

europ physics news



BULLETIN OF THE EUROPEAN PHYSICAL SOCIETY

Volume 4 Number 1

January 1973

Viewpoint

Physics and Education

The advancement of physics in Europe is closely associated with the significance that national educational policies attribute to the understanding of the impact of science and technology on our daily lives. In this context, physics must be seen to be an essential part of all basic education to which practising physicists are prepared to devote serious attention.

A common complaint amongst students is that school teachers and university lecturers approach physics teaching by simply relating facts and mathematical techniques. Then, the students' imaginations are stifled, historical and philosophical perspectives are excluded, and the creative excitement of progress from ignorance to knowledge through theory and experiment is neglected.

In this issue, the IUPAP Commission on Physics Education reveals that a planned international meeting on physics education for physics-related sciences and professions was cancelled because of insufficient financial support. The focusing of attention on the importance of physics to other disciplines surely deserves the support of physicists in future. Otherwise, there is a danger that scientists in those other disciplines will view physicists as inward-looking.

Also in this issue, the Nuffield Advanced Physics Project is described as giving physics education a sense of direction and purpose that students need.

Another answer to the students' complaint would be the establishment of effective co-operation between practising physicists, physics teachers and educational policy makers. Here, university departments and research institutes could ensure that local schools and teacher training centres are well advised by physicists prepared to act as consultants.

Certainly, these questions could be among those covered by an EPS Advisory Committee on Education, which has been proposed recently.

Physics Education

In this article the past achievements and future courses of action of the IUPAP Commission on Physics Education are reviewed.

Past achievements

by **H.H. Staub**, Zurich University, former President of the IUPAP Commission on Physics Education.

The International Commission on Physics Education was officially installed at the IUPAP General Assembly in Ottawa in 1960. The necessity for such a Commission and its broad programme had been shown in a spectacular way only a few weeks before by the outstanding success of the First International Conference on Physics Education from 18 July — 4 August 1960 in Paris. This conference, which had been organized by Sanborn C. Brown and Norman Clarke with the sponsorship of IUPAP, brought together representatives of 28 nations and of several international agencies for an exchange of ideas, aims and actual performance in teaching of physics at the university and highschool level. Most delegations, therefore, were composed of university physics professors, physics highschool teachers and one or more representatives of those government agencies (Ministry of Education or Public Instruction) concerned with the organization of schools where physics was taught.

It was no surprise, of course, that Sanborn C. Brown was elected as the first President of the newly formed commission and Norman Clarke as Secretary. The general aims and activities for the Commission were essentially those resulting from the report on the Paris conference, edited by S.C. Brown and N. Clarke, namely: to exchange views on the methods of instruction of physics in the various countries and on the purpose of teaching physics to various professional groups, and to set up recommendations to government agencies on

matters concerning the teaching of physics by sponsorship of conferences or by collaboration with international organizations like Unesco, OECD or the International Atomic Energy Agency in the production of aids (books, films, etc.) for the teaching of physics.

In 1962, a Second International Conference was organized in Rio de Janeiro mainly for the discussion of the above-named problems encountered by the developing countries. In 1965, a Third International Conference was organized in London to deal with the problems of the education of professional physicists. The reports on these conferences were published in book form.

After having served the usual two period terms as President and Secretary of the Commission, Sanborn C. Brown and Norman Clarke were replaced by Hans H. Staub and William C. Kelly respectively at the IUPAP General Assembly of 1966 in Basel. During the next six years, an International Conference, for the first time in the form of a seminar on the education of physicists for work in industry, was held in Eindhoven, Netherlands, in December 1968; and another International Conference on the education of physics teachers at the secondary school level was held

Contents

Viewpoint	1
Physics Education	1
Nuffield Advanced Physics	3
Horia Hulubei	5
Nuclear Physics	5
Physics of Semiconductors	6
ESSDERC 1972	6
Society News	7
Meetings	8

in September 1970 in Eger, Hungary. For both these conferences, reports were published in book form.

During the period 1966-72, considerable efforts went into advising and helping Unesco in the production of teaching aids in the form of books with the titles: *New trends in the teaching of physics* and *Teaching school physics, a Unesco source book* by John L. Lewis, who himself is a member of the Commission.

At the General Assembly of IUPAP in Washington, D.C., in September 1972, the present President and Secretary, William C. Kelly and John L. Lewis were elected.

Future Courses of Action

by **W.C. Kelly**, US National Academy of Sciences, President of IUPAP Commission on Physics Education

Now in its second decade, the Commission on Physics Education must examine what it has been able to accomplish by past activities and what kinds of effort seem likely to be productive in the future. The value of its international conferences and seminars in providing a forum for discussion, in turning the attention of the international physics community to educational and manpower problems, and in fostering the development of friendly ties among physicists interested in educational problems, seems well demonstrated. A much larger audience has also been reached by publications sponsored by the Commission: the proceedings of its international meetings and the reports it has co-sponsored with Unesco.

The problem of national differences in educational organization and practice has, to be sure, been a difficult one, but it has been surmounted by a variety of techniques, and no longer seems to be a major obstacle to communication. Although education in physics will never transcend its national origins as physics itself does, international discourse about physics education has been shown to be feasible.

How productive this has been for the larger physics community is debatable, but the Commission feels assured that the benefits of its activities have spread beyond the individuals who were immediately involved. Providing information about new teaching practices that are not widely known, raising questions about traditional practices that need to be re-examined, reinforcing the efforts of the sometimes lonely individuals or undersupported organizations that are

trying to improve physics education in their own countries, and bringing the influence of the world physics community to bear on a few issues about which physicists tend to hold common beliefs — all of these seem effective at a number of decision points within both national and international organizations. The Commission has evidence that its efforts have been crucial in a few situations and effective at the margin in many.

Future activities are likely to resemble past ones only superficially. It seems clear that the Commission has already explored adequately the broad general questions: education in physics, the education of the physicists, the education of the non-specialist, and so on. The topics of future conferences will probably deal with more specific issues and be addressed by smaller international groups in a workshop setting. One set of such issues agitating the physics community in many countries is the human resource problem: overproduction of specialists, underutilization, obsolescence, opportunities for women in physics. An educational problem of importance in every country is the physics education of students in physics-related sciences and professions: future engineers, medical doctors, geoscientists, bioscientists, technicians, and others. The Commission attempted to hold an international meeting on this topic last summer, but was forced to cancel its arrangements because of insufficient financial support; efforts are currently being made to revive these plans. An international seminar on physics and mathematics is another possibility; it would involve a small group of very able physicists and mathematicians, who would work together for a month or six weeks to develop papers that illustrated new uses of modern mathematical concepts in physics.

Other areas that need attention include the development of physics education in many developing countries. Here, the Commission can play a special role within IUPAP by providing a forum and a resource of which physicists in these countries are often eager to avail themselves. That many of the educational problems discussed at Commission-sponsored conferences are shared by developing and developed countries further strengthens the ties that are developed by such IUPAP activities.

Finally the Commission is uneasily aware of its relationship to one of the central problems facing physics today: the relationship of physics to the rest

of society. This is a relationship that can surely be improved by education, but education of a kind that goes far beyond the formal organizations and practices that are usually discussed at Commission meetings. Offhand, it would seem unlikely that the Commission on Physics Education with its limited resources could make an appreciable impact on the public understanding of physics, but to say this is to beg the question of what the Commission's role is. The Commission can be expected to explore this problem and determine whether it has a role to play — catalytically, if not directly, possibly serendipitously, if not in some programmed way. It seems clear that the problem of making physics understood and appreciated by a wider sector of the public and of making it useful to a larger clientele will dominate the 1970s as much as the issues of expansion of specialist education dominated the first decade of the Commission's existence.

CERN in 1973

The Council of CERN has unanimously re-elected W. Gentner, Federal Republic of Germany, as President for 1973 and has elected as Vice-Presidents Th. Kouyoumzelis, Greece, and G.H. Stafford, U.K., G. Ekspong, Sweden, and P. Levaux, Belgium, were unanimously re-elected as presidents of the Scientific Policy Committee and the Finance Committee respectively.

After hearing the progress reports of the Directors-General — W. Jentschke and J.B. Adams — the Council agreed the net budgets for 1973 shown below. The figures for 1972 shown in brackets can be transformed to 1973 prices by applying the cost variation index of 6.4%.

	1973	1972
	Sw.Fr.	
Laboratory I	382.9 million	(371.4)
Laboratory II	188.0 million	(95)

The budget for Laboratory I provides for the continuation of research with the existing high energy machines and also for the preparations for experiments on the new accelerator. The budget for Laboratory II which is in accordance with the expenditure profile agreed at the beginning of the 8-year project, includes a sum of about Sw.Fr. 11 million for services provided by Laboratory I.

Firm estimates for the following year were also agreed as well as a provisional determination for the year after.