

30th Session of CERN Council

As briefly reported in the July issue of *CERN COURIER*, delegates from the 13 Member States of CERN met at the laboratory on Wednesday and Thursday, 16 and 17 June, for the 30th Session of the Council of the Organization, held under its President, Mr. J. H. Bannier, of the Netherlands.

News of the two most important decisions taken during this session was also given in last month's issue. As usual, a brief survey of the current state of CERN was given by the Director General, Prof. V. F. Weisskopf, in presenting the Progress Reports of its Divisions (for the period November 1964 to May 1965), and various detailed points concerning the running of the Organization were discussed or given formal approval. Most of the session, however, was devoted to the future of sub-nuclear physics research in Europe, and it was in this context that the decision was taken to support the construction of intersecting storage rings for the CERN proton synchrotron.

Progress Reports

Presenting the half-yearly Progress Reports of the Divisions*, Prof. Weisskopf remarked first of all on the new technical equipment of the laboratory, especially the 2-m liquid-hydrogen bubble chamber and the radio-frequency particle separator, as well as the large new computer, which had been installed and was in use although it still lacked the full time-sharing system necessary for its proper use.

Turning to the research results, Prof. Weisskopf noted that there was a new excitement in this field of physics. New ways of looking at the evidence presented by experiment were beginning to evolve and there seemed to be a better understanding of the facts. The symmetry theory known as SU_6 , together with its various developments, was characteristic of this new feeling and the theoretical physicists at CERN had made important contributions. One of the consequences of the new way of looking at things was the possibility that all the many mesons (including 'resonances') discovered in the past few years might in reality be only one, seen, as it were, from different viewpoints.

Experimentally, the discovery at CERN of a new meson resonance having an electric charge of two units and a 'strangeness' of two units provided striking proof that our previous ideas on the nature of 'elementary particles' were insufficiently developed. Another experiment, made possible by the development of new techniques enabling very small angles of scattering to be measured, had shown the existence of diffraction patterns in the scattering of high-energy protons from the nuclei of various atoms. In the study of the so-called 'weak' nuclear interaction, the experiment on antineutrino interactions, for which the accelerator run was carried out in May, practically completed the present phase of CERN's neutrino programme, although

preparations were in hand for the next series of experiments under improved conditions. Another CERN experiment on the effects of the weak interaction had lent strong support to the idea that the basic laws governing the interactions of nuclear particles might after all depend on whether time was measured forwards or backwards — requiring a fundamental change in our thinking on these matters —, and a whole new series of experiments was beginning here and in other laboratories.

Prof. Weisskopf also mentioned the work on the structure of atomic nuclei that was being carried out with the help of the synchro-cyclotron. Since it was decided to do more experiments of this kind, supplementing the sub-nuclear investigations using both the CERN accelerators, much interest had been shown among laboratories in the Member States and there had been many proposals for experiments. Some interesting new developments, such as the measuring of the electric quadrupole moment of various nuclei and the discovery of a new excited state of helium, were coming out of this work.

Internal Organization

The Director General was followed by the Directorate Member for Administration, Mr. G. H. Hampton, who gave a short account of the changes that had been made in the internal organization of CERN over the last year or two, as a result of continued expansion and in the quest for greater efficiency. As an example, incorporation of the Purchasing Office into the Finance Division had meant, among other things, that it was no longer necessary to have two largely overlapping staffs for accounting control. At the same time, purchasing officers were being appointed to serve with the various Divisions, so as to achieve a better co-ordination between individual needs and the benefits of bulk ordering. In the Finance Division as a whole, an overhaul of the 'paperwork' was taking place and an 'organization and methods' officer had been appointed. As well as the new purchasing system, a similar arrangement was being tried with the stores, that is, a large central store supplemented by smaller, more specialist stores where required, and a stores manager had been appointed to co-ordinate the whole. Personnel-record methods were being 'mechanized', and the budget coding system was being changed so as to provide better accounting statistics. In this connexion, the labour cost of jobs carried out in the workshops would now be charged to the Divisions concerned, instead of appearing separately in the Budget, and it was hoped that this would also lead to a better balance between work carried out inside CERN and that outside.

Finally, Mr. Hampton mentioned the efforts being made in the field of social welfare, especially in respect of housing and other facilities for the very large number of transient staff. CERN was also taking the

* CERN/587

initiative in helping to solve, or at least ameliorate, the various local problems that had begun to take on a more acute form.

Future Programme

Once again at this session, the delegates devoted special attention to a discussion of the proposals for Europe's future activities in the field of sub-nuclear physics research. These proposals, it will be recalled, are in the form of a three-point programme comprising two major new projects — intersecting storage rings as an extension to the present CERN synchrotron and a new 300-GeV accelerator — as well as a series of improvements to the present CERN facilities.

Intersecting storage rings

The first part of the programme to be discussed by the Council was that concerning the storage rings. After an introduction by Mr. Bannier, Dr. Schulte-Meermann (Federal Republic of Germany), Chairman of the Finance Committee, reported on the progress that had been made in defining the procedure to be followed for the establishment and control of the supplementary programme needed for the construction of this major addition to the CERN facilities, particularly as it affected cost control and the relationship with the normal activities and budget. Although final agreement had still not been reached on some points, it was felt that this was only a matter of time and should not act as a deterrent to any decision of principle.

Sir Harry Melville, speaking for the British Delegation, then said that he was glad to be able to announce that the United Kingdom would be pleased to participate in the project and to have this further opportunity of co-operating with its partners in CERN. After Dr. Funke had added Sweden's support, the proposal for the approval in principle of the undertaking was adopted without dissent by the Council*.

This decision, according to Mr. Bannier, will assure the future of CERN-Meyrin, for many years to come. He thanked all those in CERN who had worked on the design and also those in the Council and its Committees, the Government authorities concerned, and others, who had made the decision possible.

Prof. Weisskopf also thanked the Council for their demonstration of confidence, interpreting the decision not only as one of confidence in the intersecting storage rings as such but also in the future of high-energy physics in Europe.

As previously indicated, it is expected that the number of Member States that will actually participate, as well as the first year's budget and the start of construction, will be decided at the next meeting of the Council, in December.

RESOLUTION ON THE ISR PROJECT

THE COUNCIL,
having examined document CERN/542 (Report on the design study of intersecting storage rings (ISR) for the CERN proton synchrotron);

understanding, at its Thirtieth Session, that many Member States wish in principle to undertake such a project;

being of the opinion that the project proposed in document CERN/542 is a supplementary programme in accordance with the terms of the Convention;

considering that any supplementary programme shall require approval by a two-thirds majority of all the Member States of the Organization;

APPROVES in principle the undertaking, by the Member States who wish to participate, of such a supplementary programme for the construction of intersecting storage rings;

AND SUBMITS this programme to Member States for consideration and for appropriate decision in Council at its Thirty-first Session by those Member States agreeing to contribute financially.

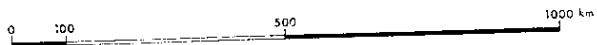
300-GeV accelerator

Turning to the new large proton synchrotron that it is hoped will be built in Europe within the next ten years, the Council received the report on the official offers of sites that had been made by Member States up to the closing date. The response to the request for offers had turned out to be greater than expected, and altogether seventeen proposals, coming from all the Member States except Denmark, Holland, Greece and Switzerland, were available for evaluation (see map on p. 119).

In the course of a preliminary discussion on ways in which criteria for evaluating the sites could be laid down, it was brought out very clearly that this is a European project and not one of CERN alone. In fact it is probable that if European Governments decide to build the accelerator, a new organization, (perhaps covering both the new Laboratory and CERN-Meyrin) will be set up for the purpose. Mr. Bannier pointed out in the discussion that the CERN Council could study the many problems of site selection but could not make any decisions that would be binding on any new body. It was agreed that a comprehensive report on the site offers, from a purely technical point of view, should be submitted to the Council and that the Steering Committee for the 300-GeV project should consider further the question of the way in which a final choice could be approached.

The map opposite shows the location of the sites proposed by the Member States of CERN for a 300-GeV accelerator.
(Ref. : CERN/SIS/R/10899)

* For more information, see CERN COURIER, vol. 5, p. 99, July 1965.



Basic programme of CERN

The third part of the future programme concerns the development of the existing CERN facilities. On this point, the Director General put forward detailed scientific proposals and analysed their financial implications. The proposals, which were first worked out during 1964, call for improvements in two stages. In the first of these, scheduled to be completed before 1969, the intensity of the proton synchrotron would be effectively improved by increasing the pulse repetition rate, the instrumentation for normal experiments and for neutrino research would be increased (the additional equipment including the proposed new bubble chamber, 'Gargamelle', to be built by France), and the experimental areas would be slightly enlarged. The second phase would involve a new injector for the synchrotron, bringing the overall increase of intensity up to a factor of ten, and a 5-m liquid-hydrogen bubble chamber. If carried through, the improvements included in the first phase, in particular, would put the laboratory in a very strong position, technically, compared to similar laboratories elsewhere, at a time when comparable or more ambitious improvements to other accelerators would still be uncompleted.

Unfortunately, such plans cost money. Together with the expected small growth in utilization, and hence cost, of the present facilities, they would lead to an average growth in CERN budgets (excluding those for the storage rings) of about 11 % per annum, up to 1971. However, in order to keep to the proposed time scale the increases in the first few years would need to be rather higher, and although most Member States appeared to be ready to consider supporting the whole programme, several of them would find it more difficult to approve the growth rates in their contributions that would be needed to get the programme started quickly.

Strong support for the Director General's proposals by the Scientific Policy Committee was expressed by its Chairman, Prof. L. Leprince-Ringuet, who also under-

NEW APPOINTMENTS

Apart from the appointment, as from 1st January 1966, of **Prof. B. P. GREGORY** as Director General of CERN in succession to Prof. V. F. Weisskopf, the Council also approved the following:

- **Dr. G. Ross MACLEOD** as Leader of CERN's Data Handling Division;
- **Dr. Kjell JOHNSEN** as Leader of the new Division that will be set up to carry out the project for intersecting storage rings.

Dr. Macleod is of British nationality and has already occupied the post *ad interim* since September 1963, in the absence of Prof. L. Kowarski, who has been on leave as Visiting Professor at Purdue University, U.S.A. Dr. Johnsen, a Norwegian, has been one of the Leaders of the Accelerator Research Division (see *CERN COURIER*, vol. 3, p. 52, April 1963) and is presently Head of its Study Group on New Accelerator Projects.

- **Prof. L. KOWARSKI**, who returned to CERN in June, has been given responsibility for the performance and guidance of studies, in a longer-term perspective, on data processing as well as on the related problems of communication and collaboration between central laboratories like CERN and the outside groups that use their facilities. Since the scope of these problems is wider than can be handled within the framework of a single CERN Division, Prof. Kowarski will belong administratively to the Directorate staff.

lined the specific cuts and delays that would be needed if the money could not be provided. However, to allow more time for consideration of the various points that had been raised, a decision on the provisional budget figures for 1967 and 1968 was deferred until the next meeting of Council. The overall budget total for 1966, amounting to 142 million Swiss francs at 1965 prices, was fixed previously by the Council at its session in December 1964 ●

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¹ First day

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BOOKS

The boundaries of science, by Magnus Pyke (Harmondsworth, Pelican Books Ltd., 1963; 4s. 6d.), is an essay in the philosophy of science rather than a 'popular science' book of the usual kind. Instead of explaining a particular scientific topic it sets out to show something of what science itself is, using examples drawn mainly from the fields of chemistry, physics, biology and astronomy. On the whole, it fulfils this task extremely well, and the book can be read with profit not only by the 'layman' but by many scientists and engineers who have become a little lost in the day-to-day progress of their own speciality.

The author, a biochemist and director of a large industrial research station, begins by denying the short dictionary definition of science as 'ordered knowledge' and substituting for it 'a way of thinking'. Science, he believes, comprises two main tenets; the first has three parts — the collection of facts, the construction of hypotheses, and the selection of further observations to test the hypotheses; the second is the assumption that the universe is a systematic and ordered place and that every observation is eventually capable of rational explanation.

One of the legacies of the former view of science has been its sub-division into the branches of physics, chemistry, biology, etc., but more than sufficient evidence is given in the first chapter of this book to show that such sub-divisions are no longer tenable. Even professional specializations, although usually narrower in scope, cut across the former boundaries.

In the second chapter, the author shows how modern chemistry falls much more naturally under the old heading of physics, even if the chemist still has to learn his own

particular trade, and physics itself is taken up in the following pages. Is biology chemistry?, the author then asks, and proceeds to prove that in many respects it is — but as chemistry it is therefore physics! A common link in all three subjects is the concept of energy, and the next chapter deals with this in its various forms.

If this first half of the book is concerned more with a much needed re-interpretation of established ideas, the second part goes further into the realms of philosophy. The chapter on 'evolution: animate and inanimate' introduces the idea that our present way of thinking about science represents an evolutionary advance, compared with the attitude of Galileo's time, for instance, and goes further to suggest that higher evolutionary steps may be in store. This leads the way to a discussion of the brain as an electronic machine, in the course of which an important distinction is made between 'reflex' actions, which can also be done by electronic computers, and the seeing of new and unexpected purposes, of which only brains are capable. This kind of distinction, between the careful routine of applied science for instance, and the flash of intuition of a Newton, an Einstein or a Heisenberg, is brought more than once into the book.

The traditional 'layman's' idea of science as something exact, with predictable applications, is further undermined in the next chapter, which deals with the lack of precision inherent in words, or even in numbers, the difficulties of ascribing an exact cause to a particular event, the corresponding ease of drawing wrong conclusions because of preconceived notions, and the ideas of statistics. The subject of astronomy is then used as an example to carry the argument forward, concluding with an interesting commentary on the true nature of science: 'Astronomers are not

This photograph gives a general idea of the scintillation-counter lay-out for the SC experiment on the scattering of polarized protons reported on p. 116. The polarized-proton target is hidden by its magnet (marked PT 1); incident protons reach the target through apertures in the concrete shielding (foreground) and the magnet yoke. Protons scattered to the right at any one of eight chosen angles are detected by means of coincidences between the signals from the corresponding pair (one behind the other) of plastic scintillation counters, clearly visible; absorbers between some of the pairs are for energy measurements. To the left of the target can be seen a long plastic scintillation counter, with two photomultipliers, of the type mentioned by Prof. Cocconi in last month's CERN COURIER (p. 105). Protons recoiling from the target travel in this direction and the position of each one as it strikes the counter is measured, thus defining its direction of travel. In this way each scattered proton can be associated with its corresponding recoil proton, separated from the general background. Other counters in the background are used in lining up the beam. G. Goignet is adjusting the counter on the left and J. Monmejat is at the back.

CERN/PI 97.7.65

