite modes of operating with them and existing originally in an external reified form (they are only later assimilated by the individual, becoming his inner attributes). But that means that implementation of the cognitive act assumes not only the subject's ability to correlate mediating objects with the object cognized. The subject must also master the modes of handling the specific reality constituted by the socially functioning artificial objects.

Let us consider in this connection some essential moments in the general problem of interrelation between activity and cognition. A short historical-philosophical excursus is in order here. The conception that there is an intimate connection between cognition and activity is of a relatively recent origin. The thinkers of antiquity characteristically drew a sharp distinction between knowledge in the proper sense, that is, understanding of the essence of things, and technical ability to produce or artificially create a certain object. Art can only imitate nature to some extent, but it cannot equal it: such was the view of ancient philosophers. Man cannot produce what is created by nature. That does not mean, in ancient philosophers' view, that man cannot cognize the reality of nature. But knowledge is not identical with ability for technical reproduction of what is cognized. The thinkers of antiquity (we ignore here the essential differences between various schools in philosophy at that time) insisted that, as distinct from artificial reproduction, knowledge presupposes neither a change in the given object nor construction of a new object but passive reception of the content of reality that is cognized as it is.

A different conception of the interrelation of knowledge and activity is developed in the philosophy of the New Times, a conception directly linked with the formation of new experimental science. First of all, the activity of artisans and technicians is re-assessed. The view gains currency that technical ability to make some thing is also knowledge, and not just one kind of knowledge, but knowledge of fundamentally the same sort as theoretical and, moreover, one that expresses the essence of any knowledge. Inasmuch as knowledge of the essence of the object implies cognition of its proximate cause, man

can really know only that which he made himself, that is, the things whose proximate cause he himself is. Knowledge is thus identified with creation or construction.[32] Since contemporary technology mostly involved mechanical processes of assembly and dismantling, knowledge of nature was reduced to discovery of particular constructions suitably assembled and dismantled, and nature itself was viewed as a giant clockwork. The thesis of the knowability of the world appears in this context as substantiation of the conception that all natural processes can be technically reproduced, that human technical art can in principle attain the same degree of perfection as nature. From this standpoint, scientific theory is nothing but a kind of accumulation of the potential modes of technical activity, for theory mentally dismantles and assembles that which can later be dismantled and assembled materially.

It is in this context that statements should be understood to the effect that knowledge is power, that man is not only a servant but also the master of nature (Bacon). Descartes did not draw a fundamental distinction between mechanisms created by craftsmen and bodies made by nature.

Thus the thesis, widely discussed in the philosophy of the New Times, that man can really know only that which he himself created is closely bound up with the prevailing mechanism in new experimental science that replaced the peripatetic medieval physics. For us, however, another point is more important. This thesis is directly linked with yet another idea that began to interest many thinkers precisely at that time, the idea that the subject's knowledge is only adequate insofar as it is connected with the subject himself, his state, and actions, that is, the idea which was expressed most distinctly by Descartes.

This last circumstance is particularly important, for the thesis discussed here outlived mechanism exactly because of it. Indeed, if we do not link up too closely any activity with material and technical activity, still less with the work of mechanical assembly and dismantling; if we assume that the essence of activity is purely spiritual, the assertion may be retained that cognition is identical with creation of the object cognized, lending this thesis distinct subjectivist meaning and at the same time discarding the obsolete ideas of philosophical mechanism. That was exactly what was done in German classical philosophy, in the first place in the systems of Kant and Fichte.

Let us also note that if cognition is identical with creation of the object cognized, all things that cannot be created by the subject and exist by themselves, turn out to be unknowable.

The establishment of fundamental links between knowledge and activity, theory and practice, and the emphasis on the subject's active role in cognition, were indubitably an essential contribution to the development of epistemology. Marxist philosophy creatively assimilated these ideas, starting out from their treatment by the German classical philosophers. Still, the idea that cognition of the object is in principle identical to its creation or construction is unacceptable to scientific epistemology. True, one can attempt to erase the subjectivist colouring of this thesis by reformulating it as the idea that all knowledge is a set of some potential practical modes of object-oriented activity, and that these modes themselves express the real structure of the object and are in this sense objectively conditioned. But in this formulation, too, the analysed thesis is hardly acceptable, for its main drawback is retained: direct equating of knowledge and modes of practical activity.

The idea that man's knowledge is most adequate where it concerns objects which he himself has created is quite untenable, too. It is well known that one may be an excellent handicraftsman or technician and at the same time have a vague notion of the processes which objectively determine the success of certain technical operations. Today, the laws of physico-chemical processes are known much better than the laws of such a man-made phenomenon as language. Man is also far from perfect understanding of the way in which scientific theories are constructed and change. And then there is all the work to be done towards cognizing the phenomena of consciousness. On the other hand, great masses of quite reliable knowledge exist which cannot so far be used practically. Knowledge of this type does not provide modes of practical artificial reconstruction of the objects to which it refers (although it may of course be used in the future, combined with other types of knowledge, for working out new technologies and new modes of practical activity). Nevertheless this kind of knowledge is quite correctly described as knowledge.

Undoubtedly, cognition grows out of practical activity, servicing material practice throughout its development. This proposition is fundamental in dialectical materialism. It is also true that cognition, being reflection, always appears as a kind of activity and consequently as construction and creation, for activity is always reified in certain objects.

Cognitive activity is directed at reflection, reproduction of the properties of real objects with the aid of a special system of artificially created mediator objects. Of course, cognition may also involve action on an external object (that happens, e. g., in experimenting), but that action does not bring about changes (or, still less, construction) of cognized characteristics of the object but only production of better conditions for their discovery. (The reference here is to those properties that appear in the given situation as the object of cognition, for it goes without saying that in any material action some objective properties are always changed and some are even created.) It is through the activity of using mediator objects that creation, or construction, of objects enters cognition. Man constructs new apparatus and measurement instruments, creating and developing scientific theories, constructing models, operating with signs and symbols in a definite manner, etc. But this creative, constructive activity pertains precisely to the world of mediator objects and does not imply creation of the object cognized. With the aid of artificially constructed mediator objects the subject cognitively reproduces other objects (often getting a better knowledge of the latter than of the former). It does not follow from the above that mediator objects themselves cannot be objects of knowledge. But in this case they cease to be mediators and assume the construction of a new system of mediator objects, embodying the knowledge about them. Importantly, the goal of theory is reproduction of the essence of an object regardless of a concrete, particular situation of practical employment of it, as distinct from perception which includes only referential meanings directly linked with existing social practice. It is this feature of theory that forms the basis for the development and perfection of practical activity, for finding ways of practical utilisation of new aspects of objects that have been cognized theoretically but have not yet become objects of technical activity.

Thus cognition, an activity that is genetically and functionally dependent on objective practice, is not at the same time identical with the latter. In practical activity, objects are constructed that have immediate value for society and individual subjects. At the same time practice assumes the use of implements—objects in which the material activity of mankind is reified. The properties of real objects may be reproduced in the process of cognition only through creation of a whole world of special mediator objects subject to specific social laws of functioning and carrying social cognitive experiences. Mediator objects

used in the process of cognition do not have a value as such but merely as carriers of knowledge about other objects. Creativity and cognition are thus linked in a most intimate manner and assume each other. But in its very essence the act of cognition cannot coincide with the act of creating the object cognized, otherwise we would have no grounds at all for any discussion of cognition and knowledge.

The idea of the identity of knowledge and creation of the object cognized, developed in the philosophy of the New Times, appears to be diametrically opposed to the ancient view of knowledge as passive reception. Let us note, however, that both of these ideas have one point in common, the conception of knowledge as direct grasping—of the external object in the first case and of the activity of the subject himself, in the second. In both cases there is a failure to understand that the characteristics of a real object may be reproduced in the process of cognition only through construction of another system of objects, a special world of mediator objects constituting social reality of a particular kind. In other words, the mediated nature of all knowledge is not understood.

Let us consider Gaston Bachelard's conception as an example of consistent development of the idea about the identity of knowledge and constructing the cognized object in modern Western philosophy. Pointing to the artificial nature of most of the realities which constitute the practical world of modern man and owe their origin to technical creativity, the French philosopher concludes that science more and more ceases to be knowledge of natural phenomena, becoming a process of constructing phenomena, a kind of factory for their production. Bachelard believes that the phenomena which a physicist or chemist studies are to a considerable extent his own creations. It is not nature that provides the chemist with "pure" substances: he prepares them in his laboratory starting from a theoretical construction. In the end Bachelard comes to the conclusion that the essence of science does not in general lie in comprehending natural reality but in constructing artificial objects; that it consists in technology and not in knowledge (thus he believes that the electron, the positron, the proton, the neutron pertain to the technical aspects of electric phenomena).[33] As we see, constructive activity of creating the world of artificial mediator objects is here confused with creation of the object itself that is to be cognized.

4. REIFICATION OF KNOWLEDGE, COMMUNICATION, AND THE SOCIAL NATURE OF COGNITION

So far we have concentrated on cognitive activity being most intimately linked with the existence and functioning of a special socio-cultural world of mediator objects. A question, however, may naturally arise here: does not this approach ignore the indubitable fact that cognition is not only realised by separate individuals but as often as not takes place "within" consciousness, without any immediate external manifestation? One is not obliged to inform anyone about the results of one's perception of some object, not to mention the fact that this perception may contain shadings of emotion that are hard to express objectively. Although the process of thinking is apparently impossible without some instruments of objectification (signs of the natural language pronounced or recorded on paper, mathematical symbols, etc.), we mostly think without speaking.

Interesting ideas usually emerge from the depths of consciousness, and their verbal formulation often requires hard work. Generally speaking, the existence of the subjective world of one's own consciousness is obvious to anyone: it is an inalienable attribute of the subject and differs not only from the world of real objects but also from the external object-directed and objectively expressed actions of the subject.

These indubitable facts cannot of course be negated. We have already pointed out that the implementation of the act of cognition assumes the subject distinguishing himself from the object cognized, which implies, among other things, distinguishing real objects from the subjective states of consciousness. But to make this differentiation possible, the subjective world must be present, it must exist. The fact is, however, that the subjective world, the world of consciousness, is by no means given from the very outset. At the early stages of individual development of the psyche the subject is not yet given the world of objective things distinct from himself and leading a life of their own. And for this reason the subject himself and the world of his consciousness do not exist for the subject. There is no subjective world at this stage of development. The outstanding Soviet psychologist L. S. Vygotsky, who relied on the fundamental propositions of Marxist philosophy, expressed an idea[34] that later became the basis of numerous theoretical and practical developments and was, in particular, realised in the

studies of A. N. Leontyev,[35] A. R. Luriya,[36] P. Ya. Galperin,[37] A. V. Zaporozhets,[38] V. V. Davydov,[39] V. P. Zinchenko, [40] and others: the idea that internal psychical processes are a result of "interiorisation", that is, "growing in" or transposition onto the inner plane of those actions of the subject which are originally performed externally and directed at external objects. Implemented in external forms, activity assumes cooperation with other individuals and utilisation of socio-historically shaped instruments and modes embodied in a system of mediator objects. In the process of interiorisation external actions are subjected to a specific transformation — they are generalised, verbalised, reduced, and at the same time become capable of further development going beyond the possibilities of external activity.[41] "In other words, the higher specifically human psychological processes can only emerge in the interaction between men," writes A. N. Leontyev "that is, they can only be intrapsychological, and only later are they performed by the individual independently, some of them losing their initial external form, becoming interpsychological processes... Consciousness is not given initially and neither is it generated by nature: consciousness is generated by society, it is produced."[42]

That means that external activity in the form of operating with certain objects, signs, schemes, etc., is not just one of the means of objectifying the "true" activity of thinking performed in one's brain but its real basis and the starting point of formation.

Therefore, all ideas appear in some objectified form, although the latter need not be verbal: an idea may appear in the shape of conception about activity involving some object, or even simply as a visual image of some situation; in the latter case the activity itself is given to the subject in hidden form and is included in the conception. The translation of a verbally unformed idea (that is, unformed even in terms of inner speech) is not simply the activity of expressing some ready-made content in a different material but development of the content itself. In general, any form of reification or objectification of some cognitive content signifies a certain change in the latter.

That means that the process of perception is not purely subjective, being mediated by mastering a socially formed world of objects which may be viewed as reified perceptions, just as scientific texts (although not only scientific texts, of course) are reifications of thinking. Man looks at the world through the eyes of society.

The subjective world of consciousness presents itself to

the individual in the first place as a stream of visual images and notions replacing one another. Let us note, however, that any visual image (including the image of memory) not only expresses a certain experience but always refers to some real object (an ensemble of objects, a process, an objective situation, etc.). And that presupposes differentiating between the object and the image itself, interpreting the object of representation (in varying degrees of activity) in some network of objective relations: spatio-temporal coordinates, certain dependences on other objects, etc. The existence of visual images assumes, of course, the ability of the brain to retain traces of previous impressions. However, human notions are by no means identical with these traces, for they are always objectively interpreted in nature. That is why animals do not have either notions or subjective memory: the "revived" traces of previous impressions, first, are not included in this case in temporal connections existing only in the present (that is, there is neither the past nor the future for the animal, subjectively), and second, they do not characterise the objective world, connecting the information received from the outside directly with some situation reaction. Pierre Janet, a well-known French psychologist, underlines the distinction between simple repetition and human memory. In the repetition of something learnt earlier, the past is retained in the present (here belongs the entire area of skills). In a socially conditioned act of memory (in Janet's terminology, in the act of "true memory") we have a narrative, an account of what happened in the past, that is, a fundamentally new action in the present, in which the past is expressed symbolically. Because of this, an aspect of personality is formed that differs from the realisation of skills—the individual's self-consciousness.

The same facts are played up and subjectively interpreted in modern existentialist psychiatry. J. Zutta writes that when someone, forgetting where he put some object, asks, "Where has it got to? ", and thinks it over in inactivity, he does something that no other living being can do, for he mentally translates a possibility into reality. The essence of amnesias, according to existentialist psychiatry, is above all the impossibility of going beyond the experienced situation and of memorising in a human manner.[43] The visual image as an elementary "quantum" of the subjective stream of consciousness is always objectively interpreted, and this interpretedness emerges in the formation of the processes of consciousness themselves, that is, in the course of interiorisation of external activity in the world of socially created objects embodying social-historical experience. It may be imagined that under different socio-cultural conditions, that is, in different contexts of social practice, the referential meanings implemented in external objective activity and later in the subjective world of consciousness will vary somewhat, for their content is determined not only by the world of real objects but also by the degree of their assimilation in the historically developing social practice. That means that under these conditions the subjectively experienced worlds of consciousness may differ in some respects in experiencing time, in the perception of the nature of replacement of some states of consciousness by others and of their mutual relations, etc.

The visual image has no cognitive content different from the content of the external object represented in it, although the existence of the image itself and some of its characteristics that do not pertain to its referential meaning (its vividness or dimness, the length of the act itself of image perception, etc.) are realised as belonging to the subjective world different from the world of external objects. Visual representation always points to a real object, being devoid of any content or meaning outside this indicative function. It is therefore impossible to separate in consciousness the content of visual image from the content of the object presented in it (although the image itself is realised as different from the object). When consciousness attempts to make the content of a given visual image its object, it discovers that it deals with the content of the real object itself presented in this image.

The referential interpretation of the content of consciousness emerging in the process of the formation of the latter, that is, in the course of external activity with socially created objects permeates all of its components, including the conscious perception of the most elementary units of psychical life. In this connection let us consider the experience of pain. It is beyond question (and has been studied thoroughly) that the basis and function of pain sensations are physiological—they serve as a kind of signal informing the individual about the need for eliminating certain external actions constituting a threat to the organism. The specifically human feeling of pain implies the realisation of this feeling as differing from all the others, its inclusion in the context of other states of psychical life, localisation of pain sensations in the body of the given subject (we do not feel pain in general but pain in the given spot of the arm, toothache, headache, etc.), realisation of the fact that pain is always *my* pain and is not therefore inherent in objects different from my body,

and finally, a certain attitude to pain itself. In other words, although the elementary sensation of pain in itself, as distinct from perception or visual representation, expresses experience rather than knowledge, it is also included in certain meaningful structures, including cognitive ones, relating, on the one hand, to external objects, and on the other, to the subjective world. These meaningful structures are assimilated by the individual only along with the formation of his consciousness, and it therefore should be assumed that the feeling of pain itself at the early stages of development differs from what we have just described. A newborn baby cannot in principle localise the feeling of pain, for its body does not yet exist for it as an object. It therefore merges, as it were, with its pain. Inasmuch as the domain of external objects is not consciously given it either, it may be said that when painfully stimulated, the baby perceives the whole world as filled with the sensation of pain. Supposedly, even this elementary sensation (as a consciously realised one) will vary with cultural-historical conditions, in any case as far as attitude to pain, the modes of external expression of this sensation, etc., are concerned.

This reference to the socially and culturally conditioned character of the processes and functions of consciousness does not of course mean that we negate the fact that the subjective world of each individual is unique and original, that I can know something about the states of my consciousness that is not known to anyone else. (At the same time someone else may know some things about myself, about my personality and even about my psychical life of which I am not aware myself.) The way I perceive, experience things, think, etc., characterises myself and no one but myself. The whole point is that the process of interiorisation in which the subjective world is formed occurs each time under a unique set of conditions: the given human organism is unlike any others even at the starting point of the development of the psyche; the individual development of consciousness itself occurs each time under specific conditions and in unique relations with other men; each person occupies a unique position not only in the system of interpersonal socio-cultural connections but even in the network of spatio-temporal relations. When I perceive a given object, I do it from a certain angle which at this moment is inaccessible to anyone else—simply because it is I who occupy this position; moreover, the act itself of my perception includes *my* individual experiences which compels me to single out some aspects of the object over others.

(A great number of psychological studies deal with the influence of personality characteristics on the process of perception.)

And yet I realise at this moment that I perceive the same objective thing which is perceived (from positions differing from mine and in somewhat different shadings) by other individuals as well. In other words, the fundamental meaningful connections of consciousness, and in particular the system of referential meanings, have general validity, however varied their individual content. Thus socio-cultural mediation takes place both in the formation of unique individual features of the given subject and in the course of assimilation of universal semantic structures underlying cognitive activity as well as other specifically human kinds of activity. The difference is that in the former case universal norms and standards are transformed in the realisation of activity under concrete unique conditions, while in the latter it is a matter of the individual assimilating of the norms themselves.

Thus Marxist philosophy emphasises the proposition (now underlying concrete psychological studies) that the fundamental characteristics of cognitive activity and the properties of knowledge cannot be understood correctly if one proceeds from analysis of consciousness as such; that was precisely what philosophical transcendentalism tried to achieve. Consciousness itself is by no means something ready-made and given a priori: it is formed and develops in the process of interiorisation of external practical activity mediated by objects created by man and for man and embodying mankind's socio-historical experiences. Marx wrote that the objective being itself of human activity appears before us as "the perceptibly existing human *psychology*".[44]

It should be said that the classical German philosophy, and in the first place the systems of Fichte and Hegel, placed considerable emphasis on the analysis of the significance of the activity of external objectification or reification for the development of consciousness, self-consciousness, and cognition. As we remember, the necessary condition of the formation of the ego, of the subject, is, according to Fichte, alienation and objectification by the Absolute Subject of its own activity in the form of non-ego. Hegel goes even farther, indicating the role of social, inter-individual activity in the process of self-comprehension of the Absolute Spirit, that is, in the process of its formation as the Absolute Subject—activity that is directed not only at reification of certain representations pertaining to the sphere of spiritual culture but also at transformation

of the external natural environment, that is, labour activity. However, not only for Fichte but even for Hegel it is ultimately a matter of objectification, of external objective expression of the content which is potentially inherent in the depths of the Absolute interpreted as a primordially spiritual entity (the Absolute Ego in Fichte, the Absolute Spirit in Hegel). For this reason what is meant here is not, strictly speaking, generation of subjectivity, of the world of consciousness, but merely its spontaneous self-development from the depth of the Absolute, its unfolding, which is merely mediated by the activity of external objectification. In other words, first there is movement from within, and only then comes the reverse movement—the penetration of consciousness into itself, and formation of adequate self-consciousness mediated by external reification. The direction of reasoning in Marxist philosophy is diametrically opposed to that: first there is movement from without or interiorisation, "growing in", assimilation by the individual subject of various socially developed modes of activity and in this connection the formation of individual consciousness and self-consciousness. At the same time this assimilation is achieved in the individual subject's object-directed activity in such a way that the movement from without expresses the transition of the subject's activity from the external plane to the internal one, rather than elementary causal action of an external object on the subject. Then, the subject's activity is directed originally not so much at the external objectification of the content that is already inherent in the "inner plane" as at the formation of the latter. Only on this basis is later the second process implemented (which, once it emerges, begins to interact with the first) the exteriorisation, external objectification, reification of the inner content of consciousness, which is a necessary component of any creativity.

The Marxist conception of nature, of the ways of formation and modes of functioning of consciousness is in principle opposed also to modern psychological behaviourism, which, on the one hand, practically rejects the possibility of scientific study of consciousness, and, on the other, interprets the subject's external actions (behaviour) as elementary organic reactions rather than as socio-culturally mediated.

Another important conclusion follows from this. Three kinds of activity are linked together at the outset of the formation of consciousness: external practical activity, the process of cognition, and communication. In performing one and the same objective action, the subject simultaneously carries out a number of functions: he changes the form of the external object, performs the act of cognitive orientation, and assimilates the socially formed modes of practical and cognitive activity implemented in the object which he uses as an instrument of mediation. The act of communicating a message from one subject to another must not be understood simply as assimilation by the subject of social experiences reified in the given instrument or the act of "de-reification" of the "hidden" modes of activity performed by the subject, a process of decoding the messages sent by the previous generations. In actual fact the assimilation itself of adequate modes of activity involving a socially functioning object is only possible on condition that the subject, in this case the child, is included in the living communicative connection with other persons existing at present, with adults teaching him the human modes of using man-made objects and thereby developing his cultural attitudes and norms, including the standards of cognitive activity. Before the child learns to act on his own, he acts in direct cooperation with an adult (the so-called "joint-but-separate" activity). Thus the relation to the object of activity is here explicitly and visually mediated by the relation to another person.

This process is manifested especially clearly when access to sensory information is sharply limited, as happens, e. g., in the psychical development of blind deaf-and-mute children. Where distant receptors are at work, communication between adult and child involves a considerable amount of the child's imitative actions which may outwardly appear as manifestations of the child's spontaneous activity rather than the product and form of communication. In the case of blind deaf-and-mutes, it becomes obvious that psychical processes and functions are modelled or created in the process of joint-but-separate activity of child and adults, an activity in which the social experience of using man-made objects is transmitted to the child. The development of this activity is characterised by a gradual decrease in the share of the adult's participation and correspondingly by a growing share of participation and activity of the child, so that ultimately the processes of assimilation of socially developed modes of activity and creative transformation of the objective world begin to function jointly.[45]

Later, at the stage when consciousness has been formed, the direct links between practical activity, cognition, and communication are broken. We have already mentioned that it is not every cognition that is directly connected with discovery of the modes of practical transformation

of the object, although a profound inner connection between cognition and practical activity is retained at all levels of knowledge. It is also obvious that a well-developed process of cognition does not at all coincide with the process of communication: the latter is singled out as a separate sphere of activity governed by special laws. Indeed, when I think in my mind, many obvious and customary mental moves are omitted, "swallowed", as it were, some premises are not formulated explicitly, some search procedures are applied in hidden form, etc. Communication of the results of my cognitive activity implies explicit formulation of many implicit elements (although not all of them, for the possibility of communication presupposes a number of common implicit premises in different individuals), as well as taking into account the interlocutor's standpoint, the level of his knowledge in the given area, etc.

At the same time it follows from the above that any cognitive activity, whatever the form of its direct subjective givenness, is socially mediated in character as regards the fundamental mechanisms of its implementation; consequently, it always contains the potential for communication, i. e., it is performed not only for oneself but also for any other person included in the given system of socially cultural norms. As we have already noted, that is also true of the cognitive ideas which emerge in consciousness without verbal mediation, for side by side with verbal communication there also exist the more elementary levels of human communication, including such a basic kind of communication as object-oriented activity itself. On the other hand, it is in the process of communication that the inner norms governing the cognitive process appear in the most explicit and developed form. Marx wrote: "But also when I am active *scientifically*, etc.—an activity which I can seldom perform in direct community with others—then my activity is *social*, because I perform it as a *man*. Not only is the material of my activity given to me as a social product (as is even the language in which the thinker is active): my *own* existence *is* social activity, and therefore that which I make of myself, I make of myself for society and with the consciousness of myself as a social being."[46]

For this reason, as far as epistemological inquiry is concerned, that is, the discovery of universal referential meanings, norms, and standards used for production of knowledge, the most suitable material for analysis proves to be the processes, means, and products of communicative activity, in which cognition is expressed in reified,

objectified form, rather than the phenomena of consciousness taken by themselves, in which these referential meanings and standards appear transformed, in hidden form, as it were, and are not always sufficiently apparent for the subject himself. This idea should be explained in some detail. Let us note first of all that in epistemological analysis the process of communication is not studied in all its complexity and multidimensionality: this task can only be solved through coordination of the efforts of a number of sciences, including information theory, semiotics, psychology, psycholinguistics, social psychology, sociology, etc. In communicative activity, epistemology singles out only that aspect which has a direct bearing on it: reified, objectified, universal norms and standards of production and evaluation of knowledge. Strictly speaking, epistemology does not therefore study the living process of communication itself but some universal conditions of its possibility relative to transmission of knowledge. Inasmuch as these conditions are implemented in the process of transmission itself, the latter provides empirical data for epistemological analysis (that assumes, rather than excludes, interaction between epistemology and the specialised sciences studying both communicative processes and the mechanisms of cognition).

Let us further note that in the light of Marxist philosophy communication of knowledge presupposes objectification of knowledge not only in the form of texts or utterances but also of man-made objects carrying socio-cultural meaning. Epistemology therefore must analyse object-oriented activity in the unity of its practical-transformative, cognitive and communicative functions, as the basis of the entire cognitive process. At the same time epistemology must consider, without fail, the givenness of referential meanings in consciousness, if only because object-related activity corresponding to some of the deeply-lying cognitive standards (in particular, perceptive object-hypotheses) has so far been quite inadequately studied in science, and we have no modes of establishing the content of these meanings other than through the data of consciousness.

Thus Marxist-Leninist epistemology radically re-orientates the traditional epistemological range of problems, fundamentally changing the mode itself of specifying and investigating them. The starting point of analysis of cognition is understood as investigation of functioning and development of systems of collective, inter-subjective activity, and not as the study of the relation of an individual subject (whether organism or consciousness) to

the opposing object. The inter-subjective activity is based on practical transformation of external objects. Cognitive reflection and communication are realised in close unity with transformation of objects. Transformative and cognitive activity assumes the creation of a whole world of socially functioning "artificial" mediator objects in which the social experience of transformative and cognitive activity is objectified. The individual subject himself as the subject of consciousness and cognition emerges only insofar as he functions as the agent of that activity, i. e. is included in a definite objective system of relations to other subjects, mastering the social modes of activity objectified in the mediator objects. In this sense, both the specifically human cognition, and its subject may be said to be "artificial" products. That does not mean that cognition deals with man's own creations only and does not reflect the characteristics of real objects existing independently of consciousness, or that the subject is a chimera of the imagination. What is meant here is the fact, fundamental from the positions of Marxist-Leninist epistemology, that the cognitive process, the production of knowledge assumes a breaking away from the organism's natural relation to the environment and the use of standards that have socio-cultural (and in this sense "artificial") character.

In the following chapters we shall consider those elements of the cognitive relation the study of which is of special interest in connection with the recent results of the science of science and the methodological analysis of science.

Chapter 2

THEORY AND THE WORLD OF OBJECTS

1. OBSERVABLE AND NON-OBSERVABLE OBJECTS

We have already given a critical analysis of phenomenalist epistemology which presents acquisition of knowledge as combining of subjective "sensory data". Another, more sophisticated variety of philosophical subjectivism has much greater currency in present-day Western works on the philosophy of science. Until recently, the view prevailed amongst West European and American specialists in the logic and methodology of science that only cognition at the pre-scientific level (perception and knowledge recorded in terms of everyday language) may deal with actually existing objects. From this standpoint, scientific theoretical knowledge is different in character: it merely records in a special schematic form the regularly recurring dependences existing between the objects of pre-scientific experience. Of course, account is taken of the fact that acquisition of scientific knowledge implies employment of artificially created objects, in particular, apparatus, measurement instruments, etc.

The actual existence of the latter is by no means rejected. Moreover, it is believed that natural and artificial objects are equally objects of cognition. To be more precise, cognition is thought to be concerned with establishing definite relations between various combinations of sensuously perceived natural and artificial objects, for that is exactly what the process of measurement consists in, and scientific cognition is in this case limited to performing various measurement operations. In terms of this conception, for instance, the object studied by the microphysicist is not the processes in which electrons, positrons, and other objects inaccessible to the senses are involved but the behaviour of the corresponding devices: oscillations of their indicators, appearance of light spots on displays, etc. In other words, it is assumed that apparatus and measurement devices do not at all mediate the cognitive relation

to the objects that are not given to the subject in pre-scientific experience but appear themselves as the objects of knowledge (the adherents of this view insist that naturally created things become objects of scientific cognition only in their relation to the apparatus and measurement instruments). Only that is regarded as real which can be directly observable. Everything else, including objects that are specified at the theoretical level only, are regarded as certain subjective fictions which, although playing a certain role in the cognitive process, do not by themselves have real objects as referents. As we have seen, these are the characteristic arguments of the operationalist doctrine.

This trend of thinking is based on the opposition of knowledge as a record of the directly observable to knowledge resulting from a whole ensemble of assumptions, suppositions, and arguments. Indeed, to make judgements about the behaviour of microobjects from instrument readings, one must be acquainted both with the theory of the domain of reality under study and with the theory describing the work of the device itself, enabling us to correlate the instrument readings with the corresponding characteristics of the phenomena studied. The adherents of this conception believe that the objects for which concepts are introduced in these complicated arguments and assumptions cannot be real in the same degree as the artificial and natural objects of our everyday experience—stones, trees, tables, chairs, machines, apparatus, etc. But it is easy to show a lack of logic in this argument.

In ordinary life we have to use all kinds of mediator objects all the time for the simplest observations—spectacles, the magnifying glass, or, say, simple window glass. In the same way, the surgeon uses the probe in examining a wound. In all these cases man studies those objects the relation to which is mediated by artificially constructed devices rather than the mediators themselves. To be consistent, one must also recognise that even in cases of elementary observation the subject's relation to the object is mediated by the environment filling the space between the two. The singling out of a real object implies in all instances a reliance (usually unconscious) on a number of assumptions concerning the behaviour of the mediator object. But that is not all. As we have tried to show in the previous chapter, even those man-made objects which do not function directly as mediators in observation (labour implements, the objects of everyday life, etc.), are actually instrumental in the social mediation of perception, for it is in the objects of the "artificial environment" that the historically accumulated experiences of object-transforming and cognitive activity, are objectified, and in particular, the standards and norms of perception are reified. The knowledge of the real object can only be singled out of the varied sensory information with the help of such norms and standards. Any perception is, as we have endeavoured to show, a complex mediating activity implying assumptions, hypotheses, schematisation, etc.

Supporters of this variety of subjectivism do not doubt the actual existence of the objects of ordinary pre-scientific experience. Moreover, in their view, those infinitesimal or extra-large objects that can only be studied with the aid of special scientific apparatus (microscopes and telescopes), also really exist. But in this case interpretation of the results of observation requires conscious use of a number of branches of theoretical physics covering, in particular, the propagation of light waves in outer space, in the Earth's atmosphere, a system of lenses, the eye, etc. Does it not mean that knowledge acquired through of a number of assumptions, suppositions, and theoretical reasoning, can also relate to real objects? Why must we then negate the existence of actual referents, e.g., of the objects of modern microphysics? The adherents of this view reply that observable and non-observable objects must be distinguished. The knowledge of observable objects, they believe, relates to actual referents although it may imply certain assumptions, hypotheses, and arguments. As for non-observable objects, their existence is fictitious.

Indeed, not all objects, magnitudes, and parameters with which a certain scientific theory is concerned, are actually observable. Let us ask ourselves this question, however: does that mean that a certain object, now non-observable and studied at the given moment on the theoretical level only, will never become observable at all? Apparently not. For example, although the theory of molecular structure of matter was originally merely a theoretical hypothesis and there was no way of observing molecules in direct experience, the molecules of many substances can now be observed through electronic microscopes.

The justice of this is recognised by the scholars holding the view here criticised. But they point to the essential difference between molecules and such subatomic objects as the electron. The knowledge of many objects that are studied purely theoretically does not cancel the possibility of their eventual fixation in experience by some instruments of experimental inquiry. But there are theoretical objects (the electron included) which cannot in principle be observed. Only that is real which can be observed actually or potentially. Objects that are non-observable

in principle do not exist as real objects—that is the conclusion drawn by the adherents of the system of views considered here.

The objects with which modern microphysics deals are indeed regarded as non-observable in principle. But what does observability or non-observability of objects and their characteristics that are studied in scientific theory mean?

Of course, only those objects can be observable which are in some way or other included in the process of acquiring sensory information. However, we have endeavoured to show in the previous chapter that already at the level of ordinary pre-scientific perception, the knowledge of the characteristics of observed phenomena is not identical to the information received through sensory channels, being determined by specific referential meanings. It is these referential meanings, object-hypotheses, the standards of perception rather than sensory information by itself, that determine *what* precisely is observed or perceived. In scientific theoretical thinking, theory rather than sensory information by itself determines which of the objects, magnitudes, or parameters studied in the theory can be actually or potentially observable. Theory has to take into account such circumstances, accidental relative to the objects studied, as the size of man's body and the specific traits of his perceptual system. The fact that men as physical bodies belong to the class of macro-objects and that man as the subject of perception can therefore use only macro-objects as apparatus proves to be essential for microphysics.

These circumstances determine the possibility of including certain objects in the very process of acquiring sensory information, i. e., in the act of experiential observation. However, only within the framework of a definite scientific theory can it be established what specific objects studied by science may or may not be included in the process of observation and for what reasons, what the meaningful characteristics of objects of both kinds are, and what precisely is observed. The properties of the subject's perceptual system are also considered in terms of the given theory. In any case, the observability or non-observability of the given objects of scientific knowledge depends in principle on definite characteristics of these objects, assumed or established in the theory, and does not directly coincide with their existence or non-existence. The objects that are not in principle observable by man can actually exist. (That means that if observations were carried out by an intelligent being strongly differing from man in its natural properties, e.g., if it were comparable in size with

micro-objects, it might record in an experimental way many of the objects that cannot in principle be observed by man. On the other hand, a radical revision of a given scientific theory and a different choice of the basic assumptions will inevitably affect the notions of the observability or non-observability as a matter of principle.)

Grover Maxwell, a modern American specialist in the philosophy of science, considers the following purely hypothetical case as an illustration of the thesis of the possibility of actual existence of objects unobservable in principle.

Suppose, he argues, that new types of micro-objects are discovered by science that are at present unknown and which interact with electrons under certain circumstances in such a way that the interaction does not disturb their eigenstate. Suppose also that a drug is discovered which alters the human perceptual apparatus—perhaps even activates latent capacities so that a new sense modality emerges. Finally, suppose that with our altered perceptual system we are able to perceive (not necessarily visually) by means of the newly discovered type of micro-objects in a manner roughly analogous to visual perception in which, as is well known, photons participate. Under certain additional conditions which we shall not characterise here, we might be able to "observe directly" the position and other characteristics of some electrons. It would follow, of course, that quantum theory would have to be altered in some respects, since the newly discovered type of micro-objects does not conform to all its principles. At the same time the revision of the theory does not in this case provide any grounds for concluding that the electrons observed are not the same objects that were regarded as non-observable in principle from the standpoint of old theoretical notions. No one will doubt the reality of the electrons observed. But if these are the same objects that were not observed earlier, it is obvious that we had no right to doubt their actual existence before that either. However improbable the hypothetical case considered here might seem, it does not involve any logical or conceptual absurdity, concludes Maxwell.[47]

In a conversation with Werner Heisenberg Einstein said once: "From the principled positions it is absolutely incorrect to desire that a theory should be founded on observable magnitudes only. For in reality it is all precisely the other way round. Only theory decides what one can observe... Your assertion that you introduce only observable magnitudes is actually an assumption about a property of the theory on which you are working."[48]

Thus the experimenter does not observe absolutely the same objects that are the objects of perception at the pre-scientific level. The scientist records in experience (one may even say "sees directly") objects, processes and situations which are not ordinarily perceived at all: changes in electric voltage, a drop in strength of current in the circuit, etc. The main point here is not, of course, a change in the sensitivity of the perceptual system but the emergence of new referential meanings determined by the accepted scientific theory.

In this respect, observation aided by theory is in principle similar to ordinary perception: in both cases the referential content of what is observed is determined by a system of object-hypotheses and not by sensory information itself. It would be a mistake, however, to slur over the differences between the two processes, as Kuhn is inclined to do, for instance. The American scientist correctly stated the extremely important fact that theoretical concepts do not serve simply for interpreting the results of ordinary perception obtained regardless of their utilisation but are included in the act of scientific observation itself determining its nature and results. Yet Kuhn is hardly justified in going still further and insisting that scientific observation is of the same subjective and direct nature as ordinary perception, that in both cases there is no conscious interpretation or extended subjective reflexion.[49] This notion of Kuhn is closely linked with the main idea developed in his book—the view that successive replacement of scientific paradigms is similar to changes in the structure of the perceptive field resulting from a "switch in visual gestalt". But the ability to "see directly", through the medium of apparatus readings, the objective processes indicated by the devices assumes an extensive education in which the behaviour of the devices is consciously correlated with the behaviour of the object studied. Even when this education is completed and the scientist sees directly, as it were, those objective processes which are for him meaningfully defined by a system of theoretical concepts, fixation of observed objects also assumes the functioning of ordinary pre-scientific perception: in order to observe the strength of current in a circuit from ampermeter readings, the subject must be able to perceive the ampermeter itself and the motion of its needle as objects of ordinary experience. Thus the "givenness" of the objects of scientific research in experience includes observation of two objects simultaneously: of the object of everyday experience and of that thing whose referential meaning is grasped by the subject in terms of

the concepts of some theory (both of these things exist objectively and actually, although on different levels of reality, so to speak). When a person becomes a scientist, he does not cease to be the subject of ordinary pre-scientific experience and of practical activity associated with it. For this reason, the system of referential meanings which serve to maintain this activity, being included in the mechanism of ordinary perception, cannot in principle be replaced by the referential meanings defined at the level of scientific cognition (though Paul Feyerabend suggests the opposite). The higher levels of cognitive activity do not cancel the functioning of the mechanisms of ordinary perception but are in a specific manner superimposed on these mechanisms incorporating them in more complex syntheses. It would therefore be wrong to insist, for instance, that the referential meanings perceived in language study are generated by language, although mastering it signifies a new stage in the interpretation of perceptions: in actual fact they are basically formed already at the pre-linguistic level of cognition, in the course of practical object-oriented activity, although language does introduce something new in them. Observation in scientific cognition does not exclude the functioning of the mechanisms of ordinary perception. The astronomer observing the Sun as a cosmic body at a certain distance from the Earth and subject in its movements to theoretically formulated laws, cannot at the same time get rid of the impression, shown to be illusory by science, that the Sun moves relative to the immobile Earth.

The development of science eliminates the illusions of pre-scientific cognition. But a scientific theoretical picture of reality does not at all imply a negation of the objective reality of those objects (as well as of their aspects and relations) with which man deals at the pre-scientific level, and neither does it negate the truth (relative truth, of course) of many assertions of the so-called common sense. This applies not only to such objects of ordinary experience as tables, trees, stones, etc., but also to properties of these objects which are commonly referred to in philosophy as secondary: colour, smell, etc. It would be inconsistent to assert that only electromagnetic waves of definite length and not colours and smells exist objectively and really, and at the same time to recognise the objective reality of the objects of ordinary pre-scientific experience, that is exactly the view held by those who divide the perceived qualities of objects into primary and secondary. Physical theories do not include the concepts of secondary qualities but, more than that, they do not include the concepts of

the objects of ordinary pre-scientific experience. If we were to regard as real only those objects to which physical theories directly refer, we should conclude that in actual fact only definite combinations of atoms and molecules rather than trees, rocks, and tables exist in reality.

In actual fact, cognition at different levels deals with real objects and real characteristics of these objects. However, objective reality itself is multidimensional, it has many levels, and different objects may belong to different levels of reality. Ordinary macro-objects and the secondary qualities inherent in them exist at that level of objective reality to which ordinary pre-scientific experiences belong. Scientific cognition, physics in particular, penetrates into a deeper level of objective reality, whose existence does not cancel the reality of the objects of ordinary experience.

A system of theoretical concepts reflects the characteristics of actually existing objects, including those that are actually or essentially non-observable. The meaning of these concepts is thus not reducible to an ensemble of the laboratory operations of measurement, as operationalists believe. On the contrary, the measurement itself only becomes possible when we know what to measure, that is, when the general characteristics of the objects measured are theoretically specified. It is exactly scientific theory that makes it possible to select from the entire diversity of experience those facts and dependences between them the investigation of which will permit the scientist to single out the essential characteristics of the objects under study. Measurements that are performed outside the context of a well-developed theoretical system formulating the essential dependences between objects, including non-observable ones, turn out to be absolutely meaningless, as a rule. And it is not just the fact that measurement results are subsequently theoretically interpreted that is important here. Well-developed theoretical conceptions are a necessary premise of meaningful measurements themselves, for only the former indicate the object and the mode of measurement itself. The measurements performed outside of a correlation with the essential dependences of a definite type of objects do not express, strictly speaking, an act of cognition, just as acquisition of information from the environment uncorrelated with objects is not yet cognition.

"We often hear," writes Kuhn, "that they [the laws expressing quantitative dependences] are found by examining measurements undertaken for their own sake and without theoretical commitment. But history offers no

support for so excessively Baconian a method. Boyle's experiments were not conceivable (and if conceived would have received another interpretation or none at all) until air was recognized as an elastic fluid to which all the elaborate concepts of hydrostatics could be applied. Coulomb's success depended upon his constructing special apparatus to measure the force between point charges. (Those who had previously measured electrical forces using ordinary pan balances, etc., had found no consistent or simple regularity at all.) But that design, in turn, depended upon the previous recognition that every particle of electric fluid acts upon every other at a distance. It was for the force between such particles—the only force which might safely be assumed a simple function of distance—that Coulomb was looking. Joule's experiments could also be used to illustrate how quantitative laws emerge through paradigm articulation. In fact, so general and close is the relation between qualitative paradigm and quantitative law that, since Galileo, such laws have often been correctly guessed with the aid of a paradigm years before apparatus could be designed for their experimental determination."[50]

Using as an example the revolution in chemistry carried out by Dalton, Kuhn shows that one and the same operation applied to nature through different paradigms may indicate quite different aspects of the patterns of nature. Moreover, an old measurement operation in a new role may produce other experimental results.[51]

Einstein's analysis of the procedures for measuring time (we may recall here that it was this analysis that was the starting point of Bridgman's formulation of the doctrine of operationalism) is far from being a mere description of a "directly given" operation, implying in actual fact a number of theoretical premises. Simultaneity can only be defined if we postulate that the velocity of light in vacuum is the same in all directions and invariant relative to the motions of source and receiver. This postulate is logically prior in the special theory of relativity to any experimental measurement of the velocity of light, because it is used in the very definition of the time scale at distant points.[52]

Even the simplest prescriptions for measurement operations used in science usually follow from theoretical considerations. True, instructions for laboratory operations may be formulated in such a way that their theoretical foundations will be camouflaged, but that does not mean at all that these foundations do not actually exist.

Thus scientific theories determining the meaning and character of experimental procedures contain as often as

not knowledge of such objects and parameters which are not observed and are not measured directly. Let us now note that there are also scientific theories, the most fundamental ones, actually, (usually referred to as substantive in the literature on the methodology of science) which are not applied directly to interpretation of observation data at all but are only correlated with the empirical world in combination with other theories (the latter are commonly referred to as "observational" or "interpretative") and on condition that a number of additional assumptions are made. Generally speaking, the question of experimental application of a fundamental scientific theory (and, in this connection, of its experimental verification) proves to be far from simple, and usually the search for methods of experimental application of such a theory requires considerable efforts for further elaboration of the theory itself and the construction of a number of additional theories, hypotheses, etc.

An isolated theory is never directly linked up with an experiment: an act of such association implies the use of a whole hierarchy of theories and hypotheses including those from other domains of knowledge, the theory of experimental devices, a number of hypotheses linking up the non-observable with the observable, certain idealisation assumptions, etc. The experimental data themselves are formulated in terms of a definite ("interpretative", or "observational") theory.

We shall not consider in detail the important problem of the interrelation of the empirical and theoretical components in scientific knowledge. In the context of the problems of immediate interest to us, it is important to stress the relative independence of knowledge recorded in theory from various (potentially infinite) ways of empirical or experimental application of that knowledge. Of course, theory must be experimentally tested, that is to say, it must be linked up through a whole chain of mediations with experimental results. The question as to how this verification is carried out is fairly complicated and is now intensively studied in the literature on the methodology of science. At the same time the meaning, the content of theoretical knowledge, is not directly determined by the modes of its association with experimental data.

In the Western philosophy of science, the conception of logical positivism has until recently prevailed; it regarded a scientific theory as an uninterpreted formal calculus given meaningful, empirical interpretation in terms of the so-called correspondence rules connecting the terms of

the theoretical language with those used in the sentences of observation allegedly recording only direct sensory data. The rules of correspondence must, from this standpoint, be necessarily included in the structure of the scientific theory itself, for only these rules transform an uninterpreted formal calculus, which refers to nothing, into a theory, that is, knowledge about a definite class of objects.[53] In reality, however, the meaning or content of a theory is not determined directly by its empirical applications, for meaning is specified "from above" rather than "from below", through a model interpretation of theoretical assertions. The number of potential modes of empirical application of the given theory is in actual fact infinite (and all possible applications cannot be foreseen in advance), whereas the number of "correspondence rules" used in the given theory is strictly limited, according to logical positivism. And finally, the most important point is this. Assertions linking the given theory with experimental results do not simply correlate theoretical and non-theoretical, "purely observational" terms but themselves belong to an auxiliary theory (auxiliary relative to the given one). Thus these statements (it would be imprecise to call them "correspondence rules", in any positivist sense) are not included in the structure of the given theory itself, which is relatively independent from various possible modes of its empirical application. Knowledge recorded in a theory reflects the essential dependences between real objects, far from being a set of prescriptions for carrying out laboratory operations; neither is it restricted to listing the ways of direct practical transformation of objects.

Here we would like to draw a far-reaching analogy between theoretical knowledge and knowledge recorded in ordinary perception. One may recall that the referential meaning of the perceptual image is amodal, that is, relatively independent from the type of modality (visual, auditory, tactile, etc.) in which perception is implemented. This is apparently a general property of the cognitive relation—relative independence of knowledge from the modes of its correlation with actual sensory information (the independence is indeed relative, for knowledge is impossible in the absence of any mode of such correlation).

Thus cognition may be a reflection of real objects both in ordinary perception and in scientific thinking—at both the empirical and theoretical levels of the latter.

2. IDEALISED AND REAL OBJECTS

The interrelation of theory and its objects poses yet another problem, one that we have not touched on so far. Implementation of theoretical cognition involves the adoption of a whole series of idealisations, i.e., of assumptions or suppositions which essentially do not correspond and even sometimes contradict what can be directly observed.

For instance, the abstraction of actual infinity that was widely used in classical mathematics is based on the assumption that we can count the entire natural number series, although that is clearly impossible in experience. In constructing his geometry, Euclid assumed that any section of a straight line, however short or long it might be, may be divided into two with the aid of ruler and dividers. In classical physics, it is assumed that we can measure velocity at any given point of the path, that is, that we can measure instantaneous velocity.

The laws formulated in scientific theory also refer to certain ideal cases. Therefore their employment for the description of actual experience and for predicting future empirical facts is only possible if a whole series of additional factors are taken into account, those which are ignored by theory revealing the law "in pure form". Inasmuch as it is impossible to consider all these factors theoretically, there will always be a kind of gap between the flow of empirical events predicted by the given theory and that which we directly observe in experience, although this gap becomes smaller and smaller as science develops. Lenin pointed out the role of idealising assumptions in Marx's development of the scientific theory of political economy: "'Concretely impossible' is not only realisation as put forward by Marx, but also land rent as put forward by him, and average profit, and the equality between wages and the value of labour-power, and much more besides. But the impossibility of something being realised in a *pure* form is not a refutation."[54]

Idealisation means not only adoption of some assumptions in formulating theoretical laws but also in constructing idealised objects. The "material point", a concept widely used in classical mechanics, is an example of such an idealised object. It is assumed that such an object, which exists in time and space, has mass (as all real bodies) and at the same time it has no extension, that is, coincides in fact with the mathematical point in this respect. Another example of an idealised object is "incompressible liquid" studied in hydrodynamics. Clearly, idealised objects have no real referents; they are constructions of

theoretical thinking (sometimes called "intratheoretical", distinct from "extratheoretical" objects, that is, those which exist independently of theory). The question naturally arises, what is the reason for such fictitious objects?

Constructing idealised objects is a way of formulating idealised assumptions and a method for establishing, "in a pure form", certain dependences expressed in theoretical laws. For example, if a real body moves under the action of a force applied to its centre of gravity, the motion of that centre does not depend on either the geometrical form of the body or the distribution of mass in it but only on the overall quantity of mass. The centre of gravity moves as if the entire mass were concentrated in it, i.e., like the idealised object known as "material point". Establishing with the aid of the idealised object the dependences obtaining in the motion of bodies under the impact of a force applied to the centre of gravity, we get a key to the whole of the complex system of dependences existing in the diverse cases of real mechanical motions.

What is the nature of the dependences formulated in a theory on the basis of a number of idealising assumptions? Should they be regarded as mere subjective "simplifications" or "schematisations" of actual empirical situations (this interpretation of the idealisation procedure is not at all rare)?

It appears that idealisation cannot be reduced to "simplification" of that which is given in experience. In idealisation one not only ignores certain factors given in experience but also formulates in some cases assumptions which cannot be realised in experience. Idealisation can therefore serve to establish essential, objective and real dependences, for revealing various connections "in pure form" is exactly the discovery of actual substantive relations which do not directly coincide with dependences characterising the phenomenon and registered in experience. However, one may accept that a theory formulating definite dependences in a system of scientific laws reflects objective, real substantive relations, while believing at the same time that all theoretical objects constructed with the aid of theory have no real referents, that is, are idealised, fictitious objects playing a purely auxiliary role in formulating definite dependences. It will have to be recognised in this case that only those objects are real that are fixed at the pre-scientific level, that is, through ordinary perception and in terms of everyday language. Those who hold this view argue that knowledge of any theoretical object is always introduced through a number of idealisations. That means that the object itself is always an idealisation, that

is to say, it has no real referent leading "intratheoretical" existence, so to speak.[55]

Let us note, however, that the knowledge, recorded in ordinary perception, about objects the reality of which does not occasion any doubts, also implies a whole series of assumptions and hypotheses; we considered this point in the previous section. True, the assumptions on which perception is founded, as distinct from the idealisations used in science, are implemented in the sense experience itself and are therefore not even consciously realised, as a rule. It is important in any case that, far from excluding the possibility of correlating knowledge and real objects, adopting a number of assumptions and suppositions is a necessary condition of such correlation. Where there are no definite assumptions, it is impossible to separate a real object from a subjective illusion. Let us note further that dependences formulated by science "in pure form" (their establishment naturally assumes the adoption of a number of idealisations) need not necessarily have only "theoretical objects" as referents, that is, objects the knowledge of which is only possible at the theoretical level. They may also be objects fixed in ordinary experience, the reality of which causes no doubts. For instance, Marx's *Capital* establishes the laws of the capitalist mode of production "in pure form" treating exclusively of real objects—commodities, men, their activity, machines, etc. Of course, the objects themselves are considered from a definite standpoint carefully formulated in theoretical assumptions, the elaboration of the theoretical system involving consistent analysis of those factors that had to be ignored at the initial stage (the famous method of ascending from the abstract to the concrete).[56] Let us note, finally, that science does not at all identify theoretical objects with idealised ones. That means that at least some of the objects the knowledge of which is introduced at the theoretical level are accepted as existing objectively and really: molecules, atoms, electrons, positrons, virtual particles, events in the four-dimensional spatio-temporal continuum, the field, quarks, etc. This point is extremely important, for the very distinction between idealised and non-idealised objects, that is, real ones, is only possible and meaningful if we know which objects are real and what their characteristics are.

This knowledge is specified not only extra-theoretically (e.g., with the aid of ordinary perception). The scientific theory itself introduces notions of such actually existing objects which may not coincide with the objects fixed in ordinary, pre-scientific experience or may even be non-

observable (actually or in principle). Importantly, the assumption concerning the existence of a number of real objects the knowledge of which is specified only at the theoretical level is usually connected with formulating the so-called nucleus of a research programme which serves as a foundation for subsequent development of a series of scientific theories; it determines to a considerable degree the heuristic possibilities of the given programme. Idealised theoretical objects are constructed only relative to real ones; they thus lack certain characteristics of real objects or, on the contrary, possess properties impossible in real objects.[57] It follows from this, among other things, that idealised objects may be idealisations not only of the real objects which are given at the extra-theoretical or even extra-scientific level (as a rule, the actual prototypes of idealised objects are interpreted in exactly this way), but also of the real objects knowledge of which can only be acquired theoretically. It is essential at the same time that the objects which are assumed at the given stage of the development of science to be actually existing, may be either rejected as completely fictitious in the course of changes in scientific conceptions (that was the destiny, e.g., of such a theoretical object of classical physics as ether) or relegated to the status of idealised objects (the atoms of classical physics as compared to the actual atoms with which modern physics deals).

If the structure of theory should be considered purely formally, without regard for its various meaningful layers, and if the meaning of the theoretical system should be reduced to a set of prescriptions for measurement operations, the difference disappears, of course, between idealised and real theoretical objects: all objects specified at the theoretical level will seem mere auxiliary constructs.

However, we shall try to demonstrate that the content aspect, the referential meaning of theoretical constructions cannot be ignored.

The procedure usually referred to in logic and the methodology of science as idealisation includes in actual fact a number of different procedures. Along with idealisation proper, aimed at establishing the substantive dependences of the processes under study, and thus permitting to study a definite system of connections "in pure form", procedures are usually included here which are not in actual fact idealisations but might more precisely be referred to as "simplifications". The latter are widely used for convenience of calculations (e.g., representing the electron orbit as circular, application of geometrical optics as a convenient simplification for purely practical pur-

poses, etc.). It appears that the reduction of the entire range of devices used in constructing knowledge about theoretical objects to idealisation only greatly impedes the analysis of the nature and structure of scientific theory.

Thus the application of the idealisation procedure as a necessary element of constructing a scientific theory does not eliminate the possibility of studying such real objects the knowledge of which is obtained only at the theoretical level.

Finally, let us consider yet another argument used in contemporary Western literature on "the philosophy of science": the assertion of the impossibility of obtaining adequate knowledge about real objects studied at the theoretical level.

We are dealing here with representing theoretical statements as an ensemble of the so-called Ramsay propositions. For this, the given theory must first be axiomatised, and then a conjunction formed of all the axioms of the given theory and of the "correspondence rules" linking theoretical terms with those of observation. This conjunction may tentatively be represented as — —p— — —q— — —..., where p and q are theoretical terms and dashes signify those propositions of the given conjunction of which p and q are terms. Then p and q are replaced in this conjunction by the variables connected with the existential quantifier. As a result, the so-called Ramsay propositions are obtained: $(\exists f)(\exists g)\ldots(- - - f - - - g - - - \ldots)$. On the content plane, the Ramsay method of eliminating terms pertaining to theoretical objects may be illustrated as follows. If, for instance, the theory originally contained the assertion that there exist atoms with such and such characteristics, and that the processes in which they participate are associated in such and such a manner with what is observed in experience, after eliminating the terms pertaining to the theoretical objects by means of the Ramsay propositions, we shall obtain the proposition that, if there exist certain non-observable objects (of indefinite nature) connected in a definite manner with what is observed in experience, we shall empirically state such and such facts. It is easy to show that after the terms pertaining to theoretical objects are eliminated by the Ramsay propositions, the theory will yield the same observation propositions as were yielded by the original axiomatised theory. This is taken as proof that a theory rewritten in Ramsay propositions has the same content as the original version of the theory. But the new variant of the theory does not contain direct knowledge of the theoretical objects. They appear as something unknown, as an x

which, though recognised as existing, is not an immediate object of knowledge. Grover Maxwell, mentioned above, infers from this that theoretically fixed real objects, as distinct from empirical ones, may only be cognized in an oblique, symbolic way, that is, knowledge of these objects cannot be regarded as adequate.[58]

It is easy to show, though, that this conclusion is untenable. Let us point out, first of all, the inadequacy of presenting the very structure of the theory in this case. We have already commented on the unjustifiability of presenting a theory in terms of an axiomatised calculus which is given a meaningful interpretation exclusively in terms of "correspondence rules" linking theoretical terms with those of observation. In actual fact, science describes experimental data in theoretical terms, and "purely" observational non-theoretical terms are not employed in the production of scientific knowledge. For this reason "correspondence rules" in their positivist interpretation are non-existent, strictly speaking. It is therefore impossible to outline the potential empirical applications of this theory (through the mediation of other, "auxiliary" theories, as a rule) beforehand: they are not fixed, and are discovered gradually, along with the elaboration of the given and other theories. It is therefore difficult to compare two theories (or two versions of a given theory) in terms of the possibilities of their application in experience. Yet even if we accept that the presentation of the structure of a theory used in the above argument about the elimination of theoretical terms is justifiable, the very possibility of rewriting the theory in terms of the Ramsay propositions arises only when this theory has already been formulated. It is easy to see that if the task was, from the outset, to construct a theory in which the terms pertaining to theoretical objects were eliminated according to Ramsay's rules, we could hardly have a single theoretical system. The assertions regarding the connections in which theoretical objects are included are determined by the meaning, the content ascribed to these objects. If the nature of the theoretical objects is unknown to us (and rewriting a theory in terms of the Ramsay propositions compels us to recognise precisely that), it is not clear why these x's, the existence of which we postulate according to the Ramsay rules, must be connected by such and such relations. Rewriting a theory in terms of the Ramsay propositions looks like a clever trick which does not express real connections between theoretical assertions and which itself only becomes possible on the basis of the unfolding of the content of the theory, assuming as it does a

knowledge of the meaningful dependences between theoretical objects. The possibility of obtaining knowledge about certain real objects only on the theoretical level does not at all make this knowledge inadequate or defective. It may be assumed that the experimental observability of the object facilitates acquisition of knowledge about it, but this fact has no direct relevance to the substantive meaningful characteristic of this knowledge. The fact that a non-observable object becomes observable (which sometimes happens, as we pointed out above) does not prove that our previous knowledge of this object was "symbolic" and that only now does it become genuine. On the contrary, the justifiability and adequacy of knowledge obtained at the theoretical level is here confirmed.

Of course, many essentially non-observable objects with which theory is concerned radically differ in their characteristics from ordinary observed bodies. (For instance, the particles differing in their position in space but identical in the rest of their properties, are regarded as identical in quantum mechanics.) However, the fundamental difference between objects of different types does not follow from their observability or non-observability but from their different real nature, for it is the latter that determines the possibility or impossibility of their observation.

In conclusion, let us touch on some general points.

In pre-Marxian philosophy, it was usual to interpret knowledge of real objects (strictly speaking, knowledge can only relate to real objects, for otherwise it is not knowledge but something else) as something more or less immediately given. Our analysis of some methodological problems involved in the study of the structure and content of scientific knowledge proceeded from the fundamental propositions of Marxist philosophy about the dialectically mediated nature of any knowledge. We have endeavoured to show that the existence of definite assumptions does not at all exclude the possibility of relating knowledge to an object existing in reality, independently of an act of cognition; on the contrary,the characteristics of real objects can only be established on the basis of a number of premises, assumptions, hypotheses, etc. (of course, on condition that these assumptions and hypotheses are in one way or another justified in practice, however complicated the justification might be).

Marxist-Leninist philosophy emphasises the genetic and functional dependence of cognition on practical activity with objects directed at transformation of natural and social reality. It is also pointed out that cognition differs essentially from practical activity on a number of vital points. Cognition is also a definite form of the subject's activity, but this activity is aimed, at any level and in any form, at revealing the substantive content of a system of real objects. The subject's activity is only possible in the framework of definite assumptions about the content of these objects and cannot therefore be viewed as simple constructing or creation of a certain ensemble of artificial structures without real referents. In this case, cognition can deal with real objects even if they are not in principle given in experience. Cognition is an activity of a special kind which assumes the use of definite referential meanings, object-hypotheses, norms, etc., and aims at reconstructing a system of substantive relations between real objects. The operations included in cognitive activity, both experimental ones and the operations of measurement, have meaning only in the context of definite assumptions about the real nature of the objects studied.

Chapter 3

"ALTERNATIVE" WORLDS AND THE PROBLEM OF CONTINUITY OF EXPERIENCE

1. OBJECTIVENESS OF KNOWLEDGE AND THE POSSIBILITY OF A GAP BETWEEN PERCEPTIVE AND CONCEPTUAL SYSTEMS

In our analysis of the Kantian conception of the cognitive relation between subject and object (see Part One) we have noted that the continuity of experience or, as Kant puts it, its unity, is an important indication of the objectiveness of knowledge. For Kant, this is even the only indication. And yet, a type of experience is imaginable that would be internally cohesive, continuous and consistent and at the same time entirely subjective. Something of this kind probably happens in the case of the illusory worlds which some mental patients create and live in. The events occurring in these worlds are subject to a definite inner logic, but it does not correspond to the real connections of the real objective world, which becomes clear from the patient's behaviour and his relation to reality and to other people. A most important condition of objectiveness of experience, as shown in Marxist philosophy, is therefore its connection with practical object-oriented activity, for it is this connection that allows man to correct experience itself, to separate illusions in it from that which corresponds to the objective real state of affairs. The latter in its turn assumes the inclusion of the subject in a system of adequate social communications. As for mental cases, they are evidently incapable of any of these things.

However, as far as socially accepted norms rather than morbid deviations are concerned, the unity or continuity of experience and its correction through practice appear to be inseparable to the subject himself. In this connection it becomes clear that Kant touched on a very important problem indeed. Consider this: if experience is discrete, if its subsequent stage does not follow from the previous one and is not conditioned by it, we have no grounds at all for regarding it as objective. Of course, I cannot observe one and the same object continuously and infinitely long.

Different things keep intruding on the field of my perception and passing beyond it. Objects may be given in the experience of other men with whom I communicate which are not given in my own experience. All these facts, however, do not prove discreteness of experience. Incorporated in the very mechanism of my perception is the realisation that the object's existence is not discontinued simply because I cease looking at it. The objects of experience of one subject may simultaneously or after some time become part of the experience of another.

Objects which are not perceived by any subject at the given moment also exist in reality. If some object disappears, if it ceases to exist, that happens only due to certain events at a previous stage of experience. At the same time, the disappearing object always leaves some trace, which is expressed in the transformation of some objects into others, so that there is a definite continuity of events and processes relating to different stages of experience. The realisation of the continuity of the objective processes to which experience relates is not merely a product of interpretative reflexion, a result of reasoning, but a direct condition of the givenness of experience itself as a kind of knowledge. In other words, the process of perception assumes the action of an amodal objective scheme of the world, which makes possible the realisation of the independence of the objects from the act of their cognition (see Chapter 1 of Part One). This scheme also underlies scientific theoretical thinking which starts from the premise that the world of objects is independent from the subject's cognitive activity. If there are gaps in experience, we have every right to doubt its objectiveness, to suspect that we deal with hallucinations, illusions, etc.

The question arises, however, whether we might not assume the existence of experience distinctly different from ours, that is, one that would relate to objects of an essentially different kind, so that there would be no direct transition from one type of experience to another. That would mean a gap between these two kinds of experience. At the same time this experience of an unusual kind would be quite normal and objective, that is, not only internally cohesive and continuous but also included in a definite type of object-related practical activity—true, an activity different from ours. Such experience might be characteristic of beings different from man (e.g., the inhabitants of other cosmic worlds). Kant accepted this possibility, but he believed this question to be insoluble, for any answer to it involves going beyond the domain of human ex-

perience, and this step is absolutely inadmissible, in his view.[59]

Even a very preliminary contemplation of this problem compels one to doubt the justifiability of posing it. Indeed, if there is only one objectively real world, there can hardly exist types of experience pertaining to this world that are so different that there are no transitions between them and that are at the same time objective. Of course, the experiences of every subject are unique and different from those of other subjects. At the same time the existence of my experience includes the possibility of understanding the statements of other individuals about the data of their experiences, for our different experiences objectively belong to one and the same world and, moreover, they subjectively comprise one and the same world of objects. I can know less about this world than another subject, or more, but the types of objects themselves remain the same for both of us. Those objects that are comprised in the experiences of another subject can also be included in my experience. In other words, our different experiences are essentially commensurable: the overall system of objects ensures continuity between them. It is quite another matter when different types of objects are subjectively present in experiences objectively belonging to the same world. If that were possible, a gap would obviously exist between these different types of experience. Inasmuch as cognition is reflection or reproduction of reality, gaps are impossible not only in the framework of the given type of experience but also in the relations between experiences of different types (and consequently, the existence of fundamentally incommensurable experiences is also impossible). It would therefore appear that if we encountered such fundamentally incommensurable cognitive experiences (although it is not quite clear how that is possible), we would have to admit, first, that all of them could not equally be referred to cognition and, second, that some of them are apparently only a subjective illusion. Kant could accept (albeit only as a hypothetical possibility) the existence of different types of cognitive experiences only because, in his view, the substantive structure of experience is constituted by consciousness and, consequently, the existence of different types of consciousness determines different types of experience. If we reject this subjectivist premise of Kant's philosophy, we have no right to argue the possibility of different types of experience.

This line of reasoning appears to be well substantiated. However, scientists in different fields have now encountered facts which they deem it necessary to explain in terms of hypotheses of the existence of different types of cognitive experience, different perceptive and conceptual worlds.

Let us begin our exposition and analysis of these conceptions with a reminder that, according to Piaget's theory, there are different stages in the development of perceptive structures, so that at the early stages of this development the continuity of experience is as yet nonexistent for the child (the object that passes beyond his field of vision disappears for him in an absolute sense) and there are gaps of a certain kind between different stages of perceptive and intellectual development, each stage being characterised by its own structures and the subsequent stages replacing the previous ones. At the same time all these stages, in Piaget's view, express different phases of the development of cognition in the intellectual ontogenesis.

True, Piaget deals with perceptive and intellectual structures which characterise only different stages in the genesis of the adult's cognitive activity rather than the activity itself.

And yet Kuhn, the well-known specialist in the theory and history of science, in his *The Structure of Scientific Revolutions* substantiates the existence in science of fundamentally different "paradigms" replacing one another in the course of historical development of scientific knowledge. Kuhn points out extremely important facts: the impossibility of presenting the structure of scientific theories as a system of purely formal relations between language constructions (that was the interpretation of scientific theory by logical positivists); the immersion of theoretical systems in certain meaningful cognitive schemes determining both the character and the paths of further development of the theory as well as the mode of setting up and interpreting experiments; the existence of continuous links between the descriptive function of the paradigm (it is the paradigm that determines the ontology of the theory, that is, the type of real objects to which the given theory or a whole system of theories relates) and its normative, methodological, and heuristic functions. Kuhn indicates that paradigms may be viewed as definite systems of prescriptions shared by the scientific community that accepts a given paradigm. These prescriptions are not usually formulated as a system of clear-cut rules or formal algorithms (apparently, such a kind of formulation of the prescriptions is even impossible), being incorporated, as it were, in the content structure of the paradigm itself.

It is the paradigm, Kuhn insists, that determines the cohesion of a scientific study at all of its levels, its inclusion in a definite semantic context. The mode of organisation of the given integral whole is reminiscent not so much of formal mathematical or logical structures as of the structures of perception, the perceptive "gestalts". The transition from one paradigm to another may be regarded as a kind of switching to a different "gestalt".

We shall not consider in detail the characteristics which Kuhn ascribes to a paradigm, or his conception as a whole. Let us note merely that he has drawn the attention of specialists in the theory, methodology, and history of science to a whole series of problems which have mostly been overshadowed by others but are nevertheless quite real and, moreover, essential for understanding the structure and functions of scientific knowledge, for an understanding of the actual historical process of the development of science.

It is important here to single out only one aspect of Kuhn's conception, namely that which provoked accusations of subjectivism. It is also a point that has caused the greatest amount of argument. The transition from one paradigm to another (that is what a scientific revolution is about, according to Kuhn) is regarded as passing into a different conceptual and perceptual world in which the scientist works. What the scientist observes in experience is determined by the content of his theoretical paradigm, states Kuhn. At the same time the paradigms being integral wholes similar to perceptive gestalts are different from one another, there are no transitions between them. After a scientific revolution, the scientist sees the world in a different way: he observes those objects which previously did not exist for him, while that which previously seemed self-obvious and directly given no longer forms part of his experience. The new paradigm may use the same terms as the old one, and it usually includes most of the symbolic generalisations present in the old paradigm (formulations of scientific principles and laws) as well as the procedures of measurement, the rules for using apparatus, etc. However, in the context of a new meaningful whole, these terms, formulations, and rules are given a qualitatively new meaning.[60] "...During revolutions scientists see new and different things when looking with familiar instruments in places where they have looked before. It is rather as if the professional community has been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well. Of course, nothing of quite that sort does occur:

there is no geographical transplantation; outside the laboratory everyday affairs usually continue as before. Nevertheless, paradigm changes do cause scientists to see the world of their research-engagement differently. In so far as their only recourse to that world is through what they see and do, we may want to say that after a revolution scientists are responding to a different world."[61] Different paradigms are mutually intranslatable and incommensurable with each other, asserts Kuhn. Adequate communication between representatives of different paradigms is impossible: the same words are given different meanings. There exists a gap between the paradigms.[62]

To substantiate the thesis of the possibility of different conceptual and perceptive worlds, some theoreticians go even farther than Kuhn in some respects, linking up these worlds not only with certain theoretical systems but also with the modes of dissecting the world which are embodied in everyday language. The American linguists Edward Sapir and Benjamin Lee Whorf, generalising the results of ethnolinguistic studies (in particular, Whorf's studies in the language of the Hopis, an Indian tribe) came to the conclusions formulated as the so-called hypothesis of linguistic relativity, or the Sapir-Whorf hypothesis. (Kuhn mentioned the influence of the Sapir-Whorf hypothesis on the shaping of his own conception.) According to this hypothesis, the world we perceive and interpret is unconsciously built on the basis of definite language norms. We break up reality into elements in accordance with classification rules (embodied in lexical units) and grammatical structures inherent in the given language. Inasmuch as there are no two similar languages, different societies may be said to exist in different worlds. "We dissect nature along lines laid down by our native languages," writes Whorf. "The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way... We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated."[63] According to the hypothesis of linguistic relativity, different language pictures of the world can implement different categorical

structures, thereby affecting the norms of thinking and, in a mediated way, the norms of behaviour of the given collective. In modern European languages of the Indo-European family, there is a division of words into nouns and verbs, into subjects and predicates. Whorf believes that this circumstance determines the ontology shared by the speakers of these languages—the division of the world into objects and their actions, processes. In Whorf's view, in the Hopi language there is no division into subject and predicate, and in that of the Nootka tribe, no division even into verbs and nouns. In this latter case, the habitual division of the world into objects and processes is non-existent.[64]

The Hopi language does not categorise time the way European languages do. "...It will be found that it is not possible to define 'event, thing, object, relationship', and so on, from nature, but that to define them always involves a circuitous return to the grammatical categories of the definer's language."[65]

The most radical and at the same time logically polished formulation of the possibility of alternative conceptual worlds has been suggested by Willard Quine, an outstanding modern American logician, mathematician, and philosopher; this formulation is linked with his theory of the so-called ontological relativity.

2. THE CONCEPTION OF ONTOLOGICAL RELATIVITY

Quine started out from the fact that there are alternative, i.e., logically incompatible, interpretations of a formal system.

For example, to define what kind of objects are numbers, we must give an interpretation of the formal system of arithmetic that would satisfy the arithmetical operations and laws; in particular, the primitive term O must be defined and the operation S the application of which to any element of the given system generates the next element S_n. Two versions of number are known. Ernst Zermelo chose the empty class λ as O and the singular class $\{x\}$ for every x as S_x. The numbers 0, 1, 2, 3,... become respectively $\lambda, \{\lambda\}, \{\{\lambda\}\}, \{\{\{\lambda\}\}\}$, etc.

In Neumann's version, the empty class λ is chosen as O and the natural number is defined as the class of all preceding numbers, that is, S_x appears as $x \cup \{x\}$. In this case, the number 1 will be $\{\lambda\}$, the number 2— $\{0,1\}$, i.e., $\{\lambda, \{\lambda\}\}$, the number 3— $\{0, 1, 2,\}$ or $\{\lambda, \{\lambda\}, \{\{\lambda\}\}\}$ etc.[66]

Both versions satisfy arithmetical laws and operations. But they are alternative. To demonstrate that, let us ask this question: does the number 3 belong to the number 5? According to Zermelo, the answer must be negative, and according to Neumann, positive. "Indeed, according to Neumann's theory, for any two numbers x and y, the number x is smaller than the number y, if and only if x belongs to y and x is a proper subset of y. Symbolically: $x < y \equiv x \in y$. Since the number 3 is smaller than the number 5, the number 3 belongs to the number 5. According to Zermelo, this argumentation leads to an incorrect conclusion, inasmuch as one number, x, belongs to another, y, if, and only if, y is the number following the number x. Symbolically: $x \in y \equiv y = S_x$. Since the number 5 is not the number following the number 3, the number 3 does not belong to the number 5. Thus we come to contradictory assertions."[67] This contradiction is explained by the fact that the concept of the number following some x differs in the two theories.

In considering objects to which a theory relates, we must give an interpretation of the corresponding formal system, that is, we must translate the terms and propositions of the given system into the terms and propositions of another. At the same time, we have seen that a given formal system admits of different translations characterised by alternative ontologies. "We may accept that translation of a theory entails a change in ontology: e.g., one may go on from a universe of numbers to a universe of sets. The new objects must satisfy the laws of the old theory, and it becomes necessary to explain in what way translation of the theory can yield incompatible systems with different ontologies. It might be asserted that the new object is an explanation of the old in the sense that the ontological status of the former is clearer than the status of the latter, so that the latter is reducible to the former. But how is one to understand that the old object is also reducible to another, new object included in an alternative theory?"[68]

Quine attempts to explain these facts in a philosophical-logical conception touching on a wider range of problems than the logical foundations of mathematics only.

He asks: what is, in general, translation from one language into another? Imagine that a researcher in anthropology has discovered a tribe absolutely unknown to science and is trying to learn its language. To do that, the researcher must translate the terms and other linguistic constructions of a foreign language into his native one. Each language, as Quine sees it, is an ensemble of terms and

grammatical forms that are not only connected with one another by definite dependence relations but also "attached" at some points to the objects and phenomena of extralinguistic reality. It is exactly this latter circumstance that permits us to use the language as an instrument for the description of what occurs in the world. It is important to understand the manner in which the language constructions are "attached" to what happens in the real world, Quine continues. Man can know something about reality first of all because he gets certain information about it through his sense organs. But sensory information by itself does not yet carry a definite division of the world into a system of objects of a certain type. This dissection, Quine believes, is given by language, by the entire totality of its lexical and grammatical means. Different languages can apparently solve this task in different ways. For example, in order that different objects might be discovered in the world, standing in definite spatio-temporal relations to one another and subject to definite processes, there must be more in the language than the division of words into nouns and verbs. Subjects and predicates must also be differentiated in the utterance, and there must be linguistic methods of distinguishing between and identifying objects: "this", "that which", "the same", expressions of the singular and plural number, etc. A language is possible in which all these linguistic means are absent. For carriers of such a language, external objects do not exist in the same manner as those to which speakers of European languages are accustomed (the character of these languages is doubtless connected with a definite type of culture). Each language is characterised by its own system of dissecting the world and by the type of meanings which are ascribed to these objects. (Quine believes that meanings *are* the dependences in a given linguistic system). For this reason, not only meanings but also objects or referents of linguistic expressions cannot be given extralinguistically.

Quine tries to assert a behaviourist, naturalist view of the psyche and language. He believes consciousness to be a kind of fiction. All psychical phenomena may and must be described, in principle, in terms of the physiology of higher nervous activity. Meanings as phenomena of the world of consciousness or of a supra-individual ideal world do not exist. There are only rules for "attaching" definite language expressions to stimuli of the given sort and methods for transforming some language expressions into others. It would be inaccurate, however, to draw the conclusion that Quine interprets language as a purely formal system. Quine believes it to be fundamentally erroneous

to divide language expressions into those which describe experience (meaningful or synthetic propositions) and those which record purely linguistic relations (analytical propositions, that is, propositions empty of meaning). All elements of a language system are mutually connected, he believes, and this system as a whole serves as an instrument of describing experience. It is this "attachment" of the language system to experience that makes it impossible to single out those relations within the language that would be purely formal and have no definite semantic meaning. In actual fact, any relation between the elements of a given language system may be regarded both as a relation between meanings (it is important to bear in mind that meaning, according to Quine, is not an extralinguistic entity but belongs to the given language and expresses the mutual relations between its elements) and a fixation of a definite extralinguistic content, that is, knowledge of the world. The meanings of language elements do not exist outside knowledge of the world. In its turn, knowledge of the world can only exist through internal relations of the elements of the linguistic system, that is, through their meanings. Choosing the angle from which to consider the relations of language expressions to the knowledge of the world which they carry is purely conventional: the choice is determined by the goals of analysis. (True, taking into account that meanings are neither extralinguistic nor intralinguistic entities—we shall touch on this point below—Quine thinks it best to stop all discussion of meanings and discuss only the relations within the language and the relations of the language to the world of objects or referents). Thus any language system is at the same time a definite system of knowledge about the world, a definite theory with an inherent ontology. In particular, a natural language is also a kind of theory.

The need is sometimes asserted for distinguishing between language and theory in view of the following facts: first, different theories may be formulated with the aid of identical language means, and even at the pre-theoretical level the carriers of the given language may hold different views on a number of questions; second, it is well known that one and the same theory may be expressed in different languages, the term "language" being applied not only to the natural languages (English, French, etc.) but also to artificial ones, as the language of mathematics.

In his reply to these arguments Quine deems it necessary to stress the conventional nature of the division into language and theory: every language is a kind of theory, and any theory may be presented as a language. One must

only remember that the theories themselves (and, correspondingly, the languages) may belong to different levels, they may possess a different degree of generality, etc. An everyday natural language expresses the broadest theory possible, embodying certain general orientations of "common sense". One may agree with these general orientations and at the same time differ in the understanding of relatively more special problems. It is therefore possible to formulate in terms of one and the same natural language different systems of views, among other things, different scientific theories. As for the translation of the given theory from one language into another, it may be regarded as practically realisable only in some cases, but theoretically, that is, in the proper sense of the term, it is unattainable, Quine believes, for theoretical content unrelated to the language means of its expression does not exist. Any translation changes the content of a theory to some extent or other, and in some cases the change may be rather significant, affecting its ontology. Quine's proposition concerning the impossibility of "radical translation" will be considered in detail somewhat later.

The question of the types of objects presupposed by the given language is not a purely formal one for Quine, it is not merely a question of conventionally adopting a certain mode of expression, as in Rudolf Carnap's theory. (The latter assumed that ontological questions, being "external" relative to the language system, do not admit of theoretical solution and are merely identical with accepting or rejecting the given modes of expression.) Quine insists that accepting a given theory (viz. language) signifies adopting not only certain modes of expression but also a conception of the world, or an ontology. He therefore regards ontological problems as extremely important and belonging to the content of a theory (or language). If a theory is logically formalised, the objects permitted by it are the values of its variables. (For theories of this kind, Quine formulates his famous thesis: "The ontology to which one's use of language commits him comprises simply the objects that he treats as falling within the subject matter of his quantifiers—within the range of values of his variables."[69] In this case "to exist" means "to be a value of a bound variable".)

Let us go back to the above example with an anthropologist. If this researcher observing the life of an unknown tribe speaking an entirely unfamiliar language attempts at the very beginning to translate into his tongue expressions unrelated directly with what is given in experience, he will hardly succeed: that much is obvious. Indeed, he

has no instruments for establishing the meaning of these expressions. He should obviously first of all try to establish the meanings of those words and expressions which are closest to experience, recording what is given directly. In doing so, he will apparently assume that he observes the same objects of the environment as the natives whom he studies. Further, the anthropologist will bear in mind that the neurophysiological apparatus responsible for receiving information from the external world is common to all men. He will thus conclude that stimulus meanings of words and expressions and, consequently, those meanings which directly characterise the "attachment" of the language to the objects of the external world (the referents) and which differ from meanings as a system of intralinguistic relations, can be relatively easily singled out and must be common to different languages. (True, they will pertain only to those expressions which are more or less directly correlated with experience.)

The anthropologist will here start from the premise that referents are extralinguistic entities, namely, the objects of the external world.

Our researcher will endeavour to apply his theoretical orientation in practice. Supposing that he observes that each time a rabbit scurries by, the native emits the sound sequence "Gavagai". The anthropologist surmises that "Gavagai" denotes, in the language of that tribe, the same thing that is denoted by the word "rabbit" (or rather the expression "Lo, a rabbit") in his native language. Our researcher is not fully confident that the surmise is correct. Could it be that "Gavagai" relates not to rabbits at all but to all rapidly moving objects? Or it may be that "Gavagai" is a rabbit but not any kind of rabbit—only a fast-running rabbit. To test his conjecture, the anthropologist continues his studies. On the one hand, he extends the range of observation, and on the other, establishes contact with the natives: pointing to a rabbit sitting still and pronouncing the sounds "Gavagai", the researcher observes the reaction of the members of the tribe and tries to establish whether they regard the pronunciation of this sound combination appropriate to the given situation. Observing for some time the behaviour of the natives and communicating with them through gestures, the researcher will settle on "rabbit" (or, to be more precise, the short phrase "Lo, a rabbit") as a translation of "Gavagai". In this way the anthropologist, Quine states, can translate a series of words and expressions of an unfamiliar language directly correlated with the experientially perceived events.

Translation of language constructions correlated with

experience in a more mediated fashion is a more complicated matter. In translating these constructions, says Quine, the anthropologist will take into account, first, the connection between them and those expressions that he can translate already, second, their inclusion in "verbal behaviour" which stands, in its turn, in definite relations with objective, experientially fixed situations, and third, certain fundamental features of such a specific object as "language" with which he is familiar from his mastery of his own language. In this way the anthropologist will finally solve the task of formulating the instruments of translation from the natives' language into his own.

The model for formulating a scheme of translation described here is, of course, extremely general and idealised. Still, Quine believes it to be a sufficiently precise expression of the main traits of the current practice of ethnolinguistic studies and, more broadly, the practice of translation from any language to any other in general. Quine has no intention at all of criticising this practice, for in his view it is impossible in any other form. However, he tries to show the theoretical untenability of those precepts which are usually associated with it and without which this practice can and must do, in Quine's opinion.

Indeed, Quine argues, what proves that the referents, the objects to which linguistic expressions refer, are extralinguistic entities? It is true, of course, that stimulus meanings are common to all men. But objects are by no means identical to stimulus meanings (whereas the anthropological researcher discussed above identifies the two). Different objective dissections may correspond to one and the same stimulus meaning, these dissections being determined by the properties of the language. When the anthropologist establishes that the sound sequence "Gavagai" refers to the same stimulus meaning as the word "rabbit", that does not mean that both these linguistic units have identical referents. Pointing to a rabbit and pronouncing "Gavagai", a native may mean a rabbit in a sense different from ours, e.g., those aspects of the rabbit which are at the given moment within his field of vision rather than a separate integral object characterised also by aspects that are not perceived at the given moment. "Gavagai" may be used in the natives' language to denote something different from a kind of objects that are similar to each other in their "general rabbity" characteristics, each of them being at the same time unique; it may rather denote the phenomenon of some general "rabbitness" in the given area of space and at the given moment (in this case, the language will not possess any means of expressing

the grammatical form of number or a division of nouns into abstract and concrete).[70] Generally speaking, there are many modes of objective interpretation of the stimulus meaning corresponding to our word "rabbit", and enumerating them all is not the main thing. The main thing is, according to Quine, that it is impossible to establish from observation of the natives' behaviour what types of objects are the referents of a given unknown language. (Let us recall once again that Quine strictly distinguishes between objects and stimulus meanings. It is not too difficult to establish the latter.) One and the same group of stimulus meanings, one and the same external behaviour may be reflected in different language systems characterised by different dissections of the world of objects. But if that is so, it is in general impossible to establish unambiguously the system of objects to which the foreign language refers. It also means that there is no unambiguously correct (Quine calls it "radical") translation from one language to another. In practice the anthropologist studying a foreign language will take into account the coincidence of objects as referents of language expressions. As for the translation of those expressions which have no direct stimulus meanings, it will be attained, first, only by taking into account the connections between these expressions and those that have stimulus meaning, and second, on the analogy with grammatical and lexical constructions of the translator's native language. Quine believes that even if one assumes that the ontology of the translator's language is common to both languages (though this assumption cannot be substantiated at all, in his view), different analytical schemes are possible of the correlation of separate language expressions in the two languages, that is to say, different variants of translation exist. In other words, radical translation is indeterminate. As a rule, the translator does not fully realise this fact, considering the analytical scheme of translation of his choosing the only possible one. As for the mutual relations of those languages that have a sufficiently firmly established tradition of translation (e.g., translation from German into French or from English into Russian), the existence of an analytical scheme of translation may not be realised at all, for there is no question of searching for such a scheme: it was found a long time ago in the work of previous generations of translators, and the possibility of a fundamentally different scheme does not even occur to translators.

In this connection, Quine asks this question: how can we determine the ontology of a given language or theory, that is, the system of objects to which this language or

theory refers? For the carriers of the given system, the language modes of expression and the ontological content are inseparable from each other: the world is given them through a system of meanings, and meanings embody knowledge of the world. To separate that which belongs to language from that which pertains to the world itself, we must go beyond the framework of the given language system and compare it with the world. Quine believes, however, that we have no way of penetrating the world as such, for the world as an ensemble of objects is always given to us only through some language system or other. (Quine does not negate the objective and real existence of the world, that is, its being independent of man and language, but he insists that the world is given to man only through some linguistic or theoretical system.) We cannot therefore speak of absolute ontology of the given language system but only of its relative ontology. When we ask what are in reality the objects of the given language or theoretical system, the role of the "world of objects" with which the system under study is compared is played by another language or theoretical system and not the world as such. The ontology of such a system is not discussed here: the system itself and the world of its objects are given as something undifferentiated. In other words, in defining the ontology of the given linguistic or theoretical system, we perform in actual fact translation from one language into another. The language into which we translate defines the world of objects of the language from which we translate (that is to say, the object to which the word "Gavagai" refers, to recur to the above example, is a rabbit, i.e. that which is denoted by the appropriate word of our language). We should not forget, however, that depending on the language into which a text in the given language will be translated, the latter will be ascribed different ontologies, in Quine's opinion. But even if we refer to two given languages only, here again one may accept different analytical schemes of translation (let us recall Quine's thesis about the indeterminate character of radical translation).[71] In this case, when the question arises about the ontology of the language into which we translate, here again we run into the same problem: we can say something about this ontology only in relation to some other language. Quine concludes that there can be no answer of absolute value to the question of what the objects of a given theory are. The ontology of a given theory can only be established in relation to some other theory. If we want to know, for instance, what kind of objects are in fact numbers, we must translate the system of arithmetic into some other mathematical system, e.g., set theory, and one of the theories (Zermelo's) will provide one answer to this question, while Neumann's will give another. As a matter of fact, the reverse procedure is also possible. To answer the question about the kind of objects sets really are, we may try to translate the propositions of set theory into the language of arithmetic. On the analogy with the relativist theory of space and time, Quine believes it possible to speak of a relativist theory of the objects of theory, or of ontological relativity.[72]

An important point of Quine's conception is that each language has its own mode of dissecting the objective world. This assertion, however, does not entail, in Quine's view, that each language has its own ontology, into which we cannot penentrate from the outside, being therefore compelled to interpret it on the analogy of the ontology of our own language. Quine believes that one cannot discuss the ontology of the given language as long as it is considered by itself: although a language carries a definite world picture in itself, the interrelation between language and the world of objects is not singled out in it. To find out in what way language expressions are correlated with objects, i.e., to single out the ontology of the given language, we have to speak about it in some other language, the ontology of which is not discussed in the context of this discourse. The problem of ontology is one of mutual relation or mutual translatability of different languages or theories. We therefore do not know the ontology of our own language, says Quine.

The ontology of the latter can only be discussed in some other language (and the ontology itself will look differently depending on the language into which the texts in our own tongue are translated). True, one may attempt to reveal the ontology of our language while remaining within its boundaries, and such attempts are made both in everyday life and especially in logic and philosophy. In this case, however, our language must figure twice, in different capacities: once as an object language (that is, the language whose ontology is elucidated), and another time as the language in which we discuss the ontology of the object language. Here we translate the sentences of our language into sentences of the same language. The sentences we translate need not be equivalent to those that result from translation. Generally speaking, even in this case, according to Quine, we can choose different analytical schemes of translation. And that means that the ontologies ascribed to our language will differ depending on the scheme of translation.

When we communicate with another person speaking the same language as we do, we are convinced that we refer to one and the same world of objects. We believe that in this case, at any rate, our own object dissection of the world and that of our partner must coincide.

But why are we so confident about it? Quine asks. Is it solely because our interlocutor pronounces approximately the same sounds as we do in similar situations? How can we make judgements about the meaningful world picture which our partner associates with these sounds? We ascribe to his words a relation to definite objective referents only because we translate his speech into the language which we use ourselves. From Quine's standpoint, our language as a system of predispositions to definite verbal behaviour appears to us in quite a different light than any other language which we always treat as an object language: that is true not only of the language of a foreign people but also of that of our countrymen.

Quine believes that the conception of ontological relativity is applicable to all language systems or theories: not only to natural, ordinary (national) languages but also to theories in mathematics and other sciences. True, we should bear in mind the following important factor. In mathematics, we can do more than translate the theory of arithmetic into the language of set theory: we can also perform retranslation. Each of these theories may appear as an object one (the theory whose ontology is established) or the one that functions as the premise (the theory specifying the ontology of the object theory). The reason for this freedom of action is equal mastery of both theories. The situation with natural languages is different. Only one of them is our native or mother tongue. We therefore usually judge of the ontology of other languages on the basis of translating them into our own: it is the latter that specifies the object dissection of the world in terms of which we understand and interpret other languages.

In natural scientific knowledge the problems of ontology are settled, in Quine's view, in the same way, i.e., through translation of the terms and propositions of one theory into the language of another. For instance, if we ask ourselves the question what really is the object referred to in physical theory as the atom, we must translate this theory into the language of another, e.g., that which operates with the "sense datum" terms, or uses the terminology of laboratory operations, or else applies terms referring to non-observable objects: it will be shown in the last case that such and such substantive processes of

objective reality correspond to the word "atom". The process of translation may reveal that some language expression of the object theory does not correspond to any real entity from the standpoint of the premise theory: that is the position, e.g., with the term "ether" if we try to translate the theory of classical physics into the language of modern science. It may also happen that we shall be unable to find any modes of translating one theory into another. In this case, Quine thinks, we cannot make judgments about the ontology of the given theory. Yet, Quine believes, the attempts to reduce the content of natural scientific knowledge to the content of "sense data" and protocol statements (something that was intensely practiced by logical positivists) are untenable. At the same time he regards conceptual theoretical gaps, the emergence of fundamentally new systems of knowledge, and scientific revolutions as a rare and undesirable phenomenon in the development of natural science. Here he differs strongly with Kuhn, as we see. In Quine's view, natural sciences develop through gradual changes and restructuring of theoretical constructions, so that questions of ontology arise here fairly rarely. (Quine believes that even metamathematical studies, dealing with problems of interpretation of formal systems, can in some cases do without solution of ontological problems.)

According to Quine, the experiences of each group of subjects that are carriers of a given language or theory are more or less continuous, and the experiences of each individual subject are even more so. Everything that appears in the field of his experience, including other languages or theories, is interpreted in terms of the world picture embodied in this experience. The question of how other subjects that are carriers of other languages or theories see and understand the world is meaningless, according to Quine: one ascribes a certain ontology to other languages proceeding from the properties of one's own. At the same time, this conception starts out from the premise that different language or theoretical systems implement different object dissections of reality. And that means that, although experience is continuous within the group of carriers of the given language, it is discrete in the relations between different groups using different languages (or theories).[73] Groups of carriers of different languages or theories live in different worlds. Accepting this thesis, Quine concurs with Sapir and Whorf as well as Kuhn. A substantive addition Quine makes to this thesis is his assertion that the subjects themselves that are carriers of different languages or theories usually do not notice that

they live in different worlds, as they interpret other worlds on the analogy of their own. They can learn another language (translating it into their own) and even communicate with the carriers of another language and yet remain outside this other world. Different worlds exist in different dimensions and do not therefore come into contact or interact. The carriers of different languages or theories in Quine's interpretation remind one of Leibnitz's monads which reflect the whole world, yet "have no windows" and do not actually interact with other monads, although they have the impression that they do participate in such interactions.

That does not, of course, mean that a person cannot master another language so that it will become his second native language (that is only possible when a person is included in a different cultural system). The subject will in this case master the mode of object dissection of the world which is characteristic of the new language. However, for Quine the main point is that one cannot simultaneously use two languages. When the given subject speaks the new language and thinks in it, his native language functions as an object one, and vice versa. Two languages (and correspondingly two world pictures) cannot come into contact in one experience field. The transition from one language to another as the basis of conversation and thinking may in this case be viewed in the same light as transposition into a different dimension.

Kuhn and Feyerabend, as we recall, insist that different paradigms and major scientific theories carrying different visions of the world come into conflict with one another; it even happens in the consciousness of an individual subject, as a result of which one of the paradigms replaces others. According to Quine, however, different language or theoretical conceptions characterised by different object dissections of the world cannot come into this kind of conflict, lying as they do in different dimensions: whenever the interrelation of two theoretical systems is elucidated and their ontologies are established, one of them acts as an object theory and the other, as a premise theory.

Quine does not specially consider the problems of scientific revolutions. His assertion, however, that conceptual changes in the development of science can only be gradual shows that he does not accept the existence of such revolutions. Reasoning *in abstracto*, we can, of course, imagine an attempt at describing successive replacement of paradigms in the language of Quine's conception of ontological relativity. In this case, however, we would, first, have to reject the assertion of the gradual

character of conceptual changes in science and, second, give an interpretation of the paradigms themselves and the process of their successive replacement that would be essentially different from Kuhn's.

3. TRANSLATION AND THE PROBLEM OF UNDERSTANDING

Let us begin a critical analysis of the conceptions of alternative worlds with Quine's theory. That is all the more convenient since the latter sets this problem against the broadest philosophical background.

Let us note from the start that the existence of alternative theories in metamathematics, which was the premise of Quine's theory, is in itself indubitable and requires serious philosophical study. Quine is also right when he says that the problem of substantiation of scientific theory cannot be solved through ontological and epistemological reduction (thus, it is impossible to reduce the theory of arithmetic to set theory; the problem of substantiation of mathematics cannot be formulated or solved within the framework of reductionism). But we are first of all interested in the analysis of the conception of ontological relativity in its general epistemological significance.

It is easy to show, however, that its basic propositions can hardly be regarded as acceptable. Indeed, Quine notes that sensory information (that is precisely what his term "stimulus meanings" refers to) does not carry in itself any object dissection of the world. He is, of course, right here. But he errs on another score, namely, in asserting that the existence of objects is not inherent in the world outside man, and that the subject singles out external objects only at the language level, the grouping of "stimulus meanings" in the objects of a definite type being entirely determined by the structure of the given language system, so that it must be fundamentally different in different languages. According to Quine, the initial content information about reality is restricted to an ensemble of "stimulus meanings", and human behaviour is determined by this information rather than the objective properties of the objects themselves. As a matter of fact, what we have here is a kind of revival of the subjectivist empirical theory of "sense data", hard as Quine might try to dissociate himself from it. He is also close to the subjectivism of logical positivism (although he believes to have overcome the latter) at another point of his conception—in rejecting the existence in objective reality of objects that are referents of the given language expressions. For Quine, just as for Carnap, the subject

cannot in a certain sense break away beyond the confines of language to the objective world itself: the meanings through the relations of which the world is given to the subject are, in their view, only a system of intralinguistic relations. Therefore the world itself as an ensemble of objects is only the product of language.

This line of reasoning, consistently and logically implemented, inevitably leads to conclusions which are in themselves enough to make one doubt such conceptions. (For instance, it is exactly that interpretation which Quine gives of subjective "stimulus meanings", taken as the starting point of cognition, that determines the emergence in this conception, in a new variant, of the difficulty which subjective empiricism would never solve: the imaginary impossibility to cognize the state of consciousness of another person.) The main point, however, is that Quine's conception cannot provide an adequate explanation of a whole series of important facts which the modern sciences of cognition cannot ignore.

The basic fact is that the subject is capable of singling out the objects of the external world before he masters the language, though Quine asserts the opposite. The modes of singling out objects are directly correlated with definite forms of object-related practical activity worked out by society; assimilating these forms, man assimilates the specifically human cognitive relation to reality, that is, that relation which assumes the givenness of the world of objects to consciousness and differentiation of the latter from the inner world of the subject, his consciousness. The assimilation of language itself implies that the subject has mastered definite "reference mechanisms", that is, the modes of referring knowledge to reality: these mechanisms are included in the basic perceptive structures. The main types of referents and systems of meaning are not constructed by the language system but are its premises.

That is why expressions of different languages may have common referents and, moreover, common meanings in a narrow sense of the term, i.e., they may be synonymous. Quine's conception compels one to reject the possibility of synonymy, which contradicts elementary language intuition. These fundamental facts are recognised in all more or less serious theories inquiring into cognitive activity in general and perception in particular.

Inasmuch as perception structures are linked with definite forms of object-related practical activity, one may make judgments, from the knowledge of the given subject's mastery of these forms, about the character of these structures and the degree in which they are formed, i.e.,

judgements about the form in which the object dissection of the world appears to the subject. That is the method of inquiry used by Piaget, among others. (We ignore here the fact that Piaget deals with spontaneous development of structures and actions in the child and not with mastering socially evolved forms of object-related activity.) Piaget draws conclusions about the forms in which external objects appear to the subject from the child's behaviour, e.g., from its searching for an object that passed beyond its field of vision. It is through external object-related activity that knowledge which the subject has is actually combined with the real objects. The forms of this activity are of course determined not only by the objects but also by the historical traits of social practice: those aspects are singled out in the object which became particularly significant for the given types of object-related activity. At the same time it is essential that, first, we are dealing here with the real aspects of the objective things themselves, and second, that the essential structure of human practical activity remains invariable, however diverse and historically changeable types of practice may be. Therefore, the principal types of objects with which humans deal in ordinary life are the same regardless of the languages they speak and the stage of cultural-historical development. (Only we must not confuse the types of objects given in knowledge with what the subject knows about these objects.)

If we break the real ties between systems of knowledge and forms of practical object-oriented activity, it is, of course, impossible to assess the extent to which the object dissection of the world given in knowledge corresponds to what exists independently of cognition and consciousness. But that is exactly what Quine does, insisting that judgments cannot be made from behaviour about the system of referents to which the given language expressions relate, and that different systems of object dissection of the world implemented in different languages can be associated with one and the same type of behaviour, the latter being, in Quine's view, oriented at an ensemble of "stimulus meanings" and not at a system of objects.

It is obvious, however, that the most meaningful and essential connections of reality are implemented precisely in the object picture of the world. The knowledge of an object assumes cognitive mastery of a whole system of substantive connections in their complex mutual dependences, the connections being not only actual but also potential. If man's activity were directed at an ensemble of "stimulus meanings" rather than at objects and their

mutual relations, his behaviour would hardly differ much from the behaviour of animals. It should be assumed that if a rabbit were perceived as a set of actually given aspects or as a phenomenon of "rabbitness" (to use Quine's example), this would affect in one way or another the behaviour of the carriers of this kind of perception. True, Quine himself underlines that the anthropologist trying to translate a text from one language into another must deal with relatively short stretches of "stimulus meanings" and correspondingly with relatively small fragments of natives' behaviour. But this restriction is hardly justified. It may be assumed that it is this restriction that makes it hard to define the object referents of some language expressions and that, consequently, its elimination does away with a whole series of imaginary difficulties to which Quine refers in substantiating the thesis that radical translation is indeterminate.

Further, Quine's conception of language itself also gives cause to certain objections. In Quine's view, language is a definite ensemble of purely conventional (associative, in his terminology) links between separate sound complexes, some of which stand in conventional (associative) relations with "stimulus meanings". Language is definite more or less stable connections of verbal behaviour, or predisposition to verbal behaviour of a definite kind. Alterations in verbal behaviour change language too, in Quine's opinion. He believes that the relations of different sound complexes to one another and to external stimuli in the framework of the given language system are not determined by the object dissection of the world. Meanings are only mutual relations of language expressions. For Quine, it is therefore quite natural to infer that the existence of a common object environment, of a common neurophysiological apparatus in carriers of different languages, and even the substantive community of different kinds of practice associated with different languages are no indications at all of the existence of essentially common structures in different languages.

However, the conception of language which becomes more and more firmly rooted in modern linguistics is based on fundamentally different notions. The point is that a language system is not determined simply by a set of sentences similar in certain respects and produced within a given time interval, that is, by verbal behaviour. This set will always be finite. Yet any language system contains the possibility of generation of an infinite set of acts of verbal behaviour, including those that do not reproduce any of the past acts. Generation of new sentences does not necessarily entail changes in the essential characteristics of the given language system (whereas, if language is a set of conventional connections between sentences the emergence of new sentences must change the language itself). An essential feature of language is the phenomenon of synonymy—that very phenomenon which Quine treats as a pseudoproblem. Modern linguistics works out theoretical models of generative grammar proceeding from the fundamental premise that language serves to express a system of definite meanings and that this system is basically common to all the different languages (having an extralinguistic nature). Apparently, such grammatical categories are universal as names of objects (nouns and nominal phrases), names of situations—sentences, and the so-called transformers, that is, linguistic objects changing linguistic objects of one class into other linguistic objects of the same or different class.[74] And that means, for instance, that singling out objects in reality and distinguishing them from processes and actions, that is, from situations, is common to all languages, being determined by extralinguistic circumstances which inevitably affect all languages.[75] The existence of invariant grammatical structures in all languages is also an argument against the universalist claims of the Sapir-Whorf hypothesis. The grammatical structure of a given language assumes a definite object dissection of the world specifying a definite very general sense of each sentence generated by the given system of grammatical rules. Therefore, if lexical semantic connections in a sentence are disrupted but the sentence itself is constructed grammatically, it is meaningful in a wider sense, though properly speaking nonsensical; at any rate, it is understandable. Noam Chomsky cites in this connection the sentence "Colorless green ideas sleep furiously".[76]

But even if we deal with a completely foreign language, the grammar of which is not known to us and may prove to be quite different from the grammar of our native tongue, the existence of language universals does not permit us to interpret that language as a simple set of sounds conventionally connected with stimuli from the external environment and allowing an almost unlimited spectrum of incompatible interpretations. Quine makes a universal and an absolute out of a definite procedure that is justified in metamathematical studies. In the latter, the need indeed arises to view a given theoretical system as a purely formal structure (a set of symbols on paper) functioning as an object language meaningfully discussed in metalanguage. Under ordinary circumstances, however, the atti-

tude to natural language and even those languages which express the content of theories in the factual sciences, i.e., those that differ from mathematics, is different. If I come across a language spoken by beings physically similar to me and interacting with the external world in a basically similar way (and that is expressed in their behaviour), I must assume at once that the semantic fields of our different languages have essential features in common.

According to Quine's conception, only those acts of verbal behaviour are ultimately given to me on the semantic plane whose agent I myself am. A dissected picture of the object world is given to me by the language which characterises *my* predisposition to definite verbal behaviour. As for the language of any other subjects, including those that speak apparently the same language as myself, this language functions, according to Quine, merely as an object language, i.e., a set of sounds allowing different interpretations. However, an individual that merely receives from the external world a set of impacts in the form of "stimulus meanings", holding other individuals and their actions also to be mere external stimuli, cannot be the starting point of epistemological or even psychological and psycholinguistic study. Such a study must have for a starting point the subject included from the outset into real connections of communication with other subjects representing society and the accumulated social-historical experiences. From the very first days of its life, the child is involved in a meaningful interaction with an adult. At first, the ties of semantic communication are established directly through practical activity with external real objects (and not at all with a set of "stimulus meanings"!) and later through the use of language, too. The latter thus actually expresses not only a definite relation of sound complexes to external objects but also the relation of the subjects using it to one another. The types of objects to which the expressions of the given language and the principal types of relations between these objects, i.e., the principal systems of meanings, relate are therefore common to all the carriers of the given language. The question, discussed by Quine, of what the ontology of the language is which my compatriot speaks cannot for this reason arise in reality and is a typical pseudoproblem.

The difference between the object dissection of the world given to me through the language I speak and the ontology of this language does not have the character ascribed to it by Quine. Of course, this differentiation has some sense in formal analysis, when we have to discuss

an object language in terms of a metalanguage, but it can hardly be so essential in all the other cases. As far as natural languages and the languages of the theories of factual sciences are concerned, their ontology is substantively determined by the object dissection of the world given in them and cannot be viewed as something determined only by the relation of the given language or theory to another arbitrarily chosen language or theory. Therefore in non-formal contexts the ontology of a theoretical system may be regarded as inbuilt.

That does not, of course, mean that all semantic shadings included in the perception of the given object by myself and another subject are absolutely identical. Indeed, if two subjects look at the same object, the latter will present to them its different aspects if only because their angles of vision may not coincide, as they occupy different positions in space. That means that the backgrounds against which the given object will be perceived will be different, to say nothing of the differences in perception determined by the specific traits of the personality and the life story of each of the subjects. The situation is essentially the same with their utterances. One and the same word necessarily calls forth different associations in them conditioned by their unique life experiences. For this reason, if we accept that understanding another person assumes complete and absolute comprehension of the entire system of the subjective semantic shadings of behaviour and speech essential for that person, we may conclude that such an understanding is in general impossible and that, consequently, semantic interaction or meaningful dialogue between two subjects are in general nonexistent. That is the conclusion to which Quine comes. But, as we have tried to show, the difference in semantic shadings characterising the experiences of different subjects is itself possible only against the background of essentially common semantic structures underlying real practical, object-directed and language communication. Real understanding and dialogue do not at all rule out certain semantic differences in the details and shadings that are inessential for the needs of communication. Moreover, communication presupposes these differences, for no subject can cease being himself or transplant himself into the body and consciousness of another.

Therefore, if we interpret understanding another person as complete coincidence of semantic fields, as absolute merging with the subjective states of another through a kind of direct empathy, we may deduce that any understanding is in actual fact non-understanding. It is another

matter that this interpretation of understanding is untenable. To distinguish between the general structure of semantic fields essential for communication and the subjective system of semantic connections in which this structure is implemented in the consciousness of each individual subject, A. N. Leontyev draws a distinction between the categories of "meaning" and "personal sense".[77] It does not follow from the above that the access to another subject's system of personal senses is absolutely closed to me, and that I cannot to some extent assimilate his characteristic mode of interpreting the system of general meanings. Every real dialogue performs this task, enabling one to see the world through the eyes of another person and to allow the possibility of a standpoint different from mine. As for the perception of the object from the same angle of vision as it presents itself to another, it is enough to take up the same spatial position which was earlier occupied by another subject. It is a different matter that absolute merging of the systems of personal senses of two subjects is impossible, since they remain different.

The situation is much more complicated, of course, in trying to understand the behaviour and speech of the carriers of a foreign language absolutely unknown to us. We have touched on the existence of grammatical universals common to different languages. But a great deal in the grammatical structures of different languages is indeed different, and this fact, though raised to an absolute by Sapir, Whorf, and Quine, cannot be ignored. For instance, there are three cases in Arabic, fifteen in Estonian, and no declension in some languages at all. Systems of lexical meanings vary particularly strongly from language to language. If we recognise the community of different types of objects assumed by different languages, we shall have to consider the fact that the ways of grouping these objects in classificatory systems (and it is the latter that are expressed in the lexical units of the given language) distinguish one language system from another and are determined by the specific traits of that kind of practice which is characteristic of the carriers of the given language. "As studies in most diverse languages have shown, the visible spectrum is 'distributed' in different ways by different languages. Let us consider the designation of colours: 'green', 'dark-blue', 'light-blue', 'grey', 'brown'. In Welsh, three words correspond to this part of the colour spectrum: *qwyrdd*, *glas*, and *elwyd*. The last word denotes that part of the spectrum which is termed in English 'brown' and 'grey' or, to be more precise, 'dark grey'. The word *glas* covers the part named in English 'light-grey', 'blue',

and 'green'. The word *qwyrdd* also refers to that part of the spectrum which we call 'green'... And in the language of one of the Negro peoples living in Liberia, all colours of the rainbow are designated by two words only: one refers to the colours which painters call 'warm' (red, orange, yellow, etc.), and the other, 'cold' (blue, violet, etc.)."[78] Inasmuch as language is directly connected with thought, not only serving as a means of expressing cognitive structures evolved in object-related practical activity before language but also creating for the first time the possibility of the emergence of new cognitive structures, it may be assumed that the difference between the grammatical and lexical means indicates a difference in definite cognitive schemes (although these differences do not involve the principal schemes of reasoning expressed in language universals). One may even go still further, assuming that the difference in language structures determines to some extent the difference in perception. It is, for instance, possible that the Negro tribe living in Liberia referred to above perceives colours in a different manner from the carriers of modern European languages.

To evaluate this line of reasoning, let us consider some facts. A difference in the grammatical structure of two given languages does not by itself predetermine the possibilities of rendering certain senses with their aid. It is well known, for instance, that the category of determination-indetermination is very essential for Romance and Germanic languages and is expressed in them grammatically, through definite and indefinite articles. There is no system of articles in Russian, but the category of determination-indetermination can be expressed in this language too—by lexical rather than grammatical means (through the pronouns *etot*, *tot* in one case and *kakoy-to*, *nekotoriy* in the other). Generally speaking, identical senses are expressed in different ways in different languages: in some the sense is expressed grammatically, in others, lexically (the phenomenon of lexico-grammatical synonymy). The vocabulary, being continually renovated, is the most flexible and dynamic part of the language system, a kind of complement to grammar. Inasmuch as there are no essential obstacles to the development of the vocabulary, one may keep introducing new senses and types of senses while remaining within the framework of the given grammatical structure, which is the most conservative part of the language system. It would therefore be rash, to say the least, to infer the characteristic world picture of a language and the cognitive schemes specific for its carriers directly from the grammatical structure, neglecting the study of lexical

systems. The study of actually existing natural languages rather provides arguments in favour of recognising the community of their semantic fields in their basic essential features.

As for the undoubtedly existing differences in vocabulary, and consequently in certain classificatory and semantic systems, their influence on the perception of the world needs careful investigation. In any case one must bear in mind that the main perceptive structures take shape already before language is mastered. Therefore the absence in the given language of words for certain objects and their aspects does not necessarily mean that the latter are not perceived at all. Indubitably, language also affects the semantic characteristics of perception structures, although the nature and extent of this influence have been quite insufficiently studied.[79]

Let us note, finally, that the social-historical changes and the actually growing affinity between the cultures of different regions necessarily lead to the addition of words to the vocabulary of the given language which allow the expression of new systems of meanings, which results in the affinity of the semantic fields of different languages thus growing.

However, as long as differences between cultures and the underlying types of practical activity continue to exist, certain differences between the semantic fields of language systems continue to exist, too. All of this creates actual difficulties both for translation and for understanding. True, these difficulties are not at all insurmountable, being eliminated in the course of social progress and cultural interaction. At certain stages in history, however, they still exist and have to be taken into account.

One-to-one translation from one language into another is in general impossible. Separate elementary meanings of one language often have no equivalents in another. But combinations or systems of meanings of different languages may on the whole correspond to each other. If the languages are very dissimilar (owing to the difference in cultures), translation of some meanings at a given stage of social, cultural and language development is sometimes simply impossible, but that does not mean that this possibility cannot arise in the future. Thus the actual difficulties of translation are quite different from those outlined by Quine in his theory of the impossibility of radical translation and, which is the main thing, they do not warrant Quine's philosophical conclusions.

Let us now imagine that we have to deal with a reasonable being whose physical make-up, the modes of obtaining and processing information from the surrounding environment, and the type of interaction with the world are essentially different from the human (extraterrestrials are favourite characters in science fiction, as we know). Assumedly, it will be extremely difficult to understand the language of this being. It is this case, rather than what we usually observe in ethnolinguistic studies, that is closest to Quine's view of the situation of an anthropologist studying the language of an unknown tribe. Yet even this case does not fully answer Quine's interpretation. Assume that the extraterrestrial's system of perception of the world was formed under conditions essentially different from terrestrial ones, that his environment did not include solid bodies, that is to say, it was something like liquid or gas. (Of course, this assumption is highly hypothetical if not improbable. We temporarily accept it entirely as a kind of "mental experiment".) In this case, the extraterrestrial will either have no means of perceiving the world of objects with which we deal or will perceive these objects in a specific manner different from ours. If we observe, however, that our guest out of space fairly successfully orients himself in our terrestrial world, we must conclude that he perceives, in one way or another, our system of objects. And if we consider as well that object dissection of the world characterises definite systems of dependences of reality itself, far from merely expressing the properties of our language (and we tried to show the necessity of exactly this interpretation of the facts), we inevitably come to the conclusion that a reasonable being different from ourselves perceives, under terrestrial conditions, essentially the same types of objects as we do. This conclusion may serve as the basis for the search for the modes of understanding the language of extraterrestrials. It also allows the assumption that we shall be able to translate a certain part of this language, though this apparently does not obtain with reference to the extraterrestrials' language as a whole, for the modes of existence of the Earth's inhabitants and of the guests from space differ too greatly. Success is more likely if we deal with messages containing scientific information: it is through science that we acquire knowledge about real objects and their dependences regardless of their being included in some form or other in direct practical activity at the given historical stage. It is not accidental that it is hoped to establish communication with extraterrestrial civilisations (if they exist!) through transmitting scientific texts.

We recall, however, that Thomas Kuhn believes that in science itself the assertions about laws assume essentially

different senses in different paradigms, so that adherents of such paradigms in science do not understand one another. So, if the inhabitants of the Earth engaged in one and the same undertaking—scientific study of the given phenomenal domain, accepting a whole series of assertions as true, and using the same apparatus, still do not fully understand one another, according to Kuhn, how is science to ensure understanding between ourselves and the hypothetical reasonable inhabitants of remote worlds differing from ours?

Can we accept Kuhn's thesis about the incommensurability of different paradigms?

To answer this question, we shall have to do a certain amount of analytical work.

Let us start by stating that the existence, at different stages of the development of science, of various ways of semantic organisation of systems of knowledge implemented in different paradigms appears quite likely. The irreducibility of one paradigm to another is expressed not only in that identical formulas are given different meanings in them, as emphasised by Kuhn himself. Even if we ignore the problem of semantic interpretation of assertions expressed in symbolic form and forming scientific theories, it is apparently impossible to perform the operation of formal deduction of all propositions of one theory from the propositions of that theory which came to replace it and which, it would appear, must fully supplant the previous one. (We have in mind here sufficiently global theories, that is, close to what is termed paradigms by Kuhn.) Reduction of one theory to another mostly proves impossible not only on the content plane but also on the formal one.

Mario Bunge shows that even thermodynamics is not fully reducible to classical mechanics, although the relation between these two theories is often cited in philosophical literature as a striking example of reduction. "In fact, no rigorous derivation of the second principle of thermodynamics is known: only the thermodynamics of the ideal gas—a very special case—has so far been reduced to molecular dynamics. As to rigid bodies, particle mechanics cannot account for their existence, since the 'particles' concerned are quantum-mechanical systems and they are glued by fields, which are extraneous to particle mechanics. Nor does quantum mechanics yield classical mechanics in some limit: it retrieves only some formulas of particle mechanics, none of continuum mechanics, which is the bulk of classical mechanics. Finally, some relativistic theories have no nonrelativistic limits while others have more than one."[80]

Does that mean that communities of scientists adhering to different paradigms live in different worlds and cannot adequately communicate?

The fact itself of the existence of paradigms hardly proves that the mode of vision of the world is entirely restructured in their successive replacement. Of course, the framework of what is observed in scientific experiment is determined by the content of the theory adopted. But the principal structures of perception, just as interpretation of the world in terms of natural everyday language, take shape at the pre-scientific level and hardly change to any essential degree throughout successive scientific theories. One may rather assume that many semantic systems characteristic of pre-scientific knowledge constitute, in a transformed shape, part of science essentially determining its content aspects. The replacement of fundamental scientific theories or paradigms thus takes place against the background of definite constant strata of knowledge implemented, at any rate, in the structures of perception and in the propositions of the so-called common sense expressed in ordinary language.

Let us note further that in the actual practice of scientific research theory is not, as a rule, applied directly to experience but through the mediation of another ("interpretant") theory, as has been indicated above. The replacement of one substantive theory by another does not, as a rule, coincide with the replacement of interpretant theories. Besides, as we have just noted, new theories never fully oust out old ones. The actual multilevel structure of scientific knowledge, the existence in it of a number of systems (not a single one!) at each given stage, changing in different ways and at different rates, and finally the "immersion" of scientific theories in everyday pre-scientific knowledge, allow actual comparison and assessment of different paradigms in terms of external criteria, so that the assertion of their incommensurability has no basis at all.

The existence of a common background for different paradigms makes it possible to apply common measuring rods or standards to them. That does not mean that they are mutually fully translatable, since that would imply the existence of common referent systems and common meanings. But paradigms are characterised precisely by different contents, by giving different interpretations to identical formulas and sometimes even by different referents. Even if we assume that there is no complete semantic break between paradigms but merely a certain difference (we shall touch on this point somewhat later), complete

mutual translatability of different paradigms is impossible. Under criticism, Kuhn gave a less rigid formulation of the thesis about that draws a parallel between paradigms and "alternative worlds", asserting in the "Postscript-1969" that, although different paradigms are mutually translatable, they are still incommensurable.[81] In actual fact, the reverse is true, as we have tried to show: paradigms are commensurable but not mutually translatable.

Recently, specialists in scientology have been greatly interested in the so-called thematic analysis of scientific theories, that is, the study of those content components of theoretical constructions which are passed on from one stage in the history of scientific thought to another, linking up different paradigms and ensuring continuity of development of scientific cognition. For example, the concept of force has certain characteristics invariant both with regard to the Aristotelian and Newtonian paradigms. The theme of conservation (of matter, motion, electricity, etc.) is passed on from one paradigm to the next. Some themes, accompanying scientific thought from its inception, are grouped in relations of antithetical couples: atomism vs continualism, holism vs reductionism, etc.[82] The existence of such common themes would be clearly impossible if different paradigms indeed implemented "alternative worlds".

The emergence of a new paradigm certainly changes the semantic interpretation of a number of scientific concepts. However, this change should hardly be understood as complete replacement of the old meaning. If we recognise the existence of common themes in the history of cognition, this kind of replacement is apparently impossible. Besides, the changes obviously do not involve all concepts. In general, it is not any appearance of a given concept in a new context that entails the replacement of one meaning by another or others, otherwise we would be unable to communicate and to understand one another, since language involves, among other things, generation of utterances which cannot have been made previously. In the theory of relativity, the interpretation of mass differs in several important points from that of classical mechanics. It does not follow, however, that two paradigms using one and the same word operate with different concepts, as Kuhn asserts. The systems of objects to which these paradigms refer are sometimes common for the two.

Finally, we must not forget that a new paradigm may only be adopted if, apart from everything else, it explains why the paradigm that is replaced could function successfully, until a certain moment, in a domain

that is common to both.

This explanation is only possible if there exists a meaningful interpretation of the old paradigm, which is ensured by the fact that some sense units and separate senses of the old paradigm are immersed or form part of the new content structure expressing the new paradigm. Kuhn's error stems from his failure to distinguish between paradigm as an integral structure and the separate semantic systems that form part of it. In his view, destruction of a paradigm is tantamount to completely discarding all systems of old meanings. In reality, it is the comprehensive incorporation of the semantic systems of one paradigm in the integral structure constituted by the new paradigm that makes mutual understanding and real communication between their representatives possible at an inter-paradigmal level. Importantly, not all the systems of meanings which are ascribed to identical terms and formulas coincide: that is excluded since different paradigms cannot be fully translatable into each other's languages. It is sufficient for inter-paradigmal understanding and communication that meanings forming part of different paradigms should coincide in certain essential components. The existence of a common constant background of knowledge allows the comparison of different paradigms and a choice between them.

Therefore a scientist studying the history of physics can understand not only the Newtonian but also Aristotelian paradigm. To do that, it is not at all required to forget the theory of relativity and quantum mechanics and, through a kind of mystic empathy, to grasp precisely the same meaning of all the concepts in these paradigms as was attributed to them in times long gone. On the contrary, it is in the light of modern scientific theories that the historian can see that content in the old paradigms of which their carriers themselves were not aware (e.g., to establish the fact that Newton did not distinguish between inertial and gravitational masses). The psychologist studying the stages of the formation of perceptive structures undoubtedly cannot see the world in the way a small child sees it. The researcher does not only describe the child's external behaviour but also surmises how the world looks to the child. The psychologist has the right to formulate these surmises (and they are of considerable significance to him) because the child's perceptual structures, different as they are from the corresponding structures of an adult, are not discarded in psychical development but, after restructuring, become components of mature perception structures. The psychiatrist in an interview with

a mental patient attempts to reconstruct his subjective world from the latter's behaviour and speech. The success of these attempts does not at all mean that the doctor must in some way assume a condition similar to that of the patient. That is impossible as long as the doctor remains a sane person, and as soon as he ceases to be one, he can no longer be a doctor. The point is that the difference between a sane person and one with abnormal mentality does not exclude the existence of common psychical structures and functions in the two. Here the doctor apparently understands the patient better than the patient the doctor, and then the doctor understands himself better than the patient understands himself.

Thus, the problem of continuity of cognitive experiences proved to be more complicated than Kant once believed. In the course of the development of cognition conceptual structures emerge which cannot be reduced to each other, and that means that that process really includes semantic gaps.

Even ordinary natural languages express systems of meaning somehow differing from one another. Therefore, there is no unambiguously determined translatability in this case either. On the whole, however, translation from one natural language into another is fully realisable, and it is all the easier the closer the cultures of the carriers of these languages. The explanation lies in the basic community of the conditions of life and practical activity of communities employing ordinary national languages. As for the relations of different theories emerging in the development of scientific knowledge, the situation here is quite different. A new scientific theory, and, still more so, a fundamentally novel paradigm emerge precisely because they carry substantively different content inexpressible in terms of old conceptual instruments. Naturally there can be no complete translatability in this case. As we have seen, it is even absent where special attempts are made to express one theory in the language of another to attain greater precision in expressing the content of the former (e.g., in putting the theory of arithmetic in the language of set theory).

At the same time there are relations of continuity and cohesion of definite meanings between different theories and paradigms, a general background of knowledge, so that paradigms cannot be equated with absolutely different "alternative worlds". Being mutually intranslatable, different paradigms are nevertheless commensurable.

The problem of continuity and alterations in the meanings of concepts in the course of the development of

science has so far been but little studied. However, the understanding of the meaningful side of scientific theoretical knowledge largely depends precisely on the solution of this problem. It should be recognised that, although there are certain gaps in the development of the conceptual systems of science, they can hardly exist in perception structures—at least in adults. True, if we should believe, as Sartre does, that a cognitive orientation does not underlie experience, and that the latter is not marked by the division into subject and object, we shall have to admit that there are complete gaps not only between the experiences of any two subjects but also in the experience of each of them. The subject continually manifests himself in unique situations, Sartre believes, and separate situations have nothing in common. The subject, too, is each time unlike himself. This interpretation can only be accepted if one agrees with Sartre's general philosophical and epistemological conception. We showed its untenability in the second chapter of Part One of the present work. Abstractly speaking, certain perception structures (though by far not all!) could, of course, change if the type of man's object environment should radically change, or the type of his practice, or the set of sensory modalities inherent in his perceptual system. In this case gaps could appear in the structures of direct experience. We may recall that Gregory admits the theoretical possibility of man creating a supercomplex artificial environment that will demand the formation of new ways of perceiving objects. If man does not solve this task, he will be unable to see. And if he solves it successfully, gaps will emerge between old and new experience.

As for the results of changing the set of modalities, they can be assessed by the results of actual successful operations of removing cataracts owing to which men begin to see. The perception of the world in such individuals is originally formed on the basis of the tactile sense. At the same time, an amodal objective scheme of the world was built in the system of perception of the formerly blind person. The blind man is confidently and correctly oriented in the system of objects, but the appearance of a new (visual) modality disrupts the well-formed system of orientation: the formerly blind person cannot at first correlate the visual information with the tactile perceptive images he has, and the earlier developed modes of tactile orientation cannot function as successfully as before. Only gradually new perceptive structures are developed which link up visual and tactile information. Apparently there is a gap (though not complete here either) between

old and new experience. The amodal objective scheme of the world remains constant, and the new experience structure is formed on its basis.

The development of cognition is thus characterised by extension and deepening of the content of knowledge, the emergence of new semantic systems and the singling out of new types of objects. In this process, the characteristics of objective reality itself existing independently of cognition and consciousness are reflected and reproduced in more and more precise and differentiated ways; that is to say, objectively true knowledge is produced. As we see, the complex dialectical interrelations between discreteness and continuity in the development of cognition are one of the modes of concrete expression of the dialectics of absolute, relative, and objective truth, a classical philosophical analysis of which was given by Lenin.[83]

4. "OTHER WORLDS" AND THE SUCCESSIVE REPLACEMENT OF THE FORMS OF OBJECTIFICATION OF KNOWLEDGE

We have noted earlier that most kinds of knowledge are, in one way or another, objectified and consolidated in a system of specific mediator objects—implements, instruments, symbols of oral and written language, scientific texts, schemes, diagrams, drawings, etc. There are also kinds of knowledge that exist in a subjective and not objectified form, such as perception. But, as we have tried to show, they are also genetically and functionally mediated by the man-made world of artificial objects embodying social-historical experience. Qualitative changes in the content of systems of knowledge are not necessarily expressed in the successive replacement of the means of their objectification: as a rule, that is exactly what does not happen.

Reading a text (if "text" is taken to mean any mode of objectification of knowledge, and "reading"—any form of its interpretation by the subject) always implies differentiation between the semantic content embodied in it and those specific traits of the material of implementation which do not have the function of differentiating meaning. In practice, this differentiation is usually subconscious, so that what is directly given to the subject is the semantic content of knowledge, that is, what the text says about the real objects themselves. Modern linguistics draws a clear distinction between the value of a language unit and the material of which it is built. The material of different units

may vary while their values expressed in interrelations are constant. When a person hears someone's speech (and this case may be included in reading a text in the broad sense accepted here), only the content rendered by that speech is given to consciousness and not the way sounds are pronounced or the separate sounds themselves. (That is, on condition, of course, that all the existing variations in pronunciation do not go beyond the limits where the meaning will be distorted.) In reading a printed text, I do not notice separate letters, the kind of paper on which the text is printed, I can miss a misprint, for consciousness is at that moment directed at reproduction of semantic connections. If my task is searching for misprints, however, the perception of the given text is quite different: working as proof-reader, I cannot grasp the meaning of the semantic phrases reified in the text. Basically the same thing happens on decoding any semantic content objectified in some form or other. For example, if I perceive a work of art, I do not see the canvas or the paint spots but the content expressed with their help. Even "reading" photographs, which at times appear as good as "natural replicas" of the real objects, is only possible if one ignores the quality of paper, the fact that the picture exists in two dimensions, unlike the three-dimensional real objects, and that the objects in the picture are motionless while in the world of real objects all kinds of changes continually take place, etc.

Singling out the properties which have the function of sense differentiation in the means of objectification of knowledge, and distinguishing them from the characteristics indifferent to meaning, are not determined by any physical properties of these objects directly given in their bodily form. This singling out is entirely determined by the culture in which the given objects function. If one has not assimilated this culture and has not mastered the modes of communication accepted in it, one is incapable of expressing the semantic content objectified in the mediator objects. Speech in an unfamiliar language is perceived as a jumble of sounds, a scientific text in which unknown terms and systems of symbols are used appears as an agglomeration of incomprehensible signs, etc. Even works of art and sculpture that are aimed at presenting reality in the form in which it is ordinarily perceived, can be correctly "read" only if we have mastered the language of art, that is, in particular, if we take into account the specificity of the given style, the modes of presentation accepted in it, etc.

However, the fact that the physical properties of the

mediator objects do not directly determine the functional role they play as instruments of objectification of knowledge, does not at all mean that the former are completely indifferent to the latter. They are independent of each other only within certain limits. The need for expressing basically new cognitive content may in some cases produce the requirement for other types of mediator objects, those whose physical properties would be more adequate to the solution of the given task. These mediators make it possible to express in knowledge a new system of objective meanings, of such aspects of the real world which it would be hard to grasp and express in terms of the existing means. The discovery of new types of mediators signifies the rising of cognition to a new content level. Of this nature is, for instance, the transition from gesture language directly linked with object-related activity to sound language, or the transition from oral to written speech.[84] (Written speech creates new possibilities for reconstructing the object in its entirety. The development of science is obviously impossible without writing.)

Absolutely identical content cannot be rendered in terms of different types of objectification of knowledge. We have already noted that verbal formulation of the content of perception introduces something new in knowledge. This kind of alteration of content happens even where there is apparently nothing but mere copying. If an artist paints from life, he is compelled to take into account the properties of the material in which he embodies his work, the specific properties of paints (which are always different from the colour characteristics of the real world), and the modes of artificially creating an impression which would recall in some important aspects the impression in ordinary perception (which is an important condition of realistic art) and at the same time essentially deepen the latter. Ordinary perception and a work of art represent two different systems of content rendering. The content itself cannot therefore be absolutely identical. The potential of painting is not indifferent to the specific features of the material which is used in it as a means of content objectification. The history of this art is among other things also the history of experimenting with the material itself for establishing its representational potential, it is a search for the modes of reflection which are not directly prompted by mere perception of the object painted. A person that cannot draw cannot represent a familiar object on paper. The ability itself is not attained through spontaneous development but through learning in which cultural-historical

experience is transmitted. The latter varies in different cultural regions and at different stages of the artistic and cognitive development of mankind. The possibility of "drawing from nature" thus assumes that the subject is included in a specific system of mediator objects, that is, he can operate with them according to definite rules. It is therefore extremely difficult to draw an object for which no modes of representation have been worked out in the given cultural tradition. E. H. Gombrich convincingly illustrates this point citing a mass of data from the history of art.[85]

Thus, the emergence of new systems of mediator objects also marks the appearance of new cognitive possibilities, of other worlds, in a sense. In this case, too, however, there is no complete disruption of continuity of cognitive experience, there are no alternative worlds absolutely excluding one another and mutually impermeable: it is rather a matter of enriching experience with qualitatively new content expressing previously unknown aspects of objective reality.

Chapter 4

REFLEXION ABOUT KNOWLEDGE AND THE DEVELOPMENT OF COGNITION

1. SELF-CONSCIOUSNESS AND REFLEXION. EXPLICIT AND IMPLICIT KNOWLEDGE

According to Kant, the continuity and unity of experience are conditioned by the transcendental unity of apperception, that is, the unity of the Transcendental Subject himself. Kant believes that the proposition "I think" is the supreme foundation of knowledge. In critically analysing the German philosopher's conception, we have pointed out that the actual dependence is of a different kind. It is true that the knowledge of external objects assumes self-consciousness, but the latter in its turn assumes the former. Both knowledge and self-consciousness are ultimately conditioned by the subject's practical object-related activity in the world of real objects, an activity that is social in its very nature, including as it does the relation of the given subject to others.

Thus Kant erroneously interpreted the actual facts of cognition. Still, we have to admit that self-consciousness indeed plays a special role in the acquisition of knowledge. This fact merits a more careful analysis.

Let us note, first of all, that self-consciousness is always knowledge of a special kind.

True, Kant draws a basic distinction between knowledge and self-consciousness, emphasising that the Transcendental Subject can only be consciously realised but it cannot be the object of knowledge. It is the attempt to think of this Subject as an object of experience that leads to one of the antinomies of pure reason, Kant believes. Sartre also separates consciousness and knowledge as a matter of principle, pointing out that consciousness does not necessarily deal with the world of objects, whereas knowledge obligatorily implies an object to which it refers. The world that is external with regard to consciousness, different and independent from it (the world in itself) does not initially appear as a world of objects, according to Sartre, and is not therefore an object of knowledge. Consciousness is

not reflective in its very nature and therefore does not initially know itself, let alone the world of external objects. However, it immediately realises itself as different from the world in itself (therefore Sartre names consciousness "Being For-Itself"). In this way the philosopher separates self-consciousness and knowledge of self (reflexion).

Let us note that both Kant and Sartre believe that under ordinary conditions there exists a relation of the subject to himself which appears as knowledge of himself. It is a different matter that, according to these philosophers, the individual empirical subject's experientially given knowledge of self is not the same as grasping the true deep nature of this subject (the latter appears as the Transcendental Subject, according to Kant, and as "pure" consciousness, Being For-Itself, according to Sartre).

Inasmuch as we begin our analysis with the study of individual empirical subjects and their mutual relations, the statement that a certain kind of knowledge is given in ordinary self-consciousness can hardly raise any objections. Later we shall also try to explain the facts interpreted by Kant and Sartre as a fundamental difference between consciousness (self-consciousness) and knowledge. We have noted the very important circumstance, recorded in modern psychology, that the objective amodal scheme of the world underlying all types and kinds of perception also assumes the incorporation of a scheme of the subject's body in it. The knowledge of the position of one's body in the objective network of spatio-temporal connections, the knowledge of the difference between the objective changes in the real world and the succession of the subjective states of consciousness, the knowledge of the connection between the perspectives of experience and the objective position of the subject's body—all of these varied kinds of knowledge are included in a compressed form in an elementary act of consciousness, the act which is indeed assumed by any cognitive process.[86] Without self-consciousness, the subject cannot determine the objective state of affairs in the world. In the specific and supreme form of reflection termed cognition, the subject does not simply know something—he also realises that he knows it, that is, he always stands in a certain relation to knowledge and himself. If that were not so, cognition could not exist. As Marx stated: "The animal is immediately one with its life activity. It does not distinguish itself from it. It is *its life activity*. Man makes his life activity itself the object of his will and of his consciousness. He has conscious life activity. It is not a determination with which he directly merges. Conscious life activity distinguishes man imme-

diately from animal life activity."[87]

Since all this is quite true, a situation emerges which appears quite paradoxical and even impossible. Indeed, if I cognize some object, can I simultaneously also cognize my cognizing self and the act of my cognition? Does not accepting the thesis that knowledge of an object also assumes knowledge of the cognizing subject and the act of his cognition lead to an insoluble logical paradox? Is not the latter similar to the paradoxes which arise when an utterance has itself for a referent? (These paradoxes, along with some others, were discovered early in this century in set theory and stimulated intense studies in the foundations of mathematics.) Consider these facts. My eyes can see everything that surrounds me. They also see certain parts of my own body. They see other subjects looking at certain objects. But my eyes cannot in principle see themselves and the process of their vision. (It can be objected that the eyes see themselves in the mirror. But what we see in the mirror is not the eyes themselves but only their reflection. Of course, the reflection in the mirror has a likeness to my eyes, and I can imagine with the aid of the mirror the way I myself, my face and my eyes look to an external observer. However, when I look in the mirror, it is not my eyes that are the object of my experience but only their physical reflection on the surface of a certain body. The fact that this reflection resembles the picture my eyes present to a stranger is not at all evident and not known at the early stages of the development of the psyche.)

Keith Gunderson, a modern American philosopher, points out that the cognizing subject cannot be the object of his own experience, an object of his knowledge. Experience is directed at the world of external objects. I can know the states and relations of physical objects. I also know other individuals, both at the level of everyday knowledge and through special scientific inquiry (e.g., physiology, psychology, sociology, etc.). In his turn, another subject may study me, and in this case I shall be the object of this other subject. But I cannot know myself, the subject, as an object of my own experience. Otherwise, Gunderson believes, we would get lost in an insoluble paradox similar to the paradoxes of set theory. It has to be recognised, states the American philosopher, that the subject himself, the carrier and generator of knowledge, drops out of the domain to which his knowledge refers. There is nothing surprising about it, he continues, since this fact is characteristic not only of man but in general of all systems, including artificially constructed technical mechanisms, which have to do with receiving information

from the environment. Any such system gathers information about objects different from the system itself, but it cannot obtain information concerning the process itself of gathering information. Periscope lenses reflect everything that happens around, but they cannot reflect themselves.[88]

We may agree with Gunderson that the situation where cognition of the world of objects also implies the subject's cognition of himself and the process of such cognition indeed appears rather paradoxical.[89] At the same time, we cannot discard the real and basic fact of human cognition really involving self-consciousness. The examples cited by the American philosopher do not contradict that fact. The point is that artificial mechanisms gathering information do not implement the process of cognition, they do not have self-consciousness or consciously realise the world of objects. The information gathered by these mechanisms only becomes a fact of cognition when it is assimilated by man. A submarine's periscope by itself does not see anything: the man using it does. Man's perception of the external world presupposes an elementary act of self-consciousness, otherwise it will not see anything even with the aid of a periscope (self-consciousness thus pertains to the man using the periscope rather than the periscope itself).

What is the way out of this paradox? Let us describe the solution in the briefest outline, with the intention of later recurring to this problem. The point here is that although self-consciousness is knowledge, it is knowledge of a special kind. So far we have assumed that knowledge presents to the subject the world of objects that are realised as such. This is true both of perception, which is a kind of knowledge associated with the individual subject, and of scientific theories, which are objectified forms of knowledge. However, the object of self-consciousness is not given to it (self-consciousness should not be confused with reflexion). When I perceive a group of objects, I realise at the same time the difference between my consciousness and these objects, I realise the spatio-temporal position of my body, etc. But all these facts of consciousness are in the background or on the periphery and not in the focus of consciousness. Directly, my consciousness is aimed at external objects that are the object of knowledge. My body, my consciousness, my cognitive process do not in this case form part of the objects of experience and knowledge. Thus knowledge of self implied by any experience and expressed in the form of self-consciousness is knowledge of a special kind. It might be somewhat tenta-

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tively called "implicit knowledge", as distinct from explicit knowledge with which we are usually concerned. The goal of the cognitive process is acquisition of explicit knowledge. Implicit knowledge acts as a tool or method of acquiring explicit knowledge.

When I touch a thing with my hand, I feel the object itself and not my hand. The tactile sense speaks of the external object and not of myself. Only in the background of my consciousness do I realise the act of touching, localising the action of the object on myself at my fingertips. If I touch the object with a stick, not with my hand, the tactile impression is again connected with the object itself, not with the tool I use (the stick). The latter is no longer in the focus of consciousness but on its periphery, and is experienced as a direct continuation of my body. In this case, the sensation of the action of the object (we have already pointed out that this is not the same as the tactile image of objects) is experienced as localised at the end of the stick and not at my fingertips.

2. SUBSTANTIATION AND DEVELOPMENT OF KNOWLEDGE

Many philosophers argued that, inasmuch as a most important and probably the only task of epistemological analysis is substantiation of knowledge, it should obviously single out and dissect all premises of knowledge, including those connected with self-consciousness. Epistemological research must explicate what is implicit, thus implementing absolute reflexion.

We may recall that one of the solutions to the problem offered in the past consisted in the assertion that the reflexive relation of "I" to itself constitutes the supreme foundation of any knowledge. The proposition formulating this reflexive relation was taken to be absolutely indubitable and irrefutable. The epistemological reflexion about knowledge was interpreted as reflexion of "I" about itself.

We have endeavoured to show the *cul-de-sacs* and the insoluble difficulties to which the acceptance of this orientation in epistemology leads. In particular, we have tried to show that any knowledge, and in the first place the knowledge of the world of external objects, though it assumes the subject's self-consciousness, cannot as a matter of principle be reduced to the subject's reflexion about himself. And insofar as knowledge about external objects can never be absolutely unquestionable (such as not to allow

any further specifications and corrections), however reliable it may be in practice, natural doubts arise about the need for searching for absolute principles and absolutely indisputable foundations of knowledge.

These doubts are redoubled as we take into account the experiences of modern science in substantiating certain special kinds of scientific knowledge. We have already noted, for instance, the impossibility of completely reducing arithmetic to set theory or of one physical theory to another, as well as the impossibility of reducing theoretical knowledge to a set of protocol utterances, propositions about "sense data" or laboratory operations. Different structures of knowledge are linked in ways other than reduction. This circumstance has to be taken into account in substantiating knowledge.

The question remains, however: to what extent is absolute completeness of reflexion possible? To what degree can the premises of knowledge be singled out, elucidated, and dissected?

In attempting to answer this question, let us recall Quine's arguments about the problem of radical translation. Quine points out that the language in which we speak is given to us in a different manner than a strange language which we study. With regard to the latter, we consider the relation of its expressions to the real objects and actual situation, that is to say, we reflect about this language. As for our own language, it directly presents to us the picture of the world and not its own structure. We know our own language in the sense that we can use it for rendering some objective content. But that is not explicit knowledge. The language is inseparable for us from that objective knowledge which we obtain with its help, so that we do not even notice it, as it were: it is in the background of consciousness. (That does not rule out the possibility of reflexion about our own language, but we have to split our language into two in this case. One of them will be the object language, the one that is studied, that is, it will play a different role than before, functioning as an ensemble of theoretical hypotheses, idealisations, etc., rather than as implicit knowledge naturally given to consciousness. The second language, used as a tool for studying the first, retains the properties of implicit knowledge.) Assume that we study the structure of the theory of arithmetic trying to establish its ontology, thus performing an act of theoretical reflexion about this conceptual system. In this case, we use set theory as an instrument of reflexion. In the context of this study, set theory is not an object of reflexion and is accepted as something familiar and clear. The re-

verse task is also possible: translation of the propositions of set theory into the language of the theory of arithmetic. Here set theory itself will be the object of reflexion and the theory of arithmetic will be accepted as something not subject to reflexion in the given context.

In studying the history of various proofs of the stereometrical theorem concerning the correlation of the numbers of sides, apices,and faces of a polyhedron, Imre Lakatos showed that finding the weak points of arguments, that is, increasing their rigour, always assumes the existence of "foundational" knowledge. The latter serves as an instrument of analysis itself, that is,a mode of reflexion about proofs, taken as an intuitively clear and unreflected guarantee of rigour. "By each 'revolution of rigour' proof-analysis penetrated deeper into the proofs down to the *foundational layer* of 'familiar background knowledge' ... where crystal-clear intuition ... reigned supreme and criticism was banned."[90] At the same time reflexion about the "foundational layer", i.e., knowledge assumed to be immediately clear (implicit knowledge, in our terminology) reveals the problematic character and even falsity of a whole series of its components.[91] "The amount of assumed familiarity decreases as criticism turns background knowledge into knowledge."[92]

Reflexion about the "foundational layer" assumes adopting some other type of knowledge as not subject to reflexion in the given context of the means of analysis.

Thus even in such a science as mathematics, where the problem of substantiating knowledge figures prominently, and reflexion about the existing systems of knowledge plays an enormous role, every procedure of reflective analysis implies a framework of implicit "foundational" knowledge that is not reflected upon in the given context. Implicit knowledge plays a much more important role in factual sciences, that is, in the disciplines dealing with explanation of empirical facts. In these sciences, research activity is, as a rule, aimed at the world of real external objects rather than at the theory itself. The elaboration and development of a theoretical system and its application to empirical data (the two are usually inseparable) are perceived by the researcher as establishment of the objective connections of reality itself.

The theoretical conceptual system is not in this case considered separately from the knowledge about real objects formulated in its terms. In such disciplines, theories are usually left unformalised and often unaxiomatised. The rules for processing empirical data, the norms and standards of discourse, and the modes of selecting significant problems are not formulated explicitly but are specified along with the basic paradigmal content premises of the theory, i.e., as implicit knowledge. Michael Polanyi and Thomas Kuhn, modern specialists in the history and theory of science, pointed out the importance of implicit knowledge ("tacit knowledge" in their terminology) for the development of natural science.[93] That does not mean that theoretical reflexion plays no role in the development of natural scientific knowledge (although the theoreticians mentioned here are inclined to belittle this role in every way, distorting the actual state of affairs).

The property of reflexion indicated here (the dialectical connection between reflected and unreflected knowledge) is fully manifested with regard to those kinds of knowledge which exist in unobjectified form, i.e., belong to the individual subject (perception, recall, etc.), and also with regard to individual consciousness itself. As we have stressed, each act of individual cognition assumes self-consciousness, that is, implicit knowledge of the subject about himself. One may try to transform this implicit knowledge into explicit one, that is, to translate self-consciousness into reflexion. In this case, the subject analyses his own mental experiences, observing the flow of his psychical life, endeavouring to find out the nature of his "I", etc. It appears that in this act of reflexion, "I" simply merges with itself. In actual fact that is not so. Every act of reflexion is an act of conscious realisation or understanding. The latter always assumes definite means of understanding, a kind of framework of semantic connections. Outside this framework, reflexion is impossible. At the same time, the semantic framework presupposed by the act of reflexion is not subject to reflexion in the act itself; "dropping out" of it, it is taken as an instrument of such an act, that is, as implicit knowledge. The dissection of the flow of psychical life and meaningful definiteness of the images coming to the surface of consciousness, the spatio-temporal reference of memories—all of this is given to consciousness in the act of individual reflexion. However, the modes themselves of semantic formation of this givenness are not reflected upon. Therefore, the question does not arise in subjective reflexion about the basic possibility of other semantic characteristics of psychical life, that is, of the possibility of the content and structure of psychical life other than that which is given in self-observation. "I" itself also drops out of the act of reflexion, at least partially, for if it makes itself the object of its reflexion, it must also perform this as the subject. And that means that "I" as the subject of reflexion is not reflected upon as long as

we remain within the framework of individual consciousness.

This circumstance served as the basis for Kant's and Sartre's view that the true nature of the subject cannot be the object of knowledge or reflexion, being given to non-reflecting consciousness only. Ludwig Wittgenstein follows a similar pattern of argument: "5.631. The thinking, presenting subject; there is no such thing. If I wrote a book *The World as I Found It*, I should also have therein to report on my body and say which members obey my will and which do not, etc. This then would be a method of isolating the subject or rather of showing that in an important sense there is no subject: that is to say, of it alone in this book mention could *not* be made. 5.632. The subject does not belong to the world but it is a limit of the world. 5.633. *Where in* the world is a metaphysical subject to be noted? You say that this case is altogether like that of the eye and the field of sight. But you do *not* really see the eye. And from nothing *in the field of sight* can it be concluded that it is seen from an eye... 5.641. ...The philosophical I is not the man, not the human body or the human soul of which psychology treats, but the metaphysical subject, the limit—not a part of the world."[94] The English philosopher Gilbert Ryle believes that the "systematic elusiveness of "I" in the course of reflexive analysis indicates the fictitious nature of the object of reflexion itself, i.e., of "I"as a specific structure irreducible to the physical, bodily characteristics of man.[95]

Does all of this mean that unreflected implicit knowledge cannot in general be regarded as an object of reflexion being doomed to remain forever on the periphery of consciousness, unamenable to analysis in principle? Not at all. The instrument of reflexion, that is, its semantic framework, can itself become the object of reflexive analysis, but for this purpose it must be interpreted in another semantic framework which will not be reflected upon in the new context. Implicit knowledge should not be understood as something irrational or as an arbitrary assumption unrelated to reality. In actual fact, this kind of knowledge always reflects, with a definite degree of precision, objective dependences, and in many cases practical and cognitive activity does not need special analysis of at least some of the cognitive premises on which they are constructed. There are situations, however, when this kind of analysis proves a necessity. As we have noted, such a situation exists, e.g., in the study of the foundations of mathematics.

Let us consider the following very important point.

Where implicit knowledge becomes explicit, thus becoming the object of reflexion, it undergoes certain changes. Theoretical reflexion about a system of objectified knowledge means its dissection, formulation of a number of assumptions and idealisations and at the same time (which is particularly essential) specification of the knowledge itself, rejection of certain implicitly accepted premises (the procedure of reflexion is prompted exactly by the need for revising some premises of knowledge). What previously appeared clear, intuitively understandable and simple, proves to be complicated enough as a result of reflexion, and often problematic, sometimes even simply erroneous. The result of reflexion is not therefore some simple and self-obvious truths or a set of absolutely indisputable assertions forming an "absolute foundation" of the system of knowledge to which different kinds of knowledge can be reduced in one way or another. The result of reflexion is a theoretical system which is a relatively genuine reflexion of some real dependences in a definite context and which at the same time implies a whole series of assumptions, a certain implicit knowledge as a premise.

Reflexion thus takes one beyond the framework of the existing system of knowledge, generating new knowledge, both explicit and implicit. What originally seemed (e.g., in mathematics) a purely substantiating procedure, is in reality a mode of development of the content of knowledge itself and one of the important ways of theoretical development. This procedure results in increasingly more precise reflection of the objective dependences of reality and exact reproduction of the structure and content of the scientific theories themselves. A study whose immediate goal was merely increasing the rigour of an argument generated in fact greater theoretical content in the given scientific field. Summing up his investigation of the history of proofs of the stereometrical theorem, Imre Lakatos writes: " 'Certainty' is never achieved (the reference here is to metaphysical absolute certainty.— *V.L.*), 'foundations' are never found—but the 'cunning of reason' turns each increase in *rigour* into an increase in *content*, in the scope of mathematics."[96]

As for the factual sciences, the links between the procedure of substantiating knowledge and the development of theoretical content are here even more explicit. We have noted already that in these sciences the problem of substantiation does not usually figure as an independent one. To the extent in which the existing system of theoretical notions allows the solution of scientific problems arising in this system, permitting at the same time definite prac-

tical applications, this system is regarded as sufficiently well founded. The emergence of a substantively novel theoretical system and adoption of new paradigmal research premises reveal that the conviction of the adequacy of the old paradigm's foundations was not quite justified. The new paradigm is not adopted through analysing the structure of theoretical knowledge within the framework of theoretical reflexion about science but in studying the real objects themselves, that is, it is accepted as a tool for a more adequate theoretical reproduction of the real dependences. At the same time, the adoption of a new paradigm implies a procedure for correlating it with an old paradigm. The latter figures in this case as an object of reflexion. Its postulates, concepts, and semantic connections are reconstructed and compared with the real objects and actual connections with the aim of retaining all that has objective real content in the old paradigm, and of eliminating everything that has no such content, that is, proves to be fictitious. Here, the new paradigm functions as an instrument for presenting the real objects and dependences. Thus, theoretical reflexion acts as an important element of transition from one paradigm to another (though Polanyi and Kuhn reject this), albeit it does not exhaust the content of the transition. This reflexion essentially means reconstruction of and inquiry into the old paradigm in the light and by means of the new one. Thus the theory of relativity allowed a clarification of the latent premises of classical mechanics which were not (and could not be) clear to its creators themselves. Galileo, in his turn, had to subject the system of premises and assumptions of Aristotelian physics to theoretical reflexion in laying the foundations of classical mechanics. But he could only solve this task successfully insofar as he went beyond the framework of the conceptual system of Aristotelian physics. Theoretical reflexion is the result of going beyond the limits of a given conceptual system and at the same time the means of such a step. As we see, in any case it proves to be closely linked with the development of the content of theoretical knowledge.

In this connection, one should consider the untenability of one interpretation of the special theory of relativity. This interpretation, which gained currency thanks to Bridgman, reduces the entire significance of the special theory of relativity to reflective analysis of primary concepts of physics (such as the concept of simultaneity). From this standpoint, Einstein created not so much a physical theory as a metatheory which deals with the problem of the meaning of physical concepts. The laboratory operations of measurement referred to in the special theory of relativity are viewed as an absolutely reliable basis of science, the foundation on which physics must be built. In actual fact, the operations of measurement used in the special theory of relativity, in their turn, assume a number of theoretical premises that are not operational in nature. The task of this theory is by no means solution to the problem of meaning of scientific concepts but the discovery of new content dependences in actual reality. Reflective analysis, that is, discussion of the problems of the nature and meaning of the concepts of physics, indeed played an important role in the elaboration of the principles of this theory. But this analysis is intimately linked with comparing the old and new paradigms—classical mechanics and Einstein's conception. Besides, theoretical reflexion was not and could not be the only tool of substantiating the new theory.

Reflexion about knowledge thus proves to be closely linked with the development of its content and with going beyond the limits of the existing conceptual system. (That does not mean, however, that the reverse proposition is also true, that is, that any development of the content of knowledge appears as reflexion. For instance, the development of a theoretical system within the given paradigmal premises obviously cannot be taken as an example of reflexion.)

If that is how things stand, the question arises, does the problem of substantiation of knowledge have any meaning at all? Classical philosophy and science presented the solution to the task of substantiating knowledge as finding a set of assertions which would be absolutely indisputable and unshakeable, assertions to which all other kinds and types of knowledge could be reduced in one way or another. Since such a task cannot be solved (and we have tried to show that that is so), should we not recognise that the problem of substantiating knowledge does not exist at all? Many Western specialists in the foundations of mathematics, logic, methodology, and philosophy of science, in the theory and history of natural science come to this conclusion.[97]

One can hardly agree with this view. What is the meaning of the task itself of substantiating knowledge? Apparently, it is the establishment of the sphere of application of the given system of knowledge and separating that which is true knowledge from that which only lays an empty claim to this title. On the general epistemological plane, it is a question of finding general criteria for the solution of this task, which may be applied to different

cases, to various concrete systems of knowledge. If we assume that this task has lost all meaning, the conclusion will have to be accepted that there are no criteria in general which allow to draw a boundary line between knowledge and absence of it.

In reality, the evolution of cognition is a dialectical process of delimitation of knowledge from absence of knowledge and at the same time a process of increasingly more precise demarcation of the objective sphere of application of the existing systems of knowledge. Substantiation of knowledge implies, first of all, correlating it with real objects through practical object-oriented activity. At the same time, not all kinds of knowledge can be directly included in practical activity. Besides, practice itself is always limited by the given concrete historical level of its development. Therefore, even the practical application of the given system of knowledge is not tantamount to full substantiation of the latter. Practice assumes the development of the systems of knowledge themselves. It is in the course of this joint development of mutually connected practical activity involving objects and cognitive activity that knowledge is substantiated. Substantiation must not thus be understood as an ensemble of procedures enabling one to provide an unshakeable basis for knowledge once and for all but rather as historical development of cognition, as emergence of new theoretical systems, discarding some old conceptions, establishment of new links between theories, revision of old theories, etc. Substantiating a given theoretical system means going beyond its framework, including it in a deeper context, and considering it against a broader background.

Thus, those procedures which were considered in the history of philosophy and science as methods for resolving the problem of substantiation are indeed relevant to the solution of this problem but in a sense different from the previously assumed. These procedures do not at all provide "absolute" substantiation, being merely elements in the historical process of substantiation coinciding with the development of knowledge itself. Substantiation as it actually takes place therefore includes elements of scientific research which classical pre-Marxian and non-Marxist philosophical and methodological literature did not consider in the context of the given problem (e.g., the origin of new theories). If substantiation of knowledge coincides with its development, and theoretical reflexion is only one of the elements of the latter, that means that actual substantiation is not reducible to reflexion, being much broader in scope.

3. REFLEXION AS A UNITY OF REFLECTION AND TRANSFORMATION OF ITS OBJECT

We have already pointed out that reflexion brings about not only a transcending of the existing system of knowledge but also its transformation. Implicit premises, becoming explicit ones, are not merely singled out, dissected and reconstructed, though even this procedure by itself changes the nature of knowledge that is the object of reflexion. Some premises are specified or entirely discarded. In itself, this is quite understandable: the need for reflexion arises only when doubts appear about the substantiation of the basic premises. The task of theoretical analysis lies in revising these premises, and the attainment of this task is impossible without changing, be it partially, what is critically studied. But that means that the very object changes as a result of theoretical reflexion. Let us dwell on this circumstance in somewhat greater detail.

When theoretical knowledge reproduces the dependences between the real objects existing independently of knowledge, as often as not one has to go beyond the limits of the given conceptual system, including the objects under study in new relations, introducing new idealisations, constructing new systems of abstract objects, etc. None of these processes, characterising the development of theoretical knowledge about real objects, changes the objects themselves to which knowledge refers. The relation between reflexion and its object is different. Through reflexion, its object, the system of knowledge, is not only included in new relations but is also completed and rebuilt, that is, it becomes different from what it was before reflexion. The process of inquiry proves to be intimately linked with creatively reshaping the very object under study. This peculiar relation between cognition and changes in the object arises because in this case we do not deal with an object existing independently from cognition and consciousness but with cognitive reproduction of cognition itself and of consciousness, directing cognition towards itself.

The peculiar relation between reflexion and its object indicated here is found not only in systems of objectified knowledge but also in individual consciousness. The point is that reflexion about the state of consciousness, about the properties of a concrete personal "I" emerges in the context of the task (whether realised or not) of restructuring the system of consciousness and personality. When I realise myself as "I" with such and such traits, I

do not merely objectify certain moments of my psychical life that were previously fluid or scattered, as it were (thereby introducing definite changes in the state of my consciousness). I also reflexively analyse myself in the light of some ideal which I accept, an ideal which expresses a type of relation to other persons and thus socially mediates my relation to myself. When I analyse myself, trying to realise my qualities, contemplating my attitude to life, and looking into the deep secret places of my own consciousness, I thereby wish to "substantiate" myself, as it were, to find a solid basis for the frame of reference, giving up some things for good and taking an even firmer hold of others. My individual "ego" thus changes and develops in the process and as a result of reflexion.

But does it not follow from the above that reflexion simply creates its own object, actually reflecting nothing? Many modern bourgeois philosophers and some Western specialists in the theory of science accept this view, to some extent or another. As we recall, according to Quine's "ontological relativity" principle we must not speak of the ontology of a given theory as long as we remain within its framework: a given theoretical system will have some ontology (and different ontologies ascribed to the theory may be mutually exclusive), depending on the language of the system into which we are going to translate it. It so appears that the arbitrarily chosen "angle of view" determines in the process of reflexion its ontology and content. Polanyi develops a conception according to which any attempt at a theoretical reflexion about the norms and rules of theoretical thinking and standards of scientific quality adopted by a given community of natural scientists in the form of implicit knowledge is inevitably doomed to failure, as these norms and rules are not in principle amenable to rational analysis. He believes that what is formulated as a result of such reflexion is merely the product of reflexion itself, having no relevance to the real norms of theoretical thinking which are forever doomed to remain implicit knowledge.[98] The latter thus assumes quite an irrational colouring. Finally, Sartre insists that the individual "I" is entirely the product of reflexion itself. Cognition attempting to cognize itself has the impression that it faces a certain definite object termed "I", while in actual fact the "I" had not existed before the process of reflexion began. Therefore "I", in Sartre's view, does not express the true nature of consciousness.

To answer the question whether reflexion creates its own experience in its entirety, let us continue our analysis.

It is not any reflexion that is concerned with science.

If reflexion is intimately connected with the development of a system of theoretical knowledge, only that kind of reflexive analysis accords with the task it faces which facilitates the augmenting and enrichment of knowledge. In other words, theoretical reflexion can restructure its object, the system of scientific knowledge, only to the extent in which this restructuring serves to establish conceptual structures which express more precisely objective real processes reproduced in scientific theory and at the same time agree with the objective norms of development of knowledge itself. If this condition is not satisfied, reflexion proves to be false. This means that the image of knowledge reconstructed in reflexion and real scientific knowledge itself may not correspond to each other. There are many such examples in the history of science. Thus, the analysis of the theoretical premises and the logical structure of classical mechanics performed by Ernst Mach in the late 19th century on the whole proved to be a false reflexive image, and could not serve as a basis for constructing a new physical theory. Sometimes the reflexive image is inadequate in some important respects, capturing at the same time certain real dependences of knowledge. For example, the reflexion about the foundations of mathematics in the framework of intuitionism contributed to the development of scientific thought, being unable at the same time to reconstruct some important propositions of mathematical theory, which could not be sacrificed without going beyond the limits of mathematics itself.[99] All of this shows that reflexion combines, in a specific manner, a reflection or reconstruction of its object, a system of knowledge, with its critical restructuring.

Reflexion and its object may also fail to agree in the framework of individual consciousness. The image of "I" is not always adequate to the real "I".

The starting point of classical pre-Marxian philosophy and psychology was that the subject has a special inner access to himself and a better knowledge of himself and of the states of his consciousness than anyone else. Moreover, it is this individual subjective reflexion that was regarded as perfect and infallible knowledge as distinct from knowledge of external objects. It must be conceded that indeed I know something about myself that can be unknown to others. Images of memories and subjective associations which surface as I perceive some object are my personal property, something directly given to my consciousness.[100] True, many of my individual experiences are usually objectified, being accompanied by external actions—bodily motions, facial expressions, exclamations,

so that other individuals can make judgments about the inner states of my consciousness. At the same time, I can suppress by an effort of will external expression of any given experience, even of pain. In this case, I alone will know about this experience.

Let us recall, however, that reflexion is a kind of cognition. And cognition is not simply passive absorption of information from without but the establishment of definite links, the singling out of semantic dependences, an activity of interpretation. There is no sense in speaking of errors where information is simply passed on from one system to another (what occurs here are merely losses and distortions of information but not errors). The possibility of errors only arises where cognition appears.

What could be more indisputable than an elementary statement "I feel pain"? Let us note, however, that the realisation of one's pain is associated with localisation of this experience, and the localisation may be erroneous (a fact everyone is familiar with who had toothache). The awareness that "I feel pain" includes not only knowledge of the difference between "I" and "not-I" but also a certain semantic interpretation of the experience of pain itself: singling it out among other experiences, knowledge of its being conditioned by the state of my body, distinguishing between my pain and that of another subject, etc.

The life of consciousness cannot flow uninterpreted. If an image comes to the surface of my consciousness, I try to define it, that is, to find out what it stands for, and to what concrete person or event of my life it refers. I often err in interpreting separate images; for instance, I may erroneously localise in space and time the object of memory, mistakenly correlate a given image with some person or other, etc.

When I have some emotional experience, e.g., joy, reflexive realisation of this experience is inseparable from the feeling itself. It may so happen that in reality I am not so joyful as it appears to me in the act of subjective reflexion. (I appear joyful to myself because for certain reasons which I do not realise I wish to be so.) In this case, a stranger may judge my emotional state better than I myself, although that stranger may also be mistaken, of course.

The possibility of error grows if I try to realise reflexively the properties of my personality, to cogitate on my concrete "I" as a whole. The thing is that my personality, my "I", is not open to me fully in the act of individual reflexion but most comprehensively manifested in my relations with other persons and can be most precisely

understood by the latter. Another subject observing me from the outside can evaluate my "I" better than I myself. Of course, to the extent I take into account this evaluation of myself by others, I can assess myself more or less correctly, too. If I am subject to mental disorder, I find it hard to define the states of my consciousness. Another person, a psychiatrist, will be better suited to untangle my subjective experiences.

It is also important to bear in mind the following circumstance. As we have indicated, reflexion as a special kind of cognition assumes a definite semantic framework which is not reflected upon in the given act itself. Therefore, when I consciously interpret even those states of mine which are known to me alone, being given only from within, I use a system of semantic connections transcending the boundaries of my individual consciousness and connecting me with other subjects. I view the subjective states of my consciousness through another person's eyes, as it were. That means that if that "other" moved into my body, had the same life story as myself, and occupied the same spatio-temporal position as myself, he would reflexively realise the same subjective states. As we have already remarked, the framework of semantic connections assumed by subjective reflexion emerges in the course of joint interpersonal activity and is assimilated by each individual in his development, in the communication with other individuals through the medium of man-made objects embodying the experience of social-cultural development. That means that reflexion about the frame itself, and in the first place reflexion about such an important element of this frame as the reflecting "I", is only possible if we leave the limits of individual consciousness, considering a different, more comprehensive and fundamental system of relations. We refer to the system of inter-personal activity, in which practical transformation of the world of objects, communication and cognition exist in a direct unity. It is in the process of this social activity that the norms of cognition are worked out. The interiorisation of the standards of this activity produces the individual "I" itself, which will thus remain incompletely reflected as long as we remain within the individual's consciousness, and can only become the object of reflexion when we study a broader system of relations.

Thus, the source of norms and standards of cognition should be sought for exactly in collective forms of activity. It so appears that those kinds of knowledge which exist in intimate association with the subject (perceptions, images of memories, etc.) are, as it were, side by side with

knowledge existing in objectified form as the property of everyone (knowledge reified in implements of labour, objects of everyday life, scientific apparatus, theory, etc.). As we have attempted to show in the first chapter of this part, it is the study of objectified forms of knowledge and the collective forms of activity producing them that enable one to understand the cognitive processes performed by the individual.

4. THE COLLECTIVE SUBJECT. THE INDIVIDUAL SUBJECT

So far we have paid attention to the far-reaching similarity between the objectified kinds of knowledge and that knowledge which is inseparable from the individual subject. In both cases there exists, along with explicit knowledge, implicit knowledge which is only made explicit through reflexion. As for the latter, both reflexion about objectified knowledge (let us tentatively name it objective) and reflexion about knowledge inseparable from the individual subject (let us call it subjective) reveal basically identical relations to their object.

In calling reflexion "objective" we merely refer to the fact that it belongs to the objectified forms of knowledge, ignoring the extent to which it adequately reproduces its object. Objective reflexion may fail to accord with the thing, being in this sense subjective in its content. Reflexion that is subjective in form can also be both objective and subjective in content. Thus, the designations "objective" and "subjective" reflexion as applied here refer only to form, not content.

Let us point out that objectified knowledge differs in a number of important aspects from the individual's knowledge. If an individual subject possesses some implicit knowledge (e.g., the knowledge of the language he speaks, the knowledge of self, etc.), he realises it in one way or another, although he does not have that knowledge in dissected and reflected form. As for objectified knowledge, elements can coexist in it which are not at the given moment realised by any individual subject. Supposing, for instance, that some scientist established hitherto unknown dependences and wrote an article about them. The article was accepted and published in a scientific journal. It was read by several dozen persons specialising in this field. But the article failed to affect the subsequent course of research and was soon forgotten. About a century passed. During that time the author of the article died, as well as

the few persons (editors and readers) who once knew its content. At present, no one knows what the article was about, and, moreover, no one even suspects its existence. Does that mean that knowledge objectified in the article does not exist at all? We would hardly dare to assert this, for the article has not disappeared: it rests in libraries among files of old journals, being only temporarily absent from the actual cognitive process. It is quite possible, however, that a researcher in the history of science will discover it, read it, and conclude that its ideas are very much in the spirit of these times. Thereupon knowledge objectified in the article will get a new lease on life: it will become the object of discussion and argument, references to it will be made in scientific journals, and scientists will ponder the ideas expressed in it.

Let us consider another example. Suppose that at a given moment no one thinks about the content of Newton's theory. Does that mean that at a given moment knowledge objectified in this theory does not exist and that it will begin to exist again only when someone thinks about this theory? That would be hard to accept.

Let us further take into account that in any objectified knowledge there is, as a rule, content which is not known to anyone who is using this knowledge. This content may remain unrealised by the producer of this objectified knowledge—creator of a scientific theory or author of a work of art. This content is manifested only in the historical development of cognition. For example, thermodynamics and the atomic-molecular theory were originally developed independently from each other. But that does not mean that the links between the theories had not existed objectively until they were established and consciously realised. Further, when Cantor formulated his set theory, he was not yet aware of the paradoxes inherent in it, although the paradoxes already existed in the content of the theory itself. In analysing Leo Tolstoy's works, Lenin showed that they were the "mirror of the Russian revolution", although neither the great writer himself nor his numerous readers had realised before Lenin's works this exceptionally important aspect of the content of the works by the classic of Russian literature. An important point here is that realisation of the content inherent in objectified knowledge does not imply introducing subjective views but only the establishment of the links objectively inherent (though previously unrealised) in the given knowledge.

That is also true of the so-called interpretation of texts—scientific, philosophical, literary, etc. Of course, any

such interpretation inevitably carries an element of subjectivity. But it can claim to interpret the text only insofar as it brings out the content actually inherent in this text without introducing into the latter something that is not (and cannot be) present in it.

Delimitating what the author of some system of ideas wanted to say from the objective content of the latter is one of the fundamental principles of Marxist-Leninist philosophy in the study of science as well as of other phenomena of social consciousness and culture.

Thus, certain elements of objectified knowledge may not be realised at the given moment by any of the individual subjects of which society consists.

Let us further note another important circumstance. Knowledge that is inseparable from the individual subject is given to the latter as directly coinciding with its object (if it does not coincide with the latter, it is illusion, not knowledge). In other words, knowledge of this kind appears as something static and complete, while the objectified knowledge produced by scientific research is in principle incomplete. Scientific knowledge necessarily implies unsolved problems: the very concept of such knowledge includes the need for further research involving formulation and discussion of new hypotheses, their evaluation according to certain standards, etc.That, in its turn, is only possible under division of research work and organisation of a special system of scientific communication—publications in journals, debates, and other forms of contacts between researchers. Knowledge, inseparable from the individual subject, appears as personally addressed to him, while objectified knowledge explicitly includes its being intended for all subjects concerned with the study of these problems. In other words, the modes of treatment of objectified knowledge are collective in their nature. For this reason, the study of scientific knowledge and cognition associated with it is impossible without an analysis of communication systems functioning in collectives of a special type called scientific communities. The modern science of science is more and more inclined towards this conclusion.[101]

But does it not follow from the above that objectified knowledge is knowledge without a subject, i.e., that it exists independently of any subject and must be understood outside of a relation to the latter? That is the conclusion to which Karl Popper, one of the major modern bourgeois philosophers and methodologists of science, is inclined.

Let us consider his arguments on the subject in greater detail.

Popper sharply distinguishes between "subjective knowledge", i.e., knowledge intimately linked with the individual subject, and "objective knowledge". The latter includes the content of journals, books, libraries, etc. This content is expressed in the form of theoretical systems, problems and problem situations, critical arguments, and also of certain "states of discussion".

Popper insists on the independence of the content referred to here from subjective opinions and views, including this content in a special sphere of reality, a "third world", the world of the objective spirit (this world also comprises the content of belles-lettres and works of art). The "third world" exists, according to Popper, side by side with the "first world", the world of real physical objects, and the "second world", the world of individual consciousness.

The "third world" is, of course, the product of man, the British philosopher admits. But, being produced by man, this world nevertheless became autonomous and independent. In any case, it is impossible to understand the characteristics and logic of the development of the "third world" from an analysis of individual human consciousness. The reverse procedure is more fruitful, in Popper's view: many important features of individual consciousness may be correctly understood if one takes into account its continual interaction with the world of the objective spirit independent of it.

To show more clearly the independence of the "third world" from man and his consciousness, the philosopher suggests the following mental experiments.

Supposing all our machines and tools are destroyed in some catastrophe, and simultaneously all our subjective learning of using them is lost, and only libraries and man's capacity to learn from them survive. In this case, after a historically necessary period, the world of culture and technology will be reconstructed and so will the specifically human mode of life associated with it.

Let us now imagine that not only machines and tools are destroyed and the subjective knowledge of how to use them is lost, but all libraries are destroyed too(though man's capacity to read books may have survived). This time, there will be no re-emergence of our civilisation for many millennia.[102]

The independence of the "third world" is expressed, according to Popper, not only in that man may not realise some of its fragments. Although that which pertains to the kingdom of the objective spirit is usually created by man, there exists as a matter of principle the possibility of

generation of some elements of this world by automata and not man, Popper believes. A series of books of logarithms may be produced and printed by a computer, the logarithms in these books being more exact than in books written by men. The books produced by the computer may lie about in a library for years unused by any person. Nevertheless, these books, of which no subject knows or has ever known, contain indubitably objective knowledge.[103]

True, Popper admits, for the signs contained on the pages of books to be regarded as the carriers of "objective knowledge", the books must have a special characteristic—the possibility of being read and understood. He believes, however, that this possibility need not be realised. It is not impossible that the books will be read by beings other than man. (Suppose that mankind perishes but libraries survive. Visitors from outer space may discover our books, decode and read them.)

Popper regards the biological approach as quite fruitful in the study of the "third world". A biologist studying the behaviour of animals must take into account that they produce "non-living structures" that are vital for them. Spiders spin webs, birds build nests, wasps build nests, beavers construct dams, animals make paths in forests, etc. Although the "non-living structures" are produced by animals, they exist quite objectively and independently of their creators, once they emerge. Popper distinguishes between two main categories of problems arising from the study of these structures. The first category pertains to the method used by animals when constructing these structures and the animals' relations to their products. The second category of problems is concerned with the characteristics of the structures themselves: the chemistry of the materials used in the structure, their geometrical and physical properties, their dependence upon special environmental conditions, etc. In analysing these problems we cannot do without studying the structures in terms of their biological functions. Popper believes that problems of the second category are more fundamental, for one may draw conclusions about the possible modes of their production from the knowledge of the objective structures themselves.

The same principle is applicable, according to Popper, to the study of the products of human activity: houses, implements, works of art. This approach proves to be particularly significant in the study of science. Popper asserts that genuine scientific epistemology must be concerned with the study of the "third world", in the first place the content of scientific theories, problems, scientific arguments, etc., rather than with the analysis of the subject, his consciousness, and cognitive activity. That will be epistemology without the cognizing subject.

Popper is undoubtedly right in noting that separate fragments of objectified knowledge may not be realised at the given moment by a single individual, that the laws of development of this knowledge cannot be reduced to the laws of individual consciousness, and that the latter itself must be understood as connected with the world of objectified knowledge. We have already touched on these important properties of cognition. Popper's critique of the traditional approach to epistemological problems in bourgeois philosophy is also to a great extent correct.

But does it follow from all this that the world of objectified knowledge must and can be understood irrespective of the subject?

There are no grounds for such a conclusion. Although objectified knowledge is not the same as conscious knowledge, that is, knowledge possessed by an individual subject, the two kinds of knowledge are closely bound up.

Only man, a concrete individual subject, may be the creator of objectified knowledge. And that means that any objectified knowledge must, at least at the time of its emergence, be to some extent consciously realised, that is, be the property of a subject. This is not at all contradicted by the possibility of production by a computer of separate fragments of objectified knowledge. The results of computer activity can be regarded as knowledge only insofar as behind the programme we discern man setting it down and capable of interpreting its output. For the computer itself, there is no knowledge.

Still less can knowledge exist "in itself", regardless of its being used in the cognitive activity of concrete individuals. The utilisation may, of course, be potential, but it is important that the potential should exist. Its preservation is ensured by the fact that the product in which knowledge is objectified, even if it is not actually a part of the ongoing cognitive process, remains included in social-cultural links which make it possible for concrete subjects to use it in their activity at any moment. And that means that even those fragments of objectified knowledge which are not at present realised retain close links with what *is* realised and used in actual activity. If the connection between the fragments of knowledge that are included in the cognitive process and those that are not, is disrupted, the latter ceases to be any kind of knowledge at all.

Assume that a civilisation is dead and no one knows the language once spoken by its subjects. Although the books

written in that extinct language survive, no one is capable of decoding them and the connection is thus lost between the defunct culture and the actual social-cultural process, including the cognitive one. And that means that the books preserved no longer contain any knowledge. Properly speaking, they are not even books but simply objects with strange strokes in them.

Cognition is implemented by real persons, by concrete individual subjects. Knowledge in subjective or objectified form exists only inasmuch as it is directly or indirectly correlated with that activity. At the same time, the cognitive activity itself should be regarded on the social-historical plane, as activity of interconnected subjects—past, present, and future. For this reason, if certain fragments of objectified knowledge are not consciously realised by a single existing subject, that does not mean that these fragments are in general outside the subjects' consciousness, for these fragments may be associated both with the subjects of the past and those of the future (association with the past is obligatory, for only man can produce knowledge).

The social-historical and collective nature of the cognitive process is expressed not only in its being implemented by an ensemble of interacting individuals. The interaction itself assumes the existence of specific laws of the development of knowledge, laws that are different from those which characterise individual knowledge. Thus, the individual subject is not the carrier of the collective cognitive process, and neither is a mere agglomeration of subjects. The collective subject may be regarded as such a carrier, to be taken in the sense of a social system irreducible to the agglomeration of individuals constituting it. Let us note that there are many collective subjects of cognition connected by definite relations. For example, the study of the functioning of a given paradigm of theoretical knowledge assumes an analysis of some community; the latter appears in this case as a collective subject of a definite kind of cognitive activity. Different paradigms apparently determine different collective subjects associated with them. At the same time, paradigms are included in a general process of development of scientific knowledge, with its characteristic common standards and norms. And that means that the given scientific community is a sub-system of a more extensive system—the community of all specialists in the given area of knowledge and the community of all individuals engaged in scientific activity. The scientist uses in his activity some national language or other, and that means that he is included in the society speaking the given language. This

community, which obviously comprises also those individuals who are not concerned with science, is again a definite collective subject of cognition. The functioning and development of knowledge is determined by the processes in a broader social system than the community of scientists. The social sciences are directly linked with the social position, interests, and practical activity of definite social classes. That means that it is the latter that appear as collective subjects of the cognition of social processes. The type of social practice characteristic of a given class determines the horizon of the cognitive possibilities open to its members. As is well known, the Marxist theory of society expressing the interests of the proletariat provides, for the first time, a scientific basis for the study of the social processes. A person not involved in science is nevertheless involved in cognition and, consequently, connected with various collective subjects.

At the same time if not only the diversity but also the unity of the socio-historical development of cognition is taken into account, society should also be regarded as a collective subject including a great number of subjects both collective and individual. It is the existence of definite connections between different collective subjects that ensures the unity of the cognitive process. The difference between these subjects is responsible for different conceptions of what should be regarded as cognition.

A complete disruption of connections between collective subjects would result in a disintegration of cognition as a unified process implemented by mankind. In this case, society as a whole would cease to be the subject of cognitive activity.

Each individual subject is simultaneously included in different collective subjects. Different systems of cognitive activity, with their diverse standards and norms, are integrated in the individual into a whole. The existence of the latter is the necessary condition of the unity of "I". The disruption of links between different collective subjects or the impossibility of integration within the framework of the given individual of those systems of cognitive activity which are associated with different collective subjects, would entail the disintegration of the individual subject.

Thus Marxist-Leninist philosophy asserts that cognition can only be correctly understood if it is considered in connection with the forms of life activity of concrete historical subjects on the basis of studying object-related practical and communicative activities of collective and individual subjects. "If one considers the relation of subject to

object in logic, one must take into account also the general premisses of being of the *concrete* subject (= *life of man*) in the objective surroundings"[104] stated Lenin.

The individual subject, his consciousness and cognition must be understood in terms of their incorporation in different systems of collective practical and cognitive activity. But that does not mean that the individual subject is in some way dissolved in the collective. First, the collective subject itself does not exist outside concrete persons, real individuals interacting among themselves according to the specific laws of collective activity. The collective subject cannot be regarded in the same light as the individual one. The former is not a personality in its own right, it has no individuality of its own and does not perform any acts of cognition other than those performed by the separate members. Second, cognition, which is inseparable from the individual subject, does not directly coincide with the objectified systems of knowledge, though it is closely linked with and ultimately determined by them. The individual traits of my perception, my memories and subjective associations constitute knowledge that is important for me personally and is accessible to me alone. They do not form part of the system of objectified knowledge that is the property of all individuals and is included in the structure of the collective subject. And that means that the types of knowledge intrinsically characteristic of the individual and the collective subjects do not fully coincide with or dissolve in each other but rather mutually imply each other.

We may recall that Kant, Fichte, and Husserl posit, along with the individual subject, the transcendental one. The latter expresses the inner community of the various empirical individuals; in this respect, it may appear similar to the collective subject. Indeed, the conceptions of these philosophers include some steps towards the collective subject idea. But these are merely initial steps, and they could only be discerned after the Marxist doctrine of the socio-historical nature of the process of cognition was formed. In more concrete terms, the Transcendental Subject as conceived in philosophical transcendentalism is basically different from the collective subject as a concrete socio-historical community. The Transcendental Subject, as transcendentalists believe, is an individual of a special kind, the supra-individual "I". At the same time, it is supra-empirical, existing outside time and space. But the collective subject, though different from the individual one, is quite empirical and set in definite spatio-temporal limits. The Transcendental Subject is accessible only from within,

from the inside of individual consciousness, being in fact a deep layer of the latter. As for the collective subject, though non-existent outside a system of interacting individuals, it exists at the same time outside each separate individual subject, in a sense. The collective subject manifests itself and the laws of its functioning not so much through the inner structures of the individual's consciousness as through external practical activity involving objects and through collective cognitive activity with systems of objectified knowledge. Finally, the collective subject is not singular. A great many such subjects are in a state of change: some collective subjects and the inherent forms of their activity emerge while others die out. The relations between different collective subjects may be complicated enough.[105]

Let us undertake in this connection an analysis of Popper's thesis concerning the importance of the "biological approach" to the study of the relation between man and the "third world" and the assumption that the analysis of the structure of the products of scientific activity determines the study of the modes of their production.

The English philosopher's principal error lies in his failure to understand that the man-made objects of the "second nature", i.e., objects implementing a specifically socio-cultural content, beginning with labour implements and buildings and ending with scientific theories, are radically different from those changes in the external environment which animals produce, since man's practical activity involving objects is social in its very nature and assumes the use of labour implements and communicative links between individual subjects. The specific features of this activity also determine its spontaneous development and continual reaching beyond the established confines. Applying the "biological approach" to its study is absolutely fruitless. "In creating a *world of objects* by his practical activity, in his *work upon* inorganic nature, man proves himself a conscious species-being, i.e., a being that treats the species as its own essential being, or that treats itself as a species-being," wrote Marx. "Admittedly animals also produce. They build themselves nests, dwellings, like the bees, beavers, ants, etc. But an animal only produces what it immediately needs for itself or its young. It produces one-sidedly, whilst man produces universally. It produces only under the dominion of immediate physical need, whilst man produces even when he is free from physical need and only truly produces in freedom therefrom. An animal produces only itself, whilst man reproduces the whole of nature. An animal's product belongs

immediately to its physical body, whilst man freely confronts his product. An animal forms objects only in accordance with the standard and the need of the species to which it belongs, whilst man knows how to produce in accordance with the standards of every species, and knows how to apply everywhere the inherent standard to the object. Man therefore also forms objects in accordance with the laws of beauty."[106]

Of course, books and other man-made objects in which knowledge is reified exist objectively. If they are to be considered from the standpoint of the chemical composition of the materials, their physical structure and geometrical form, they do not differ basically from natural objects, including "non-living structures" created by animals. They exist as carriers of knowledge only as long as they are included in the human cognitive activity. Outside the latter, these objects have no structure at all, if the reference is to the structure of knowledge objectified in them and not chemical and physical structure. To understand a book means to reproduce a definite structure of cognitive activity. To assimilate a theory reified in a book means to accept the need for further activity in this field, an activity patterned on a definite model, for a scientific theory is not so much ready-made knowledge as the activity of problem solving. If a definite kind of cognitive activity is inadequately decoded, we cannot say that we have this knowledge.

Supposing that a book is read not by men but by some visitors from outer space, non-human reasonable beings (that is the example discussed by Popper). These beings will be able to master the knowledge reified in the book only if they decode its language, i.e., when they are able to reproduce the socio-cultural communicative and cognitive system of connections in which the book was once included. And that is only possible to the extent in which the visitors from outer space will become reincarnated as human beings, as it were, assimilating the real properties of human cognitive activity.

Cognition and knowledge exist only as long as the specific activity of the collective subject is maintained and consequently the activity of the individual subjects included in it.

If elementary perception implies not only a relation to an external object but also the self-consciousness of an individual subject, the obligatory conditions of scientific activity are not only the movement of cognition through the domain of objects but also the conscious realisation (not necessarily in the form of reflexion, i.e., explicit

knowledge) of the modes and norms of cognitive activity and the standards of assessing its results intrinsically characteristic of the collective subject, for it is only through these modes and norms that the problem field of research can be specified.

Epistemology proves to be impossible without the cognizing subject.

The role of objectified systems of knowledge in the development of cognition, just as all the other questions of understanding the cognitive relation between subject and object, were given a much more precise and profound treatment than Popper's by Hegel, the greatest representative of the German classical idealist philosophy.[107] Of all the pre-Marxian and non-Marxist philosophers Hegel came closest to understanding many of the essential features of the problem analysed here, though at the same time strongly mystifying it.

Hegel asserts that individual consciousness and self-consciousness cannot be understood from within. Although each individual is given his "I" and the unity of self-consciousness as immediate certainty, this unity is actually mediated by the individual's relation to other individual subjects. The individual consciousness recognises something different in the other self-consciousnesses and at the same time something that is internally identical to it. The individual subject exists for himself as an "I" only through a relation to others. "Everyone is the mean for the other, through which each mediates and links up with himself, and each [is] for himself and for the other immediately given being existing for itself, which is at the same time thus for itself only through this mediation. They *recognise* themselves as *mutually recognising one another.*"[108]

The "substance" of the individual, his "inorganic nature", are forms of the objective spirit, that is, essentially collective modes of activity, reified products of human culture. Assimilating the latter and taking up these forms of activity (the objective spirit exists only insofar as it is an activity), the individual becomes a subject.[109]

Reflexion implies going beyond the limit of individual consciousness: recognition of oneself in the other individuals constituting society and at the same time objectification of man in the artifacts of the world of culture created by him.

But reflexion is not simply a relation to the individual "I". The essence of reflexion consists, according to Hegel, in cognition of the objective spirit itself, in the process of dialectical development of knowledge. This development is substantiation of knowledge, reflexion upon it and

deepening in itself. A real foundation emerges at the end and as a result of development, not at the beginning. The movement ahead and development of the content of objective knowledge is at the same time a movement backwards, a discovery of the true hidden basis of the whole process.

"Consciousness is, on the one hand, a realisation of the object, and on the other, consciousness of oneself: the conscious realisation of what is true for it and the realisation of one's knowledge about it."[110] The object appears to the consciousness only in the shape in which it knows that object. The consciousness compares its knowledge of the object with the object itself. "If in this comparison the two do not correspond to one another, the consciousness seems to be obliged to change its knowledge, to bring it in accord with the object; but in this change of knowledge the object itself actually changes for it, for the available knowledge was essentially the knowledge of the object; along with the knowledge, the object too becomes different, for it belonged in fact to this knowledge."[111] The consciousness makes it clear that what previously appeared as being-in-itself, i.e., independently from the given consciousness is in actual fact merely being for the given consciousness. At the same time, it is not only the consciousness and its object that change but also the standards and criteria of verifying the agreement between knowledge and its object. "The criterion of testing is changed, when that of which it was to have been the criterion does not stand the test; and the test is not only a test of knowledge but also of its own criterion."[112]

Hegel points out that the new object of knowledge comes into being "through *conversion* (*Umkehrung*) of *consciousness* itself".[113] At the same time, individual consciousness does not know how that occurs, for the emergence of the new object "takes place behind its back, as it were".[114]

Therefore, reflexion of knowledge about itself at each stage of its development (the latter being incomplete) is "untrue", imperfect reflexion, implying the existence of unreflected movements of consciousness "behind its back". Knowledge in some form or other is not yet that which is cognized, Hegel insists.

According to Hegel, cognition is a world-historical dialectical process in which both subject and object change. The subject is not some ideal object, it is not something primordially equal to itself but eternal motion, becoming, development, sublation of all established boundaries and positing new ones. The subject is inseparable from restlessness and activeness, expressing that activeness in the purest form. He is inconceivable outside a relation with the object he cognizes and changes. At the same time, the object itself is transformed along with the development of consciousness, i.e., it changes in the historical process of cognitive activity. The conception of subject and object as entities isolated from and metaphysically opposed to each other is quite untenable and can only lead into philosophical *cul-de-sacs*.

However, Hegel sees reflexion, the self-consciousness of the Absolute Spirit, the Absolute Subject, as the essence of the cognitive process, and that is where idealistic mystification of the whole problem starts.

The Absolute Subject, according to Hegel, underlies the whole of reality in general. The substance is to be thought of as the subject, Hegel insists. What appears to the individual consciousness as an object independent from and cognized by it is in actual fact the product of the Absolute Spirit. Hegel tries to show that the development of cognition leads to a sublation of the independence of the cognized object from the cognizing subject, if the latter is to be understood as the Absolute Subject and not an individual one. The Absolute is ultimately the Subject-Object, thinking about thinking, the cognition of self.

Hegel's attempt to interpret cognition as self-cognition is also connected with the above thesis. Starting out from the real facts of interaction between consciousness and self-consciousness, cognition and reflexion, Hegel, following Fichte, endeavours to present all knowledge as reducible, in the final analysis, to self-cognition. True, Hegel speaks of the self-cognition of the Absolute Subject and not of that of an individual "I" or even of a Transcendental "I".

Hegel's analysis of the concrete historical development of cognition went far beyond the limits of philosophical transcendentalism, showing the collective nature of cognition, the development of its forms and norms in time, and revealing the dialectics of reflexive and unreflected content of knowledge. At the same time, according to Hegel, fully adequate cognition, that is, cognition that really deserves its name, is only attained when absolute completeness of reflexion is achieved, when the subject (the Absolute Subject) becomes, as it were, absolutely transparent for itself and reflects on itself without going beyond its own limits. It is in this act of coincidence of the cognizing subject with itself that the process of substantiation of knowledge is completed.

Hegel believes that the foundation of knowledge should

not be sought for at the source of the cognitive process. This foundation is not given, it is moulded and takes shape in the development of cognition. In this point, Hegel opposes the metaphysical view of the problem of substantiating knowledge, widespread in Western bourgeois philosophy. At the same time, though the foundation of knowledge lies, according to Hegel, at the end rather than at the beginning of the cognitive process, substantiation is interpreted in his system as coinciding with absolute reflexion, with the self-consciousness of the Absolute Spirit.

Just like Descartes, Kant and Fichte, Hegel believes that only the self-cognition of the spirit, its knowledge of itself, can reach absolute adequacy. It is in the act of absolute reflexion that the absolute foundation of knowledge is found. Thus Hegel essentially reproduces the traditions of philosophical transcendentalism at this basic point of his epistemological conception. True, Hegel speaks of some supra-individual, Absolute Subject. But Hegel believes that the individual, too, inasmuch as he became part of the motion of the Absolute Spirit and assumed the standpoint of "absolute knowledge", does not merely comprehend the Absolute adequately but grasps at the same time his own deep essence, i.e., cognizes himself. The individual's self-cognition coincides in this case with absolute reflexion.

Hegel's philosophy ultimately explains the development of cognition by the self-cognition of the Absolute. The Absolute, which exists at the beginning of development in itself only, must eventually also become being for itself. And that means that all the historical vicissitudes of the real cognitive process are predetermined in the supra-human spheres. The real persons, the individual subjects of practical and cognitive activity are merely disappearing elements in the development of the supra-individual forces.

The relations between individuals, human communication, the real practical activity, man's reification of himself in the works of culture, and the unfolding of the social process, which Hegel includes in the sphere of the objective spirit, all of these elements mediating the spirit's relation to itself are ultimately sublated; the spirit returns to itself as to the "inner". It is in the relation to itself as the "inner", in the existence for itself rather than for others, that the spirit appears in the most adequate form.[115]

Hegel believes that external object-related activity cannot produce consciousness. This kind of activity achieves merely objectification of consciousness, as a result of which consciousness itself is enriched. But the crux of

the matter is that any external mediation of consciousness must be sublated in the unity of the immediate and the mediated, in a dialectical identity of consciousness with itself.

Purely immediate consciousness (whether this is taken to mean empirical knowledge or intellectual intuition) does not exist, Hegel insists. Immediate certainty, inasmuch as it is merely immediate, is not knowledge. The latter implies mediation. Only that knowledge is adequate in which unity is attained of the immediate and the mediated in the form of the new dialectically mediated. In the immediate, which exists at the beginning of the development of cognition, the possibility and necessity of mediation are embedded, and the nature of the latter is predetermined. The result of the development of cognition and mediation is a return to the immediate on a new basis, Hegel believes. "Mediation is nothing but equality to itself in motion, or else it is reflexion in itself... The 'I' or becoming in general is, owing to its simplicity, precisely the immediate in the process of becoming and the immediate itself."[116] (In real cognition, however, there is always, in a definite sense, a unity of the immediate and the mediating elements in knowledge. This unity does not in itself guarantee the truth of knowledge.)

In the final analysis, Hegel reduces the essence of any cognition to reflexion. Insofar as the object of reflexion changes in the course of the latter, Hegel concludes that cognition deals with an object which is a product of the Absolute Spirit itself. Hegel's *Phenomenology of the Spirit* is the story of the struggle of self-consciousness with the object, as a result of which the object proves to be a proper moment of Absolute self-consciousness. "As it drives itself towards true existence, it will reach a point where it will discard the appearance of being encumbered with the foreign which exists only for and in the capacity of another, or where appearance will be equal to the essence, its presentation coincides thereby with precisely this point of the science of the spirit properly speaking; and finally, as it captures this its being itself, it will express the nature of absolute knowledge itself."[117]

"The main point is," wrote Marx, "that the *object of consciousness* is nothing else but *self-consciousness*, or that the object is only *objectified self-consciousness*—self-consciousness as object. (Positing of man= self-consciousness.)

"The issue, therefore, is to surmount the *object of consciousness. Objectivity* as such is regarded as an *estranged* human relationship which does not correspond to the

essence of man, to self-consciousness. The *reappropriation* of the objective essence of man, produced within the orbit of estrangement as something alien, therefore denotes not only the annulment of *estrangement*, but of *objectivity* as well. Man, that is to say, is regarded as a *non-objective, spiritual* being."[118]

As Lenin wrote: "Hegel seriously 'believed', thought, that materialism as a philosophy was impossible, for philosophy is a science of thinking, of the *universal*, but the universal is a thought. Here he repeated the error of the same subjective idealism that he always called 'bad' idealism."[119]

Thus, although Hegelian philosophy grasps a number of important moments of the real cognitive process, on many fundamental issues it reveals an affinity to the epistemological position of philosophical transcendentalism; remaining within the limitations of idealism, it cannot give an adequate picture of cognition.

5. HOW IS A THEORY OF COGNITION POSSIBLE?

In the light of what has been said here let us attempt to answer the following question: what are the properties of epistemological reflexion? In other words, what is the nature and character of research which has cognition itself for its object?

We have already analysed some conceptions, widely spread in bourgeois philosophy, according to which epistemology does not assume any premises, as the very possibility of any knowledge, including scientific knowledge, must be substantiated in its framework. Substantiation is in this case understood as finding types of knowledge that would be absolutely reliable and directly given in their content. The adherents of these conceptions searched for this knowledge in individual consciousness. We may recall that it was this course of reasoning that was characteristic of epistemological transcendentalism, in particular of Descartes, Fichte, and Husserl. In this conception, "absolute", transcendental reflexion about the content of the subject's consciousness becomes a method of epistemological research, and "absolute knowledge", its result. Absolute knowledge can only be obtained within the framework of epistemology. All other kinds of knowledge, both everyday and scientific, are relative and conditional from the standpoint of transcendentalism.

But that means that epistemology becomes a rather

specific discipline basically different from the particular scientific theories. (Some transcendentalists, such as Husserl, believe that epistemology, being the foundation of scientific knowledge, is not itself a theory in the precise meaning of the term, but a kind of pre-theoretical description of the immediately given obvious entities.)

The supporters of this approach to epistemological problems differ in their understanding of the very nature and content of the obvious entities which are, in their view, directly given to the subject's consciousness. This general type of understanding of epistemological problems also includes some trends of subjectivist empiricism, in particular, such schools of bourgeois philosophy as neorealism and critical realism.

The situation is somewhat more complicated in the case of the epistemological conceptions of such philosophers as Kant and particularly Hegel, who go beyond the limits of this approach in some essential aspects.

However, in the view of Kant and Hegel, too, philosophical epistemological reflexion is concerned with obtaining "absolute" knowledge, unlike studies in the special scientific disciplines and reflexion in these areas.

As a reaction to the breakdown of the attempts to solve the problem of substantiating knowledge in its metaphysical (and as a rule, subjectivist) interpretation, the view now gains currency in bourgeois philosophy that this problem has no meaning at all, and that epistemology therefore loses its right to exist as a special philosophical discipline. All real problems pertaining to understanding the mechanisms and character of the cognitive processes are studied, from this point of view, by the special scientific disciplines. Thus, according to Quine, cognition is the subject-matter of scientific inquiry in the framework of the physiology of higher nervous activity, psychology, which uses the apparatus of information theory, and a number of other special scientific disciplines. A scientific epistemology (which in Quine's view has not yet been created) is only conceivable as a generalisation of the results of these special disciplines. This future science must take a naturalistic and biological approach to man and his cognitive process (the so-called naturalised epistemology).[120] Jean Piaget believes that the genetic epistemology he has constructed is a generalisation, on the one hand, of the empirical and theoretical data of psychology (mostly of Piaget's own psychological theory) and, on the other hand, of the data of the history of science.[121] In this conception, epistemology actually appears as a special scientific discipline of a certain kind: first, a rather general disci-

pline, and second, one dependent on other, more special sciences of cognition. (We ignore here the fact that psychology itself may be treated in quite different ways: both as an empirical science of the facts of consciousness and as a science of behaviour—in the spirit of behaviourism.)

From the standpoint of early Wittgenstein, the traditional theory of knowledge was merely an inadequate interpretation of psychological data in terms of philosophy. As distinct from psychology, Wittgenstein believed, genuine philosophy must be concerned with the study of language and not cognition: "4.1121 Psychology is no nearer related to philosophy, than is any other natural science. The theory of knowledge is the philosophy of psychology."[122]

The school of linguistic analysis, which is dominant in the modern bourgeois philosophy of England, the formation of which was strongly affected by the later works of Wittgenstein, adheres to a special position in the interpretation of the nature of epistemological research, one that is intermediate between the reduction of this research to empirical generalisation of certain objectified data and the position, analysed above, which posits the task of epistemology to be the analysis of the premises of any knowledge, including scientific knowledge. The philosophy of linguistic analysis insists, on the one hand, on the possibility and necessity of solving the philosophical problems of cognition through studying the entirely objective and generally accepted facts of the usage of words of the ordinary language. This study is only made possible by painstaking collective effort of many specialists, each of whom specifies and particularises the empirical results already obtained by applying special technical procedures. The work of an analytical philosopher reminds one, in many respects, of the work of a researcher engaged in some special science. This philosophy declares most problems of traditional epistemology, the problem of substantiating knowledge among them, to be pseudoproblems. On the other hand, the philosophy of linguistic analysis emphasises that it is the usage of everyday language that determines the semantic, or content, aspects of all the special scientific theories, in particular the theories of those sciences which study the processes of cognition. These sciences, psychology included, cannot in principle solve a single philosophical question pertaining to the understanding of knowledge and cognition, analytical philosophers believe. Epistemological problems are solved in analytical activity which in itself is not scientific, for it encompasses issues that are involved in all the sciences, and

is basically a-theoretical. The results of analysis, these philosophers insist, cannot be juxtaposed with experience in the same way as special scientific theories, for analysis deals with the structure of experience itself. Everyday language, which is the object of activity of an analytical philosopher, appears as a kind of primary givenness determining the content of all the types and modes of cognition. It is therefore not surprising that the activity of analytical philosophers manifests a certain affinity with philosophical transcendentalism, in particular phenomenology and Kantian philosophy, an affinity that is often realised by the analytical philosophers themselves.[123] Several Soviet philosophers have criticised the epistemological conception of the philosophy of linguistic analysis.[124]

However, is it possible to reveal the true nature of knowledge and cognition through simple inductive generalisation and systematisation of the conceptions of cognition formed in everyday life and in the separate sciences? The notions of the character of cognition, of the standards, criteria, and norms of knowledge, considerably vary not only in the transition from pre-scientific knowledge to scientific and from science to science: they also vary within the framework of a single scientific discipline in its historical development. Indeed, one of the essential tasks of epistemology is separating knowledge from absence of knowledge and establishing the standards of knowledge and cognition. It proves to be impossible to solve this task through elementary accumulation and systematisation of the varied facts of cognition, including those studied by psychology. Epistemology does not simply study the cognitive process in its actual implementation but sets down the general norms of cognitive activity.

Pointing out this fundamental fact, Popper rejects in his book *The Logic of Scientific Discovery* the naive naturalistic epistemology (which he also calls an "inductive theory of science") trying to describe the empirical behaviour of scientists. In actual fact, Popper says, epistemology is a general methodology of cognition. It does not describe what actually takes place in cognition but rather stipulates what requirements cognition must satisfy to agree with certain norms and ideals. According to Popper, a specialist in epistemology formulates the general norms of cognitive, and in the first place scientific, activity, and formulates certain proposals which are accepted purely conventionally. What cognition is, and what science is, is settled by agreement and not by empirical study. The character of the agreement determines the boundary between statements which express knowledge and those that do not. In

Popper's view, the specialist in epistemology (or methodology) formulates certain "absolute" prescriptions in the sense that their content is not prompted by empirical experience. These prescriptions, however, do not describe any specific supra-empirical reality, as transcendentalist philosophers believed, and neither do they express any absolute truths. They are not assertions in the strict sense, and therefore they cannot be either true or false. Some epistemological conventions can be replaced by others. Epistemology reveals connections between different epistemological (methodological) norms, resembling in this respect a scientific theory. Strictly speaking, however, epistemology (methodology) is not a theory, according to Popper, for it does not reflect any object.[125]

What is one to be guided by, then, in accepting some epistemological (methodological) system or other? If the choice is not determined either by empirical experience or the structure of transcendental consciousness, epistemological conventions can be absolutely arbitrary. In what way is then one epistemological system better than another? Or must they all be recognised as acceptable? In this case, all argument in epistemology is meaningless, all epistemological problems cease to be real problems, while their different solutions prove to be simply camouflaged proposals for rules of some sort of a game which we call cognition. Popper rejects these subjectivist and relativistic conclusions which follow from his epistemological conceptions.[126] He believes that there are certain criteria which compel the choice of one epistemological system over another. Among these criteria Popper includes the absence of contradictions in the system of epistemology and the extent to which the given system proves to be fruitful, facilitating the understanding of cognition as it actually occurs.[127] It is easy to see, however, that these criteria are, on the one hand, quite inadequate (even a most arbitrary and fantastic construction may be internally noncontradictory) and indefinite, and, on the other, they may contradict the basic principles of Popper's conception (an epistemological system has to be correlated, in one way or another, with actually existing cognition).

Still, how is the question of the nature and character of epistemological research solved? In searching for an answer to this question that would conform to the principles of dialectical materalist philosophy, let us note, first of all, that scientific epistemology is a theory which deals with actual empirical facts of cognition and attempts to study the varied forms, kinds, and types of cognition and knowledge (both scientific and pre-scientific) in terms of

their inherent standards and norms. In the first place, epistemology is oriented at analysing objectified kinds of knowledge and collective forms of cognitive activity, for it is these kinds of knowledge and cognition that reflect the cognitive norms in the most pure form. That means that scientific epistemology appears mostly as a form of objective reflexion. At the same time, epistemology also has to take into account, to some extent, the facts of individual consciousness (here the cognitive norms appear in a "transmuted form"), inasmuch as other empirically accessible paths of the reconstruction of certain cognitive standards are often absent.

A scientific theory of knowledge must thus necessarily be compared with the empirical data of cognition. But, just as any scientific theory, it does not merely passively reproduce or describe these empirical data but endeavours to reveal the essence of the process considered. For epistemology that means the singling out of such cognitive standards and norms which express deep characteristics of cognition and may not directly coincide with the way these norms are in certain cases understood in everyday cognition or in a concrete scientific study.

Epistemology must therefore take into account, in the first place, the real cognitive processes, correcting its propositions and specifying and developing them in the light of the real facts of cognition. The basic principles of dialectical materialist epistemology (the principle of reflexion, the principle of unity of practical activity and cognition, the principle of unity of dialectics, logic, and epistemology, etc.) do not at all express "absolute" and final solution to all possible epistemological problems or the creation of a closed epistemological construction incapable of development. These principles specify the necessary conditions of fruitful scientific study of epistemological problems, a study that never stands still but formulates and solves new questions and makes more precise certain propositions through the development of real cognition itself and the special sciences about it (psychology, the history of science, the science of science, etc.). At the same time, scientific epistemology, just as any scientific discipline, constructs a kind of idealised model of the process under study, later gradually specifying and particularising that model, comparing it with the empirical data of cognition. Thus epistemology is not a product of direct grasping of certain subjective certainties, and neither is it a simple description of the diverse facts of cognition. Still less can epistemology coincide with some special science of cognition, whether it be psychology or the

science of science.

Although epistemology is in some basic aspects similar to all the other scientific theories, it differs in some points from most theories. We must not forget that epistemology is a reflective theory.

Most scientific theories deal with objects of which they have no previous knowledge. No science can ignore the data of everyday experience, of course, but the development of scientific knowledge means going beyond the limits of this experience. The latter says nothing of the nature of those objects with which, for instance, modern physics deals. The knowledge of these objects is only acquired in the process of scientific research itself. A reflective theory, however, has, as we have noted, some preliminary, implicit knowledge of the object about which it formulates explicit knowledge. Epistemology as a reflective theory proceeds from an implicit knowledge of what knowledge and cognition are and what the basic cognitive norms are, i.e., it begins with implicit knowledge which is contained in individual consciousness, in everyday language, and in the paradigmal premises of scientific theories.

At the same time reflexion about knowledge, translation of the latter from its implicit into explicit form, and its theoretical formulation, involve certain changes of the very object of reflexion, revealing the imaginary character of some formations which were included in knowledge without proper foundation before the implementation of the procedure itself. We have already cited examples of reformulation of the object of reflexion as a result of this procedure in the special sciences. Epistemology differs from reflexion in the special sciences in that it tries to establish the necessary conditions for any cognition and universal cognitive norms. The links between an epistemological system and a certain particular theory of a special science are therefore rather mediated. Nevertheless, formulation of an epistemological conception is always an attempt not merely to state the existing practice of cognition but also to change this practice, to reject certain established canons of cognitive activity as distracting cognition from the attainment of its goal, and at the same time to introduce new standards of this activity. The general image of cognition and science created by epistemology is itself included in the real course of cognition and in certain respects restructures it. Therefore any serious, influential epistemological conceptions are not only an interpretation of the existing practice of cognition but also a critique of some aspects of this practice in the light of

some ideals of knowledge and science.

Thus, a certain gap between the model of knowledge constructed in epistemology and the actual cognitive practice is explained not only by the differences between any scientific theory and its empirical basis. As far as these differences are concerned, epistemology should strive for a greater assimilation of empirical data, it must be revised and made more precise. At the same time, the differences between epistemology and the corresponding empirical practices of cognition may mark a gap between the specified ideal of knowledge and the practice of its realisation. In the latter case, practice, the empirical givenness of cognition, must be restructured and brought to the level of the ideal.

The above does not mean that all epistemological systems (and there have been quite a number of these in the history of philosophy) could affect the actual course of cognition. We must not assume either, that this influence was necessarily fruitful wherever it occurred. Situations were not infrequent in the history of philosophical and scientific thought where a given epistemological conception specified a reference frame for the production of special scientific theories of a definite type and at the same time an entirely erroneous conception of the nature of cognition, knowledge and science, which resulted in an insoluble collision in the construction of a general epistemological conception, essentially limiting at the same time the possibilities of science itself. For instance, the epistemological empiricism of Bacon played a very progressive role at the time of the formation of experimental science. At the same time, it did not accord with the actual practice of contemporary natural science and later became a drag on its development. We have already discussed some substantive defects of Descartes' epistemological conception. It cannot be ignored, however, that Descartes' epistemology serves as a basis of his metaphysics, while the latter is the nucleus of a research programme in physics and in psychology. Some historically important results were attained in Cartesian physics. Considerable factual material was accumulated within the framework of empirical psychology, though this psychology outlived its usefulness as a scientific discipline by the beginning of the 20th century. The epistemology of Kant, a critic of which was given above, did not merely formulate a general research strategy in several theoretical disciplines (for example, Kant's epistemology posits the impossibility of rationalist ontology, a special status of psychology as a non-mathematised science, the need for complement-

ing biological descriptions with teleological ones, etc.). Kant's conception (along with Husserl's phenomenology) was used by Brouwer and Heyting in constructing the intuitionist programme for the foundations of mathematics. Some important results were obtained in mathematical intuitionism, although on the whole this trend failed to solve the task it set itself. It is well known, however, that Kant's aprioristic interpretation of the basic principles of classical science came into a sharp collision with the development of cognition.

There are other instances, too, of the influence of epistemological conceptions on the development of science. An epistemological system may be completely inadequate as reflexion about scientific knowledge, offering an entirely false image of science and being quite untenable on the general philosophical plane. At the same time, such a system is used for the production of some local special scientific theories which retain a certain value even after their philosophical interpretation is rejected. That is possible because some aspects of the real cognitive process are usually grasped even in false epistemological constructions. But the special scientific theories produced in such cases are usually of very limited significance. At the same time, the main paths of scientific development are here obstructed by false epistemological constructions, and the development of theoretical thought in this area is on the whole deflected. That was the situation, e.g., with the epistemology of operationalism and the physical theories constructed according to operationalist prescriptions.

The epistemology of dialectical materialism is specific in that it provides, for the first time, an adequate picture of cognition, knowledge, and science. And that means that the impact of this image of cognition on the actual development of science must result in extremely significant results. The history of Marxist philosophy and its relationships with the natural and social sciences confirms this idea. Marx's *Capital*, which embodies the scientific theory of political economy, was created on the basis of conscious application of the dialectical materialist epistemology and methodology of science.

Relying on a scientific conception of the nature of theoretical thinking and consciously employing the philosophically substantiated method of ascending from the abstract to the concrete, Marx constructed a scientific economic theory, formulating in detail the methodological problems arising in theoretical research and consistently solving them on the basis of general epistemological principles. Marx criticised bourgeois political economy not

just by comparing the content of a scientific theory with distorted interpretations of the same subject-matter, but through consistent refutation of basically erroneous methodological approaches. The main defect of bourgeois political economy, which predetermined its basically unscientific quality and was directly linked with its social function, was, as Marx showed, a false interpretation of both the nature of the object cognized and of the ways and methods of scientific cognition. Therefore a change in methodological and epistemological orientation is a necessary condition of creating a scientific political economy.

The epistemological ideas worked out by Lenin in his *Materialism and Empirio-Criticism* (the entire complex of ideas of the Marxist-Leninist theory of reflection, the scientific conception of matter, of image, the dialectics of relative and absolute truth, the thesis of the inexhaustibility of matter "in depth", the thesis of reflection as a property of all matter, etc.) were adopted by modern science (physics, biology, physiology, psychology, cybernetics, etc.), and proved to be exceptionally fruitful. One of the traits of the modern stage in the development of science is the consciously realised need for including general epistemological ideas (of which the scientific basis is Marxist-Leninist epistemology) into the production of theories in the special areas of knowledge. Modern science has reached a stage in its development when its further advance demands the weaving of self-reflexion into the very fabric of scientific research. That is the basis for an ever increasing interaction between philosophical, in particular epistemological, and special scientific knowledge.

CONCLUSION

The approaches to the analysis of the cognitive relation, characteristic of pre-Marxian and non-Marxist philosophy, prove to be internally untenable and contradict the practice of modern cognition. Whether cognition is interpreted as mere interaction of two natural systems or as determined by the structure of individual consciousness, in both cases the very mode of formulating and discussing the problem under consideration predetermines the fruitlessness of the researcher's thinking, leading to false results.

Within the framework of the first approach, correct materialist premises (the subject and the object being considered as definite material systems with real material links between them) go side by side with implications which lead the study of some basic epistemological questions into a blind alley, and compel metaphysical materialists to make serious concessions to subjectivism on a number of points.

Idealistic conceptions which assume that cognition is conditioned by the structure of individual consciousness, exploit for their own ends the problem of substantiating knowledge and the need for establishing norms which serve as criteria for separating knowledge from absence of it. In discussing the problem of substantiation of knowledge, the upholders of this approach proceed from two false assumptions which predetermine the subjectivist nature of their epistemological conceptions. The first is the metaphysical notion about the existence of standards permitting one to draw a distinct boundary between knowledge and absence of knowledge and to single out "absolute knowledge" in pure form which could be used as the foundation of the entire system of scientific theories. The second is that the adherents of the idealistic conceptions considered here, assuming that raising the problem of substantiation implies a critical attitude to the various kinds of existing knowledge, arrive at the conclusion that the philosophical analysis of the cognitive relation should reject any reliance on the results of the special sciences or the propositions of the pre-scientific "common sense".

The dialectical materialist conception of the cognitive relation, apart from answering the questions which confuse

non-Marxist epistemology, sets tasks and problems before epistemology which do not exist for traditional bourgeois philosophy. Marxist-Leninist epistemology makes its starting point the recognition of the unity of reflection, of practical object-oriented activity and communication, and the conception of cognition as a socially mediated and historically developing activity of reflection.

Marxist philosophy asserts that cognition is founded on practical activity and that the latter must be understood in its specifically human characteristics, to wit, as collective or joint activity, in which the individual enters upon definite relations with other persons, as mediated activity in which man places between himself and an external naturally emerging object other man-made objects functioning as the implements of activity; and finally, as a historically developing activity carrying in itself its own history. In the objects that are cognized, man singles out those features that prove to be essential for the developing social practice, and that is only possible through mediator objects implementing socio-historical experiences. Man-made instruments act as the forms of expressing objective norms, standards, and object-hypotheses existing outside a given individual. The assimilation of these norms, social in their origin, by the individual, makes possible their functioning as structure-forming components of cognition.

The internal processes of consciousness emerge as the consequence of their interiorisation, that is, "growing in" or transposition onto the inner plane of those actions of the subject which are originally implemented in an external form and directed at external objects. At the start of the formation of consciousness, three kinds of activity emerge as linked together: external practical activity, the process of cognition, and communication. In implementing one and the same object-oriented action, the subject simultaneously performs a number of functions—he changes the form of the external object, performs the act of cognitive orientation and assimilates the socially moulded ways of practical and cognitive activity embodied in the object which he uses as a mediator object. The assimilation of adequate modes of manipulating a socially functioning object is only possible if the subject is included in the living communicative connections with other persons, who teach him methods of using man-made things and thereby shape his cultural orientations and norms, including the standards of cognitive activity. At the stage of well-formed consciousness, the direct links between practical activity, cognition and communication

are disrupted. At the same time, any cognitive activity, whatever the form of its direct subjective givenness, is socially mediated in the basic mechanisms of its realisation, and consequently always carries the potential of communicating. Therefore, as far as epistemological research, i.e., the discovery of universal referential meanings, norms and standards, is concerned, the most suitable material for analysis is precisely the processes, means, and products of communicative activity, in which cognition is reified and objectified, and not the phenomena of consciousness taken as such, in which these referential meanings and standards appear in "converted" or "folded" form, so to speak, and are not always sufficiently clear to the subject himself. In the Marxist philosophical conception, the process of transmission of knowledge implies objectification of knowledge not only in the form of texts or utterances but also in the form of man-made objects carrying socio-cultural meaning.

Marxist-Leninist epistemology radically reorientates the traditional epistemological problems and fundamentally changes the very manner of positing and studying them. The starting point of analysis of knowledge is not taken to be the study of the relation of the individual subject (whether it be organism or consciousness) to the opposing object but the study of the functioning and development of systems of collective, inter-subject activity based on practical transformation of external objects.

The Marxist-Leninist conception of the nature of cognition entails a number of propositions important for further study of problems in scientific epistemology and at the same time opening up the possibility of scientific interpretation of numerous questions widely discussed in modern works on the methodology of science, scientology, and the psychology of cognition.

The task of epistemology does not at all consist in the solution of a metaphysically interpreted problem of "absolute" substantiation of knowledge. The real substantiation of knowledge is attained in the process of actual development of cognition itself in its union with practical activity. The development of cognition involves a complicated dialectical interaction of discreteness and continuity or cohesion. This mutual relation is one of the aspects of the connection between absolute and relative moments in objective truth, which was analysed in classical form by Lenin. Scientific epistemology is an integral and special part of cognition. Neither the individual nor the collective subjects of cognition are the supreme guarantors of this substantiation. It may be said, of course, that scientific

epistemology is objective reflexion about the collective cognizing subject. The latter, however, is not a complete entity equal to itself, not a world of consciousness closed in itself, but a system of constantly developing collective cognitive activity closely linked with practical object-oriented activity. Therefore, the proper field of epistemological study is, first of all, the development of cognitive norms, the philogenesis and ontogenesis of cognition in their dialectical unity. The development of cognition implies also changes in the cognizing subjects, both collective and individual, and in the range of cognized objects. At the same time, it encompasses the development of certain cognitive standards, and consequently the development of some characteristics of cognition itself.

NOTES

Introduction

[1] See, e.g., B. M. Kedrov, *Lenin and the Dialectics of the Natural Science of the 20th Century*, Moscow, 1971 (in Russian).
[2] See P. S. Dyshleviy, *Materialist Dialectics and Physical Relativism*, Kiev, 1972, pp. 22-23 (in Russian).
[3] Niels Bohr, "Quantum Physics and Philosophy. Causality and Complementarity", *Philosophy in the Mid-Century. A Survey*, ed. by Raymond Klibansky, La Nuova Italia Editrice, Firenze, 1958, p. 311.
[4] V. A. Fok, *Quantum Physics and the Structure of Matter*, Leningrad, 1965, p. 11 (in Russian).
[5] Stephen Cole Kleene, *Introduction to Metamathematics*, North-Holland Publishing Co., Amsterdam, 1952, p. 48.
[6] Ibid., p. 51.
[7] See *Mathematisches Zeitschrift*, No. 10, 1921.
[8] See W. V. O. Quine, *Ontological Relativity and Other Essays*, New York, 1969.
[9] See N. Chomsky, *Cartesian Linguistics*, New York, 1966; idem, "Recent Contributions to the Theory of Innate Ideas", *Boston Studies in the Philosophy of Science*, Vol. III, Dordrecht, 1967.
[10] See Th. Kuhn, *The Structure of Scientific Revolutions*, Chicago, 1970.
[11] *Lenin's Theory of Reflection and Modern Science* in 3 Vols, Sofia, 1973 (ed. by T. Pavlov); S. L. Rubinstein, *Being and Consciousness*, Moscow, 1957; idem, "Man and the World ", in *Problems of General Psychology*, Moscow, 1976; P. V. Kopnin, *Dialectics as Logic*, Kiev, 1961; idem, *Introduction into Marxist Epistemology*, Kiev, 1966; idem, *Dialectics, Logic, Science*, Moscow, 1973; idem, *Dialectics as Logic and Epistemology*, Moscow, 1973; B. M. Kedrov, *The Unity of Dialectics, Logic, and Epistemology*, Moscow, 1963; idem, *Lenin and the Dialectics of Natural Science in the 20th Century*; idem, *From the Laboratory of Lenin's Thought*, Moscow, 1972; E. V. Ilyenkov, *On Idols and Ideals*, Moscow, 1968; idem, *Dialectical Logic*, Moscow, 1974; A. M. Korshunov, *The Theory of Reflection and Creativity*, Moscow, 1971; idem, *Cognition and Activity*, Moscow, 1967; A. M. Korshunov, V. V. Mantatov, *The Theory of Reflection and the Heuristic Role of Signs*, Moscow, 1974; V. S. Tyukhtin, *On the Nature of the Image (Psychical Reflection in the Light of Cybernetic Ideas)*, Moscow, 1963; idem, *Reflection, Systems, Cybernetics: The Theory of Reflection in the Light of Cybernetics and the Systems Approach*, Moscow, 1972; A. G. Spirkin, *The Origin of Consciousness*, Moscow, 1960; idem, *Consciousness and Self-Consciousness*, Moscow, 1972; V. I. Shinkaruk, *The Unity of Dialectics, Logic, and Epistemology. An Introduction into Dialectical Logic*, Kiev, 1977; Zh. M. Abdildin, A. S. Balgimbayev, *The Dialectics of the Subject's Activeness in Scientific Cognition*,

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[12] M. E. Omelyanovsky, "On Physical Reality", *Voprosy filosofii*, No. 10, 1971; idem, "The Objective and the Subjective in Quantum Theory", *Voprosy filosofii*, No. 6, 1974; idem, "Philosophical Debate in Modern Physics Around the Problem of the Objective and the Subjective", *Voprosy filosofii*, No. 2, 1976; P. S. Dyshlevly, *Materialist Dialectics and Physical Relativism*; idem, "The Dialectics of the Correlation of the Object and Subject of Cognition in Modern Physics", *Voprosy filosofii*, No. 6, 1969; V. V. Bazhan, P. S. Dyshleviy et al., *Dialectical Materialism and the Problem of Reality in Modern Physics*, Kiev, 1974; V. S. Stepin, L. M. Tomilchik, *The Practical Nature of Cognition and the Methodological Problems of Modern Physics*, Minsk, 1970; V. S. Stepin, *The Formation of Scientific Theory*, Minsk, 1976; idem, "The Problem of Subject and Object in Experimental Science", *Voprosy filosofii*, No. 1, 1970; V. V. Kazyutinsky, G. N. Naan, "Epistemology and the Problems of Modern Astronomy", *Problems in Epistemology*, Issue 1, Moscow, 1969; L. G. Antipenko, *The Problem of Physical Reality. Logico-Epistemological Analysis*, Moscow, 1973; V. P. Hütt, *The Conception of Complementarity and the Problem of the Objectiveness of Physical Knowledge*, Tallinn, 1977; V. I. Kuptsov, "The Problem of Reality of Macroscopic Spontaneous Fluctuations", *Man, Creativity, Science*, Moscow, 1967 (all in Russian); M. E. Omelyanovsky, *Dialectics in Modern Physics*, Progress Publishers, Mos-

cow, 1979, and other works.

[13] S. L. Rubinstein, *The Principles and Paths of the Development of Psychology*, Moscow, 1959; idem, *Problems of General Psychology*; A. N. Leontyev, *Activity. Consciousness. Personality*, Moscow, 1975; P. Ya. Galperin, "The Development of Studies in the Formation of Mental Actions", *Psychological Science in the USSR*, Vol. 1, Moscow, 1959; idem, "Towards the Study of the Child's Intellectual Development", *Voprosy psikhologii*, No. 1, 1969; idem, *Introduction into Psychology*, Moscow, 1976; V. V. Davydov, *Types of Generalisation in Learning*, Moscow, 1972; idem, "Analysis of the Structure of the Cognitive Act", *Doklady APN RSFSR*, No. 2, 1960; idem, "The Categories of Logic and Pedagogics", *Problems in Dialectical Logic: Materials for a Symposium*, Alma-Ata, 1968; A. R. Luriya, *On the Historical Development of Cognitive Processes: An Experimental-Psychological Study*, Moscow, 1974; A. V. Zaporozhets, L. A. Venger, V. P. Zinchenko, A. G. Ruzskaya, *Perception and Action*, Moscow, 1967; Ye. V. Shorokhova, *The Problem of Consciousness in Philosophy and Natural Science*, Moscow, 1961; K. A. Abulkhanova, *On the Subject of Psychical Activity*, Moscow, 1973; idem, *The Dialectics of Human Life: The Correlation of the Philosophical, Methodological, and Concrete Scientific Approaches to the Problem of the Individual*, Moscow, 1977; A. V. Brushlinsky, *A Cultural-Historical Theory of Thinking (Philosophical Problems of Psychology)*, Moscow, 1968; M. S. Rogovin, *Introduction into Psychology*, Moscow, 1969; M. S. Rogovin, A. B. Solovyov, L. P. Urvantsev, Sh. Sh. Shotemor, "The Structure of the Psyche and the Problem of Cognition", *Voprosy filosofii*, No. 4, 1977 (all in Russian); A. N. Leontyev, *Problems of the Development of the Mind*, Progress Publishers, Moscow, 1981; A. I. Meshcheryakov, *Awakening to Life. Forming Behaviour and the Mind in Deaf-Blind Children*, Progress Publishers, Moscow, 1979, and other works.

[14] V. A. Lektorsky, *The Problem of the Subject and Object in Classical and Modern Bourgeois Philosophy*, Moscow, 1965; idem, "The Subject-Object Problem in Epistemology", *Voprosy filosofii*, No. 5, 1964; idem, "The Principles of Reproduction of the Object in Knowledge", *Voprosy filosofii*, No. 4, 1967; idem, "Lenin's Conception of the Dialectics of Subject and Object", *Kommunist*, No. 6, 1967; idem, "The Unity of the Empirical and Theoretical in Scientific Cognition", *Dialectics as Epistemology. Problems in Scientific Method*, Moscow, 1964; the articles on "Experience", "Object", "Subject", "Subjective", Epistemology" in the *Philosophical Encyclopedia*, Moscow, Vol. 4, 1967, Vol. 5, 1970; idem, "Materialist Dialectics as the Methodological Basis of Scientific Cognition", *Kommunist*, No. 7, 1971, (jointly with P. V. Kopnin); idem, "The Methodological Analysis of Science (Types and Levels)", *Philosophy, Methodology, Science*, Moscow, 1972 (jointly with V. S. Shvyrev), idem, "Philosophy and the Scientific Method", *Philosophy in the Modern World. Philosophy and Science*, Moscow, 1972; idem, "On the Subjective and the Objective", *Some Problems of Dialectics*, Issue VII, Moscow, 1973; idem, "The Problem of the Subject and Object in the Epistemology of Hegel and Marx", *The Philosophy of Hegel and Modern Times*, Moscow, 1973; idem, "Lenin's Development of Dialectics as Logic and Epistemology", *The History of Marxist Dialectics: The Leninist Stage*, Moscow, 1973 (jointly with A. Kh. Kasymjanov); idem, "Philosophy, Science, 'The Philosophy of Science' ", *Voprosy filosofii*, No. 4, 1973; idem, "Philosophy and Science in the Light of the Scientific and Technological Revolution", *Man—Science—Technology*, Moscow, 1973, and other works.

[15] The history of the formulation and discussion of the problem of subject and object is considered in our works *The Problem of the Subject and Object in Classical and Modern Bourgeois Philosophy*; "Epistemology", *Philosophical Encyclopedia*, Vol. 5.

Part One

[1] J. Locke, *An Essay Concerning Human Understanding*, The Harvester Press, Sussex, 1978, p. 288.

[2] For a critique of representationism see also S. L. Rubinstein, *Being and Consciousness*, p. 34; A. N. Leontyev, *Activity. Consciousness. Personality*, pp. 60, 130; idem, "The Image and the Model", *Voprosy psikhologii*, No. 2, 1970; V. A. Lektorsky, *The Problem of the Subject and Object in Classical and Modern Bourgeois Philosophy*, pp. 84-94; A. V. Brushlinsky, "On Some Methods of Modelling in Psychology", *Methodological and Theoretical Problems of Psychology*, Moscow, 1969, pp. 148-254; A. M. Korshunov, *The Theory of Reflection and Creativity*, Moscow, 1971, pp. 89-118; idem, "The Problem of Correlation of the So-Called Primary and Secondary Properties", *Man, Creativity, Science. Philosophical Problems*, Moscow, 1967 (all in Russian); F. T. Mikhailov, *The Riddle of the Self*.

[3] Bertrand Russell, *Human Knowledge. Its Scope and Limits*, George Allen and Unwin LTD, London, 1951, p. 245.

[4] Jean Piaget, *The Psychology of Intelligence*, Routledge & Kegan Paul Limited, London, 1947, p. 4.

[5] Ibid., p. 8.

[6] Ibid.

[7] Ibid., p. 9.

[8] Ibid., p. 10.

[9] Ibid., p. 11.

[10] In outlining the stages in intellect formation we draw mostly on the work by J. Piaget, B. Inhelder "Die Psychologie der frühen Kindheit. Die geistige Entwicklung von der Geburt bis zum 7. Lebensjahr", *Handbuch der Psychologie*, Hrsg. D. und R. Katz, Basel—Stuttgart, 1960, pp. 275-314.

[11] Ibid., p. 285.

[12] See Jean Piaget, *Introduction à l'épistémologie génétique*, Vols. I-III, Presses universitaires de France, Paris, 1950.

[13] See Jean Piaget, "The Role of Action in the Formation of Thinking", *Voprosy psikhologii*, No. 6, 1965, p. 43 (in Russian).

[14] Max Born, *Physics in My Generation*, Pergamon Press, London, 1956, p. 163.

[15] Ibid., p. 157.

[16] For a more detailed discussion of invariance as an indicator of objective knowledge see S. L. Rubinstein, *Being and Consciousness*, pp. 125-126; M. E. Omelyanovsky, *V. I. Lenin and the Philosophical*

Problems of Modern Physics, Moscow, 1958; idem, "Dialectical Materialism as the Methodological Basis of Modern Physics", *Filosofskiye nauki*, No. 1, 1965; V. A. Lektorsky, *The Problem of the Subject and Object in Classical and Modern Bourgeois Philosophy*, pp. 66-84; idem, "On the Subjective and the Objective", *Some Problems of Dialectics*, Issue VII; V. S. Tyukhtin, *Reflection, Systems, Cybernetics...*, pp. 107-112 (all in Russian).

[17] See Jean Piaget, *Introduction à l'épistémologie génétique*, Vol. I.

[18] See L. Apostel, B. Mandelbrot et J. Piaget, *Logique et équilibre*, Presses universitaires de France, Paris, 1957, p. 44.

[19] Jean Piaget, *Introduction à l'épistémologie génétique*, Vol. II, p. 42.

[20] P. W. Bridgman, *The Logic of Modern Physics*, The Macmillan Company, New York, 1954, p. 1.

[21] Ibid., p. 5.

[22] Ibid., pp. 5, 6.

[23] Ibid., p. 10.

[24] A. Cornelius Benjamin, *Operationism*, Charles C. Thomas, Publisher, Springfield, 1955, p. 67.

[25] P. W. Bridgman, "Some General Principles of Operational Analysis", *Psychological Review*, Vol. 52, No. 5. September 1945, p. 248.

[26] "From the operational point of view it is meaningless to attempt to separate 'nature' from 'knowledge of nature'." (P. W. Bridgman, *The Logic of Modern Physics*, p. 62.)

[27] P. W. Bridgman, *The Nature of Physical Theory*, Princeton University Press, Princeton, 1936, pp. 13-14, 15.

[28] P. W. Bridgman, *The Intelligent Individual and Society*, The Macmillan Company, New York, 1938, p. 80.

[29] See V. Lenzen, "Operational Theory in Elementary Physics", *American Physical Teacher*, Vol. 7, 1939, p. 367.

[30] "The Present State of Operationalism", *The Scientific Monthly*, Vol. 79, No. 4, October 1954, pp. 209-231.

[31] Adolf Grünbaum, "Operationism and Relativity", *The Scientific Monthly*, Vol. 79, No. 4, October 1954, p. 230.

[32] D. P. Gorsky, "On the Kinds of Definitions and Their Significance in Science", *Problems in the Logic of Scientific Cognition*, Moscow, 1964, p. 308 (in Russian).

[33] V. S. Shvyrev, "Some Problems in the Logico-Methodological Analysis of the Relation Between the Theoretical and Empirical Levels of Scientific Cognition", *Problems in the Logic of Scientific Cognition*, p. 74 (in Russian).

[34] René Descartes, *Oeuvres et lettres*, Editions de la Nouvelle Revue Française, Paris, 1937, pp. 97-98.

[35] Ibid., p. 97.

[36] Ibid., p. 96.

[37] Ibid.

[38] Ibid., p. 213.

[39] Ibid., p. 161.

[40] Ibid., p. 162.

[41] Ibid., p. 163.

[42] Ibid.

[43] Ibid., p. 167.

[44] Ibid., p. 435.

[45] Ibid., p. 436.

[46] Ibid.

[47] Ibid.

[48] Ibid., p. 171.

[49] Ibid., p. 174.

[50] Ibid., p. 169.

[51] Ibid., p. 214.

[52] Ibid., p. 216.

[53] Ibid., p. 453.

[54] Quoted from R. J. Hirst, *The Problems of Perception*, George Allen and Unwin LTD, London, 1959, p. 28.

[55] Ibid., pp. 67-68.

[56] Ibid., p. 85.

[57] Ibid., pp. 91-92.

[58] Ibid., p. 102.

[59] See Edmund Husserl, *Erfahrung und Urteil. Untersuchungen zur Genealogie der Logik*, Academia Verlagsbuchhandlung, Prague, 1939, pp. 12-13.

[60] Quoted from Z. M. Kakabadze, *The Problem of "Existential Crisis" and Edmund Husserl's Transcendental Phenomenology*, Tbilisi, 1966, p. 76 (in Russian).

[61] See Quentin Lauer, *Phénoménologie de Husserl*, Presses universitaires de France, Paris, 1955, pp. 188, 315; Joseph Kockelmans, *Edmund Husserl's Phenomenological Psychology*, Duquesm University Press, Pittsburgh, 1967, pp. 225-231, 260, 261.

[62] For an analysis of the problem of the subject and object in Fichte's philosophy see also A. M. Deborin, "Dialectics in Fichte", *Marx and Engels Archives*, Book 3, Moscow-Leningrad, 1927; V. F. Asmus, *Essays on the History of Dialectics in the Philosophy of the New Times*, Moscow-Leningrad, 1930; T. I. Oizerman, *The Philosophy of Fichte*, Moscow, 1962; M. Bur, *Fichte*, Moscow, 1965; K. N. Lyubutin, *The Problem of the Subject and Object in Classical German and Marxist-Leninist Philosophy*, pp. 35-47 (all in Russian).

[63] Johann Gottlieb Fichte, *Grundlage der gesamten Wissenschaftslehre*, Fritz Eckardt Verlag, Leipzig, 1911, p. 8.

[64] Ibid., p. 10.

[65] Ibid., p. 17.

[66] Ibid., p. 16.

[67] Ibid., p. 104.

[68] Ibid., p. 105.

[69] For an analysis of Kant's epistemology see also the following works: Yu. M. Borodai, *Imagination and Epistemology*, Moscow, 1966; *The Philosophy of Kant and Modern Times* (ed. by T. I. Oizerman), Moscow, 1974; *Critical Essays on Kant's Philosophy* (ed. by M. A. Bulatov), Kiev, 1975; T. I. Oizerman, *The Philosophy of Kant*, Moscow, 1974; V. F. Asmus, *Immanuel Kant*, Moscow, 1973; V. I. Shinkaruk, *The Epistemology, Logic, and Dialectics of Kant*, Kiev, 1974; Zh. M. Abdildin, *The Dialectics of Kant*, Alma-Ata, 1974; N V. Motroshilova, "Husserl and Kant: the Problem of 'Transcendental Philosophy'", in: *The Philosophy of Kant and Modern Times*, Moscow, 1974, I. S. Narsky, *Kant*, Moscow, 1976 (all in Russian).

[70] See Immanuel Kant, *Critique of Pure Reason*, G. Bell and Sons LTD., London, 1930, p. 13.
[71] Ibid., p. 83.
[72] Ibid., p. 86.
[73] Ibid., pp. 168-169.
[74] Ibid., p. 168.
[75] Ibid., p. 166.
[76] Ibid., pp. 167-168.
[77] Ibid., p. 169.
[78] Ibid., pp. 84-85.
[79] Ibid., p. 249.
[80] Ibid., p. 96.
[81] One may get the impression that what has been said here is inapplicable at least to the Kantian conception of "pure mathematics". The latter is considered in the *Critique of Pure Reason* as a science whose subject-matter is determined by the apriori sense forms—space and time. That means that, from the Kantian standpoint, the speculative elements play a fundamental role in mathematical knowledge. However, mathematics as a science assumes, according to Kant, application of the logical categories of reason to the pure apriori sense forms. Kant's conception of mathematics is thus different from Husserl's. It is the latter rather than the former that underlies that modern trend in the substantiation of mathematics that became known as intuitionism.
[82] Quoted in Z. M. Kakabadze, *The Problem of "Existential Crisis" and Edmund Husserl's Transcendental Phenomenology*, p. 87.
[83] Ibid., p. 90.
[84] For an analysis of Sartre's philosophical conception see V. N. Kuznetsov, *Jean-Paul Sartre and Existentialism*, Moscow, 1969; G. Ya. Streltsova, *A Critique of the Existentialist Conception of Dialectics (Analysis of the Philosophical Views of J.-P. Sartre)*, Moscow, 1974; M. A. Kissel, *The Philosophical Evolution of J.-P. Sartre*, Leningrad, 1976; L. I. Filippov, *The Philosophical Anthropology of Jean-Paul Sartre*, Moscow, 1977 (all in Russian).
[85] See J.-P. Sartre, *L'etre et le néant. Essai d'ontologie phénoménologique*, Librairie Gallimard, Paris, 1943, pp. 372, 388, 390.
[86] Ibid., pp. 332-333.
[87] Ibid., pp. 198-202.
[88] Ibid., pp. 342-343.
[89] Ibid., pp. 220-240.
[90] See Jean Piaget, *The Language and Thought of the Child*, The New American Library, Inc., New York, 1974; Jean Piaget, "Pensée egocentrique et pensée sociocentrique", *Cahiers internationaux de sociologie*, Vol. X, 1951, pp. 34-49; Jean Piaget, *Comments on Vygotsky's Critical Remarks Concerning "The Language and Thought of the Child"*, Massachusetts Institute of Technology Press, Cambridge, 1962; V. A. Lektorsky, V. N. Sadovsky, "The Genesis and Structure of Intellectual Activity in the Conceptions of Jean Piaget", *The Main Directions in the Study of the Psychology of Thought in the Capitalist Countries*, Moscow, 1966 (in Russian).
[91] Karl Marx, *Capital*, Vol. I, Progress Publishers, Moscow, 1974, p. 59.
[92] See L. S. Vygotsky, "The Problems of Speech and Thought in the

Theory of J. Piaget" in Jean Piaget, *The Language and Thought of the Child*, Moscow-Leningrad, 1932, pp. 3-54; L. S. Vygotsky, *Selected Psychological Studies*, Moscow, 1956; idem, *The Development of the Higher Psychical Functions*, Moscow, 1960 (all in Russian).
[93] See Jean Piaget, *Comments on Vygotsky's Critical Remarks Concerning "The Language and Thought of the Child"*.
[94] Jean Piaget, "Pensée egocentrique et pensée sociocentrique", Op. cit. p. 37.
[95] See A. J. Ayer, *The Problem of Knowledge*, Macmillan & Co. LTD., London, 1956, pp. 47, 48, 50-52.

Part Two

[1] S. L. Rubinstein, *Problems of General Psychology*, Moscow, 1976, p. 253.
[2] A. M. Korshunov, *The Theory of Reflection and Creativity*, p. 20 (in Russian).
[3] See V. D. Glezer, Zuckermann I. I., *Information and Vision*, Moscow-Leningrad, 1961, p. 89 (in Russian).
[4] See A. V. Zaporozhets, L. A. Venger, V. P. Zinchenko, A. G. Ruzskaya, *Perception and Action*, Moscow, 1967, p. 55 (in Russian).
[5] Karl Marx, *Capital*, Vol. I, Moscow 1974, p. 77.
[6] Quoted from J. Piaget, B. Inhelder, *La genèse des structures logiques élémentaires*, Paris, 1951.
[7] V. S. Tyukhtin, *On the Nature of the Image*, Moscow 1963, pp. 40, 50 (in Russian).
[8] See E. H. Gombrich, *Art and Illusion*, N.Y., 1961, p. 363.
[9] J. Gibson, *The Perception of the Visual World*, Cambridge, Massachusetts, 1950, pp. 26, 27.
[10] Ibid., p. 42.
[11] See A. N. Leontyev, "On the Ways of Studying Perception"; V. V. Stolin, "A Study in the Generation of the Visual Spatial Image"; A. D. Logvinenko, "Perceptual Activity under Inversion of the Retinal Image"; A. A. Puzyrei, "Sense-Formation in the Processes of Perceptual Activity", in *Perception and Activity* (in Russian).
[12] J. Ruskin, *The Elements of Drawing*, note to para 4; quoted from E. H. Gombrich, *Art and Illusion*, p. 296.
[13] See A. D. Logvinenko, "Perceptual Activity under Inversion of the Retinal Image", in *Perception and Activity*, pp. 252-256.
[14] See N. Yu. Vergiles, V. P. Zinchenko, "The Problem of the Adequacy of the Image (with Reference to Visual Perception)", *Voprosy filosofii*, 1967, No. 4 (all in Russian).
[15] See ibid., p. 65.
[16] See V. I. Lenin, "Conspectus of Hegel's Book *The Science of Logic*", *Collected Works*, Vol. 38, Moscow 1972, p. 171.
[17] V. I. Lenin, "Conspectus of Hegel's Book *The Science of Logic*", *Collected Works*, Vol. 38, p. 195.
[18] For a description of the experiments with the Ames chairs see E. H. Gombrich, op. cit, pp. 248-49.
[19] E. H. Gombrich, op. cit., p. 249.
[20] Karl Marx, "Theses on Feuerbach", in: Karl Marx, Frederick

Engels, *Collected Works*, Vol. 5, Progress Publishers, Moscow, 1976, p. 3.

[21] Karl Marx, "Randglossen zu Adolph Wagners *Lehrbuch der politischen Ökonomie*", Karl Marx, Friedrich Engels, *Werke*, Band 19, Dietz Verlag, Berlin 1962, pp. 362-63.

[22] V. I. Lenin, "Conspectus of Hegel's Book *The Science of Logic*", *Collected Works*, Vol. 38, p. 213.

[23] V. I. Lenin, "Once Again on the Trade Unions, the Current Situation and the Mistakes of Trotsky and Bukharin", *Collected Works*, Vol. 32, Moscow 1975, p. 94.

[24] J. Piaget, *La construction du réel chez l'enfant*, Neuchatel-Paris 1937; cited from A. V. Zaporozhets et al., *Perception and Action*, pp. 163-165.

[25] A. M. Korshunov, *The Theory of Reflection and Creativity*, p. 78.

[26] See N. Yu. Vergiles, V. P. Zinchenko, "The Problem of the Adequacy of the Image", *Voprosy filosofii*, 1967, No. 4, p. 57.

[27] For a philosophical analysis of the Marxist principle of object-related activity see: A. M. Korshunov, *Cognition and Activity*; A. P. Ogurtsov, "Practice as a Philosophical Problem", *Voprosy filosofii*, 1967, No. 7; V. A. Lektorsky, "The Principle of Object-Related Activity and Marxist Epistemology", *Ergonomics. The Methodological Problems of Studying Activity, Trudy VNIITE*, Vol. 10, Moscow, 1976; V. S. Shvyrev, "The Tasks of Studying the Category of Activity as a Theoretical Concept", op. cit.; E. G. Yudin, "The Concept of Activity as a Methodological Problem", op. cit.; N. N. Trubnikov, *On the Categories of "Goal", "Means", and "Result"*, Moscow, 1968; M. A. Bulatov *Activity and the Structure of Philosophical Knowledge*, Kiev, 1976; V. P. Ivanov, *Human Activity—Cognition—Art*, Kiev, 1977; A. I. Yatsenko, *Goal-Setting and Ideals*, Kiev, 1977 (all in Russian).

For a discussion of the significance of the category of object-oriented activity for psychological theory see: S. L. Rubinstein, *Being and Consciousness*, Moscow, 1957; idem, *The Principles and Ways of the Development of Psychology. On the Place of the Psychical in the Universal Interconnection of the Phenomena of the Material World*, Moscow, 1959; A. N. Leontyev, *Activity. Consciousness. Personality*, Moscow 1975; M. S. Rogovin, A. V. Solovyov, L. P. Urvantsev, Sh. Sh. Shotemor, "The Structures of the Psyche and the Problem of Cognition", *Voprosy filosofii*, 1977, No. 4 (all in Russian).

[28] See E. V. Ilyenkov, *Dialectical Logic*, Progress Publishers, Moscow, 1977.

[29] See A. V. Zaporozhets et al., *Perception and Action*, pp. 265, 285.

[30] See *A Source Book of Gestalt Psychology*, Keagan Paul, Trench, Trubner & Co. Ltd., London, 1938, pp. 48, 50, 52-54.

[31] Karl Marx, "Economic and Philosophic Manuscripts of 1844" in: Karl Marx, Frederick Engels, *Collected Works*, Vol. 3, Moscow, 1975, pp. 300, 302.

[32] Cf. the following arguments of Spinoza about the essence of the circle. A circle may be "defined as a figure, such that all straight lines drawn from the centre to the circumference are equal" (B. Spinoza, *How to Improve Your Mind*, Philosophical Library, Inc., N.Y., 1956, pp. 79, 80). But this definition, Spinoza believes, "does not in the least explain the essence of a circle, but solely one of its properties" (ibid.), and a derivative, secondary property at that. That is merely a nominal definition. A real definition must express the proximate cause of a thing, and that in Spinoza's view is the same as specifying the mode of constructing the thing. The circle in this case will "be defined as follows: the figure described by any line where one end is fixed and the other free" (ibid.).

[33] See G. Bachelard, *L'activité rationaliste de la physique contemporaine*, Presses universitaries de France, Paris 1951, p. 90.

[34] See L. S. Vygotsky, *The Development of the Higher Psychical Functions*, Moscow, 1960 (in Russian).

[35] See A. N. Leontyev, *Problems of the Development of the Mind*, Progress Publishers, Moscow, 1981; idem, *Activity. Consciousness. Personality* (in Russian).

[36] See A. R. Luriya, *On the Historical Development of the Cognitive Processes. An Experimental-Psychological Study*, Moscow 1974 (in Russian).

[37] See P. Ya. Galperin, *The Development of the Studies in the Formation of Mental Actions*; idem, "On the Study of the Child's Intellectual Development", *Voprosy psichologii*, 1969, No. 1; idem, *Introduction into Psychology*, Moscow, 1976.

[38] See A. V. Zaporozhets, *The Development of Arbitrary Movements*, Moscow, 1960 (in Russian).

[39] See V. V. Davydov, *Types of Generalisation in Learning*, Moscow, 1972; idem, "Analysis of the Structure of the Cognitive Act", *Doklady APN RSFSR*, 1960, No. 2; idem, "The Categories of Logic and Pedagogics", in *Problems of Dialectical Logic*, Alma-Ata, 1968 (in Russian).

[40] See N. Yu. Vergiles, V. P. Zinchenko, "The Problem of the Adequacy of Images", *Voprosy filosofii*, 1967, No. 4; A. V. Zaporozhets et al., *Perception and Action*.

[41] See A. N. Leontyev, *Activity. Consciousness. Personality*, p. 95.

[42] Ibid., pp. 97-98.

[43] See M. S. Rogovin, *Problems in the Theory of Memory*, pp. 78-79.

[44] Karl Marx, "Economic and Philosophic Manuscripts of 1844" in: Karl Marx, Frederick Engels, *Collected Works* Vol. 3, p. 302.

[45] See A. I. Meshcheryakov, *Awakening to Life*,; G. S. Gurgenidze, E. V. Ilyenkov, "Outstanding Progress of Soviet Science", *Voprosy filosofii*, 1975, No. 6, pp. 69-79; E. V. Ilyenkov, "Personality Formation: on the Results of a Scientific Experiment", *Kommunist*, 1977, No. 2.

[46] Karl Marx, "Economic and Philosophic Manuscripts of 1944", p. 298.

[47] G. Maxwell, "The Ontological Status of Theoretical Entities", *Minnesota Studies in the Philosophy of Science*, Vol. III, University of Minnesota Press, Minneapolis, 1962, p. 10.

[48] W. Heisenberg, *Der Teil und das Ganze. Gespräche im Umkreis der Atomphysik*, R. Piper & Co. Verlag, Munich, 1971, pp. 92, 93.

[49] Th. S. Kuhn, *The Structure of Scientific Revolutions*, pp. 111-135.

[50] Ibid., pp. 28-29.

[51] Ibid., pp. 132-135.
[52] M. Hesse, "Is There an Independent Observation Language?", *The Nature and Function of Scientific Theories. Essays in Contemporary Science and Philosophy*, ed. by R. G. Colodny, University of Pittsburgh Press, 1970, p. 47.
[53] F. Suppe, "The Search for Philosophic Understanding of Scientific Theories", *The Structure of Scientific Theories*, University of Illinois Press, Urbana, 1974, pp. 104-109.
See also V. A. Lektorsky, "Positivism", *Philosophical Encyclopedia*, Moscow, 1967, Vol. 4; idem "From Positivism to Neopositivism", *Bourgeois Philosophy in the 20th Century*, Moscow, 1974; V. S. Shvyrev, *Neopositivism and the Problems of Empirical Substantiation of Science;* I. S. Narsky, *Essays in the History of Positivism*, Moscow, 1960 (all in Russian).
[54] V. I. Lenin, "To A. N. Potresov", *Collected Works*, Vol. 34, Moscow, 1977, p. 34.
[55] See e.g. B. S. Gryaznov, "Theory and Its World", B. S. Gryaznov et al., *Theory and Its Object*, Moscow, 1973, pp. 5-38.
[56] On Marx's method in *Capital* see M. M. Rozental, *The Dialectics of Marx's "Capital"*, Moscow, 1967; V. P. Kuzmin, *The Systems Principle in Marx's Theory and Methodology*, Moscow, 1976; *The History of Marxist Dialectics from the Origin of Marxism to the Leninist Stage* (ed. by M. M. Rozental), Moscow, 1971, (all in Russian); E. V. Ilyenkov, *The Dialectics of the Abstract and the Concrete in Marx's "Capital"*, Progress Publishers, Moscow, 1982.
[57] Dudley Shapere formulates the following features inherent in the real objects with which scientific theoretical thinking is concerned and which are absent in the idealised objects:
(1) If object *A* exists really, it can interact with other real objects, in particular macroscopic ones (which is not true of idealised objects);
(2) To say that "*A* exists" implies that *A* may have properties which have not yet been discovered;
(3) A real object *A* may be ascribed properties which it does not actually have, but which may subsequently come to light (it would obviously be meaningless to refer the features formulated in points (2) and (3) to idealised objects);
(4) If *A* actually exists, there may be different and even competing theories about it (as is actually the case with the electron); *A* thus acquires what amounts to a theory-transcendent status.
See D. Shapere, "Notes toward a Post-Positivistic Interpretation of Science", *The Legacy of Logical Positivism*, ed. by P. Achinstein and S. F. Barker, Baltimore, 1969, pp. 155, 156.
Also: D. Shapere, "Scientific Theories and Their Domains" *The Structure of Scientific Theories*, pp. 567-569. We shall point out in this connection, that the so-called abstract objects studied in mathematics (numbers, sets, functions etc.) express certain relations between real objects and not real objects existing in space and time.
[58] G. Maxwell, "Theories, Perception, and Structural Realism", *The Nature and Function of Scientific Theories*, University of Pittsburgh Press, 1970, pp. 3-34.
[59] "Other forms of intuition, besides those of space and time, other forms of understanding besides the discursive forms of thought, or

of cognition, we can neither imagine nor make intelligible to ourselves; and even if we could, they would still not belong to experience, which is the only mode of cognition by which objects are presented to us. Whether other perceptions besides those which belong to the total of our possible experience, and consequently whether some other sphere of matter exists, the understanding has no power to decide, its proper occupation being with the synthesis of that which is given" (I. Kant, *Critique of Pure Reason*, London, G. Bell and Sons, LTD, 1930, pp. 171-72).
[60] Th. S. Kuhn, op. cit., p. 102.
[61] Ibid., p. 111.
[62] True, in his "Postscript-1969" Kuhn gives a less rigid formulation of the thesis about the existence of a gap between different paradigms. Taking into account that the everyday world, language, and most of the world of science are shared by members of different scientific coummunities, Kuhn now believes it possible to translate from the language of one paradigm into the language of another using the common vocabulary of everyday life.
[63] B. L. Whorf, *Language, Thought, and Reality. Selected Writings*, Cambridge, Massachusetts, 1966, pp. 27, 213, 214.
[64] See Vasilyev S. A., *A Philosophical Analysis of the Hypothesis of Linguistic Relativity*, Kiev, 1974, p. 21 (in Russian).
[65] B. L. Whorf, op. cit., p. 215.
[66] See V. V. Tselishchev, *Logical Truth and Empiricism*, Novosibirsk, 1974, p. 13 (in Russian).
[67] Ibid.
[68] Ibid., p. 16.
[69] W. V. Quine, "Notes on Existence and Necessity". In: *The Journal of Philosophy*. Vol. XL, No. 5, March 4, 1943, p. 118.
[70] W. V. Quine, *Word and Object*, New York and London, 1960, pp. 29-57.
[71] See W. V. Quine, *Ontological Relativity and Other Essays*, 1969, p. 67.
[72] Ibid., p. 50.
[73] The conception of ontological relativity points to the absurdity of arguments, current in modern American and British epistemological literature, concerning the possibility of the existence of a language (and consequently of reason and of a world picture) in beings which we ordinarily do not regard as sentient (e.g., tulips). The authors of these arguments substantiate their positions by assuming that the language to which they refer may be so different from ours that we cannot understand its meaning, the more so that the behaviour of the carriers of this language has nothing in common with human behaviour. We can even fail to guess that we are dealing with a language, these authors say. Situations of this kind are possible in their view in man's contacts with sentient extraterrestrials: the latter do not have to be similar to man in appearance, they may behave in a manner completely strange to us and communicate in a manner quite different from ours. In this case we shall not recognise them as reasonable beings. Generally speaking, we may be surrounded by a mass of sentient beings, these authors believe, whose presence we do not even suspect and whose world is completely impervious to us. Quine sweeps aside all these arguments pointing out that there

are no experimental data for their refutation or confirmation: our experience carries in itself the object scheme of world dissection which is accepted in our language. Here Quine's position is reminiscent of Kant. See A. C. Genova, "Kant and Alternative Frameworks and Possible Worlds", *Akten des 4. Internationalen Kant-Kongresses*, Mainz, 6-10 April, 1974, Teil II. 2: Sektionen, Berlin—N.Y., pp. 834-841; R. Rorty, "The World Well Lost". In: *The Journal of Philosophy*, Vol. LXIX, No. 19, October 26, 1972, pp. 649-665.

[74] S. A. Vasilyev, *A Philosophical Analysis of the Hypothesis of Linguistic Relativity*, p. 96 (in Russian).

[75] N. Chomsky, a major modern proponent of the theory of generative grammars, uses the existence of language universals and the irreducibility of language to verbal behaviour as a basis for reviving the Cartesian conception of innate ideas. In reality, the universality of the primary semantic field, expressed through different language means in different languages, is determined by the community of the substantive structure of practical activity characteristic of the users of different national languages.

[76] See N. Chomsky, *Syntactic Structures*, 's-Gravenhage, Mouton, 1957.

[77] See A. N. Leontyev, *Activity. Consciousness. Personality*, pp. 140-158.

[78] S. A. Vasilyev, *A Philosophical Analysis of the Hypothesis of Linguistic Relativity*, p. 45.

[79] The possibilities and ways of experimental research into the effect of different language systems on the nature of perception are discussed in M. Cole, S. Scribner, *Culture and Thought: Psychological Introduction*, N.Y. 1974.

[80] M. Bunge, *Philosophy of Physics*, Dordrecht, 1973, pp. 181-182.

[81] See Th. S. Kuhn, op. cit., pp. 202-204.

[82] G. Holton, "On the Role of Themata in Scientific Thought", *Science*, 25 April, 1975, Vol. 188, No. 4186, pp. 328-334. For an analysis of continuous lines in the development of science see *Contradictions in the Development of Natural Science* (ed. by B. M. Kedrov), Moscow, 1965; V. S. Stepin, *The Formation of a Scientific Theory*, Minsk, 1976; V. S. Bibler, *Thinking as Creativity*; A. V. Akhutin, *The History of the Principles of Physical Experiment*, Moscow,1967 (all in Russian).

[83] See V. A. Lektorsky, "V. I. Lenin and the Principles of Dialectical Logic", *Leninism as the Philosophy of the Modern Epoch*, Moscow, 1969; idem, "The Development of Epistemology in F. Engels's Book *Anti-Dühring*", *F. Engels's "Anti-Dühring" and the Modern Times*, Moscow, 1978; V. A. Lektorsky, Kh. Safari, "On the Logic of the Development of Theoretical Knowledge", *Problemy mira i sotsializma*, 1976, No. 12 (all in Russian).

[84] "The sign nature of verbal language has that advantage over the language of gestures that it permits to perform any changes or transformations with ideal objects implemented in verbal material. Verbal language, as compared to gesture language, is a more plastic material; one may reproduce in it all the properties and laws of the objective world with great precision and differentiation, and these properties may not coincide with those forms which are reproduced in gestures. As a crude analogy, one may consider plasticine (the word) and

stone (gestures). Plasticine can precisely assume all kinds of intricate forms, while stone offers no such possibility. But the trouble is that the plasticity of the word must be handled very carefully, for it may produce properties that do not exist in the objective world." (S.A. Sirotkin, "What Is Thought Better Armed With—Gesture or Word?", *Voprosy filosofii*, 1977, No. 6, p. 101).

[85] See E. H. Gombrich, op. cit.

[86] "Knowledge is not identical to any psychical act, it implies man's singling out of himself from the surrounding world in the process of its realisation" (P. V. Kopnin, *Introduction to Marxist Epistemology*, Kiev, 1966, p. 46, in Russian). "Animals are not aware of their knowledge while man is: he knows that he *knows*, that it is *he* who knows, and *what* he knows" (A. G. Spirkin, *Consciousness and Self-Consciousness*, Moscow, 1972, p. 142, in Russian).

[87] Karl Marx, "Economic and Philosophic Manuscripts of 1844", p. 276.

[88] See Keith Gunderson, "Asymmetries and Mind-Body Perplexities". In: *Minnesota Studies in the Philosophy of Science*, Vol. IV, ed. by Michael Radner and Stephen Winokur, University of Minnesota Press, Minneapolis, 1970, pp. 273-309.

[89] It was the formulation of this paradox and the search for ways of its logical solution that stimulated the development of dialectics on an idealistic basis first in Fichte and later in Schelling and Hegel.

[90] Imre Lakatos, *Proofs and Refutations. The Logic of Mathematical Discovery*, Cambridge University Press, Cambridge, 1976, p. 56.

[91] Imre Lakatos thus analyses one of the stages in the history of proofs of the stereometric theorem: "If you did make conscious assumptions, they were that a) removing a face always leaves a connected network and b) any non-triangular face can be dissected into triangles by diagonals. While they were in your *subconscious* they were listed as *trivially true*—the cylinder however made them somersault into your conscious list as *trivially false*" (Ibid., p. 46).

[92] Ibid., p. 45.

[93] See M. Polanyi, *Personal Knowledge. Towards a Post-Critical Philosophy*, The University of Chicago Press, Chicago, 1958. "...'Tacit knowledge'... is learned by doing science rather than by acquiring rules for doing it" (Th. S. Kuhn, *The Structure of Scientific Revolutions*, the University of Chicago Press, Chicago, 1970, p. 191).

[94] Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, Routledge & Kegan Paul LTD, London, 1949, pp. 151, 153.

[95] Gilbert Ryle, *The Concept of Mind*, Hutchinson's University Library, London, 1951, pp. 186, 195-198.

[96] Imre Lakatos, Op. cit., p. 56.

S. A. Yanovskaya points to the "importance of achievements in the area of increasing logical rigour for obtaining new results in mathematics, for solving its most difficult problems, for constructing novel and revolutionary trends in science. Suffice it to recall that the greatest achievements in calculus in the 19th century were due to the increased precision of the basic concepts of calculus attained in several debates—those of real and complex number, limit, continuum, function. It may now be said that the image of modern mathematics, and computer mathematics in the first place, is increasingly determined by greater rigour and precision introduced in the

concept of algorithm (and the equivalent concept of recursive or computable function) in the development of the philosophical and logical foundations of mathematics and the logical theory of mathematical proof..." (S. A. Yanovskaya, "On Mathematical Rigour", *Voprosy filosofii*, 1966, No. 3, pp. 41, 42, 43).

[97] Noting the impossibility of reducing one conceptual system to another, Quine believes that the classical epistemological problem of substantiating knowledge is a pseudoproblem. See e.g., Willard V. Quine, "Epistemology Naturalized". In: *The Psychology of Knowing*, ed. by Joseph R. Royce and W. W. Rozeboom, Gordon and Breach, New York, 1972, pp. 9-23. In Lakatos's view, "background knowledge is where we assume that we know everything but in fact know nothing" (Imre Ladatos, op. cit., p. 45). Popper, Feyerabend, and Kuhn also regard the problem of substantiating knowledge as meaningless.

[98] Michael Polanyi, *Personal Knowledge. Towards a Post-Critical Philosophy*, pp. 63-65.

[99] Stephen Kleene, *Introduction to Metamathematics*, North-Holland Publishing Co., Amsterdam, 1952, p. 48.

[100] "We all know about ourselves such things and so many of them that no one will ever learn about them through any objective methods" (A. G. Spirkin, *Consciousness and Self-Consciousness*, p. 155).

[101] See e.g. Thomas S. Kuhn, Op. cit.; S. R. Mikulinsky, M. G. Yaroshevsky, "The Socio-Psychological Aspects of Scientific Activity", *Voprosy filosofii*, 1972, No. 12; John M. Ziman, *Public Knowledge. An Essay Concerning the Social Dimension of Science*, Cambridge University Press, Cambridge, 1968.

[102] Karl R. Popper, *Objective Knowledge. An Evolutionary Approach*, Oxford at the Clarendon Press, 1979, pp. 106, 107-108.

[103] Ibid., p. 115.

[104] V. I. Lenin, "Conspectus of Hegel's Book *The Science of Logic*", *Collected Works*, Vol. 38, 1972, p. 202.

[105] For a discussion of collective and individual subjects see also P. V. Kopnin, *Introduction into Marxist Epistemology*, pp. 58-65; idem, *Dialectics as the Logic and Epistemology of Cognition*, pp. 106-117; V. A. Lektorsky, *The Problem of the Subject and Object in Classical and Modern Bourgeois Philosophy*, pp. 100-113 (all in Russian).

[106] Karl Marx, "Economic and Philosophic Manuscripts of 1844", pp. 276-277.

[107] For an analysis of the Hegelian conception of subject and object see also T. I. Oizerman, *Hegel's Philosophy*, Moscow, 1956; K. S. Bakradze, *The System and Method of Hegel's Philosophy*, Tbilisi, 1958; V. I. Shinkaruk, *Hegel's Logic, Dialectics, and Epistemology*, Kiev, 1964; B. M. Kedrov, *V. I. Lenin and Hegel's Dialectics*, Moscow, 1975; V. A. Lektorsky, "The Subject-Object Problem in the Epistemology of Hegel and Marx". In: *The Philosophy of Hegel and Modern Times*; K. N. Lyubutin, *The Problem of the Subject and the Object in German Classical and Marxist-Leninist Philosophy*, pp. 56-57; A. S. Bogomolov, "The Philosophy of Hegel and the Modern Times", *Kommunist*, 1970, No. 14; M. K. Mamardashvili, *The Forms and Content of Thinking*, Moscow, 1968;

M. A. Bulatov, *Lenin's Analysis of German Classical Philosophy*, Kiev, 1974 (all in Russian); E. V. Ilyenkov, *Dialectical Logic*.

[108] G. W. F. Hegel, *Phänomenologie des Geistes*, Akademie-Verlag, Berlin, 1964, p. 142.

[109] "In this respect education consists, if it is considered from the standpoint of the individual, in that he gains that which is available, absorbs his inorganic nature and takes possession of it" (Ibid., p. 27).

[110] Ibid., p. 72.

[111] Ibid.

[112] Ibid., pp. 72-73.

[113] Ibid., pp. 73-74.

[114] Ibid., p. 74.

[115] In Hegel's view, the philosophy of Kant and Fichte "did not attain the level of concept or spirit as it is *in and for itself* but only that of spirit as it is in relation to another" (G. W. F. Hegel, *Enzyklopädie der philosophischen Wissenschaften im Grundrisse*, Akademie-Verlag, Berlin, 1975, p. 345).

[116] G. W. F. Hegel, *Phänomenologie des Geistes*, p. 21.

[117] Ibid., p. 75.

[118] Karl Marx, "Economic and Philosophic Manuscripts of 1844", pp. 333-334.

[119] V. I. Lenin, "Conspectus of Hegel's Book *Lectures on the History of Philosophy*", *Collected Works*, Vol. 38, p. 278.

[120] See Willard V. Quine, "Epistemology Naturalized", *The Psychology of Knowing*, pp. 9-23.

[121] See Jean Piaget, *Sagesse et illusions de la philosophie*, Presse Universitaires de France, Paris, 1965; idem, *Epistémologie des sciences de l'homme*, Gallimard, Paris, 1970; idem, *Psychology and Epistemology*, Grossman, New York, 1971.

[122] L. Wittgenstein, Op. cit., p. 77.

[123] See e.g., Peter F. Strawson, *The Bounds of Sense. An Essay on Kant's Critique of Pure Reason*, Methuen, London, 1973; Barry Stroud, "Transcendental Arguments", *The Journal of Philosophy*, Vol. LXV, No. 9, May 2, 1968, pp. 241-256.

[124] See e.g., V. A. Lektorsky, "Analytical Philosophy Today", *Voprosy filosofii*, No. 1, 1972; M. S. Kozlova, *Philosophy and Language*, Moscow, 1972; A. S. Bogomolov, *English Bourgeois Philosophy of the 20th Century*, Moscow, 1973 (all in Russian).

[125] See Karl R. Popper, *The Logic of Scientific Discovery*, Hutchinson, London, 1972, pp. 49-72.

[126] But they are accepted and even reduced to an absurdity by Paul Feyerabend, a disciple of Popper who has proposed a substantiation of "anarchism" in epistemology. See Paul Feyerabend, *Against Method. Outline of an Anarchistic Theory of Knowledge*, NLB, London, 1975.

[127] See Karl R. Popper, Op. cit., p. 52.

NAME INDEX

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Proceeding from a philosophical generalisation of problems in the methodology of science, psychology of knowledge, psycholinguistics, and history of science, this book offers a comprehensive analysis of the cognitive relation between subject and object, a study of the various forms and types of links between the object-related practical activity and the cognitive one, the relationships between self-consciousness and cognition, the components of the system of knowledge, and problems in its substantiation and development.

In the book, a number of unresolved vital philosophical and methodological problems are dealt with. The author also critically considers the approaches to the cognitive relation characteristic of pre-Marxian and non-Marxist philosophy.

The book is intended for readers interested in problems of epistemology, the methodology of science, the science of science, and the psychology of knowledge.

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