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ABSTRACT

This document summarizes the discussion and recommendation made at a meeting held to consider ways and means of putting the syllabuses of teacher training colleges and subsequently those of primary schools on an interdisciplinary footing. The conference was attended by teachers on the staff of primary teacher training colleges in Cameroon, the Ivory Coast, Niger, and Togo; by staff of the French bilateral assistance program; and by a United Kingdom observer. The report is divided into three parts. Part 1 discusses the rationale for an interdisciplinary system; part 2 relates the interdisciplinary system to language teaching in a bilingual system; and part 3 discusses the role of environmental studies in an interdisciplinary system. (RT)

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UNITED NATIONS EDUCATIONAL,
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SEMINAR ON THE TRAINING OF TEACHERS, BY THE INTERDISCIPLINARY SYSTEM, TO USE THIS SYSTEM IN SCHOOLS

Bouaké, Ivory Coast
24 March - 4 April 1970

FINAL REPORT

SUMMARY

This seminar was organized in pursuance of resolution 1.231, adopted by the General Conference at its fifteenth session. It was held at the Primary Teacher Training School at Bouaké (Unesco/Special Fund Project). The Ivory Coast authorities and Unesco were responsible for the material preparation and the intellectual and technical organization of the conference.

The conference was attended by teachers on the staff of primary teacher training colleges receiving aid from Unesco and UNDP (Special Fund) or from Unicef, or assistance under various bilateral arrangements, and also by persons working, under the French technical co-operation system, at the educational television centre at Bouaké. The United Kingdom sent an observer. The purpose of the meeting was to consider ways and means of putting the syllabuses of teacher-training colleges and subsequently those of primary schools on an interdisciplinary footing.

TABLE OF CONTENTS

INTRODUCTION

A. NATURE, DATE AND PLACE OF THE MEETING; PARTICIPANTS, CONSULTANTS

1. This seminar, organized in pursuance of resolution 1.231 adopted by the General Conference of Unesco at its fifteenth session, was held at the Primary Teacher Training School at Bouaké (Unesco/Special Fund Project), which was kindly placed at the disposal of the Organization by the Government of the Ivory Coast. The competent Ivory Coast authorities and the Unesco Secretariat were jointly responsible for the material preparation and the intellectual and technical organization of the meeting.

2. The main participants were members of the teaching staffs of the other primary teacher-training colleges set up by Unesco in Cameroon, the Ivory Coast, Niger and Togo, with the assistance of the United Nations Development Programme (Special Fund) and Unicef and with bilateral assistance, and the staff operating the French bilateral assistance programme, who were working in co-operation with the educational television centre at Bouaké. The United Kingdom sent an observer, a specialist on education in the developing countries, to attend the meeting.

3. The purpose of the meeting was to consider ways and means of putting the programmes of teacher-training colleges, and subsequently of primary schools, on an interdisciplinary basis. It must be borne in mind that this new approach to teacher training is merely part of a more general move to review structures and methods as well as curricula.

4. Another point to mention is the unusual method used to prepare for the meeting. It is no use hoping for radical changes in the attitudes and methods of primary school teachers unless they themselves take part in the study and introduction of the proposed changes. In view of this, the preparation of the working document to serve as the basis for the seminar proceeded as follows:

The consultants and the Secretariat first drew up a draft document, based on their own experience and on such little material as is available on the subject of interdisciplinary methods;

this draft, deliberately couched in tentative terms, was distributed to future participants well beforehand to give time for it to be discussed in teacher-training colleges and for comments to be sent in to the Secretariat and to consultants,

lastly, the consultants and the Secretariat incorporated the comments and suggestions received in the final version of the working paper which was to guide participants in their work.

Thanks to this procedure, participants were materially and psychologically prepared for the discussion, right from the beginning of the debates, which saved a considerable amount of time.

5. Throughout the discussions, participants, consultants and Secretariat members were constantly aware of the novelty of the undertaking and of the difficulties attendant on it. The report that follows does not, therefore, claim to solve all the problems involved in introducing an interdisciplinary system into primary teacher training and primary schools. It is, however, hoped that it will provide a solid foundation on the basis of which the teacher-training colleges concerned and all similar institutions will be able to reorganize their syllabuses and teaching methods. Our thanks are due to the following:

Mrs. J.W. Barnard, Her Majesty's Inspector of Education

Mr. A. Biancheri, Inspector-General of Education (France)

Mr. J. Ader, chargé de mission at the Ministry of Education

Mr. R. Lallez, professeur agrégé, Director of CREFED (Centre de Recherche et de Formation en Education) at the Saint Cloud Higher Teacher Training College, who made a decisive contribution to the meeting.

The Secretariat was represented by the following:

Messrs E. Armerding of the Teacher Training Division (Education Sector);

D. Najman, Director of the Division;

A. Lestage, Chief of the Division of Curricula and Research, Director of the Seminar.

6. A short bibliography on the subject of the interdisciplinary system will be supplied on request.

B. ORGANIZATION OF WORK AND STAGES OF THE SEMINAR

It was decided in the course of the consultations preceding the seminar that the first day would be set aside for a general debate dealing firstly with the subjects to be discussed and the order in which they should be dealt with and secondly with the methods of work to be adopted.

As regards the first point - subjects to be discussed - it was agreed, at least provisionally, to keep to the work programme proposed in the original document. This meant that the work of the seminar would proceed as follows:

First stage: The meeting would concentrate on demonstrating that it is advantageous, urgent and indeed essential to replace the traditional teaching system by a system that is far more interdisciplinary in character. For it would be unreasonable to investigate the methods used in an interdisciplinary system without first going into the arguments in its favour. Thus the object of this first stage was to provide an opportunity for defining what was meant by an interdisciplinary system and determining what specific forms it might take, whilst at the same time making it clear that this system is relative in its application and that it in no way implies merging all disciplines in one, but can be applied in varying measure, according to the level of the class and the subjects to be taught.

Second stage: Before even seeking to determine how, in practical terms, the various subjects could be interlinked, the meeting would endeavour to ascertain what repercussions interdisciplinary teaching will have on training. It presupposes a new attitude, in regard to both the material taught and to those who are taught, and a profound modification both of the teacher's idea of himself and of his attitude towards his fellow teachers. All these new aspects of training can and indeed should be clarified without delay, because they are important in themselves, quite regardless of what is being taught; and because they will lead to a general reassessment of attitudes. Unless teachers are capable of making this change, it is completely useless to investigate the methods used in an interdisciplinary system.

Third stage: After these general considerations, the meeting would proceed to investigate the co-ordination of the various subjects. Here again it was decided to adopt, at least provisionally, the work plan proposed in the basic document. Reports and discussions would therefore concentrate on the following three points:

How to group the subjects included in traditional language teaching so as to form an integrated programme;

how to plan a course in such a way as to relate the different modes of expression, and how to associate these in the study of language; in this connexion, special attention would be paid to the language of mathematics;

how to use the study of the environment as an effective basis for grouping together what are usually regarded as the general cultural subjects.

Fourth stage: An attempt would be made to synthesize the conclusions reached in the course of the three preceding stages, the purpose of this being both to indicate what progress had so far been made and to provide a basis for the elaboration of new curricula and new methods to be used for the training of teachers.

As regards methods of work, the meeting first discussed the following two points:

Firstly, whether it was better to set up commissions or to remain in plenary session. It was decided, after considerable discussion, that, since so little was known about the interdisciplinary

system and since participants possessed relatively little information about it, it would be preferable to remain in plenary session. It was therefore decided to ask consultants to give a short exposition of the subject, which would provide material for the discussions and might suggest the direction they should take. It was agreed, nevertheless, that it would be both more stimulating and more useful to work in small groups during the fourth stage, and arrangements were accordingly made for the meeting to split up, at that juncture, into three commissions, each led by a consultant. Each of these commissions would then appoint a rapporteur, who would convey to the general assembly the views of members of his group on the discussions held during the seminar, the conclusions they had drawn from them and their proposals for the future. The final resolutions would be drafted on the basis of these three reports.

Secondly, the meeting debated how account could be taken of the practical experience gained by participants and the conclusions they had formed as a result, in accordance with the resolutions adopted after the preparatory work. It was quickly agreed that this presented no difficulty: on the contrary, the experience thus gained would fully meet the requirements of the method to be used in dealing with a subject of this kind. There are normally two methods of deciding for what subjects and in what ways a particular form of integrated teaching can be used; and these two methods, far from being mutually exclusive, are both equally necessary and useful. In the case of the training of teachers, as we shall see, in the last analysis both lead to the adoption of similar methods.

The first of these methods is inductive. We can take as our starting point either the experience gained by the various people taking part in the seminar or reports on similar experiments carried out in Africa or in other developing countries and then examine the means used for arriving at a synthesis, observe how the difficulties have been overcome, and take note of the problems still unsolved. The examples sited furnish an excellent basis for analysing the reasons for their success or failure. This process, obviously, very soon leads to a consideration of principles, in accordance with which an attempt can be made to solve existing problems and analyse the nature of the combinations so far tried out. If teacher-training programmes are to impart something more than a knowledge of the tricks of the trade or educational nostrums, it is essential to analyse the reasons for past success or failure; otherwise, the practical discoveries that have undeniably been made will never be generally applied.

This leads us to the second method, which is to determine, on the basis of psychological and epistemological analyses, the principles underlying all the possible and most successful combinations. All rational, systematic teacher-training programmes must always use this method, though the first method may be used in the initial stages; but it is absolutely essential to proceed from theoretical analyses to the practical level; otherwise the problems involved in putting theory into practice may not be appreciated. There is thus a constant interaction between theory and practice, success in the use of techniques can stimulate and guide theoretical reflection, which, in its turn, enables procedures evolved by the practising teacher to be consolidated and made known to others.

Every effort would be made, therefore, to persuade those taking part in the seminar to carry out experiments in integrated teaching; but above all it was hoped that they would describe and analyse the efforts they themselves had made in this direction.

PART I

WHY AN INTERDISCIPLINARY SYSTEM?

It was deemed necessary, for the sake of clarity, to start by settling a question of terminology - what is meant by a "subject". It will be taken to mean everything which is taught as a separate branch of knowledge, for which certain specific periods are allocated and also, in most cases, a specific syllabus. Thus, in language study, for instance, traditional teaching methods allocate a definite amount of time to activities to which an appropriate name is given - spelling, reading, writing, learning by heart, essay-writing, and so on. In the terminology we have adopted, each of these activities is a subject. Similarly, under the traditional teaching system, history, geography and object lessons are all regarded as separate subjects.

There is no denying that this traditional course, imported into Africa as it stands, comprises a very large number of separate subjects, and is highly analytical, breaking up knowledge and culture into a number of small sections. There can be no doubt, either, that teacher training has, hitherto, both reflected and perpetuated this system.

The need for replacing it by an interdisciplinary system that is more unified and more organically structured and the conditions that the new kind of teaching require will both become clearer if we begin by examining the causes of the fragmentary nature of the traditional course. Our account of the subject makes no claim to be a complete scientific and historical survey; we shall be satisfied if it throws light on the problem before us.

I. ANALYSIS OF THE REASONS WHY THE ANALYTICAL TYPE OF TEACHING CAME INTO BEING AND WAS DEVELOPED

Most of these reasons have their roots in civilization and history, the history of the sciences as well as political, economic and social history.

1. McLuhan, as we know, divides Western civilization into three main phases: the first ends with the invention of the phonetic alphabet, culminating in the invention of printing and the beginning of the mass circulation of printed material; the second phase is marked by the radical changes brought about in all domains by the technique of printing - hence the title of his book: The Gutenberg Galaxy. According to McLuhan, it was this new civilization that was responsible for the increase in the number of subjects taught. Without going into the whole of this philosopher's theory, the introductory statement referred to certain points he makes; he shows, for instance, that the result of stressing the sense of sight is that the approach to meaning is analytical rather than multisensorial and the objects of knowledge and culture are placed in separate compartments. Whilst granting that certain of McLuhan's deductions are somewhat bold, not to say rash it must be admitted that some of his ideas are interesting; and they are important in so far as they show that the causes of analytical teaching are rooted in the very nature of Western civilization.

2. We know also that the German sociologist Max Weber maintains that there is a close link between the rise and development of Renaissance capitalism, based on trade and essentially commercial in character, and Protestant ethics. This is the explanation he gives for the particularly intensive development of capitalism in Protestant countries. The conception of a religious calling linked with earthly success led to the early emergence of a form of education which already, to some extent, consisted of the study of certain well-defined technical procedures. The Catholic countries resisted this idea, and accentuated the distinction between the mechanical arts, regarded as being of a lower order, and the liberal arts, alone deemed worthy of true study. They thus helped to strengthen the notion of culture as traditionally understood. When we come, later, to examine the pedagogical consequences of these cultural phenomena, it will be seen that they all contribute, in different ways but in equal measure, towards the development of an analytical form of teaching.

3. The Eighteenth century endorsed the idea of natural enlightenment inherited from the previous century and placed it on a logical basis. The aim of the new ideology was to substitute truth based on reason for revealed truth in all domains; and this could only be achieved by means of an "encyclopaedia", substituting the sum of scientific knowledge for the "Summa Theologica" of Saint Thomas Aquinas. In this way, a close link was established between encyclopaedic knowledge and the concept of a truly free man; an idea which was to exercise a powerful influence, persisting long beyond the close of the Eighteenth century. The Nineteenth century considerably extended the range of man's knowledge, and changed the domains into which it was divided, both increasing the volume of knowledge and making it constantly more specialized. The number of sciences increased, the distinctions between them being accentuated by the belief that scientific knowledge was stable and final. This exalted idea of knowledge, combined with the growth, increased specialization and stability of the content of knowledge, further accentuated the analytical character of teaching.

4. The bourgeois society which grew up during the Eighteenth and Nineteenth centuries further accentuated the fragmentation of education by adding another distinction to that between subjects - a clearly marked distinction between the various levels of education (between primary and secondary education in particular). On the one hand, the sense of the continuity of education is blurred by its division into a number of stages, corresponding to the divisions of society and of the school-going population. Pupils are required, at every new stage, to acquire certain new information regarded as more worthwhile and as a suitable preparation for certain specific offices and functions in society. At the same time, primary schools, under this policy, are expected to teach certain very specific skills, resulting in a further intensification of the analytical attitude to education.

There is thus good reason to conclude that the traditional system is, to a large extent, a reflection of a particular period of civilization and a particular social system. It follows that any new, more integrated and more organically coherent system must reflect the aims of modern schooling. The traditional system, which was exported to Africa, where it encountered a civilization and a social environment totally different from that for which it was intended, was from the outset quite unsuitable for that environment. In a more general way, the changes which have now taken place in civilization and society are making this kind of education even more out-dated. To take an example, McLuhan's studies show that modern technology, which is based on electronics, and the new communication networks are bringing about changes in the world of today that are no less radical than those that followed Gutenberg's invention. We are witnessing the birth of a new civilization, one which will be world-wide in scope, and from which the developing countries will not be excluded. It will call for a far more interdisciplinary form of education. Then again, the needs of society are changing as society becomes more industrialized; and this too necessitates a new type of education. Lastly, the structure of society is no longer the same as in the past: children, for instance, have now acquired a social status, and take their place, with their "peer group" amongst the other groups of society. So it is that the need for change in education is felt spontaneously. At the same time, all contemporary societies, developed and developing alike, aspire to economic and social progress, which will not be achieved unless there is an equally intense desire for change on the part of the schools and of teachers. Thus it may be concluded that educational research into the interdisciplinary system - in particular at primary school level - will meet one of the principal needs of our day.

II. PEDAGOGICAL CONSEQUENCES AND DRAWBACKS OF AN EXCESSIVELY ANALYTICAL TYPE OF PRIMARY COURSE

1. As already observed, the traditional teaching system is planned to meet the needs of development and to take account of the modern forms of science, and it tends, accordingly, to be extremely abstract in character. The fact that the main object is to impart knowledge based on logic leads us, to some extent, to scorn all practical activities and to fail to realize the part that sensori-motor mental activities can play in symbolic thinking, to the harmonious development of which it contributes. The traditional method of teaching not only assumes that children are immediately able to grasp scientific truths, but also ignores the fundamental difference between science, which is developing and experimenting, and the teaching which imparts a knowledge of science. Teachers proceed as if pupils, despite their youth, were capable of pursuing the knowledge of pure truth for its own sake. Without dwelling on other considerations sufficiently familiar to need no repetition, it is clear that there is a vast difference between trying to apprehend a truth which is still concealed, as the scientist does, and learning from the teacher truths that science has already discovered, as pupils do. No amount of simulated "re-discovery" in teaching can give the pupil that thirst for the discovery of truth at first hand by which adult scientific researchers are inspired.

Added to this is the all-important fact that scientists feel the need to mitigate the effects of the highly specialized nature of their work by writing papers and holding symposia, as a means to co-ordinating their knowledge. Traditional education, unfortunately, does not feel this need, and has taken no steps to follow suit. The result is that, paradoxically, teaching is becoming increasingly abstract and theoretical, and the various subjects are taught separately, so that children seldom perceive the relationship between them.

2. This has further results. In addition to losing all sense of the unity of knowledge, many children fail to grasp either the point of learning or the reasons why they are required to spend a large part of their time at school; for the teaching they receive is abstract and theoretical, designed to impart ready-made knowledge, and forms no more part of real life than the school forms part of the social environment. We tend to lose sight of the aim of schooling, and forget that the real purpose of education is to prepare children for adult life, the pattern of which must be laid down at school. Education has forgotten about the type of person it is aiming to produce, and at the same time is failing to cater for the needs of the children for whom it is intended; it has become a synonym for assimilating or communicating knowledge. Little attention is paid to the problem of which cognitive processes are proper to a child of a particular age, and teachers do not question the suppositions underlying the methods by which knowledge is acquired. Because they do not concentrate on the aims of education and on the child for whom it is intended, their teaching is governed solely by their anxiety to cover the syllabus and the false importance they attribute to it. All too often, therefore, teachers "do the syllabus" with little regard either for the children obliged to follow it or for its bearing on everyday life and society, with the result that education is cut off from life in the same way as the subjects are cut off from one another, and the fragmentation of learning is matched by the gulf between school and the social environment. It is clear that schools can never be integrated into the environment unless some degree of integration is introduced into the teaching of the traditional subjects. In these conditions, children are certainly losing interest in the ordinary type of school, and it is not surprising that the sort of education it provides is becoming less and less effective.

3. The emphasis laid on the syllabus, moreover, affects the methods used for covering it; for as knowledge increases in volume and variety, syllabuses inevitably acquire more ramifications and become overloaded. In such conditions, teachers are forced to concentrate on memory work, rather than seeking to teach their pupils how to learn. And the quantity of facts accumulated is evaluated by a marking system based purely on figures and designed to test children's ability to reproduce what they have learnt rather than the extent to which they have really assimilated it.

4. The logical outcome of this system is that education is regarded as merely acquiring knowledge about something, which means that insufficient attention is paid to the problem of attitudes and modes of behaviour and, worse still, that, right from the outset, the vehicles and instruments of knowledge are treated as objects of knowledge. This is what happens, for instance, in language teaching which treats the language as the object of knowledge, and so concentrates on the study of written texts. The study of the written language, which is but a code for the spoken language, is stressed even before children have learned to speak - a situation all the more paradoxical in that a certain mastery of the spoken language is essential for the study of the written form. Language study takes two main forms: in the first, grammar, which consists of the analysis of the various parts of speech, and is designed to enable pupils to learn a language through combining these parts of speech in accordance with certain laws, is treated as a basic study in its own right. The second likewise leads to a paradoxical situation; language is treated as an object of culture even before it is mastered as an instrument of culture. Under this system literature, at a very early stage in the study of language, becomes a separate study of great importance, and is taught without any preliminary steps being taken to awaken children's aesthetic sense and develop their creative faculties, and before they possess a knowledge of the expressions required for literary analysis.

By analogy, similar comments could be made about the language of mathematics and the traditional study of arithmetic.

5. Teacher training has reflected this philosophy of education, and has exhibited the same paradoxes. The "school-master" is first and foremost someone who knows, and whose main job it is to impart his knowledge. In teacher training, far more attention is paid to the diversity and value of knowledge than to learning how to teach; and the acquisition of encyclopaedic knowledge takes precedence over vocational training and an understanding of children. Children, if they are recognized as such, are seen only as the recipients of knowledge. Thus, the master is the person who

knows, and the child by definition is the person who knows nothing, a tabula rasa on which everything must and can be written. So it is that teacher training concentrates on extremely dogmatic methods. It may be pointed out, incidentally, that this applies not only to vocational training but also to the acquisition of scientific knowledge or rather, a knowledge of the various subjects to be taught, where the same dilemma arises: teachers can either be qualified in a number of subjects, as they should be in order to take charge of primary school children, in which case they will know a little about everything, but nothing well; or else they will be relatively specialized, but in that case, though their knowledge will be sounder, there is a danger of their specialization producing, a state of psychological bewilderment in the children they teach, which most people would deplore.

In accordance with the working method adopted, the presentation of this introductory report was followed by a general debate, concentrating on two main points. The first was the question of the problems facing teachers because of the close and now very obvious connexion between the method of teaching and the philosophy of education, i.e., its economic, social and political goals.

The second question, which likewise directly concerned the teachers taking part in the seminar - though, unlike the first, it related not to the ethical and personal aspects of the profession, but only to the technical aspect - was how to train teachers for interdisciplinary teaching. This is a matter which should be considered even before going into the question of the ways in which the different subjects might be related. For it was amply clear from the introductory remarks that, quite apart from the question of its content, the new kind of education would call for different knowledge and different skills. It was on this aspect of teacher training that the second part of the discussion centred, and it formed the subject of the first general statement drafted.

In the next part of this report, we shall deal with these two questions in turn.

III. THE PHILOSOPHY OF INTERDISCIPLINARY TEACHING AND THE ETHICS OF THE TEACHING PROFESSION

1. In the Introduction, care was taken to point out the connexion between the social system and the educational system and to show that the two are closely interlinked. It is difficult to see how an educational system can be changed unless a start is made by changing society itself. Indeed, we would never have begun to investigate the subject of interdisciplinary teaching had we not been convinced that the African countries, now that the colonial epoch is over, had made a fresh start, in a different direction. Governments have resolved to concentrate their efforts on economic and social development and, though not actually taking the developed countries as the only perfect model, are nevertheless endeavouring to introduce an increasing measure of industrialization into traditional societies. Further, all governments are perfectly well aware of how much investments in education can do to attain this end. In view of this situation, it appeared that most of the fundamental problems which might have been involved in introducing an interdisciplinary system of education were as good as solved. It is logical to suppose that those governments which have opted for economic and social development and have realized the importance of the rôle of education will apply themselves to instituting the structures necessary for such development and also to promoting the appropriate changes in the system and goals of education. Consequently, and providing they do so, the school, though remaining dependent on society, can nevertheless become an active instrument for social change. Another consequence will be that teachers, aware that the introduction of new educational methods raises the whole question of the purpose of education - which they themselves cannot determine - are no longer in danger of coming up against moral problems which are particularly serious in the case of outsiders, unable to take a stand, as ordinary citizens would, in favour of new economic and social aims for schools. Their endeavours to develop new teaching methods, to change the traditional conception of the school syllabus and to provide a new type of teacher training will, henceforth, be merely an attempt to bring the aims of education, which they alone are qualified to determine, into line with social aims, which they have not laid down. So, then, all they are doing will be to comply with the wishes of governments, and render assistance within the limits of their abilities and powers.

2. However, the problem of economic, social and political organization is not the only one to be overcome: there is also the more general problem of culture and civilization: the two problems are usually linked, because it is impossible, broadly speaking, to separate society and civilization completely. And there is no doubt that this is even more true of traditional societies. The introduction of a new type of education designed to produce a new form of society implies new ways

of thinking and living, a new system of values and a new outlook on the world. To foist a new culture and a new civilization suddenly onto a traditional society through the medium of education would be a dangerous undertaking, and would result either in cultural imperialism or in a clash of cultures which would be damaging to all alike and would, moreover, engender serious psychological disturbances and wreck havoc in human lives. It behoves us, therefore, to make a thorough investigation of existing societies with a view to finding how we can transform them without destroying them. At the same time, care must be taken lest the desire to adapt rather than destroy turn into an unreasoning conservatism. Adaptation must never be allowed to bar the way to change. It is by no means certain that it will always be possible, in a society that is coming into being, for all the cultural elements of traditional society to be preserved intact.

It should be said at once that the risks and problems are by no means as serious as might be thought; for all genuine culture is a living entity, which is constantly evolving as it creates, and any attempt to freeze it in a permanent mould, for fear of deterioration, would be the surest means of killing it, or relegating it to the museum. It should be realized that cultural dynamism can only survive, in the world of today, if it obeys two general laws. The first is this, that no national culture can remain alive unless its specific character stems, at least in some degree, from the partial and specific assimilation of the universal culture of industrialized societies. The second is that no national culture can remain alive, today, unless it draws nourishment from contact with other cultures. Such contact need not necessarily take the form of a clash or a conflict; on the contrary, it should, ideally, be a source of mutual inspiration, engendering new and original creative activity. These laws do not apply to African national cultures only; they have universal validity; and such reciprocal influences are no more of a threat to Africa than they are to the national cultures of Europe.

Schools, in so far as they create new mental attitudes and impart new values, train the men of the future and are an effective instrument of social change, are central to all these problems. And it is incumbent on them, or rather on teachers, to state these problems clearly and propose effective solutions. This naturally raised the question of the selection and training of teachers for an interdisciplinary teaching system.

IV. GENERAL RECOMMENDATIONS CONCERNING THE TRAINING OF TEACHERS FOR AN INTERDISCIPLINARY TEACHING SYSTEM

1. In order to train future teachers, the training colleges themselves will of course need to be staffed by people who have been trained in the new way and believe in the new system. A seminar such as that held at Bouaké can make a small contribution in this direction. Nevertheless, since our chief concern is with the training of school teachers, we shall confine ourselves to a few comments on the subject of the staff who are to train them. Training college teachers must be determined not to allow their establishment to exist in a vacuum, cut off from the environment; but there would be no point in this unless the teacher-trainers on the staff of the college swept away all that still tends to compartmentalize the college itself. It will become clearer, further on, why their work cannot be done successfully unless they all work together. In any case, whatever the nature and aim of their task, it is obvious from the outset that it calls for a new attitude and a new type of personal relations amongst the members of the teaching staff. Besides, what has been said above about the relationship between teaching, culture and society suggests that these colleges should be staffed by Africans. To enable this to be done should be the aim of the cultural and technical assistance furnished by the Member States of Unesco. Difficult though it no doubt is for Africans to live in two cultural worlds, it is certainly easier for them to absorb into their national culture the elements essential to the formation of a modern society than it is for Europeans to grasp the essence of the traditional cultures of Africa.

2. It would be extremely difficult to train teachers for this new type of teaching unless they already had a fairly clear idea of what it involves and were convinced of the need for introducing it. They must, therefore, be reminded that the school has responsibilities towards society. They must be shown that the methods and content of education are closely linked with the whole philosophy of education, that teachers are also citizens, and that their task as educators is part and parcel of their civic duties. If they are to accept these ideas, economic and social facts will of course have to be put before them, and they will have to be shown how the analysis of the relation between the social system and the educational system applies to their own country. This aspect of their training should be examined first of all, since it should be the first topic covered at the teacher-training

college. But if future teachers are to be made conscious of their social rôle, the general information and analyses of society and the environment put before them must not be too general in nature; they will need to be given actual examples taken from life, and shown, by means of case studies, that traditional teaching methods may fail to meet both individual aspirations and social needs. Their intellectual conviction will be far stronger if it is based on examples supporting and illustrating the theory.

3. To convince student-teachers of the need for this new type of teaching, however, is not in itself sufficient. If we are to obtain results, they must also be convinced that it is possible as well as desirable to introduce it; and in order to do this the reasons for co-ordinating the subjects they teach, relating them and indeed integrating them must be made clear. These reasons are of various kinds; and to explain them will involve using not only new information but, above all, new modes of thinking. Thus training will have to include epistemological reflection and methodological description, which throw light on the new type of relations we are seeking to establish, and are the only way to show student-teachers that the need to distinguish between the objects of knowledge affects neither the universality of the forms of knowledge nor the interdependence of the different branches of knowledge. Rather than seeking to impart encyclopaedic knowledge, they must try to see what form the encyclopaedic system of knowledge can take in the modern world. A course on the analysis and mastery of the cognitive processes would also be useful.

4. That the introduction of this kind of teaching is necessary does not in itself mean that it is possible; nor does the fact that it should be feasible mean that it is so in fact. The teacher-training system must provide the means of putting the theory into practice; and in order to ensure that it does so we must proceed from discussion of the theory to consideration of its practical application.

There are in fact serious difficulties in the way of its application. The first of these does not really concern teacher training as such, but should nevertheless be mentioned here. It is the fact that the introduction of interdisciplinary teaching, though not requiring the latest technological equipment, does involve carrying out studies and reforms and purchasing equipment, which will certainly increase the education budget.

It is also possible that a second obstacle may arise, which has a bearing on the subject we are discussing: there may be resistance from traditionalists, the public authorities, professional associations, and parents of schoolchildren. Future teachers must therefore be prepared to propagate the theories which they themselves have accepted. They must act as the champions of a cause, and be able to educate members of the general public who know little about the subject and, at the same time, are not likely to understand arguments of too technical or scientific a nature. In this particular connexion, we merely wish to confirm what has already been said about the rôle which student-teachers must be trained to play in society. In this case, mastery of this rôle presupposes a knowledge of the various social groups, including their mentality and the language they use.

But this is certainly not the main point. The essential problem, to which we now come, is how to get future teachers to adopt a new approach to teaching, consonant with their ethical and intellectual convictions. We must not overestimate the value of "exposure" to interdisciplinary teaching methods in training, but it can certainly help to show how to apply them in practice. The question remains as to how this can be done in teacher-training colleges, and to what extent. The point is that teaching at this level is inevitably more specialized than at elementary level. For instance, student-teachers must necessarily possess a certain knowledge of science which, by its very nature, cannot have its full value unless extremely rigorous conditions are observed. It is impossible, for instance, to establish scientific laws except on the basis of analyses; except, in other words, by organizing, in the laboratory, certain precise experimental conditions; and this is, inevitably, a far cry from the apprehension of reality as a single entity and from the combination of the subjects by which reality can be systematized and understood. This does not, however, mean that closely co-ordinated teaching of the various sciences, in particular the exact and natural sciences, is not possible. "Exposure" to such co-ordinated teaching can contribute in some measure to training for the new form of primary teaching.

But in the teacher-training college itself there is certainly one course which can bring in several subjects that were formerly taught separately or, in some cases, not at all. This may merely involve revising the traditional attitude towards child psychology and the way of teaching this subject in teacher-training colleges. Instead of separating the study of child psychology from that of sociology and the other human sciences - thus confining it, despite its experimental character, to the

knowledge of general and necessarily theoretical laws - it could centre round the African child, considered in his natural environment, i.e., against a complex background of all kinds of cultural, social and personal factors. Taken in this way, the study of the child will no doubt bring in the various sciences of man. So, once again, it is obvious that to remove the barriers between subjects is not possible without also removing the barriers cutting off schools from their environment. For the only way to teach child psychology, under the new system, would be by case studies. Student-teachers should learn first how to draw up a child's file, containing, in classified form, all the data supplied by physiological and medical examinations, as well as by psychological tests and social observation, and then how to interpret the information it contains and form a general conclusion from it.

But training for the new teaching would not be enough; the student-teacher should have a chance to put what he has learnt into practice in the primary school classroom. This naturally raises problems of two kinds. The first relate to the difficulty of arranging for practice classes, in which children would be taught quite differently from children in the other schools throughout the country. The second concern us more closely, and show clearly that it is impossible to separate research and training when it comes to the application of new teaching methods: for to train students, in actual conditions, for this new system involves producing models of the new techniques, even if they are only approximations and of a provisional nature as well as new methods and new syllabuses. Since all this takes time, since it is unlikely that we shall find the perfect solution immediately and since it is essential that changes can be introduced as progress is made, it is imperative to interest student-teachers in the research work being done in this field. They must be informed, in the early stages of their training, of what is being done, and they must understand its significance and purpose and the methods used. This is the only means of making them capable, subsequently, of assimilating the results of research and incorporating them in their teaching. The importance of this will be realized when we remember that these are the people on whom we shall have to rely to take over and to co-operate in continuing research on the basis of the results obtained from the first experiments. This brings us to the consideration of another aspect of training.

5. The question we now come to is that of how the problem of evaluation should be dealt with in relation to training. Generally speaking, future teachers should be shown what are the prerequisites for making a scientific evaluation of their teaching. At present they tend too much to take the view that they of themselves are competent to judge, to regard themselves as infallible, and to regard progress tests in the same way as the models used for imparting knowledge. In fact, the problem of evaluation is of particular importance in the case of teaching designed in some measure to integrate the various subjects. For this method makes it impossible to plan each step beforehand by taking, one after another, all the topics included in the syllabus, since these are no longer presented in the logical order proper to each subject, but are grouped around the central theme adopted for the teaching of all subjects. There can be no denying that there are two dangers inherent in this system. The first of these is certainly the more serious, arising, as it does, from the fact that points are not dealt with in logical order. The second, though less important - the fact that gaps may occur as a result of not working through each separate subject point by point - must also be avoided if possible. It is for these reasons that evaluation, apart from the fact that it acquires especial importance, must combine the testing of knowledge with the analysis of content. Since teaching has now assumed a more syncretic form, it is more important than ever that this analytical study be made. The analysis of content, however, requires special techniques which student-teachers must learn.

V. PROCEEDING FROM REFLECTION AND DISCUSSION TO EXPERIMENTS AND PROJECTS

We had an opportunity, during this first stage of the seminar, to test the efficiency of the working method we had adopted immediately. The report on the projects in progress and the experiments already carried out at the teacher-training colleges at Atakpamé in the Republic of Togo and at Yaoundé in Cameroon illustrated very clearly how closely practical experience corresponded to the problems that our theoretical discussions had led us to expect and the solutions proposed for them. We were particularly struck by the method used by the group of teachers in Atakpamé - first, individuals worked on projects, and then they communicated their findings to the group. Under this system, each teacher plans his teaching in stages, as follows: first, individual work - the teacher works out the syllabus in his particular subject, taking account of the following four basic points - training of the personality, training of the producer-citizen, professional teacher training and the need for the school to be adapted to Togolese needs, i.e., to the situation in the country and the requirements for development. He then examines the centre or centres of interest selected for

each section and goes systematically through his syllabus, deciding which aspects of the centre of interest relate to the various points on the syllabus. After that, he discusses the position with the teachers of those subjects more particularly concerned with the centre of interest, and they make a joint study of certain points, draw up a list of the means to be used for the study of each centre of interest, and make plans for interdisciplinary teaching. Lastly, a general plan is drafted, which, for each centre of interest, takes account of the syllabus for each subject, the points where the syllabuses are similar or identical, and the means of investigation adopted.

The Yaoundé group demonstrated that all its measures for introducing changes came under the same headings as those used in the introductory report on the general training of teachers - why an interdisciplinary system is necessary, how it can be established, theoretically and in practice, and how to evaluate the first results obtained.

Thus this group considers that the authorities should be informed of their projects and their support enlisted, and that student-teachers should be shown that school and life, education and the activities of the community are closely interlinked. This involves devising a form of training calculated to produce a different attitude and outlook and to lead to a new system of classifying knowledge. The group, however, soon realized the difficulties of this project and were convinced that it could not be carried out until they were overcome. The standard of the teachers makes it essential to provide further training courses and to compile notes for teachers. The idea that time-tables will not necessarily follow the traditional pattern must be accepted, and urgent measures must be taken to provide primary schools with additional equipment. Equally serious problems are encountered in the higher teacher-training school itself. Not all the teachers are yet won over to the new system, and the search for points in common in the matter of teaching methods - observation, reflection and gradual synthesis, action and application - has scarcely begun. Lastly, this group states that at the same time as embarking on this work, it has taken steps to devise methods and tests for the evaluation of results. Various specific suggestions have already been put forward, including holding a final examination in the form of a test. The group, having declared itself in favour of constant self-criticism, is now considering what form this should take, and how it should be organized.

PART II

THE INTERDISCIPLINARY SYSTEM AND LANGUAGE TEACHING

I. IMPORTANCE OF LANGUAGE TEACHING

Quite apart from any special connexion with the interdisciplinary system, language teaching necessarily occupies an important place in educational theory relating to primary education. For all teaching is, first and foremost, a process of communication, and, regardless of the methods adopted, language is both an essential tool and also one of the first to be acquired. It is the common vehicle of all forms of knowledge and culture, and their most permanent and general foundation. And it is, in particular, an essential tool for use in the cognitive process.

Language teaching is even more important in Africa and, more generally speaking, in all countries where pupils have first to master a language which is both a foreign tongue and at the same time the language in and through which they are to receive instruction.

Looking at the traditional teaching system, we shall see immediately that the study of language has been divided up into various exercises and activities, for which there are specific programmes and time-tables: elocution, recitation, vocabulary, grammar, reading, writing, spelling, essay-writing. These different exercises are not necessarily kept completely separate, but neither can they be said to be always closely co-ordinated, and it must be admitted that the activities they involve are often fragmentary. The question arose whether it would not be desirable to synthesize language teaching more closely and, if so, how it could be done.

It soon became clear that the first step must be to agree on the meaning of the word "synthesize" and to propose a definition, or definitions of it. Hitherto, the idea of an interdisciplinary system, general though it was, had provided a satisfactory basis for reflection. But the time had now come to indicate more precisely what was meant by "more synthesized" or "more organic" teaching. Not until these questions of terminology and meaning had been settled, at least provisionally and on the basis of working hypotheses, could we start to examine the distinguishing characteristics of this new type of teaching.

Thus the general term "interdisciplinary or synthesized teaching" has several connotations:

simply the co-ordination of subjects; in this case, the traditional subjects are retained, but an endeavour is made to link them up in various ways (using similar terminology, progressing at the same rate, arranging for the knowledge imparted in the various subjects to be complementary, and so on);

in other cases, though the subjects remain separate and are taught separately, they are not regarded as necessarily being mutually exclusive; it is realized that a lesson in mathematics, for instance, may make a contribution to the study of language. The term "interdisciplinary teaching" in the strict sense of the term might be used only for teaching of this type;

it is also possible to reduce the number of subjects or types of teaching activity either by co-ordinating them at every point, but in such a way that the teaching of all subjects proceeds simultaneously, or else by combining them to form new and original courses. The term "integrated teaching" could be reserved for this form of co-ordination.

It was therefore decided to examine the content of education and the training of student teachers in relation to these three meanings. It was, however, realized immediately that it would be necessary, in each case, to determine the limitations as well as the possibilities of co-ordination, interdisciplinary teaching and integration, and that this could only be done satisfactorily by taking the basic aims of education as a guide and bearing them constantly in mind. This, incidentally, confirmed the view that the concept of interdisciplinary teaching, in its general meaning is closely linked with the aims of education.

To conclude this introduction, it should be added that it was thought necessary for analyses to be made on two distinct planes simultaneously; for it would be impossible to decide how student-teachers should be trained for the new type of primary education without first defining clearly what form that education was to take. Such training is essentially preparation for a certain level and type of teaching, and the means cannot be determined until the ends have first been defined.

Once these stipulations had been made and these points clarified, the seminar was able to revert to the question of language teaching with a much clearer idea of what was involved.

II. WHAT IS LANGUAGE TEACHING?

1. Priority for learning how to speak a language

To teach someone means first of all to communicate with him, mainly by means of speech. The first object in teaching should therefore be to provide the pupil with that instrument of communication. He must master it well enough to understand what is said and to make what he says understandable. That is why, before making language a subject for study and analysis, we must give the pupil enough skill to handle the language with assurance. That means that it is wrong either to teach grammar too early or to fail to teach the type of grammar that is based on analysing the parts of speech and synthesizing them, according to formal laws, at a later stage.

Language teaching, if understood in this way, is in line with the basic human functions of language. Language is primarily speech addressed by one person to another. To give priority to learning the oral language is therefore to harmonize one of the requirements of teaching in general with the requirements of the fundamental nature of language. Essentially, writing is only the graphic code of the phonological system. It would therefore be paradoxical to want to study that code before knowing, at least to some extent, what it codifies. The paradox is the more striking if one remembers that, in order to study and analyse that code, one must use language naturally, as manifested in spontaneous oral expression. For this reason it is undesirable either to begin the study of written texts at an early stage or to teach reading and writing too soon.

2. What is meant by learning to speak a language?

When we consider how oral expression can be taught, we see that it is very useful, if not necessary, to employ a number of techniques of expression, some of which are not used in natural, everyday speech, whilst others are used in preverbal modes of communication. A variety of activities and exercises will therefore be used in the early stages of language learning.

In order to make this statement clear and explicit enough to eliminate confusion or error, the different modes of oral expression must first be carefully distinguished. By its nature, oral expression covers different levels of language, which must be defined and related to each other. As we have already suggested earlier, the first level is that of spontaneous expression, in which absolute accuracy is not expected - only immediate intelligibility. At this level of language, communication is only a matter of everyday conversation in which individuals exchange information about what happens in daily life.

That being clear, it is much easier to determine what teaching methods should be used for:

(a) The transition from learning logical constructions to learning linguistic constructions

We have seen that language teaching should be based on a conception that has little to do with traditional grammar. It was also seen that the goal was no longer to teach the rules of ideally correct speech, but to enable the child to employ the language as it is naturally used; and we know that such natural language may be objectively described and sufficiently formalized to become the field of study of that science which contemporary linguists are trying to develop. Therefore, the ideas of structure and function subtend this new kind of teaching. The so-called new mathematics is essentially a grammar of sets, whose syntax is what one studies. Learning the logical constructions proper to this mathematics thus becomes learning a language which is not unrelated to ordinary, everyday language. In fact, linguistic sets could not function without bringing into play logical functions and connexions which the study of mathematics shows so clearly and accurately.

It goes without saying, however, that there is no question of directly teaching the child the symbolic language characteristic of that strict expression. This formalized language can be only an end goal, the final point of a process of intellectual abstraction whose point of departure may be successfully provided by certain concrete activities. We know, in fact, that certain preverbal behaviour, spontaneously derived from the child's culture and civilization, obeys rules bringing into play relationships which may be said to convert logical thought into actions. At this level of behaviour, these rules and relationships are obviously lived and acted out, not considered and systematized. The more the child is motivated by the play character of essentially sensorimotor activities, the more easily and spontaneously he learns them. None the less, the more these activities are practised and the better they are acted out, the easier it is, at a later stage, to ask the child to describe them and to teach the rules that apply to them. Thus, before language itself is mastered, preverbal modes of expression can prepare for the understanding and mastery of logical forms, many of which exist in ordinary, everyday language.

It has been found that the translation into words of an understood structure (for example, arrangement in series or the irreversibility of implication) can occur in two different ways: first, the motivating object may be referred to by the term "an unspecified object", which means that it is not considered for itself and its qualities, as it would be by a physicist, but only as a basis for a co-ordinated group of well-defined sensorimotor activities (the acts of arranging, classifying, etc.). Therefore, it suffices if the object has the appropriate properties for the desired use. In other cases, activities may be involved which are not artificially provoked, but refer back to real, common practices in the child's cultural and human environment. It is then that reference to the environment becomes useful in teaching. It is true that the environment is like the indifferent object, in that it is not studied for itself, it is not the subject taught. It is all the more important not to confuse reference to the environment with study of the environment because the latter cannot be undertaken before the child has an adequate mastery of language, as will be shown later. It is to give him that mastery that reference is made to the environment. Yet it is true that this method can only be applied if the teacher is well acquainted with his cultural environment and if the school does not hesitate to turn towards that environment and seek its support. From which we see again that breaking down the partitions between subjects also implies breaking down the partition between school and life.

In this connexion the effectiveness of the method adopted for the work of the seminar was again examined. Various groups in turn described the different experiments attempted, especially the G.R.P. (Groupe de Recherches Pédagogiques) and the Bouaké group.

But these reports also gave us a clearer idea of the relations between language learning and the learning of mathematics and of the difficulties and limitations of co-ordinating them. The following is an attempt to summarize the discussion of this subject.

(b) Learning language and learning mathematics: complexity, difficulties and limitations of the interdisciplinary method as applied to these subjects

First, it should be noted that the relationship between learning mathematics and language learning is not a one-way relationship. Although it sometimes seems desirable that a form or idea be first introduced in mathematics, using teaching aids, so that the concept at once accurately conveys its true meaning, on the other hand, notions and forms which the mathematician needs must be introduced by means of language teaching. For example, the prepositions "in", "on", and "under", introduced in a language lesson, provide topological concepts that can be used directly in the mathematics course. In a more general way, although the symbolic language defines with great purity and clarity elements and structures that ordinary language uses (connector, quantifier, comparative...), although it trains the pupil to manipulate those elements and structures, it must nevertheless be admitted that mathematical language in itself is a mixed language: while it is a symbolic language, at the same time it uses ordinary language - for example, for the description and handling of signs. That is why learning the mathematical language proper implies a certain mastery of ordinary language.

It must also be admitted that there are more differences than resemblances between mathematical language and ordinary language - indeed, there is a fundamental opposition between them. This opposition may be brought out in three ways:

To make language clear and explicit, we naturally try to eliminate the equivocal and ambiguous. But the means employed are by no means always identical in the two cases. Indeed, they are often

opposites. For example, the expression of negation, which had previously enabled us to demonstrate the part that a study of the rudiments of logic can play in the early stages of language learning, was again considered, but this time in a critical way, the object being to demonsirate the limits of integration of the two kinds of learning. In ordinary language the expression of negation may be ambiguous, because the negation does not cover the entire sentence(1). For example, when I say "he did not succeed by chance", the statement is not clear. All I can do to reduce the ambiguity is to introduce an artificial main clause such as "it is not true that" or "it is false that" or even "it is not by". In this case, the ambiguity can only be reduced by formulating a sentence employing more complicated linguistic constructions. The sentence becomes longer and more complex. And that also requires, specifically, a mastery of ordinary language. The mathematician trying to avoid the same danger does not go about it in the same way. The negation is placed in parentheses, until it affects only single-element propositions, where it is expressed by introducing a new incorporated sign, e.g. $x \neq y$. The consequence for teaching is clear: the pupil never sees an explicit negative bearing on an entire statement. In mathematics, therefore, we do not use turns of phrase like the French "Il ne faut pas que ....", which are acceptable in ordinary language, so that the pupil, as far as his knowledge of language goes, does not know what a logical negation is.

The idea of ambiguity also reveals a much more radical opposition between the two languages. In ordinary language it is certainly possible, and always very helpful, to define the words one uses. But to define a word I can only use other words; in turn these words call for definition, and the definition is subject to the same necessities. The reason why it is finally impossible to avoid ambiguity completely and to arrive at a meaning that is clear to everyone is that ambiguity is of the essence of natural language. If we wanted to obtain a strictly unequivocal meaning, we might have to postpone indefinitely the moment of expressing that meaning. An irreducible margin of approximation is a normal characteristic of ordinary language; without it communication between human beings would be very difficult, if not impossible. Living, spontaneous relationships imply considerable semantic tolerance. Although it is true that it is often desirable to clarify what one wishes to say by re-wording it in more accurate terms, it is also true that if one carries this too far, one may introduce confusion once more. It is as if there were an optimum amount of analysis and also an optimum amount of discussion. "If we wish to understand one another", said Bachelard, "let us not talk too much".

In ordinary language, writing is only the graphic code of a phoneme system. Linguistic elements as such are not completely lacking, but are greatly reduced in number. By contrast, symbolic language finds its natural expression in the writing of signs. It may be necessary in teaching to "say" these signs, to enunciate them, both singly and in groups, but then the word becomes the phonatory code of a language which is primarily written.

This fundamental opposition should warn us against excessive intermingling of the two kinds of learning. However much mathematical language and ordinary language may help each other, there can be no question of ce sing to teach them as two distinct subjects, each with its own methods and aims.

It was the more necessary to be clear as to how far integrati n should go in that we thereby become aware of the need for specific teaching of spoken language. To give an introduction to logic, although useful, does not mean that we need not search for the methods to be used in giving sound instruction in all aspects of oral expression. We therefore turned to the questio n of the nature of such methods, remembering that the problem was how to teach a foreign language to African children.

(c) Specific methods for teaching oral expression

If we are to grasp what the teaching of oral expression implies, we must first examine three points, the first two of which will round out what we have already said about the nature and primitive function of language:

If it is true that language is first of all an instrument of communication and if to speak is first of all to speak to someone, then it must also be recognized that speech can only occur in a concrete situation which provides an opportunity or creates an obligation for the persons present to embark on a conversation in which their emotions, feelings and opinions will be revealed. Speakers are thus actors on the stage of life: they strike attitudes, they play rôles. It is difficult to play rôles

(1) This example is taken from a lecture given by M. Lacombe. 1969-1970. Faculté des Sciences, Paris. Quai St. -Bernard.

or strike attitudes without adopting bodily postures and facial expressions just as spontaneously as we speak and without expressing emotions and feelings through them. Originally, therefore, speech is fundamentally an act that involves a certain kind of demeanour. It will not be completely or easily understood if the bodily expressions and emotive gestures that give point to it are not seen. Oral expression is therefore spontaneously associated with physical expression, and all references initially require such dual, joint expression. Many of the flaws or weaknesses of oral language are tolerable only because this essential physical reinforcement compensates for them.

If we are to see clearly the association between speech and situation we must also remember that emotions, feelings and opinions are themselves reactions either to the world of which we are speaking or to action we take that affects it or those inhabiting it. In other words, speaking is not only speaking to someone, but also speaking about "something" to someone. To speak to him we must also have "something" to say to him. What the child will first speak of most freely is the world of which he has immediate experience, the world that surrounds him, which he sees, senses and lives in. It is only by referring to the child's actual sensory experience that communication is possible in the beginning. And this psychological truth is quite consistent with the primary function of language, for both the linguistic and the transcendental analysis of language show that it can only come into being by creating the world of which it speaks. We have not on the one hand the world and, on the other, the language which gives it names by making objects, their qualities, relationships, and movements correspond to substantives, complements, or verbs. As against this nominalistic conception, de Saussure has shown that language is a system organized according to its own laws. The world itself cannot be organized except in so far as it is apprehended by the system of language. In the sense of seeing and understanding, there is no world except for "homo loquens". From this we can already see that the language lesson will be inseparable from reference to the environment. But the surrounding world is much too vast and complex for a vague reference to the environment to suffice for our inquiry. Everything that is said circumscribes, effects a choice and leads to selections. Here again, psychological truth and philosophical analysis meet. In the first place, to speak is not only "to say something to someone", but also "to want to say it to him", to wish to express oneself on that subject. The child speaks first of what attracts him, beguiles him and interests him in the world around him.

The third preliminary comment relates to the linguistic situation of the African child. He finds himself in very special and very difficult circumstances. In contrast to the French or English pupil, for example, he is not well enough acquainted with the language he will need to master all the skills and knowledge he will have to acquire during his later education, because it is not his mother tongue He will almost certainly have to learn that language very quickly and when very young.

These three comments have a twofold value - they point to both the difficulties of the problem and the means of solving it. To move pupils from one linguistic system to another early in life, all we need do is to consider the natural and original function of language as we have just analysed them. Although the transition must not be made by direct translation, one may use expressive attitudes and images taken from the environment. If the formulation of the linguistic structures of the first system is accompanied by physical movements and representation of the situation to which they refer, then the child will grasp the analogy between the meanings behind the two signifiers.

But the same comments warn us that the transition will not be possible unless certain conditions are fulfilled. Some are general, others cultural and directly related to the environment concerned. As to the first group, we may note that if the environment and situation referred to were too complex and brought in too many meanings at once, their message would become ambiguous and difficult to read. To avoid that difficulty, one must refer only to simple situations and represent things in a way that has only one meaning. As to the second group, it will be noted that the more the objects and situations referred to are familiar to the child the greater will be the correspondence between the two systems. One must select from the target system, that is, from the French language being taught, the vocabulary and constructions that best describe the surrounding environment and local life. We may note in passing that that means doing research and drawing up word lists beforehand; otherwise the teacher would have to grope his way and would run the risks inherent in purely empirical research.

This analysis, brief though it is, will give us some idea of the methods that must be used. And knowing something of the methods we can see what sort of training should be given to teachers so as to equip them to teach in that way.

(d) The teaching of oral expression and teacher training

It will be seen shortly how this conception of the early stages in the teaching of language enables the various subjects or activities related to that teaching to be associated or harmonized. For the moment, dealing only with the elementary level, we should like to show how it presupposes integration of methods and of various forms of expression.

As in the examples we have already seen, the teachers will have to be trained to approach their work differently. Because language has its rules and because certain techniques must be used, the teaching methods will retain the quality of guidance. But, on the other hand, teachers must be capable not only of respecting but also of arousing the child's spontaneity. If the teacher says too much, the child will say nothing. Rather than playing a major rôle himself, the teacher should encourage conversation between the children themselves. This attitude is so contrary to tradition that teachers will certainly require special training in it, and the methods to be used will have to be studied in detail. It is difficult to be at once discreet, attentive, open-minded and watchful.

Training is not merely a matter of this general change in attitude, however. In particular, the teacher must be capable of introducing the intermediaries that link the two linguistic systems. These intermediaries may, and even should, be of many kinds: far from being mutually exclusive, they must be as closely related as possible. The teacher himself should be able, at least partially, to play this rôle. He must therefore be able to act the part of a person in the situation described. He must have enough mastery of his body to be able to exploit all its powers of expression. We may note that what we have said about the relation between oral expression and physical expression explains at least in part why difficulties in communication are always reflected in a lack of bodily ease, an awkward appearance, an unnatural bearing and constrained attitudes. A person who speaks fluently and communicates freely often has great ease of demeanour and posture. Great freedom of expression is accompanied by great freedom of movement and bearing. He who is master of his speech is often master of his physical movements and bearing. Conversely, it is reasonable to think that, to some extent at least, physical education that would relax and free the body, with the object of giving the pupil mastery and control of it and making it a controlled means of expression, at once easy and assured, could help children to acquire ease and assurance in speech. This has two implications: first, with regard to the teacher, who must both perfect his own speech and learn to use his body so that it conveys meaning; and second, with regard to the pupil, for the teacher must be capable of imparting the behavioural and bodily control he himself has acquired. In an extreme case, paradoxical though it may seem, mime and dance, in which meaning is conveyed silently, can be of use in teaching a language orally.

This association between learning to express oneself and physical education of itself gives us a new attitude towards physical education, an attitude both more varied and more organic than heretofore. Physical education takes different forms, from gymnastics to mime and dancing, and at the same time it is a coherent whole, in that it embraces two such apparently dissimilar objectives as the harmonious development of the body - that is, harmonious communication between its different parts - and ease of expression in speech and conversation - that is, the harmonious development of communication between individuals.

It is none the less obvious that the bodily postures and facial expressions through which emotions and feelings are expressed must be essentially secondary to oral expression. It would be very risky to rely solely on the body's powers of expression. One must be capable of creating or constructing images that are so simple or simplified that they give the idea only of equally simple and immediately comprehensible situations. Depending on the case, that is, according to their types, these images will either give added point to the actions of teacher and pupil, by providing them with a visual framework and basis, or demand from them a different kind of activity. For example, the teacher will be so trained that he can skilfully manipulate the figures on the feltboard which he has planned and made for use as illustrations for a story he intends to tell. Similarly, if funds are available, the resources of the most modern technology may be called into play; for example, television is particularly suitable for showing films, which meet the teacher's needs excellently. On a less ambitious level, radio can supply the spoken message that the feltboard will illustrate. These means will be used in conjunction, according to the resources available; and only when the child has acquired a certain mastery of speech in this way should sketches or acting games be used. We have seen that the use of speech is basically linked not only to a situation, but also to rôles and attitudes. It can thus be suggested to the child that he act out a certain rôle, and one can be sure that identifying himself with a character will help him to speak more freely and spontaneously as that character would speak.

Once again, it is obvious that although a teacher who is to teach in this way must be able to give free rein to the children in expressing themselves he must also be trained properly; otherwise he will find it difficult to introduce sketches or acting games, or, if he did introduce them, they might fail to achieve their linguistic purpose.

However, one must not be deluded as to the results the methods just suggested can produce. For the environment and its image could not act as perfect intermediaries between two linguistic systems unless the two systems were similarly structured. Hence, for every representation of the environment according to the linguistic structures of the first system there would be a corresponding representation according to the structures of the other. But we know that this is not so. We always see the world according to the system of the language through which we apprehend it. It follows that the meaning that is perceived in the image associated with the linguistic sequence is that given by the mother tongue or at least by the linguistic system we learnt first or know best. Consequently, if language learning is to go beyond the stage of such a limited vocabulary and such simple structures as can reflect universal and unambiguous situations, one must resort to other means in order to avoid misunderstanding. Whether we wish it or not, the time comes when we must substitute the translation of ideas for literal translation. The same words do not necessarily have the same meaning in different languages. They stand for ideas which may be understood in different ways. There are two ways of overcoming these difficulties. The first is to live in the environment in which the language is used as the instrument of communication and culture; it is by absorbing a country's culture that we can reach the roots of the language system and really understand its concepts. In contrast to what has been said previously, entering into the foreign environment in this way implies separation from the local environment. The other way is that of analysis: the pupil understands concepts as they are defined. But that assumes that he has reached a degree of mastery of the language far above what can be achieved in a course such as we have been discussing. And we cannot consider the question of the later stages of the course without at the same time considering the teaching of spoken language and the teaching of the written language and the close relation between them. We shall now turn to this question.

3. The different levels of language and the different forms of linguistic expression

(a) From speech to reading and writing

Written expression is very different from oral expression. We shall deal with the main differences later. For the moment we shall note only that writing is primarily the graphic code of a phoneme system, and that it was necessary to master that system before approaching the code. We should also note that although one must be able to express oneself in writing, it may be in the first place for the sake of communication. Considered in this way, written language is what we have seen oral language to be - a means of communication between persons. These two points make it clear that learning the first kind of expression can help in learning the second, and they also show how the two can be linked together.

For example, it is certainly advisable to see that the motivation for oral expression, the vocabulary and constructions used in it, and the reading material are closely related. Likewise, spontaneity of oral expression could be matched by spontaneity in writing, although both may be based on the same experience and motivation. Free composition might be used as a follow-up to a conversation, and the same visual material that was used in the case of oral expression could be used for free composition. We may note that the converse may also occur - a fact which shows the reciprocity of the two forms of language learning. The conversation or the story composed and narrated aloud could follow on from a written composition. In this case, the composition would be truly free, in the sense that the pupil himself would choose the experience and occasion motivating it. In brief, we can imagine many combinations that help in the transition from speech to writing while maintaining the close relationship and continuity between them.

It is nevertheless true that, apart from the technical problems of penmanship and writing, there are considerable differences between these two forms of expression, only the major ones of which will be mentioned here.

We have seen that speech originates in response to a situation created within a given environment. The physical behaviour aroused, within the environment we are watching, by the situation of the person involved in it helps us to understand what he says. The written word cannot use movements or emotive gestures to make the meaning clear, and must employ its own resources and

methods instead. There are several ways of doing so. The first is to use the fact that time has elapsed since the event occurred to analyse and describe the event in the terms proper to language, which take the place of bodily gesture and facial expression. But that presupposes a high degree of linguistic ability and in particular an ability to analyse situations and concepts, which the education referred to so far did not impart. It is not that the bridges between oral and written expression are entirely cut. For example, one may ask a speaker to describe a past event or one that has taken place elsewhere. As he cannot use the actual events to illustrate what he says or make direct reference to the situation and environment, the narrator must reduce and stylize bodily expression and rely more upon language itself. His will to convey his impressions of an object becomes ipso facto the will to describe it in words, if need be by analysis and explanation. For example, a pupil (or group of pupils) investigating the environment may be asked to report to the entire class on what he - or they - saw and found interesting. This is certainly one way of making the transition towards the level of linguistic ability just mentioned in relation to writing - an even more fully descriptive, analytical and conceptual level. But, conversely, we can also say that this new degree of ability for oral expression, the ability to give a verbal account of an event, as we might call it, will be achieved all the more efficiently if the pupil has acquired a good command of the language by analysing it.

So there comes a time - and it must be very carefully chosen - when language must be analysed in order to improve both oral and written expression. This considered, systematic study is what we call grammar. The question before us was how the teaching of grammar should be understood. There was no thought of changing our mind as to earlier criticisms of traditional grammar. To continue to teach it would certainly be to run counter to the idea of language teaching as we have understood it. It seemed clear that, far from introducing a theoretical contradiction that would lead to a discrepancy in teaching methods, the teaching of grammar should be harmonized with the teaching of expression that preceded it and linked with it as closely as possible. It should be brought in so as to secure not only the desired unity but also coherence. The concepts and methods used in this kind of grammatical study can only be elaborated on the basis of fundamental hypotheses and theories defining the status and nature of the object of knowledge. ("The difficulty in a science is its object - CANGUILHEM). We already know that both the priority accorded to oral expression and the methods recommended for teaching it are directed towards mastery of the language as an instrument of communication and hence mastery of the functions of the linguistic system. What we need, therefore is a method of teaching grammar in which the language will be analysed by systematic description of it, its various components being considered according to their functions. Instead of dealing with "components", analysing the different parts of speech and stating the rules governing their use, we would have a new distributive or generative type of grammar. In general, and no matter what other differences there may be between them it is by trying to reduce their positions to axioms that we attempt to analyse the functions of the components as accurately and thoroughly as possible. Spontaneity of speech is nothing else than the spontaneity with which the child places words in a sentence, without thinking about it, and links them so that they form linguistic sequences which, although not always quite correct, yet at once mean something to the listener. The child has thus acquired, at the level of play and actual experience, an acquaintance with the language which will be reproduced, ordered and systematized by means of functional grammar. This formalization will be all the easier for being based on spontaneous practice. But, conversely, a knowledge of grammar will enable pupils to reach a much more advanced stage of spontaneous practice and a much higher linguistic level. The grammarian elaborates a vocabulary for speaking about language - what we might call a meta-language. But he also gives the student a command of language not only as an instrument of communication but also as an instrument for analysis and knowledge. Analysis of language enables one to learn the language of analysis. That is important not only for a literary education, which aims at the comprehension and analysis of texts, but also for a scientific education, in which the ability to use language in this way and at this level is essential.

There are other ways in which the written word can compensate for the lack of physical movements and emotive gestures. We have seen that, without the help of actions or direct reference to the situation and environment, the narrator must reduce and sylize bodily expression, concentrate it in facial expression and try to make his voice particularly expressive. We have also seen that that was insufficient and that narrative can overcome that inadequacy by means of analysis. However, the narrator has other means of giving life to material from other places or from the past. Often he will introduce into his language elements of a style used specifically in the art of description or narration. So we see not only that there is a new relationship between the learning of speech and the learning of writing, that is, a transition from one to the other of these forms of expression, but also that there can be a transition from ordinary expression to artistic expression, and, more generally, an association between language learning and aesthetic education. This point is touched on in the following section.

(b) From language learning to aesthetic education

Although he may have experienced or seen what he is narrating, the pupil will not necessarily write his compositions in a style that conveys the impression he wants to give. But experience can help him to acquire such a style, and that is why, once more, actual experience, which presupposes that the school is linked to life, can be an excellent starting-point. But when the child moves from action to narrative his speech ceases to be accompanied only by the emotions communicated to him by the situation in which he is involved. He attempts to express his emotions by means of words. His words are no longer heard only within the context of the situation in which they are spoken. They attempt to reproduce, to "reflect" that situation, and by doing so expression becomes essentially self-expression, the expression of the person. While remaining an instrument of communication, speech tends to become a work of art. This tendency will certainly be seen when, after proper preparation, the transition from oral expression to written expression is made. Without the help of physical movements or any other form of expression, writing really derives its evocative power only from the magic of style. If the narrative is regarded as important and if the speaker wants it to be vivid enough to give the impression of life, then it must become, even more than before, the expression of the personality and a work of art. It is of course not the purest form of art, and it will probably not be very perfect or beautiful in its first impact, but it is nevertheless one of the first forms of art.

In the above analysis we have tried to show the difference between language considered as a mere instrument of communication and language considered as a work of art. We do not believe that everyone can become a great artist, and we do not fail to appreciate the part that genius plays in the creation of great works. Nor do we believe that children's free compositions can be considered true works of art. Their very spontaneity places them outside the sphere of artistic creation, which requires work, technique or ingenuity. But an aesthetic education in which only works already produced are studied at first hand will always seem to us inadequate and all the more difficult if no one has tried to awaken the pupil's creative powers in childhood. We all possess such powers, limited though they may be. If aesthetic education is understood in this way, it is certainly very unlikely that it can be treated in as methodical, formal and practical a manner as many other subjects, including the study of ordinary communication by speech and writing. But it would be unthinkable to examine works of art without having first tried to awaken the child's aesthetic feeling. If he has not learned to appreciate and recognize beauty, it is useless and absurd to suggest that he should analyse it. He must be taught to see before he is taught to explain. And in order to teach him to see one must surely, as Eluard says, "give him something to see". But it must also be remembered that the gift will be the more warmly welcomed the more the child is able to appreciate it. It is in order to develop this ability that he will first be asked to express his personality with complete freedom.

Along the lines indicated in the above analysis, the association between oral expression and expression of the personality suggests that the synthesis may be extended to cover various modes of artistic expression.

One may move from the real situation and actual experience to spoken or written narration, but another transposition is possible, the transition from life or narrative to expression by drawing and by coloured forms and surfaces. These coloured sketches or figures can in turn be the subject of speech.

Physical expression is not the only basis for oral expression. The transposition to imagery can be made through the graphic power of movements, which are arranged according to their own laws and possess their own stylistic figures. Mime, dance and the two combined then take on their full significance.

Graphic and pictorial expression can have as their intermediary physical expression which becomes their medium and which a person drawing or painting captures as he works. But that implies a third term, which is not spatial and figurative, but which is capable of inspiring physical expression. Take musical expression, for instance. In Sweden - and also in France, in a slightly different form - children are asked to draw and paint according to the sequence of movements which the sequence of sounds in a piece of modern or classical music suggests to them. In their final summary, participants in the seminar regretted not having had enough time to pursue further their study of the relationships between these different modes of expression.

(c) Implications for teacher training

In order to meet the need for consistency in teaching methods, we have just given a brief account of an organically linked set of harmonious activities which actually take the place of the much less closely linked set of traditional exercises, which in some cases they appear to resemble. We can now draw some conclusions as regards syllabuses and methods and, consequently, teacher training. Our discussions, perfunctory though they were, brought out a number of important points.

First, teachers must be convinced of the validity of the above analyses, which have led us to recognize the need for consistency of method in all aspects of the teaching of language. If they are to realize their validity, they will have to make a study of epistemology, which will show them the resemblances and differences between oral and written expression and between language and the other modes of expression. Obviously, if the student is to be capable of undertaking such epistemological studies and subsequently applying them he will require a knowledge of linguistics.

To be effective and win the student-teachers' support, this dual course, both scientific and epistemological in nature, must itself fulfil certain conditions. First, the basic aim towards which these studies are directed must constantly be kept in mind. Second, one must never forget to view these studies from the standpoint of their application to teaching.

But evolving and applying these new teaching methods are not the only difficulties, for they will not have their real force or prove effective unless there has first been a change in attitude. Here we must first repeat what we have already said previously - that the teacher must be so trained that he can at the same time both respect and stimulate the pupils' spontaneity. Next, it will be noted that this interdisciplinary type of teaching has little in common with the traditional system, and involves real difficulties. The subjects seem to lose their purpose and their inner logic. It therefore seems more difficult to achieve steady progress throughout the course. There seems to be no guarantee whatever of objectivity in the course as a whole. Traditional examinations are abandoned in the interdisciplinary course, which does not fit in with the traditional view of the syllabus, and so encounters resistance from both parents and teachers. The student teacher himself also may set up resistances when he goes to the elementary school to teach. He must adopt a fresh approach to both the syllabuses and the pupils. It is never very difficult to acquire new knowledge, but it is much more difficult, as we have already emphasized, to abandon patterns of teaching and a conception of the teacher's rôle which are all the more tenacious and inflexible because they usually control behaviour unconsciously. Students must be made aware of this situation - and this is an important part of the work of those who teach in teacher-training schools; but one must beware of thinking that new attitudes will be adopted automatically, as a result. Intellectual conviction is not enough to change behaviour. There must be a great deal of practical teaching, with opportunities for observation, consideration and adjustment. That implies creating real-life situations, that is, classes in which the new teaching methods can be confidently introduced. But the difficulties raised by the creation and organization of such classes must also be realized. Moreover, nothing would be possible if the training-school teachers too had not been converted, if they had not already acquired a knowledge of these facts. Their knowledge may be at such a level and consequently so highly specialized that they must co-operate in imparting it to their students. Their co-operation may take different forms: reciprocal in-service courses, team teaching, and so on. Here again we can only repeat what has already been said. And what is valid for the teaching of language (collaboration of the epistemologist, linguist, and psychologist; the kind of attitude of the teacher towards the group of pupils which ensures that both the group as a whole and each member of it retain their freedom of expression and apply it in practice; the teacher's behaviour in the classroom, and so on) will be valid for the other aspects of teaching we shall have to deal with.

As for teaching based on communication between different modes of expression, it must be recognized that it is at present still at the stage of experiment and research. But the results of experiments could not be made known or the findings of research applied unless syllabuses and methods were reviewed and the teacher-training system examined afresh. Nevertheless, from now on, experiments and research will need the collaboration of teachers, and cannot be successfully completed without their help. That is why we came to the conclusion, at Bouaké, that we must now begin to consider the kind of teacher-training course we could and should establish. The first conclusion we reached was that it presupposed:

A much broader education, including more than the humanities;

the integration into the basic course of subjects heretofore generally considered secondary (music, drawing) and the introduction of new activities often considered to be not part of a school course (representation in graphic forms, mime, choreography);

correlatively, various forms of collaboration among teachers in teacher-training schools, in particular the collaboration of those who have not always been considered "true" teachers and equal to the others in importance and rank;

the encouragement of attitudes which will encourage elementary school pupils to express themselves, using different modes of expression and moving freely from one to another.

Even more than before, the application of these last measures would mean giving up conventional patterns and ideas, making radical changes and adopting a new mental outlook - all obviously most difficult to achieve. Participants in the Bouaké seminar thought that it would be extremely useful and important to try to find ways of making such changes.

More generally, they felt that in research and in applying the suggested methods full account should be taken of the African mentality and of the factors that make up the culture of the African children for whom these methods are intended - an observation that applies to other parts of the world as well. We know that cultural influence can manifest itself in two ways - primarily by the modes in which it acts, by the means by which it is acquired, disseminated and communicated. If we consider these means, we see that the plastic arts or, to be more precise, the non-verbal modes of expression are of great importance. For example, research on the use of audiovisual means could well be undertaken in relation to the image in African culture. As regards communication by specifically linguistic means, preference will of course still be given to the oral language in almost all cases. It would also be useful to try to ascertain both how far that traditional basis might be used to advantage in a course in which speech is at once one of the main objects and an instrument of great value, and also how it could be so used. The influence of a culture is felt not only in its modes of representation but also in its content. This content may not always be an obstacle to innovation, in particular to educational innovation. During the first part of the seminar the question arose whether the interdisciplinary system was not particularly attuned to the cognitive processes characteristic of African tradition. Thus we would need not only to see whether there is in fact a relationship between them, but also to inquire into the extent to which it could be used in the particular forms of teaching that we have dealt with so far.

The papers presented by the various groups participating in the seminar not only gave fresh confirmation that the method of work we had adopted was a good one; they also demonstrated how far the first attempts at practical work anticipated theoretical consideration and revealed in practice the very problems that logical analysis had led us to expect.

PART III

INTERDISCIPLINARITY AND ENVIRONMENTAL STUDY

In tackling the pedagogic problems of environmental studies as a nexus of the disciplines, the seminar participants had at once to stick to the method of approach they had adopted and embark on a more specific aspect of this problem.

Thus on the one hand there was discussion on the twin planes of school education and teacher training, and here the differences were to assert themselves between a first level, at which the globality of the approaches postulates the overlapping of the fields of knowledge as a datum, and a second where the necessary specialization of the learnings poses their integration as a problem.

On the other hand, however, whereas until that point the starting point for dealing with the question of interdisciplinarity had been the internal analysis of the disciplines, learnings, or skills, environmental studies was a subject conducing rather to examination of the convergence of the disciplines in the exploration of a common field of investigation. Emerging as an original form of teaching capable of taking up the conventional disciplines, it afforded an opening for developing the meeting's thinking on "integrated teaching", in the sense in which the term had been defined.

However, both the discussions and the evidence of the experiences reported were to show that in the situation currently obtaining this integration had certain limits. Some of these are connected with the nature of the disciplines involved in environmental studies, the specificity of each one becoming more accentuated as the level of study rises and its rigour increases; others with insufficient mastery of the conduct of a difficult educational activity whose objectives are often obscured by instructional necessities. Too little time remained available for the seminar to consider getting to analysis of the underlying reasons for these limitations and of the conditions for overcoming them.

I. ENVIRONMENT AND ENVIRONMENTAL STUDIES

The earlier discussions on the teaching of the main language practice in the other forms of expression had frequently touched on the problems of reference to the environment, either from the technical point of view, in considering for example the necessity of linking the study and development of expression to the pupil's experience, or from the standpoint of the conception to be held of education and its goals, in challenging an analytical pedagogic outlook, in which the compartmentation of the disciplines exacerbated the severance between school and life. The notion of environment was thus constantly in mind in the earlier part of the deliberations as a major base line, in the definition of an educational system in which the transmission of learning was no longer the essential preoccupation.

It was therefore no accident that all speakers who described and analysed the rôle of environmental studies in their projects and experiments constantly recalled the choices made by the States they served regarding the objectives assigned to basic education. While the wording differed, the coherence of the choices emerged quite clearly: schools should promote the positive integration of the young into their environment and their times, the targets being closely linked to the economic and social development of the country.

Here, therefore, the very same terms recurred in which the problem of integration of the disciplines had been posed at the opening of the seminar. With the object of schooling being no longer the transmission of a corpus of knowledge, and the curriculum idea losing its priority rôle, the school comes to the point of making its objective its pupils' adjustment to and progressive mastery of their environmental situation. Thereafter it is by apprehension and exploration of his relations in the world that the child compasses his own development. The school promotes and exploits this dynamic by making the environment the subject of a study which carries the seeds for that development of the intellectual aptitudes, learnings, and skills to which it should conduct the child.

As regards pluridisciplinarity, this perspective gave rise to reflections of two types: one group relating to the consequences of the complexity of that reality understood by the term "environment", and to the difficulty of getting a clear knowledge of it; and the other to the pedagogical problems of the discovery and exploration of the environment.

(a) Complexity of the notion of environment

Tackling the study of the reality in which the school is immersed means giving education a perspective that is necessarily multidisciplinary, and in two senses:

(1) The environment is an entity that cannot be reduced to what one particular type of knowledge can express; there is always more to it than any discipline can say about it. The growth of science accentuates the analytical character of knowledge which endeavours to grasp the complexity of the world only by interdisciplinary combined movements conducted on a basis of highly developed specialization. This round-about approach cannot serve as a model for school practice, particularly at the elementary level. Perception of the environment is necessarily global; but as perception is hopelessly overtopped by scientific knowledge, the problem is how to preserve the richness of the intuitive approach and to strengthen the children's sense of the unity of the world and the interlocking of learning, while allowing them to get beyond a syncretism which blocks the intellectual démarches or bogs them down in the confusion that sometimes develops in the conduct of environmental studies at school level.

The question thus becomes one of how to structure the global apprehension of the complexity.

The problem, as was emphasized as regards language study, was solved in one particular way when univocal representations of concrete situations were being used to mediate the change-over from the system of the mother tongue to that of the second language.

While language-teaching can indeed have selective recourse to univocal situations, this is because its objective is specific: a clear distinction is made between language-as-an-end and environmental explication-as-an-end. Nevertheless certain instructional projects which the proceedings brought up for consideration did reveal the temptation to confound the two ends, with apprehension of the environment in danger of reduction to the elaboration of a terminology permitting of description of the world around the child. On the other hand, an original mode of structuring understanding of the world materializes if one postulates - which is perfectly possible at the elementary level - that the environment is a system of relations and affinities. In this sense, it is not enough to say that the human environment is only comprehensible in its relations with the natural environment, and conversely; it is within those aspects of the environment that one finds a fabric of relationships that can be taken as an object of study. Besides the fact that this line of approach makes it possible to go beyond the nominalism of a certain type of description and is congruent with the conception of language set forth in the second part of this report, the hypothesis of the integration of learning is inherent in it.

Even so, given the impossibility of being exhaustive at the elementary level of knowledge, a choice will have to be made of the preferred relations to which one will try to direct the children's attention and exploratory activity. The need for these choices emerged clearly in the course of the discussions. However, the question of the criteria for the choices, which would for practical purposes have led on to a programming study, was in the end not touched on, except indirectly, but two brief comments will serve to consolidate the diffuse references or implicit approaches to the matter:

First, the study of these relationships creates a knowledge structure different from the one which would be imposed by the conventional categorization of learnings. Thus, the technological angle of vision that brings out, say, the relations between hand and tool and between tool and earth, is from the outset integrative, because it marries anatomy, mechanics, and geology for the discovery, but without engendering confusion, and without barring the way to a possible specialization of learnings at a later stage.

Secondly, the fact of giving preference to certain relations induces reference to the aims of education; in effect its outcome is to valorize certain aspects of the world, and it would imply a very naïve notion of objectivity to deplore that necessity. Certain participants laid special emphasis on the need to orient environmental studies in terms of a view of the world in which man's action to organize his environment, to control his relations with it, becomes the major dimension. The

choice of themes prescribed by the different pilot schemes, both at school and at teacher-training level, are revealing on this point.

Thus the Cameroon schools offer children in the first year of elementary school six themes connected with man in his environment: man and his geographical environment - man and his family - man and the soil - man and animals - man in the village - man outside the village. At the Bouaké Teacher-Training School the first environmental studies confronted the students with the problems of urban development: water supply - police and justice - hygiene - roads - abattoirs. Finally the Atakpamé National Education Authority is trying to organize the whole of its teaching by starting from the real problems faced by the group of student teachers being trained.

All these examples show not only the integrating value of study by themes, but also that integration is dictated by the nature of the situations confronted and not by the exigencies of the disciplines.

(2) Secondly, the complexity of an environment concept that could be said to be no longer horizontal but vertical, arises from the fact that it is never reducible to a "state of affairs". We cannot regard the environment solely as the "book of the world". For one thing, it is constantly changing - and in this connexion the alleged conservation of rural African societies is often an illusion conceived by persons who project on those societies patterns of evolution that do not correspond to their real dynamism; to take only one example appropriate to the pedagogic domain, the opening of a school in a village constitutes a modification of the social relations which characterize that environment.

Furthermore, and more generally, the environment should be considered as a field of complex interactions, and the majority of the relations, whose importance was brought out by the preceding analysis, are action relations.

This angle of vision also refers us back to the purposes of the school and incidentally permits us to perceive another aspect of the problem of interdisciplinarity.

Regarding the last, it became observable that, in linking acquiring knowledge with action, environmental studies were setting up a new form of synthesizing activity. The fact is that understanding the action and organizing it involve taking into consideration a multiplicity of aspects of reality. In the modern world the great human enterprises are led by multidisciplinary teams - for example, for the conduct of development projects in underdeveloped countries. Similarly, the recently developed rationalization and decision-taking techniques are founded on the multiplicity of the approaches to the reality to be changed and the graded synthesis of the elements of information. More modestly, on the school level, exercise in the processes leading from action to understanding and from understanding to action, say, for example, the linkage of the practical comportments and of the discovery, observation, and reflection processes, develops the ability to mobilize learnings by reference to necessities external to themselves, to give learning an availability which does not depend solely on its own internal logic, and finally, to break down the barriers between learnings different in nature.

On the first point, it would be enough to add to what has already been said about the goals of the school that, in the perspective adopted by the seminar, environmental studies finalize the child's integration with the world: their essential object is to develop a certain type of relations between the child and his environment, so that he feels himself involved, with progressive responsibility, in the development and transformation of the world around him.

Several participants, notably the national directors of the projects, stressed the affective side of the attitudes to be induced among the young, emphasizing that one of the major goals of the schools is to develop in the young an attachment to their milieu and the solidarity which expresses that attachment. This was an interesting way of bringing out a fresh aspect of the integrative value of environmental studies, calculated to give more weight to investigations into the cultural deposit of tradition and traditional technology. A short discussion of this point made it clear that any danger of falling into a kind of conservative fetichism could be avoided, but on two conditions:

That the investigation be situated in the dynamic configuration defined above, which would show that traditional culture and technology are evolving, notably under the impact of external influences.

That the investigation be freed of all purely contemplative goals, in particular by associating it with actual creation, construction, and even manufacture.

Finally, at this stage the object of the school and of environmental studies defined as the linking of learning with action was bound to come under discussion. Some participants put the main emphasis on the necessity of expressing the school's commitment to action and its rôle in the transformation of the environment by the inclusion of a maximum of concrete activities, of practical and productive operations in the actual training process, and by the inculcation of types of comportment useful towards that transformation of the environment. Even so, as several participants pointed out, it must be made clear that the practical work and manual tasks do not exhaust all the aspects of action for which the child is to be prepared: that action is also organization, learning to live with others, assumption of responsibility, participation in the preparation and execution of a variety of projects.

It was on this account that other participants warned against the limitations they were in danger of producing if the young were forced too early into the straitjacket of prescribed types of intervention or technique. In their view, the school's involvement in the action is via the road of learning, and the main thing is to supply pupils with the instruments for future action upon the environment.

II. HOW TO CONDUCT ENVIRONMENTAL STUDIES: PEDAGOGICAL PROBLEMS IN THE ELEMENTARY SCHOOL

1. A new pedagogical stage

(a) The new rôle of the environment

The study of the environment conforms with a sort of reversal of teaching perspective compared to the skills phase. In that phase reference to the environment was continual, as was amply brought out with reference to language studies. However, the introduction of situations borrowed from the environment was only meaningful in terms of the skills for whose teaching or practice it served.

In this sense, environmental studies constitute a new stage, where the environment is no longer the medium, but the subject, of the teaching action.

The distinction between reference to the environment and study of the environment became one of the most frequently used schemas during the seminar and hence the one most generally accepted by the participants.

On the question of the conditions for going on to this second phase, it was generally agreed that two things were essential:

First, a sufficient degree of intellectual maturation in the child for him to wonder about the situations which previously he had simply experienced; and secondly an adequate mastery of language, which now becomes the indispensable tool for observation, speculation and analysis. It is language that makes the child's reflective attitude towards his environment possible; in this sense the environment can only become a field for study and action when language is mastered.

(b) Study of the environment and language

Analysis of this aspect brought up two types of question:

The first group concerned the possibility of dating the passage to the environmental study stage within the schooling period. The replies did little towards clarifying this. To give a correct answer it would, in fact, be necessary to have psycho-pedagogical studies available for following the unfolding of linguistic and mental aptitudes in the development of the African school child. However, the Zinder and Yaoundé experiments locate the passage to the study of the environment at the third or fourth year of elementary education.

The second type of question, related indeed to the first type, concerned the rôle of the mother tongue in the study of the environment. To begin with, it is probable that the African school child has sufficient command of his mother tongue for making a start on the study of the environment well before a comparable mastery of French is attained.

Thus the question of environmental studies revived among the participants a preoccupation which had already emerged over the matter of French language pedagogics.

Again - and this made the question still more ticklish - the mother tongue is undoubtedly more congruent with the universe to which environmental studies relate, and better suited - as long as analytical processes are not necessary - to express or recreate it.

The status of pupils' mother tongues in a school that has chosen French as second language and the language of instruction - which is the case for the four States represented at Bouaké - does not primarily depend on educational considerations, but rather on political decisions: this was agreed by all.

Educationally, it seems possible, subject to specification of the choices, to accept the use of any language offering possibilities of communication for all members of a teacher-pupils group for a first introduction to the exploration of the environment.

For the rest, since the passage to the study of the environment does not constitute an abrupt switch to a new line of attack in the educational process, it is desirable to prepare for it gradually. There are numbers of activities whereby the environment could be made to figure in school life: games, playlets which are a sort of transposition of the environment and often unconsciously symbolic; drawings, paintings or modellings, which have the dual advantage of creating an interest in the environment and of training for observation; and collections, which encourage development of certain logical structures and prepare the ground for the burgeoning of the spirit of discovery.

In the stage following that of the employment of these intermediary techniques in the early years of education to train pupils for the study of the environment, the latter study itself will raise new problems of language as it progresses. The cultural system informing the foreign language used for instruction, does not coincide with those imposing the vernacular tongues. There is thus a danger that the (local) categorization of environmental objects and phenomena or of comportments will not be expressible in the foreign language. An example was given of this difficulty in Niger, where the Peuls divide the year into five seasons and the tribes of the south into three, while there are names for four in French.

The teaching difficulties arising from this state of affairs are merely a front for a phenomenon of a much ampler order. The fact is that reciprocal interactions are discoverable between language and the study of the environment: the language used modifies the pupil's apprehension of the environment and even more the structuration of his environmental knowledge. There is therefore a risk that his conscious knowledge will no longer correspond exactly with his perceptual knowledge of the environment. Conversely, the foreign language used for the study of an environment which is not that of the culture which shaped the language is liable to be corrupted by such use.

However, the participants did not feel that any of these were serious reasons to give up study of the environment. In the first place a certain interval always develops between pupils' intellectual and perceptual knowledge of the environment, even with those who are using their mother tongue for their environmental studies - and the "perspectivism" possible as a result gives environmental studies a formative value.

Again, the moment the second language ceases to be treated as an end, it becomes possible to escape from linguistic conservatism and to trust in the living activity which, in research and dialogue, shapes the language and determines its evolution.

2. The notion of situations

(a) Pretexted situations and problem situations

In the course of the discussions it became apparent that the notion of environment was too vast in itself, difficult to compass, and insufficiently operative for the purposes of those using it. It therefore needed to be replaced by the notion of the "situation" in the sense less of an element or sector of the environment, than of a combination of data or circumstances through which the environment manifests itself to the individual studying it. It is the situation which creates wonder and curiosity, motivates research, induces observation and analysis, and prompts intervention.

Again the situations themselves, or more exactly, the uses the educator makes of them have to be differentiated into those which serve to motivate, support or reinforce the acquisition of a "learning" which remains the final goal of the activity, and those which, being themselves subjects for inquiry, are treated as such by focusing investigation on them. The first are called "pretexted situations", the second "problem situations". This convenient division, widely used during the discussions, enabled fresh questions to be tackled.

In contrast to the pretext situation, which conduces to the isolation of disciplines by focusing the pupils' attention on a predetermined study, the problem situation involves analysis and synthesis, for the research subject it proposes is precisely the complex of factors which trace back to a diversity of learnings which solving the problem calls into play simultaneously.

(b) How to exhibit the problem

In day-to-day teaching it is not easy to select problem situations, or rather, to show the "problem" character of situations. For this it is, for instance, necessary to expand the single substantives which usually serve to indicate the themes of environmental studies into questions. By reconsidering the designation of the themes in the course of presenting the various experiments it could be shown that this leaves the method of approaching the themes open.

The point is that whether or not a theme is a problem then depends less on its content than on the material fashion in which that theme presents itself as a situation to the pupil. Now the environment is a problem only to the person who feels involved with it, and before it is possible to formalize it, the problem is apparent in the experiential relation between the subject and the terms of the situation.

In Decrolyan pedagogics environmental studies are defined as the fundamental activity, because they express and take as their subject the relations between the individual and the world, apprehended under the category of need: the environment is structured by the manner in which man organizes the satisfaction of his basic needs in the world. This amounted to positing the principle, still essential, that environmental studies are founded on the relation of the subject and the object.

The fact remains, however, that the principle does not per se permit of settlement of the practical problem of passing from the need felt to the need represented. It can even be said that in trying to proffer a picture of the world founded on a debatable biologism, the Decrolyan tradition has opened the way to all sorts of distortions of the primitive concept to the extent that the world picture has finally won out over the individual's relations to the world as the thing studied. Hence perhaps that caricature of Decroly's idea, the "centres of interest" method in which the environment, displayed rather than studied, resumes the rôle of pretext for the presentation of a subject decided on in advance by the teacher; the disciplines, whose compartmentalization is not challenged, are introduced one by one, as the occasions for it are created.

It is in the "problem-presentation" of a situation that environmental studies not only have their start but also get their integrating significance. The start is a motivation which will break down the indifference of the observer. But the process is carried to completion only by a formalization in which the different learnings play a part. For example, some participants were able to show how a new conception of mathematics made it possible to use mathematics as the instrument for the formalization. Of course, mathematics alone cannot do the job; thus, the terms between which it establishes relations are drawn from other "learnings".

The "interdisciplinarity" we are here considering is not just what arises from the "turn-table" rôle of the environmental "situation", with its references to a diversity of notions and learnings and its orientation of research in several directions simultaneously; it consists also, and perhaps more profoundly, in the selection and combination of the schemas, learnings, or research tracks needed to elucidate the situation. In the final count, this formalization-elucidation operation subordinates to itself the learnings it mobilizes, which achieve a value only in so far as they contribute to a better grasp of the situation.

3. Limits of the integration of disciplines in environmental studies

It will, however, be well to note that this prospective integration of disciplines has specific limits, not only determined by elementary school teaching practice, but unquestionably inherent in itself.

(a) Structure of perception of the environment and structure of learnings

Of course, as in all discussions of educational method, the verbal and written contributions of participants showed up the disparity which inevitably develops between intention and actual practice, arising - it was agreed - from the inadequate technical and educational training of primary school teachers, from the difficulty of working daring views into daily teaching, even when they are held as convictions, and the bogging down of imagination in a workaday life which spurns the man in a hurry and is weighed down by habit.

But these arguments were to be outweighed by an analysis of another order - the teaching schema outlined above approximates by analogy, to the proceedings of the man of action who rationalizes his actions by working his knowledge of the environment into his strategy. However it must be appreciated that there are profound differences between the situation of the man of action and the classroom situation of the elementary school pupil. In effect, even if his actions offer him possibilities for research and discovery, the man is bringing a solidly structured fund of acquired knowledge into play. It is quite otherwise with the school child who is still at the learning and assimulating stage. In his case the schemata and learnings he can bring to bear are rudimentary or shaky, and for that matter are of a lesser order than what he has to absorb or structure. There is a reciprocal relation between environmental studies and learnings: the first develops the acquisition of the second, but the second fructifies the first. Thus in their own dynamic environment studies are diversified in successive digressions by the acquisition of learnings and the working up of intellectural schemas, and these proceedings necessitate analysis and a degree of relative specialization at certain stages. Well-active education, the art of teaching is not sticking to a framework of convergent "learnings" and interwoven initiations or discoveries but in judiciously locating within an overall process the analytical phases which determine the structuration of the knowledge acquired.

(b) Dynamic of environmental studies and progression of knowledge

The effects of this necessary digression are seen to be even more limiting if one considers that the characteristic dynamic of classroom studies does not coincide with that which environmental studies develop concretely in the life of the school. One shifts attention to successive situations according to the happenings and developments in a class's history, and the preoccupations, and personalities of the pupils. The other, on the contrary, seeks to progress according to an internal logic.

In a short unfinished discussion, questions considered were when and how to end an investigation, or to pass from the study of one situation to that of another. It amounted to an attempt, from several angles, to tackle the contradiction between these two dynamisms, which, however, cannot always be made to coincide.

(c) Some expedients for relieving those limitations

From the foregoing it follows that the disciplines must be conceded a degree of autonomy and an obvious solution emerges if the two following points are made:

In the elementary school it is useful to distinguish between the disciplines. One group has as its object grounding and practising the pupil in a fundamental "language" (mathematics, the spoken and written word); their internal logic presents a maximum of constraint. Environmental studies provide occasions to develop these disciplines, but the disciplines in turn supply means of expression and formalization for environmental studies; although continually involved, they have a solid autonomy.

The other assignments, at this level, are much less structured, whether they relate to certain types of knowledge (historical, geographical, technological) or develop certain concrete activities (non-verbal expression, practical work) and can accordingly accommodate themselves, without harm, to the rhythm of environmental studies, evolve in a non-linear manner by successive fresh starts and are not constrained to rigorous continuity.

In the second place, special attention should be given to programmed learning. It is not an accident that the active method teaching systems which gave the most prominence to environmental studies (Freinet for example) were those which were the first to introduce programmed learning at the elementary level. By structuring the learnings in alignment with the environmental studies, programmed learning enables the latter to avoid contradictions and to develop more freely in accordance with its own exigencies, without fear of creating discontinuity or confusion.

4. Integrative value of the method

If environmental studies retain undeniable value as an integrative method, it is primarily because of the possibility they offer of resorting to trains of thought which are coherent, if not identical, over the whole range of disciplines they bring in. As one speaker said in describing his own experience, the school thus gives priority to the methods and pedagogical attitudes favouring the development of the capacity for thinking, acting, adjusting and informing oneself. In environmental studies, all the researches and all the kinds of knowledge brought in need to provide an occasion for observation, comparison, classification, and even causal explication. In the final count it is the unity of the method that creates the solidarity of the learnings.

III. ENVIRONMENTAL STUDIES AND TEACHER TRAINING

Environmental studies are a tricky subject. It involves new attitudes towards the environment and towards learning, purged of any formal conception of knowledge. It is thus to be expected that readying primary teachers for this type of instruction presents difficulties that only systematic training can overcome. It follows, therefore, that the training of teachers for a kind of education founded on environmental studies has environmental studies as its own foundation and adopts their characteristic interdisciplinary standpoint.

1. Attitudes to be fostered

The attitudes required for interdisciplinary courses were defined in the first section of the report. Obviously they hold true for environmental studies regarded as an interdisciplinary nexus. But training for taking environmental studies imparts to those general attitudes a specificity which the meeting had to consider.

(a) Awareness of the complexity of the environment is not immediate

This is due to the fact that we often confuse what is familiar and what is known. In fact, familiarity more often inhibits knowledge than it implies it: it blunts curiosity and interdicts the sense of wonder. Accordingly, prospective teachers should be taught to distinguish between immediate experiential knowledge of the environment and a thought out and more rational knowledge of it. This distinction does not imply the rejection of the first for the second. But it is possible, during training, to query the student's experiential knowledge as a way of bringing out the possibilities and the necessity of knowledge of a different kind. It is through this that the multiplicity of the environment's dimensions will be grasped and the impossibility of achieving knowledge of it by study from a single standpoint or by simple intuition.

(b) The environment as a study theme

Teachers also have to be trained to use their own environment as the study theme. This too does not happen automatically. There is a type of education, often linked to a way of life that has cut teachers off from their roots, gives them the illusion that, since what they have learnt is what sets them apart from their environment, it is thereby unrelated to it. Another mental block also came to light, resulting from the reaction against an already lengthy ethnological tradition of reifying what is observed and founding research on the radical exteriority of observer and observed.

It is therefore necessary to build up in perspective teachers' powerful motivations for accepting the importance of environmental studies for their own training and for that of their pupils. Initiation into certain sciences new to them - the human sciences, for example - can conduce to this acceptance. But it will be made strongest by giving the training school a permanent window onto the collectivity and by the exchanges with the outer world which must be given a formal place in the organization of training.

(c) This policy will also promote teachers' attachment to their environment. Even where there is a profound attachment, it is not necessarily accompanied by awareness of the responsibilities that go with the environment. But it is the responsibilities which are important for the educator, as he will have to play a major rôle in the transformation of his environment. Accordingly during his training he will need to sample this involvement in the work of moulding the environment. That is the purpose of the student teachers' stints in the villages or their participation in rehabilitation activities which

were mentioned as particularly important forms of training. To these could be added exploration of the traditional cultural substratum and the creative activities whereby it could be revived.

2. The new learnings

Preparing teachers to take environmental studies necessitates the inclusion in their training of new material which they have never had occasion to tackle in their earlier studies.

First there are the human, economic and social sciences more particularly. This type of study presents the twofold advantage of permitting comprehension of the most important problems of environmental development and, by their synthetical character, preparing for interdisciplinarity. To these should be added the learnings and know-hows with a direct bearing on the transformation of the environment. They relate essentially to health, hygiene and agriculture, and are in fact compound learnings combining scientific knowledge and technical data, which automatically gives an appreciable power of integration. For example, the study of dietary regimens involves not only biology and chemistry, but also psycho-sociology, since every system of nourishment is tied in with group representations.

Finally, technology is an important discipline for the training of teachers. As we know, its purpose is the analytical study of technical constructions. Here again, the analysis cannot be unidimensional but must include studies of the diverse functions of the construction (technical, social, economic, and even aesthetic), of its fabrication and of its employment. Itself an "environmental" science, technology is - as we can see - an integrating discipline.

3. Exercises in environmental studies

The exercise generally takes the form of a survey which the student prepares, conducts and develops. The survey is not the only possible kind of environmental study, but it is the most used, and as it represents an adequately comprehensive approach combining a diversity of techniques, it can unhesitatingly be given the leading place in training.

(a) Survey techniques

Survey exercises imply exercises in survey techniques. There is a variety of these and it is up to the instructors to choose those which are the most easily applicable and if possible, the most productive - the main preference was for surveys by questionnaire with direct observation and the various types of interview (individual or group, open-ended or structured) a poorish second. It is by no means useless to devote careful attention to the techniques of the survey with a view to making sure of a degree of validity in its results. But an additional possibility is to focus on the pedagogic value of what are essentially communication techniques. For example, the preparation of a questionnaire raises major problems of language, whose homogeneity among those preparing the questionnaire, pollsters and polled, must be verified. Similarly, in learning to conduct an interview, the goal is not so much scientific rigour as mastery of a means of getting information and communicating.

(b) Phases of a survey

A survey is a long and often complex operation. Teachers must be taught how to organize its conduct by distinct phases and also the latters' purpose - pre-survey for assembling the basic data which will permit of the statement of the problem of problems - formulation of hypotheses and determination of the areas of inquiry - the survey proper - and development of the results - i.e. formulation and interpretation.

Breaking the student in to the use of this methodology is necessarily long and often difficult. A variety of advantages can nevertheless be looked for from it as regards preparation for interdisciplinarity. A diversity of disciplines necessarily come into a survey. At the level of education which concerns us, some of these disciplines will require a degree of specialized study determined by their nature or their internal logic and the survey plan can provide for interruptions for this. However, surveys have the merit of organizing the convergence of the disciplines, of putting them under contribution, simultaneously or successively, for the same piece of research.

The interdisciplinarity is obviously of another order than what it is in elementary schooling, as the call for specialization grows as the level of studies rises. Its expression is in terms of co-ordination and organized complementarity of viewpoints.

(c) Surveys and the moulding of the intellect

Survey exercises should issue in the creation of a scientific attitude extensible to all intellectual operations. Undoubtedly in this sphere surveys do not have the formation rigour of pure science. But their underlying value is, by decompartmentalizing the disciplines and opening new fields for research, to induce the discovery that this method is applicable more widely than just for the specialized activities to which it is often restricted.

Accordingly in surveys' initiation into the methodological principles should accompany the working out of the research procedures and instrumentalities. In this way the pupil will be led to discover firstly that the survey method distinguishes between empirical and scientific observation, orders and considers information, elaborates hypotheses and organizes the testing of them, and that it secondly also brings into play and develops intellectual techniques of general applicability - assembly and classification of facts, determination of the causes of errors, selection of a significant fact, examination of different points of view, formulation of a problem, determination of causal relations, generalizing and validating interpretations, expression in probabilistic terms of conclusions, etc.

(d) Surveys and expression

Finally, surveys pose interesting problems of expression and accordingly mobilize a diversity of activities which are put under contribution for a single end, namely communicating the results of the research. The fact is that every discovery has to be communicable. In surveys the written/spoken word and mathematics enter into this work of expression to some degree; this was discussed at some length in the early part of the seminar. Here, it is of more interest to underline the important part played by the illustrative activities, particularly photography and drawing, or more generally, by graphic expression. Whether it is a matter of sensitizing opinion to a problem and thus motivating a survey, or even more, of setting out its results, graphic expression, with its adaptation to the nature of the notions it seeks to express, becomes a worth while and effective means of exhibiting the specificity of the several disciplines' interventions at the same time that it establishes a link between them. In effect, the way the mathematician uses drawing is different from the way it is used by the biologist or geographer, differences arising from the nature of their research and their objects. But at the same time, when the draughtsman is called in by one or another of them turn-and-turn about, he applies the same laws of visual interpretation in each case.

It is much the same for the various audiovisual media that a survey uses: the specificity of the application is closely tied in with the general compass of the medium employed. Thus these techniques of expression provide a passage between the disciplines that contributes strongly to their co-ordination.

(e) Team work between the educators

All these considerations apply only if real team work by the teachers can be organized. The initial tryouts at Bouaké make it clear that a survey involves the whole teaching faculty; they must therefore get together to plan its course and to co-ordinate the hypotheses on which they are working. In this domain "team teaching" should have as its primary aim ensuring the coherence of the lines of inquiry suggested to the children in the survey and hence defining the contribution of each to the formation of their scientific team spirit. Agreement on a common methodology in the survey requires confrontation and discussion; each must locate his own contribution in the overall process. When it comes to expressing the results alike co-ordination is as necessary as in the preparation and conduct of the survey; otherwise, the development of the survey attains a degree of discreteness at which the specificity of the disciplines degenerate into divergence. It is therefore necessary to organize the complementarity of their several contributions to the interpretation of the results of any particular research.

4. Survey and action: the participation survey

To train teachers for a pedagogics in which learning and action as here defined are closely linked, their survey exercises must be based on the same attitude. In teacher training the survey is not only a cognitive démarche, but also a constrict of action.

(a) Criticism of the classical investigation

The foregoing implies a new conception of methodology for the survey. In the traditional conception the relation of the researcher to the community, to the environment studied, is bracketed off and excluded from the field of research: for objectivity's sake, the researcher makes every effort not to modify what he is studying.

In reality, even the physico-mathematical sciences now call in question this notion of objectivity. An interaction exists between the observer and the phenomenon observed, and observation itself is an action, an interaction that modifies the observed phenomenon. In the social sciences the same is true, and the fashion in which the observation is carried on modifies what is observed. The evidence of those who had effected surveys in rural environments were very revealing on this point: for example, the presence of investigators in a village is always a disturbance, which often illicits intervention by the villagers in the actual course of the study. Even in epistemological terms it is thus not possible, in surveys, to separate study of the environment and action in the environment.

Reference to the social action purposes in which the purposes of the school as an agent of change are bound up reinforces this criticism of the conventional survey with its implicit postulates whereby it treats the environment as static - reifies it - and the time dimension as purely formal, freezing all statements as of a particular moment in time. The community studied is kept in a passive "guinea-pig" relationship vis-à-vis the investigators. Finally, for the conventional survey, the researcher is outside the area of research, whereas today the social sciences assert that it is not possible to discern the dynamism of an environment without being involved in it.

(b) Brief definition of the participation survey

The survey must accordingly be conceptualized in terms of other hypotheses[1]. It is on that condition that the survey will become formative as involving the entire personality and the responsibility of those conducting it. The survey then becomes what modern terminology has christened a "participation-survey". It relates to a pedagogics of environmental development which must, to be effective, induce the environment's participation in the process.

The influence of Kurt Lewin is fairly unanimously cited by all those concerned with the practice or theory of the participation-survey. The notion of action research simultaneously links learning and intervention in the first place and in the second, in a shared participation process, researchers and their subjects. Working on these lines Lewin used to create regular sociological laboratories, associating the subjects themselves in the research, in the definition of the survey's objectives, and the elaboration of its hypotheses, and organizing a feedback permitting of continuous reference back to the subjects themselves of the information which they had supplied with the integration of it which the researchers had in mind. After a fashion it was a matter of a permanent apprehension of the environment by itself.

(c) Practice in participation-surveys in teacher training

Inasmuch as this schema reflects a genuine pedagogic of social action, it can and should inspire the survey exercises in teacher training. It is perfectly practicable to establish, between a group of student teachers and neighbouring communities, durable relations tending to promote the apprehension of the environment by itself that we have described involving the teachers and giving them an active rôle. The integration of the knowledge acquired and the action arising from it breaks down the compartmentation which too often develops between theoretical acquisitions and "practical exercises" in teacher training.

As regards the disciplines, there is no question of this approach disregarding their necessary specificity, but it reorients all the learnings in an unitary vision of their social function.

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(1) This analysis is in large measure drawn from the work of Guy Le Boterf: "Enquête-Participation et Animation" - CED - 27 rue Cassette - Paris.

(d) "Psychopedagogic" training as a participation survey

The same line can be followed in the psychopedagogic training of teachers. All participants in the seminar agreed on the fact that in the notion of teacher training they had elaborated, the rôle of the educational psychologist was clearly preponderant. It is he who keeps the primary question of the end-purposes of the training constantly to the fore; he contributes to the methodological co-ordination of the various disciplines and can ensure the cohesion of the epistemological analyses, whose necessity was underscored. Finally he intervenes to unify the evaluation procedures, which, as had been observed, take on special characteristics as an outcome of interdisciplinarity. But yet another rôle can be found for him which might consist in applying the survey methodology to psychopedagogic training itself. The fact is that this is a domain in which the linkage between knowledge acquired and action is fundamental, but experience shows, and the difficulties instanced during the seminar confirm, that in this field theoretical knowledge and practical training often develop quasi-independently. The problem would be resolved by taking the scholastic environments around teacher-training schools as their areas for research and action. It would be by analysing the real problems posed as regards the functioning, yield, results, and indirect effects of a school that a psychopedagogy could be developed capable of integrating acquaintance with the child, the factors conditioning daily life, the educational procedures used with the child, and the relations between school and community, with concrete intervention in the school situation. Psychopedagogical training would then take the form of a running survey of a defined environment, and it would be a participation-survey. It would imply association in the survey - and hence in the training of teachers - of the local survey teachers, the parents of pupils and, to a certain degree, the pupils themselves.

5. Community leadership and teacher training

The participation-survey, in its association of study with action and of the researcher with the environment he studies, falls within the frame of reference of social pedagogics and automatically arrives at the notion of the sociologist as a community leader.

Similarly, one may say that survey practice on the lines described conduces to enhancing the teacher's rôle as community leader. The professors of the Atatefané Teacher Training School (Togo) were eloquent on the importance they attached, in teacher training, to readying students for the teacher's leadership rôle. For them this is not just one target among many, but is the principal dimension of the training process, with the student teachers preparing for leadership by leading their own group.

The community leader can be briefly defined as the person who helps the groups to find themselves, to accept their contradictions, to ensure more effective communication between each other and within their membership, to see themselves more in perspective and thereby to understand themselves and their objectives better and there was a discussion on the reconciliation of the teacher's lead rôles as educator and community leader. Some speakers were inclined to reduce the two functions to one, pointing out that each notion was implicit on the other and that in the final count they melded. Others, stressing the concrete tasks of the teacher, defended the primacy of his educative function, with his leadership function as a complement and extension of it.

In the teacher's real-life situation, his intervention is specificized and, to be effective, he is constrained to direct it preferentially to the classroom domain to teaching tasks. His immersion in a larger environment with which he is bound to feel himself solidary induces him to play an organizer's rôle in the community. However, there was general agreement that that rôle could be accorded only part of his time and energy and that it was better for him to seek to participate in a local team that included local leaders and development agents, giving him more a supportive than a primary rôle.

The conclusion was that there is a distinction between the teacher's educational and leadership functions.