Nearly 21 years ago, in December 1962, Viktor Weisskopf and Cecil Powell, then respectively CERN’s Director General and Chairman of the Scientific Policy Committee, called together a group of European high energy physicists to advise on steps to reach higher energy. The CERN PS had been in operation since 1959, its experimental programme was well established and the time had come to think of the future.

The Chairman of the group, which later took the title ‘European Committee for Future Accelerators’, was Edoardo Amaldi and his influential report, presented to the CERN Council in June 1963, reviewed the whole structure and possible development of the field in the CERN Member States. Its proposals included the construction of the Intersecting Storage Rings (ISR), and of a 300 GeV proton accelerator which was then envisaged as being the major facility of a second CERN Laboratory elsewhere in Europe.

The ISR project was then far in advance of its time and widely predicted to be ‘impossible’. The project was nevertheless approved and this still unique machine came into operation in 1971. It eventually exceeded its design specifications by a wide margin and remained top of the energy league until displaced by the SPS proton-antiproton collider in 1981. Approval of the 300 GeV project, later called the SPS, was however delayed and the European Committee was re-convened early in 1966, again under Amaldi, to review its recommendations. After this it met regularly and took the form it has today.

A few months ago I asked Amaldi about the years when ECFA was formed, and how he viewed its role today. The first point he stressed was that although created on an initiative from CERN, ECFA has from its beginnings been an independent body. Amaldi’s letter of invitation to the 1966 meeting explains that the Committee ‘...should represent the opinions... of the physicists of the Member States working in the field of high energy physics. Thus the collaboration with CERN is supposed to offer, besides technical and scientific suggestions, also constructive criticism.’

ECFA is not part of the CERN organization and this independence is essential to its role in presenting the views of the community on all matters relating to high energy physics in Europe. For example, an important item on ECFA’s current agenda is the future programme of research at DESY and the HERA project.

Another aspect of ECFA’s work, emphasized by Amaldi and very well illustrated by the reports of the Committee under his chairmanship, is the task of reviewing European high energy physics activities as a whole — not just the plans for future accelerators but also their utilization, the resources necessary in the universities to support experiments, and the character of the community itself. His reports covered the full spectrum of activities and set a pattern for those to follow. The most recent report in 1978 was prepared in the context of the proposal to build LEP and it will be updated in 1984.

ECFA has no formal links with Governments in the Member States and no budget; its only resources are the efforts and the enthusiasm of the members. Its main work is done by the members of the community in the Workshops and Meetings it organizes and sponsors. These studies are useful in themselves and may also lead to recommendations agreed by Plenary ECFA which carry, the authority of the community, influencing the Laboratories and the
Scientific Councils of Governments.

The major activity of recent years has been the thorough assessment of the physics potential and the feasibility of the LEP project. In close collaboration with the CERN team, these studies led to the main specifications of the design, including the optimization for beam energies of about 90 GeV (or approaching 120 GeV with superconducting r.f. cavities). ECFA brought many European physicists into these considerations, thus paving the way for a remarkably wide consensus within the community, which resulted in rapid approval — only one year after LEP’s first formal presentation to the CERN Council.

As part of the LEP studies, ECFA considered the development of high energy physics in Europe over the last decades of this century. It concluded that although the physics potential of LEP gave it priority as the next step, the range of fundamental questions to be tackled called for another new front-line machine in Europe. The next most attractive idea was the electron-proton collider proposed by DESY, and ECFA collaborated with DESY in a number of studies, culminating in the HERA proposal for a 30 GeV electron ring plus an 820 GeV superconducting proton ring, with four experimental areas. A Workshop on electron-proton physics was held at Wuppertal in October 1981, and in June last year Plenary ECFA again considered the proposal, in the context of a review of world-wide plans for accelerators, and confirmed its strong support for HERA.

Recently, the Minister of Science and Technology of the Federal Republic of Germany has taken a decision in principle that HERA should go ahead provided certain conditions are met, including a requirement that a share of the construction is borne by other countries. This is very welcome news and we must encourage our countries to join this first-rate enterprise while maintaining their commitment to CERN.

In today’s economic climate, less clement than in ECFA’s early years, the support for fundamental research like high energy physics is under great pressure in many countries and has declined in proportion to national wealth, rather than moving in parallel. But the high cost of high energy physics experiments makes long periods of ‘marking time’ difficult to justify. Progress, as recent events at CERN clearly demonstrate, demands better experimental equipment to use with existing machines, and new accelerators to bring new phenomena within range. Balance between investment and exploitation, construction and research becomes precarious and one of ECFA’s main tasks is to stand watch over this balance in Europe.

LEP was approved as part of the CERN programme under a constant annual budget. Part of this ‘package’ foresaw closure of the ISR which although overshadowed by the dramatic discoveries at the SPS proton-antiproton collider still has a unique programme. Its scientifically premature closure will be a sad consequence of today’s economic constraints. The CERN materials budget (which has not been held constant in real terms) is now under great strain. Manpower is also a serious limitation, and the recent decision of CERN Council to allow some recruitment to replace departing staff is very welcome. The squeeze which LEP construction is putting on the continuing research programme at CERN is sev-

ECFA father-figure Edoardo Amaldi whose influential report in 1963 paved the way for the future development of the European accelerator scene.
ere. Its effects are being amplified by the very health and vigour of the research, with several excellent proposals for SPS fixed target experiments and improvements to the proton-antiproton collider operation vying for support. LEAR is another novel application of CERN’s accelerator ingenuity bringing a lively new community of users to CERN. To match available resources, more very difficult decisions will have to be made.

Also, since more of CERN’s resources are needed for the accelerators, the CERN contribution to the LEP experiments will be less than a third of that typical for the ISR and SPS experiments. A greater share of the support for experiments will fall on the home institutions. In some ways this should be welcomed, since there has been a tendency to overcentralize detector development and construction at CERN. It does however put greater emphasis on the need for adequate technical and financial support in the universities and research institutes of the Member States. ECFA will review this as part of the 1984 survey.

Other current activities of ECFA range from the use of computers and networks to the accelerators of the far future. A series of Working Groups have been defining standards for a wide range of software and hardware used in data analysis and data acquisition. Copies of reports can be obtained from the leader of the Working Groups, Egil Lillestol at Bergen, or from Peggy Rimmer at CERN. Another aspect of this activity is a study aimed at linking the European high energy physics groups in a communications network, HEP-NET. This Group has a participant from each Member State; agreement has been reached on a number of tasks and work has started on a file-transfer protocol conversion which would allow file-transfers between CERNET and the Italian, Scandinavian and UK systems. (Information can be obtained from Mike Sendall at CERN.)

For the future, an energy range thought not long ago to be a featureless desert is blooming with all manner of exotic species and the theorists bemuse us with tales of great discoveries to be made beyond the TeV horizon, where clues to a superunification of the basic forces of Nature might be found. Even without these temptations, experimenters have to go and see. With 10 T magnets, a 10 TeV per beam proton-antiproton collider is an attractive long-term possibility for the LEP tunnel after the electron-positron programme. A ‘Desertron’, a larger ring in the American desert, might go somewhat higher but it is hard to contemplate the size and cost of a proton machine of significantly greater energy, and equally difficult to believe that more than 1 TeV could be reached in an electron-positron collider... unless a new way i

Constitution of ECFA

The members of Plenary ECFA, which normally meets twice a year, are chosen by the thirteen Member States of CERN and include a delegation from CERN itself. The meetings of Plenary ECFA are open and are also attended by observers from the European Science Foundation, the European Physical Society and two non-Member States: Israel and Finland.

On a smaller body, ‘Restricted ECFA’, one physicist represents each of the Member States and one represents the CERN physicists. It meets more frequently to discuss the affairs of high energy physics, to advise the Chairman on the work of ECFA and to prepare for the Plenary meetings. The Director General of CERN and the Director of DESY are ex-officio members of Restricted ECFA. Recently, Restricted ECFA has held more of its meetings in the Member States and has preceded them with a discussion meeting with members of the local high energy physics community.

The Chairman is elected by Plenary ECFA for a three year term, not normally renewable. Through the Chairman, ECFA has a voice on the CERN Council; he is an ex-officio member of the CERN Scientific Policy Committee (SPC) and Committee of Council, attends meetings of the Finance Committee, and advises the Director General. The Chairman has also been invited to attend meetings of the DESY Extended Scientific Council.

Since its formation by the IUPAP Commission for Particles and Fields in 1976, the International Committee for Future Accelerators (ICFA) has had three West European members: the CERN Director General, the Chairman of the CERN SPC and the Chairman of ECFA.
ing gradients from the present 10 MV/m or so (100 MV/m has been demonstrated) up to 1 to 10 GeV/m. This was the main topic of the ECFA-Rutherford meeting held last September in Oxford (see December 1982 issue, page 405). Ingenious ideas were described, but few were really new, and practical demonstrations of feasibility are far away. And if the challenge of reaching such energies is formidable, that of delivering the power to attain desirable luminosities seems greater.

The proceedings of the meeting are now available from Rutherford Appleton Laboratory or CERN, and ECFA invited European scientists who are working in the field, or who are interested in starting, to a short meeting at Trieste on 1 June following the 'Workshop on Laser and Collective Accelerators', which the International Centre for Theoretical Physics organized on 31 May and 1 June. If we, or, rather, our children, are to look beyond the several TeV horizon some effort must be put into this research; we must encourage more scientists to become involved in this very challenging physics and build collaborations with other areas of research such as plasma and high power laser physics. We must also attract and train young physicists who will take over from the present ageing population of experts. A new initiative, which ECFA is strongly supporting, is the proposal by CERN to establish a School in accelerator physics. The idea is to give this a European-wide framework, with courses at CERN and other Laboratories, and to provide lecturers for universities. A small group, led by Kjell Johnsen, is now drawing up plans for this new venture, which should help to produce the physicists to devise and build the really high energy accelerators of the future.

On 18 March, a superconducting quadrupole was installed at position A-49 in the Fermilab Main Ring tunnel to complete the magnet installation for the new Energy Saver/Doubler ring which threads through the supports of the conventional magnets of the existing Main Ring. The Saver/Doubler ring now has 774 dipoles and 216 quadrupoles and will eventually have 204 control spool pieces. Subsequent recommissioning of the Main Ring and Saver/Doubler tests went well. On 16 April, Sectors E and F of the Saver (one-third of the ring) were powered to 2200 A, equivalent to 500 GeV. The next day, the Main Ring was in action for the first time in nearly a year. Beam was taken to 150 GeV, the injection energy for the Saver.

On 22 April, beam was injected from the Main Ring into the Saver at the E0 straight section. By the following day, a low intensity beam had been transported one-third of the way round the ring to a temporary beam dump. Fine tuning in both rings will continue, but the next major milestone will be completion of Saver installation so that full turns can be attempted.

In this one-third ring exercise, no quench problems were encountered. The fields and alignments of the superconducting magnets required little correction. The new beam position and loss monitoring systems were tested for the first time and worked beautifully.

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