



Viewpoint

Physics and Communications

'For scientific research, communication is essential. The results of research only become scientific when they are published.'

A formidable array of physics periodicals have been established on the basis of this viewpoint. As the number grew, secondary abstracts publications and even more advanced systems were introduced to cope with the 'information explosion'.

However, despite this increasing abundance of literature in physics itself, there does not appear to have been corresponding success in communicating understanding of physics to the public. It is not only clear explanation of the results of research which are required — a task well within the competence of many articulate physicists — but also imaginative portrayals of the operational effectiveness of the physics research system.

At the Second General Conference of EPS earlier in October, well-formulated Plenary Lectures captured some of the most fascinating work in European physics. Although the Conference received some coverage from television, radio and newspapers in Fed. Rep. of Germany, it proved impossible to focus the attention of the public on the most rewarding fields of physics, on the changing emphasis on the role of physics and physicists in society, and on the continuing interdependence of physics and technology. The almost complete disregard by the media and the subsequent lack of response by the public should be a clear danger signal which flashes throughout the European physics community. It is essential that communication with the public be extended effectively, so that an appreciation of physics becomes a more significant aspect of European culture. How else is the physics research system to obtain the public support so essential to its well-being?

Subnuclear physics and scientific culture

The Editor of *Europhysics News* reports on a visit to the International Centre for Scientific Culture, Erice, Sicily, on the occasion of the International School of Subnuclear Physics from 7-29 July 1972.

At the invitation of A. Zichichi, Director of the International Centre for Scientific Culture, the Editor travelled to Erice for two days. Apart from the technical content, the School presented the opportunity for students and lecturers to discuss the nature of science and its role in the world in an environment of history and beauty.

International Centre for Scientific Culture

Founded ten years ago, through the efforts of A. Zichichi, the Centre comprises 35 Schools, whose activities go on from March to October each year, and which range across the pure and applied sciences (including medicine and agronomy). Of these in 1972, no fewer than 18 courses aimed at the international scientific community. Amongst the most successful has

been the International School of Subnuclear Physics, directed by Zichichi himself, for which 400 applicants sought 100 places. The Centre sets out to attract the best lecturers and so can be highly selective amongst students.

Apart from the Schools with an international audience, the Centre has others in Italian for students from pre-university level upwards. All courses are sponsored by the Regional Sicilian Government, the Italian Ministry of Public Education, and the Italian Ministry of Scientific and Technological Research.

Zichichi, who is Director of the Centre and has acted as Chairman of the High Energy and Particle Physics Division of EPS, was quite willing for Erice to be considered an established site for Europhysics 'Summer' Schools. The recommendation for establishment of such sites was contained in the paper '**A Guide to Europhysics Conferences**' prepared by the EPS Advisory Committee on Conferences and published in *Europhysics News* 3 5 (June 1972) 1-4. The Quantum Electronics Division will hold their third course at Erice in 1973.

Erice is a quiet town situated on top of a coastal mountain and overlooks an extensive fertile plain and the Mediterranean Sea. It is easily accessible from Trapani airport or railway station, and by road and ferry from the Italian mainland. Although it is well off the main tourist circuit, Erice is magnificent and well worth a visit. Outstanding features are the two castles (Castle Venus and a medieval castle), the Cyclopean walls

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(partly Phoenician) and the fourteenth century cathedral. There are splendid beaches within driving distance.

High-lights in particle physics

The International School of Sub-nuclear Physics was the first to be set up at the Centre, and this tenth annual course from 7-29 July 1972 brought together 136 participants and lecturers from 24 countries.

The opening lecture on 'Some reflections on theoretical hadron physics, past achievements and future tasks' was delivered by L. van Hove (CERN), and the programme contained 6 theoretical lecture courses, 12 review lectures, 11 seminars on specialized topics, 3 estimates of the future of high-energy physics, and a round-table discussion on 'Why Science today?', before the closing lecture by E.P. Wigner (Princeton University) on 'What I have learned on the Course.' The preliminary reading for the Course included the Proceedings of the previous nine courses, which participants studied at the level suited to their own requirements.

The mornings were devoted to the lectures, whilst the afternoons were given over to discussions at which students were encouraged to benefit from the experience and knowledge of the lecturers at the School. The participants had the opportunity to compete for one prize for the 'best student' and for ten scholarships. The prize of Lire 100,000 was awarded to H.B. Thacker (Los Angeles) on the basis of quality of contributions to the discussions, on ability to follow the lecturers and on showing how much had been gained from the lectures.

The Proceedings of the School are to be published by Editrice Compositori, Bologna, Italy, under the title 'High-lights in particle physics'.

Non-military role of NATO

A number of students on the course had expressed concern about the fact that the School was supported by NATO. A Zichichi, Director of the School, agreed to a special session on 16 July at which they could put questions to I.I. Rabi (Columbia University and the NATO Science Committee). In his opening statement, Rabi explained that NATO had a cultural obligation to member states as well as a military role. He had been instrumental in persuading President Eisenhower that one aspect of culture that merited support was science. Subsequently, NATO set up a Science

Committee which had a brief to award Fellowships and to support Schools. Rabi had been with the Science Committee as the US representative since its foundation and had seen its activities grow so that now it supported no fewer than 60 Schools all over Europe each year. He was convinced that the five-million dollar budget was benefiting not only scientists in NATO countries, but also participants from other countries who were welcome to attend the Schools. Rabi also emphasized that he had hopes that the NATO Science Committee could have formal links with scientific bodies in other countries.

Then it was the turn of the students. Most of the ardent speakers feared that the Science Committee was being used to give NATO 'a human face'. However, Rabi did not consider it part of his brief to defend the military or political role of NATO and pointed out that its support for science could not be channelled into another organization.

Although the three-hour confrontation was largely repetitive and strongly emotional, two important facts did emerge: firstly, the younger physicists learned that senior scientists like Rabi were not simply tools of the military establishment but that they had come to terms with the fact that science and scientists were not independent of society, and that much research was carried out, in the first instance, only because of the possibilities of defence applications; secondly, it was learned that attendance by participants from some non-member countries was made more difficult because it was clear that the Schools were supported by NATO.

Why Science today ?

This round-table discussion on 17 July was led by I.I. Rabi, on the occasion of his seventy-fifth birthday. In his opening remarks, Rabi gave three basic reasons for the pursuit of science: firstly, the personal illumination that was obtained through scientific discovery; secondly, the release that the application of science through technology gave from drudgery; thirdly, the possibility that science would enable us to understand ourselves.

E.P. Wigner, who followed Rabi, believed that physics had already fulfilled the second of these purposes and that somehow it must justify its continued support by imparting enjoyment and pleasure to the public who must be persuaded to participate in its development.

G. Bernardini had reservations about these opening statements: on the one hand, he accepted Pauli's view that the aim of science was to find harmony in the universe; on the other hand, it was clear that intellectual pleasure was limited by intelligence, and one could only be pessimistic about the possibility of imparting it to the majority of the public. Also, Bernardini was disturbed at the tendency to emphasize the technological fruits of science, since this led the public to expect miracles instead of being informed of the facts.

That the confidence of science was an example to society was ample justification for its support in the view of S.D. Drell.

The Japanese member of the panel, Y. Nambu, was most concerned about the growing complexity of science.



In session at the International School of Subnuclear Physics. From left to right, the lecturers are: G. Salvini, W. Paul, K. Johnsen, W. Jentschke, A. Zichichi, S. Drell and J.B. Adams.



I.I. Rabi reminisces about his experiences as a young American physicist in Europe in the 1930s at the dinner to celebrate his 75th birthday in Erice.

After the inspiration of learning about its beauty, the scientist now faced frustration. Society was alienated by the complexity of science and the only hope was in simplification.

S. Fubini was even more sceptical than Bernardini about the possibility of public participation, since it was apparent that not only were the majority unable to gain intellectual pleasure from science, but the gap appeared to be widening.

In concluding the first round of contributions from the panel, Rabi stated that pleasure could be transmitted to the public by scientists who would be prepared to write good books for popular consumption. The type of argument that had persuaded the American government to support the Batavia project had been that of R.L. Wilson that science was a cultural venture that needed as much support from a strong society as art and literature.

their opportunity to address the question 'Why Science today?'. The first three speakers dwelt on the problems

of pollution, Vietnam, population growth and the loss of religion, for which they considered science was guilty either as the cause or by neglect. The impact of science for good or evil was obvious to another speaker, but it was egoistical for scien-

The students had listened to these views courteously, patiently awaiting the personal insight that it gave. According to several speakers whose children had recently entered school, one major drawback to a good image for science was the lack of understanding by teachers from the elementary school level upwards. Poor teaching and poor textbooks made science dull and boring. One fault was that science professors concentrated solely on the elite amongst university students and did not have contact with schools.

After such criticisms, it was difficult to disagree with the conclusion of Zichichi that there seemed to be a lack of enthusiasm for science amongst this generation of students. However, the fact that they were aware of the problems as well as the promise of science held out hope for a new realism to replace much of the unwarranted optimism and confidence of the past.

Future suggestions

In order to maintain and improve the high level of Schools at the Centre, Zichichi would be pleased to receive suggestions and offers of collaboration from physicists as well as from research workers engaged in frontiers other than physics. Further information may be obtained from the Secretariat of the Centre:

International Centre for Scientific Culture
Via Irnerio 46
I - 40126 Bologna (Italy).

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