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The character and aims of the Organization are defined in its Convention as follows:

'The Organization shall provide for collaboration among European States in nuclear research of a pure scientific and fundamental character, and in research essentially related thereto. The Organization shall have no concern with work for military requirements and the results of its experimental and theoretical work shall be published or otherwise made generally available.'

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The cover photograph shows one way to keep cool during the summer hot weather (though it was in fact taken last winter!). Outside the East bubble-chamber building of the proton synchrotron, liquid nitrogen is being pumped from the large railway tanker in which it is delivered to one of the containers in which it is stored at CERN. These, constructed like giant thermos flasks, hold some 9000 litres of the liquid, which is at a temperature of -196°C . A cloud is formed by the condensation of water from the air, cooled by the liquid flowing through the pipe. Among other uses, liquid nitrogen plays an important part in the operation of liquid-hydrogen bubble chambers, where it provides cooling for heat shields placed between the very cold chamber and the vacuum tank, which is at room temperature. It is also used as a cooling medium in the hydrogen refrigerator.

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Roger Anthoine

Editor :
Alec G. Hester

Assistant Editor :
Frédéric C. Maurer

CERN, 1211 Geneva 23, Switzerland
Tel. 41 98 11

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Last month at CERN

In the second half of June, the **British National Hydrogen Bubble Chamber** successfully came into operation in the East bubble-chamber building of the CERN proton synchrotron. Although on two previous occasions the preliminary 'technical' runs had shown up defects which (though relatively minor) had meant postponing actual operation, this time everything went much more smoothly. Before the end of the first week, which had been allotted only for tests, several thousand photographs were accumulated for physicists in Durham and Turin, and the chamber's first scheduled experiment began the week after. Some reward could at last be seen for the many months of hard work, both by the British team in charge of the chamber and by those in CERN's Track Chambers and other Divisions who had co-operated to assemble the equipment here and carry out the various modifications that were found to be necessary.

This new liquid-hydrogen bubble chamber is the largest so far operated in Europe. By convention, its size is given by reference to the length of the actual liquid-hydrogen container, which is aligned with the direction of the incident beam. Although usually known in CERN as the 150-cm chamber, the British chamber in fact has a length of 60 inches, equivalent to 152.4 cm (that is, at room temperature; about 0.6 cm less at the operating temperature of -246°C).

The chamber was built by the collaborative efforts of three British universities (Birmingham, Liverpool and London), the Rutherford High Energy Laboratory and the Department of Scientific and Industrial Research, at a cost of about £1 million (12 million Swiss francs). This cost also covers the development of automatic film-analysis equipment, of the Hough-Powell type, for seven British universities.

Earlier in the month, the final machine runs were made for the second phase

of the **neutrino experiment** at the CERN proton synchrotron. One of the decisions taken by the Nuclear Physics Research Committee at its meeting on 10 June was to cancel the two weeks' run provisionally scheduled for next August (see *CERN COURIER*, vol. 4, p. 60, May 1964) and in fact not to schedule any further runs during 1964.

Several thousand new photographs of neutrino interactions have been collected in the recent runs, both with the bubble chamber and the spark chambers, and it will take some time yet to analyse the findings satisfactorily. In addition, it had already been planned to **enlarge the CERN heavy-liquid bubble chamber**, and work on the actual rebuilding can now go ahead. The chamber was removed from its concrete enclosure in the South hall on 7 July and transported to the newly finished extension of the NPA building (no. 162) for dismantling. The new chamber body will have a volume of 1200 litres, more than twice that of the present chamber, and a fiducial volume (that part within which an interaction has to occur in order to be certain of providing sufficient information for analysis) nearly three times greater than previously. This will be especially valuable for experiments with antineutrinos. The greater volume entails also the lengthening of the magnet by 21 cm, with the mounting of three additional coils. Work is also progressing on various modifications to the illumination system, the expansion equipment and the temperature-control circuits.

During the last neutrino run, a successful pilot experiment **combining spark chambers with nuclear emulsions** (expt. E49) was carried out in the neutrino beam. The idea of this is to use the high resolution of the emulsion technique, to obtain greater accuracy of measurement, while retaining the discrimination against background afforded by an array of spark chambers triggered by electronic counters. Each set of tracks

arising from a neutrino interaction in the emulsion stack must be associated with particular tracks on one of the spark-chamber photographs, and it was to test the feasibility of finding such correlations that the pilot experiment was carried out, using a 10-litre stack of emulsion. Its success points to other interesting applications, for example the study of cascade particles produced by negative kaons, in which the interaction producing the cascade particle would be found by tracing back into the emulsion the track of the associated positive kaon appearing in the spark chamber as a result of selection by the triggering system.

At the same time as the 152-cm chamber was going into operation, the **81-cm Saclay/École Polytechnique liquid-hydrogen bubble chamber** began a new series of runs in the k_4 beam in the North experimental hall of the proton synchrotron. This beam is of separated kaons, of momentum variable between 0.6 and 1.2 GeV/c, or of separated anti-protons between 0.6 and 1.4 GeV/c. The chamber will be operated either with liquid hydrogen, in which case all the target nucleons are protons, or with liquid deuterium (heavy hydrogen), which provides equal numbers of protons and neutrons.

Six counter experiments and two emulsion experiments were also in progress during the month, apart from the usual exposures for nuclear-chemistry experiments and various calibration measurements.

Prof. V. F. Weisskopf, CERN's Director General, was one of the members of the Scientific Council of the **International Centre of Theoretical Physics** at Trieste who met for the Council's first session in Vienna on 28 May. The other members are Robert Oppenheimer, Professor of Physics and Director of the Institute for Advanced Study, Princeton, U. S. A., Manuel Sandoval Vallarta, Professor of Physics and Member of the Nuclear Energy Commission of Mexico, and Abdus Salam, Professor of Theoretical Physics, Imperial College, London, and Director of the Centre.

The main purpose of the Centre, established by the International Atomic Energy Agency in June 1963, is to foster, through training and research, the

TERAPROTONS AT THE PS

On 29 July the intensity of the circulating beam in the CERN proton synchrotron reached, for the first time, 10^{12} (a million million) protons per pulse. Adopting the next prefix in the series kilo-, mega-, giga-, etc., engineers at the PS are now talking of their intensity in terms of the 'teraproton'. This intensity is a hundred times greater than the design figure.

advancement of theoretical physics, with special regard to the needs of developing countries. Its range of interest will be broader than that of the Theoretical Studies Division at CERN, embracing solid-state physics and low-energy physics, among other things, as well as high-energy and elementary-particle physics. The Centre will be inaugurated by a Seminar on Plasma Physics, which will be held from 5 October to 15 November.

In addition to having its Director General as a member of the Council, CERN will collaborate with the Trieste Centre by a periodic exchange of scientists and by encouraging its experimental physicists to accept invitations to lecture in Trieste on their work.

Also in Vienna, Prof. Weisskopf and Mr. G. H. Hampton, Directorate Member for Administration, were among the many participants in the **Second Scientific and Parliamentary Conference** held there from 23 to 27 May. This conference, a successor to the one held in London in 1961, brought together members of parliament and scientists from 20 different countries and many international organizations to discuss the complex problems that arise between those who are responsible for scientific progress and those who, in large measure, are responsible for paying for it and using its results.

At about the same time it was announced that **Prof. Weisskopf** had been elected as Foreign Corresponding Member of the Austrian Academy of Sciences. In Geneva, on 5 June, at a ceremony in the hall of the University, he was awarded the degree of Doctor honoris causa, a recognition not only of Prof. Weisskopf's high position in the world of science but also of the close ties that bind the University of Geneva to CERN. In recent months Prof. Weisskopf has also received honorary degrees from the University of Uppsala (Sweden) and Yale University (U. S. A.).

At its 184th annual meeting on 13 May, in Boston, the American Academy of Arts and Sciences elected among its Foreign Honorary Members, Prof. **Léon Van Hove**, leader of the CERN Theoretical Studies Division.

At the CERN Council meeting on 19 June, Dr. **Giorgio Brianti** was appointed Leader of the Synchro-cyclotron Machine Division, in succession to Dr. Pierre Lapostolle who, as announced previously (*CERN COURIER*, vol. 4, p. 47, April 1964), is now in charge of a group in the Accelerator Research Division.

Dr. **G. Ross Macleod** was appointed acting Leader of the Data Handling Division, confirming, in effect, the position he had occupied since last September, when the Division leader, Dr. **Leu Kowarski**, went to Purdue University (U. S. A.) as a Visiting Professor. Dr. Kowarski (who, incidentally, was made 'Officier de la Légion d'honneur' by the French Government earlier this year) came back to CERN after the termination of the academic year at Purdue, but will return there for another nine-month period starting in September next.

For the election of this year's Chairman of the CERN Staff Association Committee, many nomination forms were received but they all carried the same name, that of last year's Chairman, **Guy Vanderhaeghe**. Since no other name was put forward, Dr. Vanderhaeghe, who is Head of the Training and Education Section (see *CERN COURIER* vol. 3, p. 155, December 1963) was declared elected.

On 22 June, CERN was visited by Prof. **D. Gjaerevoll**, Norwegian Minister for Social Affairs. With him were Mrs. R. Sewiriin (a Member of the Norwegian Parliament), Mr. B. Skall, Mr. S. Chr. Sommerfelt (Norwegian Delegate to CERN Council) and Mr. T. Ibsen (Adviser to the Norwegian Delegates) ●