

CHAPTER 3*

THE FORMAL STRUCTURE OF AN EMERGING
SCIENCE OF EDUCATION

PART I: SOME OPINIONS ABOUT THE SCIENTIFIC STATUS
OF A SCIENCE OF EDUCATION

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TRANSITION: Is it possible to justify a sentence of education from the point of view of the general philosophy of science? What are the basic criteria to which science in general is subject? What is the specific status of the science of education? What does the formal structure of a technology or praxiology consist of? Which function can be attributed to a science of education within Elizabeth Steiner's conception of educology? In this chapter, Monshouwer examines these questions in relation to the treatment that they have been given in Western Europe, the Soviet Union, and the English-speaking countries. While Professor Brezinka in chapter 1 traced European contributions from the 18th century. Monshouwer focuses attention on developments in the second half of the 20th century. This chapter completes the setting of the scene for a consideration of Professor Steiner's conception of educology (Chapters 4 and 5). In a subsequent chapter, Professor Monshouwer offers an analysis of Steiner's concept of 'science of education' and 'praxiology of education' in relation to what is in Monshouwer's judgment a paradigm concept of 'science of education'.

The fact that there are substantial differences of opinion about the structure of a science of education is plainly evident. Researchers and inquirers of education (henceforth in this chapter called, 'educologists') on the continent of Europe have for decades been and still are, confronted with endless discussions about "pedagogical theory" s' specific "identify;" this to such an extent that actual scientific research in the field of education was grossly neglected and was in fact left to psychologists and sociologists. In addition, continental educologists had, and still do have, only a very vague idea of views in English-speaking countries on this subject; the average European educologist takes it completely for granted that views on science (and thus also on science of education) in English-speaking countries can be labeled for the most part as "neo-positivism." On the other hand, the average Englishman, American, Canadian, Australian, etc. hardly knows what is happening in this field on the coast inert of Europe. The breakdown in communications is made even worse by.....

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the fact that, on the one hand numerous works have appeared in the German language, which describe thoroughly and extensively the various views in Germany about the scientific status of an educational theory, but which are unknown in the English-speaking world because of the language barrier, whilst on the other hand, to my knowledge, no book or article has ever been published in the English language,² which makes an attempt to analyze more closely the various views on this subject in English-speaking educology, or even to make a list of them).³

It therefore seems to me useful to open my exposition with a concise review of these ideas and discussions. Since we are, after all, only concerned here with an introduction to the actual definition of the problem, I intend to restrict myself to an extremely brief treatment of the relative ideas in West Germany (1), France (2), the East Bloc countries and in particular the Soviet Union (3) Great Britain (4) and the United States of America (5). The extreme brevity of my exposition will be compensated by references to literature which will facilitate deeper study (provided at least that in certain cases the reader understands German, French, and Dutch). Further more I am purposefully restricting myself to those views which have been formulated since the Second World War. (This means, for example, that with reference to the United States, the ideas of Dewey, very important though they are, are nevertheless omitted.)

Finally, I must point out the ambiguity of the term 'education'. In English-speaking countries this term is practically always related to schools and similar institutions. On the continent of Europe, on the other hand, this term carries the much wider meaning of 'family education'. Whereas an educator in English-speaking countries is primarily a teacher, on the continent of Europe parents are regarded as being educators in the most proper sense of the word.

1. WEST GERMANY

The views current in West Germany have for a long time past had an important influence on ideas in the Netherlands, Flemish-speaking Belgium, and Austria. Within this geographical area we can distinguish by and large the following trends of thought.⁴

- (1) The *geisteswissenschaftliche*⁵ school in which, for the sake of convenience, I also classify the existential-phenomenological school and the hermeneutic school.⁶
- (2) The *kritische Erziehungswissenschaft* (critical educational theory)⁷ movement.
- (3) The critical rationalism school inspired by K. R. Popper.

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1.1. The *gesteswissenschaftliche* school. Broadly, the following points are of importance for our subject. This school

- i. supports a strict division between natural sciences and human sciences;
- ii. takes great pains to defend the methodology which is typical to the human sciences and to make them explicit (*Verstehen*, hermeneutic method, or even *Wesensschau*);
- iii. classifies a distinct educational theory without further ado with the human sciences
- iv. distinguishes educational theory clearly from psychology, sociology, etc. in the sense that educational theory can be described not as a theoretical but as a *practical* discipline;
- v. emphasizes the essential function of philosophy (and in particular philosophical anthropology and ethics, which it also expressly describes as ‘sciences’) in the origination of an educational theory;
- vi. resolutely rejects the assumption that an educational theory could be equated to applied psychology or applied sociology or a combination thereof, and emphasizes in contrast to a greater or lesser degree the fact that such an educational theory has its own specific characteristics.

In this school also there is, of course, not complete agreement between the various opinions; if the scientific status of educational theory is given concrete form, we come across ideas which vary between the assertion that the discipline of education occupies a completely *unique* position within the sciences⁸ to the recognition that although an educational theory is a *practical* discipline (in contrast, for example, with psychology), it can, in this respect, be compared with medicine (N.B. not with engineering).⁹ Opinions also vary on the foundations of the identity of a discipline of education: some seek it in the specific role of philosophy within an educational theory;¹⁰ others believe that it is to be found in the unity of either that which is commonly known as the “educational phenomenon” or the child (in contrast to the adult).¹¹

Finally, the following two points are also important: First, for the *geisteswissenschaftliche* school, education is identical to good education (in the sense of education in line with a morally good aim of education; with the result that an education as a burglar -- however technically perfect this education might be -- cannot be classified as an educational phenomenon).¹² This substantial philosophical premise.....

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has a formal consequence, via, that ethics play an essential role within an educational theory. The second point is that it is necessary to emphasize that the *geisteswissenschaftliche school* is essentially adverse to the principle of exactitude as soon as it is a question of an educational theory.

1.2. The critical educational theory. Even within the so-called critical educational theory there is not complete unanimity. Representatives of this school hold views which vary from a fairly strict neo-Marxism, to an interesting philosophy of science in the style of Jurgen Habermas (which should be taken seriously), to a number of humanist, idealistic, utopian ideas with a modern flavor. Many orthodox Marxist commentators¹³ in Eastern Europe distrust and, indeed, reject this school (which is often sold as a progressive school) and label it as a misleading bourgeois ideology. Brezinka (1974, pp. 93 if.) who has shown himself to be a firm opponent of this critical educational theory, differentiates within this movement between emancipatory educational theory and socialist educational theory. I believe that the substantial difference between these two sub-streams can be described as follows: the former lays more emphasis on the emancipation of the individual and of micro and meso-organizations in society. It believes that emancipation of this type can also gradually result in an improvement of the structure of society in general. The second takes up more the Marxist idea of revolution and believes that a revolution within the existing society (and if necessary, violent revolution) will eventually also bring about the emancipation of the individual.¹⁴ One of the many consequences of these two varying lines of approach is that the latter sub-stream will emphasize particularly political education, whereas the former adheres primarily to compensatory programs and internal democratization of the classroom situation.

The views about the scientific status of an educational theory as held by this critical educational)», can be summarized in the following points:

i. the emancipatory school presumes as does Habermas (1968a, pp. 146 ff. and 1968t) that every form of practice of science is characterized by a certain interest. On the basis of three transcendental forms of interest in knowledge, it is possible to distinguish: (a) the empirical—analytical sciences which are guided by a technical interest; (b) the historical-hermeneutic sciences which are guided by practical interest; and (c) the action sciences or social sciences (*Handlungswissenschaften*¹⁵) which are guided by an emancipatory interest and are chiefly characterized by self-reflection (E-Habermas, 1968a, p. 159). It is obvious that an educational theory must be classified within this last category. This means that such an educational theory, although it must strive towards the goal of so-called empirical-analytical sciences, namely nomological knowledge (p. 158), it must as a critical science in addition exercise ideological criticism' (pp.158-159). This is no more than a more detailed statement of the concept of self-reflection used earlier. Self reflection is of course not possible with the normal methods of empirical research; something like philosophical reflection will therefore have to.....

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be inherent in a critical theory. It is true that the principle of exactitude is accepted, but it has to be, as it were, transcended in the process of self-reflection.

ii. Both the emancipatory school and the socialist school emphasize the need for a close connection between theory and praxis. They oppose the idea of the sciences being free from the necessity of making value judgments and defend the ideal of a close relationship between science and politics.¹⁶ They reproach both the *geisteswissenschaftliche* educational theory and critical rationalism (although for different reasons) with being too non—committal and with not having a sufficiently clear relationship with *praxis*.

iii. The differences between the emancipatory school and - the socialist school lie mainly in the field of the aims of education. Whilst the former emphasizes the development of the individual's capabilities (without however neglecting the social aspects of people), the latter sees man primarily as a social being, thereby explicitly taking up the Marxist idea of class conflicts. This difference also has methodological consequences. The latter school holds rigidly to what Marxists term the "dialectical method." The former gives a wider meaning to the term 'dialectics' (sometimes it even means no more than 'interaction') and emphasizes the importance of the hermeneutic method.

iv. Both of them (compared with critical rationalism) use a broad definition of the concept of science, something which, amongst other things, finds expression in the fact that they also accord to philosophy the title of a science.

1.3. Critical rationalism. It was Brezinka¹⁸ (1971 and 1978) who was foremost in declaring that the methodological requirements of critical rationalism are also imperative for an educational theory. He distinguishes within educology three important constituent parts, viz.:

- (1) a science of education (*Erziehungswissenschaft*) which is subdivided into "nomothetic science of education" and "historiography of education;"
- (2) the philosophy of education, which is principally occupied with aims of education;
- (3) the "practical educational theory" (*praktische Paedagogik*), which Brezinka incorrectly translated into English as "praxiology of education" and which is supposed to provide a bridge between the science of education and the philosophy of education, on the one hand, and educational practice, on the other.

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For the definition of our problem, the following points from Brezinka's meta-educological ideas are the most important:

- i. Philosophy of education and practical educational theory are indeed regarded by him as indispensable, but are not considered by him as being sciences.
- ii. The science of education should keep to all the methodological requirements of critical rationalism. I believe that I can assume that these requirements are sufficiently known and shall therefore not describe them in more detail here. Indeed, various aspects will be treated in Part 2. (see Chapter 7.)
- iii. Brezinka believes correctly that, viewed from the standpoint of the general philosophy of science, no logically compelling reasons can be given for being able to distinguish a separate or unique science of education. The science of education is only a sub-discipline of the general human sciences without its own methodology. The only reason for talking about a science of *education* is purely of a pragmatic nature. Education forms a sufficiently complex and important field of problems to justify a concentration of scientific research (Brezinka, 1971, pp. 34 ff., and 1978, pp. 651 ff.).
- iv. Despite assertions to the contrary by Brezinka (Breünka, 1978, p. 38), his "practical educational theory" is not identical to E. Steiner's "praxiology of education."¹⁹ In Chapter 7 of this volume we will go into more detail on this subject.

2. FRANCE

Questions are seldom asked in France about the scientific status of educational theory. It is typical in this respect that it was not until October, 1967 (in other words only thirteen years ago) that the first start was made with a university course in the *sciences de l'éducation*.²⁰ The views of two authors will suffice to illustrate French-language conceptions of the science of education: Jean Piaget and Gaston Nialaret.....

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2.1. Jean Piaget. The French-speaking Swiss,²¹ Jean Piaget, whose psychological theories have even earned clear recognition in English-speaking countries, does not provide us with a systematic philosophy of the science of education. However, he is incidentally active in this field. In connection with questions about the possible existence of a science of education, he argues, on the one hand, that

there can be no question of seeking for a solution by means of deductive considerations based upon knowledge provided by psychology. (Piaget, 1971, p. 21).

On the other hand, he categorically rejects a “complete independence” (Ibid., p. 23). His conception lies somewhere in the middle. On the one hand, he emphasizes that

the problems [of an experimental pedagogy] are, in reality, of a pedagogical order and not purely psychological, since the measurement of scholastic productivity obeys criteria that are the concern of the educator alone, even if the methods employed do partly overlap with those of the psychologist. (Ibid., p. 22)

On the other hand, he states that

if experimental pedagogy wishes to understand what it is doing and to complete its observations with causal interpretations or “explanation,” it is obvious that it will have to employ a precise psychology, not merely that of common sense (Ibid., pp. 23-24).²²

To resolve this contradiction, he shows himself to be a supporter of “interdisciplinary researches,” not only with regard to the science of education, but also with regard to all other sciences:

Any didactic method or any program of instruction, if its application and results are to be analysed by experimental pedagogy, will raise problems pertaining to the psychology of development, the psychology of learning, and the general psychology of intelligence. Consequently, any advances to be made by experimental pedagogy, taken as an independent science with regard to its subject matter, must necessarily be linked, as in all sciences, to interdisciplinary researches, if there is to be any question of constituting it as a true science, of its being, in other words, not merely descriptive but explanatory. (Ibid., p. 24)

2.2. Gaston Mialaret: G. Mialaret also has an eye for both the interdisciplinary character and the separateness of an educational theory. In the first place, he always speaks emphatically about “sciences.....”

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of education” in the plural form. In connection with this he differentiates among three categories of disciplines within the sciences of education:

- i. disciplines studying the general and local conditions of education;
- ii. disciplines studying the educational situation and the proper educational facts;
- iii. disciplines of reflection on and evolution of education (Mialaret, 1976, pp. 44-45).

Category i includes history of education, sociology of the school, demography of the school, educational economy, and comparative education (cf. pp. 44-59).

Category ii includes sciences studying the immediate conditions of educational action (physiology of education, psychology of education, psycho—sociology of small groups, and the sciences of communication), theories of science of education, sciences of educational methods and techniques, and sciences of evaluation (for example, “doxology”) (pp. 59-80).

Finally, category &i includes the philosophy of education 23 and the educational planning and the theory of educational models (pp. 80-84).

Mialaret goes into detail about the common notion of “interdisciplinarity” by differentiating among (a) intradisciplinarity, (b) internal pluridisciplinarity, and (c) external pluridisciplinarity.

The concept of ‘intradisciplinarity’ implies that each discipline of the sciences of education must stick to its own methods, but this does not mean that the relationship to education simply consists of an application of the “mother-discipline” to educational problems: What is desired is that

the area of education, analyzed with the habitual instruments of the mother-discipline, should reveal in function of its proper specificity new problems for the specialist, problems, the solution of which, constitutes an original contribution to the whole of the discipline, (something which] demands precise knowledge of the educational conditions. (p. 86)

The concept of ‘internal pluridisciplinarity’ refers to the fact that meaningful research into educational phenomena is only possible with “collaboration between specialists from varying disciplines.” (p. 87). The didactics of geographical education can thus only be developed meaningfully if there is cooperation with geographers themselves.

The concept of ‘external pluridisciplinarity’ forms “the keystone for the unity and the autonomy of the sciences of education” (p. 88). Because of the extremely complex nature of the educational phenomena,.....

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the educologist is dependent on numerous disciplines. In order to be able to co—ordinate and synthesize all data from these disciplines, he is expected to have a cuLture ~ên~raLe, or in other words, a very broad knowledge of the attainments of as many disciplines as possible, and an insight into the problems of the whole subject field.

It is impossible to specialize in one of the sciences of education without having a total picture of both the educational facts and situations and the various techniques which the different sciences use in their approach to the phenomena (p. 90).²⁴

3. THE SOVIET UNION AND THE GERMAN DEMOCRATIC REPUBLIC

It is customary at the moment in certain circles in continental Western Europe to talk of a typical Marxist conception of science. Such a title is partly justified and partly not.

Let us first advance a few reasons in justification of the distinction between an authentic Marxist conception of science and the non-Marxist (commonly known as “idealistic,” “ideological,” capitalistic,” or “bourgeois”) conceptions of science. We will then consider whether this distinction should not be substantially moderated.

It is obvious that in the treatment of this question we will again be mainly concerned with the scientific status of an educational theory. Furthermore, in view of lack of knowledge of the Russian language, we are tied to the standard works which have been translated into German or English.²⁵

3.1. Arguments pro. The arguments in support of a distinction between Marxist and non-Marxist conceptions of science include the following.

i. For the Marxist thinkers, the principle of dialectics is very important. They emphasize a necessary dialectic between “abstract” and concrete” (cf. E.W. Iljenkow, 1973), between “induction” and “deduction,” between “analysis” and “synthesis” (Danilow and Boldyrew, 1974, p. 27), between “theory” and “praxis,”²⁶ and (very characteristic of the orthodox Marxist) between “science” and “the objective interests of the proletarians,” these interests seeming to coincide with the laws of progress of humanity in general.

ii. The Marxist philosophy, which is considered as a real science, and sometimes (despite assertions to the contrary; cf. Koroljow and Gmurrnan, 1973, p. 203) as a sort of “super-science,” is not only an arbitrary or unavoidable conception of the world, but also “the methodological fundament” (Koroljow and Cmurman, 1973, p. 69), even “the most advanced methodology” (*Ibid*, p. 183) and “the universal methodology” (Danilow and Boldytow, 1974, p. 6) of all other conceivable disciplines (*Ibid*, p. 21). However, this does not mean that “materialistic dialectics”

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can simply provide ready-made solutions for educational problems (Third., p. 20). The methodological and synthesizing function of philosophy, Marxist philosophy of course, is indispensable for all sciences, thus also for a science of education.²⁷

iii. A third general principle is that the connection and the necessary co-operation between the various scientific disciplines (including of course Marxist philosophy) is continuously emphasized, not only for pragmatic reasons, but also for reasons of principle. 20 On these grounds, inter-disciplinary studios (Kollektivuntersuchung) are strongly recommended, much more so than in the West (cf. Koroljow and Cmurman, 1973, p. 190; Danilow and Boldyrew, 1974, p. 28).

iv. In contrast to critical rationalism's principle of falsification, the Marxist philosophy of science clings, at least in theory, relentlessly to the principle of verification (whereby verification mostly takes place along the lines of an apparent contradiction which can then be solved by means of the dialectical method in the sense of Lenin {cf. for example Danilow and Boldyres, 1974, p. 141). In any case, Marxists cling to the idea of a knowable *objective reality* which sciences, including as already mentioned Marxist philosophy, must reproduce, not only in abstract form, but also in concrete form.²⁹ In doing this, "objective reality" is often identified as "praxis," particularly in the social sciences: "The objective criterion of truth is the *praxis*" so that "the point of view of life, of *praxis*, must be the first and fundamental point of view of epistemology" (Kirchhoff *et al*, 1975, p. 1356).

v. Finally, it must be mentioned that historical analysis occupies an exceptionally important place in Marxist philosophy of science. This is connected with the fact that Marxists presume a certain regularity in history (thus also in the history of science, the history of the philosophy of science, the history of education, and the history of the science of education), (cf. Danilow and Boldyrew, 1974, p. 81).

3.2. Arguments contra. Arguments against the claim that a distinctive kind of practice of science takes place in the East Bloc countries are not to be found in official tracts on epistemology and philosophy of science. They can only be drawn from the Marxist pursuit of practice of science, a fact which corresponds so closely to one of the most important Marxist principles. The following examples may suffice:

i. It is true that *Zur Methodologie der Paedagogik* (Danilow and Boldyrew, 1974), the standard work published under the auspices of the Academy for Educational Sciences of the U.S.S.R., underlines the five points mentioned above as arguments pro. But as soon as the question of the formal structure of the practice of science arises, this standard work employs a build-up in phases which shows strong resemblance to the "empirical cycle" propounded by A. de Groot under the influence of Popper.³⁰ Moreover, approximately half of the book is taken up by a.....

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description of sociological, sociometric, and statistical methods which would not be out of place in an American manual.

ii. It is also evident at congresses, particularly during the “Congress of Logic, Methodology and Philosophy of Science,” held every four years, that Marxists, without doubt, take up the same methodological positions with respect to scientific research in the narrower sense as their non-Marxist colleagues and that they also deal with the same issues.³¹ A typical example of this is the school in Russian philosophy of science which is known as ‘Logic of Scientific Discovery’³² and which is also generally regarded as being particularly important for a science of education (Danilow/Boldyrew, 1974, p. 24).

iii. Nowhere in the world³³ is the importance of cybernetics and systems theory with respect to science of education emphasized as much as in the Soviet Union and the other Eastern Bloc countries.³⁴

3.3. Conclusion. As far as the methods of educational scientific research are conceived, there are no differences worthy of mention between the views in East Bloc countries and those held in the Western world. Indeed, the importance of mathematical models for an educational science is emphasized even more in the East Bloc countries than in most educational theories in the Western world.

On the level of the general philosophy of science, there are indeed differences in degree of emphasis between East and West, although one could not call them absolute contrasts. The two following differences are perhaps the most important:

i. Marxists, without doubt (at any rate in theory), employ a wider definition of the concept of science, at least insofar as they conceive Marxist philosophy also as a science and often even as the highest science, in that it unites all other sciences.

ii. Epistemologically Marxist philosophers of science (at least in theory) take up a very realistic position.³⁵ Because of this, they attach just as much value to the context of discovery as to the context of justification or validation. This context of discovery must also have access to a logic, and this logic can be no other than Marxism’s dialectical logic (Kopnin, quoted by Danilow/Boldyrow, 1974, p. 21).

4. GREAT BRITAIN

In Great Britain, we can distinguish broadly³⁶ three views concerning the possibility of a science of education; the first considers the idea of a separate science of education to be simply absurd; the second formulates a number of criteria for a science and finds that current educational theories do not yet conform to those criteria; the third defends a fairly broad concept of science, states further that not only strictly scientific theories are real theories, and concludes that an educational.....

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theory can be considered as a fully fledged theory. Elsewhere (Monshouwer, 1978) I have written in detail about the various arguments concerning these problems; I will restrict myself here to a few principle characteristics.

4.1. R. S. Peters. One of the most important British philosophers of education, R.S. Peters (1963), states unambiguously "that there can never be a discipline (in any ordinary sense) of education" (p. 17 and 21). He feels that he can substantiate this assertion with two arguments: a logical argument and a practical argument. Theological argument implies that the study of a specific subject, of a clearly definable "subject matter" does not necessarily have to result in a separate science (of Scheffler, below):

The notion of a subject matter might have some practical value for the fixing of a syllabus, the setting of examinations and the organization of university departments. But its importance extends little beyond this level.

Yet there is another criterion, albeit not altogether hard and fast, but but on the basis of which certain distinctions can be made between the sciences:

Sciences can only be vaguely distinguished from each other by reference to the types of questions that they ask and the types of answers which they give and the types of procedure which they employ in testing such answers. (p. 17)

It is precisely because the phenomenon of education can and must be approached via such a large variety of questions, answers, and testing procedures, that it is 'absurd to think that the various disciplines that have bearing on education could ever be coordinated into one discipline' (p.18)³⁷ Following on this comes his practical argument: if the phenomenon of education can indeed be approached via such a wide variety of "established disciplines (psychology, sociology, history, philosophy, and so on, which moreover also each have their own numerous sub-divisions) then a "general discipline of education" would presume that there are scientists who have a good command of all these disciplines, which is "practically impossible" (p. 19). Besides, and he advances this point for the purpose of strengthening his logical argument, in psychology and sociology we are also concerned not with *one* discipline, but rather with a "number of disciplines:" indeed, the "whole approach to the social sciences," which takes the line "that it might be possible to develop unifying theories in the sciences of man such as one finds in physics and mechanics" is in his eyes "fundamentally mistaken" (*Ibid.*) . He therefore comes to the conclusion that "education" can at most be called "a focus or a meeting place of disciplines" (p. 17): "Education, like medicine, is a profession, not a discipline" (p. 22).....

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4.2. D. U. O'Connor. In his well known book *An Introduction to the Philosophy of Education* (1969) and in an article which appeared later (1972), O'Connor tackles the question of whether educational theories' can be considered as real "theories." The question is actually--although this comes out at the most only implicitly -- whether educational theories can be considered as *scientific* theories.

After having analyzed³⁸ four current meanings of the term 'theory', the author states that the meaning of the term 'theory' to which he gives the number 4 is the most appropriate meaning and "gives us standards by which we can assess the value and use of any claimant to the title of 'theory'" (1969, p. 76). This concerns the view that by 'theory' we should understand "a hypothesis that has been verified by observation and, more commonly, a logically interconnected set of such confirmed hypotheses" (cf. also p. 96), the purpose of which is to describe, to predict, and -- by far the most important function (pp. 81-91)-- to explain (1969, p. 81; 1972, p. 101). He later adds to this that an essential characteristic of such a theory is that it is "refutable" (1972, p. 102).

It is clear right from the start that existing educational theories do not (cannot) conform to these criteria. Hence, his conclusion that "the word 'theory' is used in educational contexts in a derivative and weakened sense (1969, p. 75), indeed, "is generally a courtesy title" (p. 110). For, he reasons, if we can distinguish three components in current educational theories, namely a metaphysical part, judgments of value, and an empirical component, then it is evident that the first two components cannot, on principle, satisfy the requirements formulated above for a scientific theory (pp. 104 ff.). The empirical component, in the most favorable case, consists of an application of psychological and sociological knowledge to "educational situations." So according to O'Connor, the use of the term 'theory' in "educational contexts" is only justified "where we are applying well-established experimental findings in psychology and sociology to the practice of education (p. 110). This is of course insufficient to justify a distinguished science of education.

Later, in his discussion with P. H. Hirst (cf. below), he clarifies the proposition that judgments of value do not belong in a scientific theory:

There is no reason why a satisfactory scientific background to education should not enable us to bring about those educational outcomes which are accepted as desirable in a given community. (1972, p. 106)

But this position differs from Hirst's demand that judgments of value must be able to function within the educational theory itself. Logically, there is a complete discrepancy between ethical-normative statements and empirical statements, and a confusion of this kind between sorts of statements appears to him to be "both unnecessary and logically disastrous" (*Ibid.*) Even if one were to assume that judgments of value can be accepted "side by side with empirical statements" in an educational theory.....

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then it would still be an insoluble problem to determine which logical relationships must exist between the two types of statements, and meaningful use of the term 'scientific theory' would automatically be discredited as a result of this impossibility since

a theory is not just a collection of propositions; it is a set of propositions made into a unity by logical relations between the members. A theory is a structure, not an intellectual salad. (p. 108)

In summary, O'Connor proposes the following alternative:

Either the value components of his [i.e., first's] theory are proved from its factual components or they are not. If they are, let us see the proof (which would indeed be a philosophical landmark). If they are not, there is no point in making them integral to the theory. For they can do their own work of prescription and guidance just as well outside it. (*Ibid.*)

It must be emphasized that -- as is implicitly apparent from the above--O'Connor does not exclude, on principle the possibility of a science of education and that he restricts himself to the finding that existing educational theories to a greater or lesser degree fail to satisfy the requirements which he sets for a scientific theory.

4.3. P. H. Hirst. [first's views are diametrically opposed to some of O'Connor's premises. He reproaches O'Connor that he "totally misjudges the importance of the non-scientific elements" (1966a, p. 89; 1966b, p.39), which, according to him, should play an essential role in a meaningful study of the phenomenon of education. Furthermore, he reproaches O'Connor for unwarranted "reductionism" (1966a, p. 41), insofar as O'Connor raises 'theory' in its fourth sense (theory&1 to the status of a paradigm, to a standard for all possible forms of theory. According to first, this is 'thoroughly false and artificial.'" Finally, he contests O'Connor's inclination to consider philosophy as "no more than an accessory to the theory, useful only when difficulties of a logical or conceptual kind arise" (1966a, p. 90).

Hirst sees an educational theory as a practical theory," that is to say, as "knowledge that is organised for determining some practical activity" (1966b, p. 40). To put it another way, it is "the essential background to rational educational practice, not as a limited would-be scientific pursuit" (1966a, p. 89). And such a "theory of practical activity must, logically must, involve a concern for more than scientific knowledge" (1972, p. 110), since the social institution of education is not, of course, a natural object and what makes it the thing it is, cannot be set out merely in terms of observable features" (1972, p. 111). It is, therefore, inevitable that.....

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education being the kind of activity it is, the theory must range right across and draw from many kinds of knowledge, value judgments and beliefs including the metaphysical, the epistemological and the religious. All these must contribute to the peculiar character of the theory. (1966a, p. 90)

The problem of the logical connection between statements of fact and judgments of value, raised by O'Connor, and thus the well-known "is-ought-issue," does not worry Hirst:

My answer is that though I do not for one moment think that value judgments can be 'proved from the factual components, I do not accept that there is no logical connection between them that is important in determining educational practice. (1972, pp. 115—116)

Just as in educational practice no "dissociation of fact and value is possible, similarly in the practical theory of education both components are inseparably connected with each other (1972, p. 115):

Value assessments that are significant in deciding to do A rather than B must be made from within and are not simply derivable from value assessments taken from without. (*Ibid.*, italics added)

The fact that, as a result of this, an educational theory cannot be called a 'scientific theory' in the narrow sense of the word, does not interest Hirst; what he does stick to is the legitimate use of the term 'theory'.

5. THE U.S.A.

Until 1970, at least, a wide variety of views of the scientific status of the discipline of education had been published in the U.S.A. Here, too, I must restrict myself to a number of principal features; elsewhere (Monshouer, 1979a and 1979b) I have described the various viewpoints in detail.

5.1. Rejection of a separate discipline of education. Although I. Scheffler (to my knowledge, the first person to promote in the U.S.A. an analytical philosophy of education 39) adopted a much more optimistic viewpoint in an article which appeared much earlier (1956), he later found, as did R. S. Peters in Great Britain, that he had to reject the idea of a separate science of education as being absurd. On closer study, he appears to have two premises: In the first place, he flatly denies the existence of any parallelism between any conceivable areas of empirical reality and the disciplines which concern themselves therewith (1966, pp. 66 and 68; cf. below). In the second place, he is of the opinion that the use of certain theoretical terms which do not yet occur in other disciplines is not sufficient reason for the creation.....

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of a separate, new discipline (1966, pp.74-75): Even if we could accept the improbable supposition that “educational terminology is distinctive, and thus expresses more than could be expressed without it, the crucial question remains whether this surplus is scientifically significant” (p. 74). The answer to the latter, rhetorical question can only be negative, in view of the fact that the writer apparently equates education structurally with engineering and medicine and even with poetry (“there is no science of poetry”) and painting (pp. 65-66).

5.2. Philosophy as general theory of education. The major streams within American philosophy of education (pragmatism, positive relativism, reconstructionism, realism, existentialism, idealism, neo— Thomism, and so-on4t) assume not only implicitly or explicitly that philosophy can be considered as a full science, but attribute to this philosophy (or philosophy of education) an extremely important role in the construction of an educational theory. It goes without saying that as a result of this, the term ‘philosophy’ often acquires a very broad meaning (sometimes, even all forms of speculative thought are termed “philosophical”). Very influential in this respect is the famous statement by Dewey (1916, p. 383) that “philosophy may even be defined as the general theory of education.” As a reaction to this, not only has there been extensive discussion over the years on whether a philosophy of education is really identical to general philosophy (cf. , e.g., Symposium, 1956; Committee of the Philosophy of Education Society, 1954; Schilpp, 1953), but also the problem has arisen of what relationship can exist between a philosophy of education and educational practice (cf. Burns, 1962; Gowin, 1963; Willower, 1963; Newsome, 1964; Perkinson, 1964; Guttchen, 1966). In addition, Dewey’s statement gave rise to divergent reactions, varying from complete agreement (cf. Kneller, 1962, p. 43) to various forms of rejection (cf. below).

5.3. Education as a distinctive discipline. There have been attempts in the U.S.A. (partly as a reaction to Dewey’s views) to show in various ways that a true educational theory is a distinctive discipline. The following views can be distinguished:

i. The idea of an “autonomous discipline of education” was proclaimed by McMurray (1955 and 1956), Sidney Hook (1956), foal Chin Sun (1960), and William O. Stanley (1958), amongst others. 42 In order to not make things too complicated, 17 will restrict myself in this context to McMurray’s ideas. This writer opposes the customary acknowledgement of educational theory’s dependence on general philosophy. He views a genuine educational theory as a “unique discipline:”

By a unique discipline I mean one which has its own problems, its own line of inquiry staked out, such that anyone who pursues it may find his theoretical materials and his procedures of validation contained within the discipline itself, rather than in some other. (1955, p. 129).....

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This “autonomy” is with regard to both “general philosophy” and the so-called ‘foundational sciences.’ An educational theory may not be a “derivative from philosophy” (1955, p. 134), and

the empirical findings or research conducted in or concerning the schools, when problems and procedures are those of the recognized social sciences (“educational psychology” and “educational sociology”) do not tell us how to teach nor what to teach. (*Ibid.*)

A structural dependence on philosophy unavoidably renders a “theory of education a “matter for individual choosing according to the peculiarities of individual taste” (1955, p. 150). That does not alter the fact that

the educational theory of the kind I have proposed is philosophical, not scientific, theory. The constructions of an educational theorist must be speculative or dialectic, projecting the meanings of our beliefs beyond the limits of scientifically warranted knowledge. (1956, p. 18)

On the other hand, the writer emphasizes that

educational theory, on my description, is thoroughly empirical, and established upon foundations common to the social sciences. (1956, p. 17)

In view of his concept of a philosophy of education, this does not per se have to comprise a contradiction with the above:

To be responsible, educational philosophy must be compatible with whatever is known To be useful, it must be empirical in content, predicting outcomes of educational activities. (1956, p. 18)

A *logical* dependence on the “foundational sciences” would, however, lead to the incorrect view that an “educational theory” is merely a simple “technological application of scientific knowledge’ (1955, p. 133):

In the same way that application of pure science to industrial process is not found by simple deduction from basic knowledge, but is rather the product of creative invention, so also the “moaning” of the social sciences for education must be discovered by activities of a higher intellectual order than following suggestions, analogies, or supposed “implications” from foundational sciences. (1955, p. 134)

In this context, I cannot go into the contradictions and vaguenesses to which these views lead; elsewhere (Monshouwer, 1979, pp. 4-5) I have.....

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stated them explicitly. Even the essence of McMurray's argument, namely the exposition of what actually determines the uniqueness and autonomy of the educational theory, remains vague and full of obscurities. Only a "construction of a unique point of view" (1955, p. 135) is capable of both guaranteeing the autonomy of the "educational theory" and of creating some order in the "diversity of raw materials" which the social sciences provide or should provide. For let us understand clearly that an "educational theory" does not *automatically* have its own "subject matter" in the sense that, for example, a Romanist studies the Romance languages; the educational theorists' subject matter is "unique only by an act of intellectual construction" (1955, p. 136). The precise content of this "construction of a unique point of view" (1955, p. 135), unfortunately, remains vague since the writer gives no exact definition, but restricts himself principally to providing an example (the "theory of knowing;" 1955, p.140), which does not come across very convincingly.

ii. The "uniqueness" of the "subject matter of education" presents no problem for J. Walton (1963):

It is obvious that many of the phenomena of education, as we have defined it, are unique . . . Who can mistake a classroom for anything else? What does a curriculum resemble . . . ? (1963, p. 11)

The writer -- not entirely incorrectly -- does not consider separate research methods specific to a distinctive discipline of education as being a *conditio sine qua non* since

there are no copyrights on methods of organization and inquiry [and] observation, conceptualization, classification, analysis, theorizing and experimentation; . . . logic, originality, imagination and curiosity are public domain. (p. 15)

His principal argument in favor of a relatively distinctive discipline of education is of a pragmatic kind:

Organized education is a historic, discrete, complex and important activity in which many people, and most people concerned with scholarship, are interested. (p. 14)

In close relation to Walton's views, J. L. Kuethe (1963) emphasizes that neither the possession of a "unique corpus of facts" nor the possession of a "unique method" is the criterion which determines whether something can be called a "discipline" or not. Indeed, if one did use these criteria, then it would be simple to justify "education as a discipline" by pointing to the "curriculum" and "the idiosyncratic nature of the instructional process." No, Kuethe seeks his salvation in what he calls "the viewpoint of concern:"

Education is a discipline in the sense that there is.....

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a body of facts and principles organized in a framework of a unique concern. (p. 75) What is unique to education is its primary concern . . . (p. 80) about the transmittal of human knowledge and culture from generation to generation. (p. 75)

Unfortunately, the further elaboration of this “unique concern” remains, sadly, vague. (Cf. Monshouwer, 1979a, p. 9)

iii. M. Belth’s ideas (1962 and 1965) are particularly remarkable. The fact that there is scarcely any question of the development of an independent “discipline of education” is blamed by him on two factors. The first is that many people conceive of such a discipline as an “applied discipline,” and whereby it is immediately brought into a “logically precarious situation” (1965, p. 3), all the more because education is not simply a matter of deduction . . . ‘ (1962, p. 204). The second is that there are continual attempts to develop an ‘educational discipline’ on a par with sociology, psychology, anthropology, etc. These attempts are doomed, in advance, to failure.

Education [as a study] does not operate on either of these levels of abstraction, but on an entirely different level. (1965, p. 7)

Not only is “education” something which is unique (‘the ‘subject of subjects’ perhaps the most creative, certainly the most demanding, of all areas of study” (1965, p. 191) ,but also the discipline of education cannot be compared with any other discipline:⁴³

Education as a study appears to borrow from other disciplines. But in reality it only “borrows” the consequences which it has enabled those disciplines to produce. Pot without education, is it likely that there would ever be a psychologist, a biologist, or a sociologist in the world? (p. 20)

Belth’s most detailed description of the discipline of education is as follows:

The study of education is the study of the way in which models for inquiry are constructed, used, altered, and reconstructed. It is, further, a study of the types of models available to us at any given moment, and the conditions which make the model either employable or in need of rebuilding. It is an inquiry into the various particular models which are employed in judgments made about the world in which men live, and toward whose fulfillment they are striving. It is an inquiry into the character of the elements found in any given view of the process of education, and the way in which those elements are weighted and emphasized in their relationship to each other. Most.....

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important of all, the study of education is directed toward an evaluation of the claims which each model user makes about his concept of the process of education. (1965, pp. 103-104)

It is clear that Belth attributes to the discipline of education an exceptionally difficult task. How, and in particular, with what research methods it must perform this task, remains, unfortunately, largely uncertain. (For a critical discussion, cf. Monshouwer, 1979a, pp. 11-14.)

5.4. Education as a partially applied discipline. Many educologists emphasize that the discipline of education is no more than the application of -- if not a deduction from -- philosophical systems. We have already seen how the so-called "separatists" oppose this. Others regard education purely as applied psychology (and in some cases, applied sociology). Others again see an educational theory -- following Herbart more or less in this respect -- as a combination of both applications.

Some English-speaking educational theorists, however, adopt a more differentiated viewpoint in this respect. Deese (1963, p. 162) for example, and, a few years later, Beck (1970 and 1974) state

that education is a social science as well as an applied discipline. It is a somewhat unusual social science, though probably not absolutely unique, in that it has no unique tradition of method as its own.

On the one hand, it is clear that

education, in company with most applied sciences, does not have a unique body of method that serves to define its study. It relies on the methods in the traditions of other disciplines. (Deese, 1963, p. 168)

On the other hand, it is evident that the "study of education" is more than "poultry husbandry" (p. 165). It is very clearly "as fundamental as the study of money or law that it is almost unnecessary to raise any questions about it" (p. 166).

Further, Deese points to the fact that the "discipline of education" -- and this is also true to a greater or lesser extent for all other social sciences -- is actually still in its infancy, since it is scarcely capable of explanation and prediction (let alone, "control"), but he immediately warns against the danger of compensating metaphysical speculation:

I do not mean to imply that the lack of predictability in the study of the individual or in the study of certain aspects of social systems is something metaphysical or inherent in the freedom of the individual human mind or the human will.⁴⁵ It simply is,.....

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that the limitations of the methods available to us and the inherent difficulties in the subject matter, do not allow us to apply the ordinary canons of induction with anything like a specifiable degree of accuracy. (p. 175)

Ausubel (1953), concluding from similar considerations that the “science of pedagogy” does not yet exist, believes that if “educational research is to be fruitful, then it must direct itself towards “applied research” and not to basic research.” C.D. Hardie, the Australian philosopher of education (1965, 1973, p. 101), who regularly publishes articles in American journals, also cautions “educational research” to modesty and suggests that it should, for the time being, restrict itself to the “more modest aim of proving reasons for changing some aspects of educational practice.”⁴⁶

5.5. A science of education. In addition to all the views described above, we also find a movement in the U.S.A. which clearly assumes that a theory of education, if it is to earn the title ‘scientific,’ must satisfy all criteria to which other recognized sciences conform. The most important of these is the search for theories which are built up from laws or law—like generalizations on the basis of which, “explanation”. and “predictions” (and also “technology”) become logically and practically possible (cf. below). The theorists of education who adhere to this view are in the minority; those who are occupied with educational research do, indeed, often formally recognize the value of this criterion, but in practice mostly restrict themselves -- as, indeed, do sociologists for example -- solely to exploratory or descriptive research.

A few names should be sufficient. When introducing a treatise on “logic and scientific method in research on teaching,” May Brodbeck gives an extensive description of the criteria to which every form of scientific research according to well-known handbooks must conform. She states in the last paragraphs that educational research also has to keep to these guidelines (Brodbeck, 1957 and 1963). Partly on the basis of the above named criterion the well known philosopher of science, Ernest Nagel, comes to the conclusion that there is in fact no genuine scientific theory of education (Nagel, 1969). This assertion brings him in line with O’Connor (cf. above). “ Both Suppes (e.g., 1974) and Kerlinger (e.g., 1969 and 1978) emphasize repeatedly that, even in educational research, descriptions on their own are not enough. One must strive for theories which should include law like generalizations and should thereby be capable of explaining and predicting. Skinner (e.g., 1954 and 1973) tries to put this view into practice, not only in a theoretical way, but also in an experimental context. Still others (Harrison, 1966; Levit, 1968; E. Steiner {Maccia} ct ci., 1963; and P. Suppes, e.g., 1969) attempt to show, either in theory or in practice, the importance of mathematical models in the emergence of an educational theory.

In addition, we find various deviant views. Cowin (1972) underlines -- with, to a certain extent, the support of Fenstermacher (1973) -- the.....

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separate character of educational research. Maslow (1968) is obviously of the opinion that the principles of his 'humanistic psychology' are also directly applicable to a study of the phenomenon of education. Scriven (e.g., 1972 and 1973) is fundamentally critical of that philosophy of science which presupposes a very narrowly defined concept of science; in particular he has difficulties with the so-called principle of objectivity (cf. Spiöcker, 1974, pp. 61 ff4. Finally, both Soltis (1971) and Popp (1975) take up the well know, ~ ideas of Thomas S. Kuhn (1970) and claim to be able to show a succession of 'paradigms,' even within educational inquiry.

5.6. The idea of educology. Elizabeth Steiner (Maccia) occupies for various reasons an important place amongst those who are concerned with the scientific status of the discipline of education.

i. Not only does she assert -- as do the so-called "separatists" -- that an educational theory may not and cannot be a deduction from general philosophical ideas, but she also proposes that a theory of education is something completely different from a philosophy of education (1962 and 1972).

ii. Science, according to her, must contain a certain amount of creativity ("re-searching must be neo-searching" { 1964b,p. 61). According to her, CS. Peirce's principle of "retroduction" can serve as a logical starting point for this purpose (1964a, 1964b, 1967, 1969, and 1978). ~ Put simply, this starting point implies, according to her interpretation, that in the science of education we must renounce utterly every form of "inductivism" and 'experimentalism,' in favor of the development of models of educational theories.

iii. Together with George Maccia and others, she has put this idea into practice by the development of the so-called "SIGCS-model" of an educational theory (e.g., 1963, 1969, 1971, 1975, and 1977a). SI

iv. In addition to this, she has since 1964 regularly brought forward the idea of an "educology" (1964b, 1967, 1970, 1977b, and 1978). An educology implies, amongst other things, that the discipline of education is more than just a science of education and/or a philosophy of education: It includes "qualitative knowledge of education," "performative knowledge of education," and "quantitative (or theoretical) knowledge of education." This latter category is in turn composed not only of "science of education" and "philosophy of education," but also of "praxiology of education." However, in the context of this book, there is no sense in going into detail concerning the meanings of these various components of educology, since E. Steiner (Maccia) has undertaken such an analysis herself (cf. her chapters in this volume). Moreover, in another chapter of this volume, I shall raise, and attempt to answer, the question of whether this is indeed the most ideal classification (cf. below). I shall also raise, there, the similarities with, and difference from, the views of Wolfgang Brezinka (1971 and 1978). (For a more thorough analysis of the ideas of B. Steiner {Maccia} and C. Maccia, cf. Monshouwer, 1971b, pp. 64-71.)

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FOOTNOTES

1. Cf. her chapters in this volume and below p. 72.
2. Whereas the market is flooded with books which compare various philosophical movements (pragmatism, reconstructionism, existentialism, realism, neo-Thomism, idealism, etc.) with each other.
3. In the last two years, I have made an attempt at such a stock-taking and comparison; unfortunately the results of this research are only accessible to Dutch-speaking people (Monshouwer, 1978, 1979a, 197Db).
4. For a more precise or more detailed exposition see Lassahn (1978), Wulf (1977), König (1975), Benner (1973), Brezinka (1971 and 1978).
5. Literally “sciences of mind” or “spiritual sciences.”
6. Cf. Radnitzky (1970), Vol. II, pp. 39 ff.
7. Literally “critical science of education.” Since this movement however assumes a very broad definition of the concept of science it is better to speak in this context of “critical theory of education.”
8. Cf. Th. Litt (1964) and particularly M. Langeveld (1951). Moreover we also sometimes find such ideas in Anglo-Saxon countries (Cf. e.g. Belth, 1965).
9. Cf. S. Strasser (1961, 1965).
10. Cf. for example Strasser (1965) and Heitger (1972).
11. E.g., Langeveld (1962), Beckman (1972), and Imelman (1974).
12. Langeveld (1962). In line with this, Van Beugen (1968) states that a technically perfect brainwashing technique does not belong in what is commonly called “adult education.” Compare the rejection of this premise by E. Steiner (Maccia) (1972, p. 19).
13. Much criticism comes particularly from the German Democratic Republic. An example of such criticism is Beyer (1971).
14. Cf. for example Marcuse (1964, and 1965).
15. Habermas himself (1968a, p. 158) names only “economic theories, sociology and political science” as examples of these *Randlungswissenschaften*; in none of his many works does he give explicit form to the idea of a science of education.
16. Habermas (e.g., 1968a, pp. 120 ff.) distinguishes among three models for a relationship between science and politics (i.e., practical.....)

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decision making): *Decisionism* which wants to maintain strict separation between science and practical, political statements and decisions in order to safeguard the freedom from value judgements in scientific statements; the *technocratic model* which strives to have practical decisions taken as much as possible by the sciences and which therefore attempts to reduce practical, political problems to technological problems; and the Pragmatist's model which lays the accent on a continuous critical interaction between science and politics (*Dauerkonznunikation zwischen Wissenschaft und Politik,*" *op. cit.*, p. 134).

17. For example, Mollenhauer (1972) who seeks a close relationship with C.H. Mead's "Symbolic Interactionism" (for a methodological analysis, cf. Blumer, 1969) and with modern theories of communication such as that of Watzlawick. The term 'praxis' means more than just 'practice'. It includes in particular a normative determination of a viewpoint with respect to the past, the present, and the future of mankind (including society), or expressed in another way: the "normative communication" with people, things, and structures. "Orthodox" Marxists usually understand by 'praxis', the "*gesamtgesellschaftlicher Prozess der Veränderung und Umgestaltung don objektiv realen Wirklichkeit durch den Menschen*" terminology which can scarcely be translated into English (Klaus/Buhr, 1965, p. 431).
18. One of Brezinka's most important followers in West Germany is L.Rdssner (e.g., 1974 and 1975).
19. Cf. Steiner's chapter in this volume.
20. And then only at three out of the many French universities, namely Paris, Bordeaux, and Caen (cf. Debesse/Mialaret, 1969, preface, and Mialaret, 1976, p. 115). Before that time "*pedagogie*" was usually considered as "applied philosophy" and/or "applied psychology."
21. Piaget was Professor of Psychology at the Sorbonne for many years and can, therefore, be considered certain extent as being a French scientist.
22. He does not hesitate to use the risky comparison "that experimental pedagogy is bound to rely upon psychology in much the same way as medicine relies upon biology or physiology, while remaining distinct from them" (Piaget, 1971, p. 23).
23. The first task of a philosophy of education is, according to Mialaret, a normative one, namely "the choice of a coherent system of objectives, in the double context of an internal coherence (of each objective with the others) and an external coherence (coherence with other, more general, philosophical positions)." At the same time he emphasizes that '(unlike the opinions of certain American colleagues) the current taxonomical studies provide no solution to those normative problems,' since taxonomy although giving us, it is true, a bet-.....

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ter classification and analysis of the existing educational objectives, does not apply itself to value judgements (Mialaret, 1976, p. 81). However, this normative evaluation of educational objectives is not the only task of the philosophy of education. Together with Lévêque and Best (in Debesse/Mialaret, 1969) the writer states that further tasks of a philosophy of education consist “in an elucidation of the problems, in clarifying the antinomies which are contained in the act of education itself (culture and nature, liberty and determinism, and so on), and also in a study of the conditions of possibility of education (p. 82).

24. G. G. Granger’s ideas form a typically French philosophy of science orientated towards structuralism (Granger, 1967). However, since Granger’s views have, up till now, had no noticeable influence on the formulation of an answer to the question as to what the formal structure of a “*science de l’éducation*” comprises, there is little sense in this context in going into his views in more detail.
25. M interesting book in the field of the Marxist general philosophy of science is, for example, Sankiihler (1975). Tavanec (1970) -- accessible for the English-speaking reader -- is an outspoken exponent of the movement which is given the title of ‘logic of scientific discovery.’ A standard work for the Marxist philosophy of education is Suchodolski (1972).
26. For the meaning of the term ‘praxis’, see note 16. In connection with E. Steiner (Maccia) and her work with the concept of praxiology, it is interesting to mention that in the context of the general philosophy of science, Zeleny (1973) repeatedly lets fall the term “onto-praxiological problems.”
27. It is also characteristic of the principal, modern, bourgeois philosophical systems that “they attempt to separate philosophy from singular sciences” (Koroljow/Cmurman, 1973, p. 203), but “no science, not even an educational theory, can exist without a philosophical, without a methodological fundament,” otherwise “the singular facts would only form a mass without any cohesion” (*Ibid.*).
28. “The relationship and cooperation between the sciences reflect the correlations which exist objectively between the phenomena, i.e. the dialectical unity of the world” (Koroljow/Gniurman, 1973, p. 183; cf. also Danilow/Boldyrew, 1974, p. 23).
29. This is also a fundamental source of difference of opinion with Popper’s “critical rationalism,” which of course never claims to *reproduce* the “reality.”
30. De Groot (1969, pp. 1-32). The only difference is that De Groot distinguishes five phases in this cycle whereas Danilow/Roldyrew (1974, pp. 26-27) assume seven phases.

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31. This can be seen by reading the Proceedings, in particular P. Suppes, L. Henkin, Cr. C. Moisil, and A. Joja (eds.), *Logic, Methodology and Philosophy of Science IV. Proceedings of the Fourth International Congress for Logic, Methodology and Philosophy of Science, Bucharest 1971* (Amsterdam-London: North Holland Publishing Company, 1973). Eminent philosophers of science are for example M.N. Alexejew, B.M. Kedrow, P.W. Kopnin and P.V. Tavanec referred to earlier.
32. The fact that this name corresponds with the title of Popper's most famous book (1968) cannot as such be used as an argument in favor, particularly not since the Marxists and Popper hold fundamentally different views on the possibilities and function of the social sciences (cf. K.R. Popper, *The Poverty of Historicism*, London: 1957). Nevertheless, in many respects, agreement exists between this particular school and Popper with respect to the formal structure of the practice of science.
33. Concern with this is more sporadic in the West European science of education. F. von Cube and H. Prank (West Germany) in particular have performed important work in this respect, but the practical application of their ideas leaves much to be desired.
34. The motives for this are moreover not always equally impressive. Professor Chakarow from the University of Sofia, for instance, argued at the 15th International Congress of Philosophy at Varna (Bulgaria, 1973) that cybernetic models are quantitative elaborations of the dialectical model of the Marxist philosophy. This apparent isomorphy between cybernetics and dialectics appears to be the reason why in many Eastern European writings Systems Theory is considered to be a part of Cybernetics, whilst elsewhere in the world a precisely opposite relationship is assumed (cf. J. H. L. Oud, *System-methodologie in social-wetenschappelijk onderzoek*, Nijmegen: Alfa, 1978, pp. 6-8).
35. "Wissenschaft ala Erkenntnistatigkeit ist objektbestimmt, denn die Erkenntnis ist Widerspiege und ideeler Gegebenheiten, die unabhingig von den Prozeszen ihr Erkenntnis existieren" (Laitko, 1975, p. 99).
36. The discussions about a possible distinction between "natural sciences" and "social sciences" (cf. on the level of the general philosophy of science for example, Winch, 1958, and with specific reference to educational theory, Bantock, 1961) cannot be considered here. The same is true of Hardie's views (e.g., 1942, 1957, 1965 and 1971). Similarly, certain 'middle positions such as those of Cohen (1969) and Moore (1974) cannot be discussed here. For a more detailed analysis see Monshouwer (1978)
37. Cf. Mialaret's implicit premise above.
38. O'Connor's approach (1969, pp. 75-76) bears strong resemblance -- despite differences in content -- to that of Nagel (1969).

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39. In this article he asserts ‘that there is no theoretical barrier to the advance of scientific study of social phenomena, and in particular, of education;’ adding to this: ‘theoretically, science can be applied to education’ (Scheffler, 1959, p. 6).
40. Cf. Scheffler, 1954.
41. In recent years, increasing interest has been evident in the U.S.A. for typically European movements, such as for example existential phenomenology, the principle proponent of which -- at least within the field of philosophy of education -- is Donald Vandenberg.
42. This movement which has been labelled as separatism” by Kneller (1962), has been subjected to fundamental criticism not only in the U.S.A. (for example, alongside Kneller: Burnett (1956) and Smith (1956), but also in Great Britain (Hirst, 1966b, pp. 30-33). To my knowledge, continental European philosophers of education have never commented on this movement.
43. It is only in the German *geisteswissenschaftliche* theories of education (cf. above) that we find such an emphasis on the uniqueness of the discipline of education, and even then principally in Th. Litt’s work. The suggestion that the discipline of education must be considered as a sort of basic science for all other sciences is also to be found (temporarily) in Langeveld’s work (1951).
44. J. F. Herbart (1776-1841) was undoubtedly the first person to elaborate in theory the idea of an educational theory considered as a combination of applied psychology and practical philosophy (cf. Strasser/Monshouwer, 1967).
45. Cf. Hardie, 1942, pp. 43 ff.
46. Others are absolutely not in agreement with these views. Carroll (1968) for instance warns against the danger that “basic research’ may be neglected in favor of ‘applied research.”
47. A criterion which was elaborated earlier by him in Nagel (1961).
48. For a more detailed analysis of his reasoning and the incorrect interpretation of both Flower (1970) and E. Steiner (Maccia) (1970) see Monshouwer (1979b, pp. 61 if.).
49. Refer to his well known books and articles.
50. For a not entirely unjustified criticism, cf. Morris (1970).
51. A judgment of the value of this model falls outside the competence of a philosopher.

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