freedom of action - not following step by step predetermined directions
time for reflection
resolution of contradictions.

This scheme is basic for so called self-regulation methods or Piaget's "equilibration": "In the act of knowing, the subject is active, and consequently, faced with an external disturbance, he will react in order to compensate, and consequently he will tend toward equilibrium". (J. Piaget, *Journal of Research and Sci. Teaching,* **2** (1964) 176-186.

These ideas of Piaget, his followers maintain, should be taken into consideration in new curricula of physics, as for instance in the "Nebraska Program of Teaching Physics" (R. Karplus). The basis for this program is a "learning circle" consisting of the following steps:

exploration - open flexible experiments with objects in small groups
concept introduction - define concepts by lead person based on the first phase
concept's application - going to new system.

Of great assistance in understanding the above ideas was the "Workshop on Physics Teaching and the Development of Reasoning" organized during the EPS-4 Conference on the lines of a workshop already held by the American Association of Physics Teachers. The following is a brief resume of the Workshop programme.

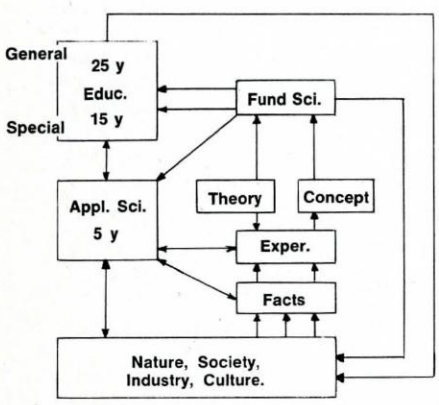
Module 1 "How people think". Many students do not use reasoning patterns that seem to be obvious. By comparing their own solutions of tests with student's solutions, participants were able to distinguish between various patterns of thought used to solve simple problems.

In the next Modules 2, 3, 4, "Concrete and Formal Thought" the idea of concrete level and formal level thought was introduced as defined in Piaget's theory. There were presented relations (films and video-tape) on students' responses to typical Piaget tasks.

Recent research results obtained by similar methods were presented in Module 5. They included the classification of 14-16 years old college students' responses which varied from 12% for the concrete-operational level and 48% formal-level responses (Fuller) to 50% concrete and 25% formal level (J. McKinnon, J. Renner, *Am. J. Phys.* **39** (1971) 1047.

The last modules were devoted to methods of analysis of test questions, textbooks and to strategies of teaching.

Education should not be orientated only towards the production of more physicists. Consideration has to be given to the development of really high quality research - something of a rarity. Current studies aim to try and analyse the ratio of high-value to low-value research so that quality can also be taken into account in education methods.



Popularization

Moreover, education does not stop there. Physicists are becoming more conscious of their responsibilities toward society, the interaction being illustrated in the accompagnying figure. A part of this interaction concerns the education of the public, the "popularization" of physics. Teaching and popularization fuse into each other as the public is not a homogeneous bloc but constitutes a wide variety of different people of differing experiences and interests who consequently have differing needs.

Two recent experiments in communication illustrate this point. In Poitiers (France) over a period of some two months the general public was able to enter into direct contact with scientists and discuss what was in their mind. They could also participate in experiments. Attendance was unexpectedly high and covered a broad cross-section of the population.

At IKO in Amsterdam a deliberate effort was made to reach the professional (but non-Scientific) staff of the institute, not only by giving popular lectures but by listening to proposals and then analysing the attitudes of the scientists, laymen and students, that emerged. The meeting in York demonstrated that education and popularization are no longer "fringe" activities.

Pawel Kruszynski and Jan Vlachy

New I.O.M.s Accepted

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P. Lascaux, Villeneuve St. Georges, F
D. Mead, Stuttgart, D

CATEGORY 4 C

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French Physical Society :
C. Faure, Ozoir la Ferrière - Lesigny

German Physical Society :
E. Lebsanft, Jülich
W. Schmidt, Aalen

The Institute of Physics :
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D. Kalymnios, Piraeus, GR
H. Lightblau, Sunbury on Thames

Italian Physical Society :
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C.M. Bertoni, Modena
F. Manghi, Modena
F. Nizzoli, Modena
I. Ortalli, Parma

The Netherlands' Physical Society :
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