

and record the passage of several charged particles at once and provide the required data directly in electronic form.

The chamber which has been installed has a sensitive area of 80 x 100 cm. It consists of two planes of parallel wires; one pulsed at a high voltage (5 kV) and the other earthed. When a charged particle passes through, it causes ionisation along its path in the gap between the planes and a spark is formed, on application of the pulse, at the track of the particle. Currents then pass in the wires where the spark occurs.

This chamber detects the currents using 'magnetostrictive read-out' — employing the magnetostrictive property of a ferromagnetic wire (in this case nickel). The wires of the parallel plane cross at 90° to the nickel wire. When there is a current in one of these wires, it passes over the nickel wire and the magnetic field associated with the current causes a distortion in the nickel wire which travels along it at the velocity of sound. At the end of the wire the distortion is detected by a 'pick up' coil, thus giving the time between the creation of the distortion and its detection, which is proportional to the position of the spark. (Another method, called core read-out, is also being pursued in connection with wire chambers.)

Work on wire chambers of the magnetostrictive read-out type was initiated at CERN by G. Brautti who carried out some tests with a chamber on the SC. Development of the chamber and the electronics to be used in the PS experiment was done by M. Bott-Bodenhausen and B. Friend, members of the Vivargent group.

Appointments

At a meeting on 8 March, the Scientific Policy Committee elected Professor G. Puppi to the post of Chairman of the Committee in succession to Professor L. Leprince-Ringuet. The SPC is the major authority which makes recommendations to the CERN Council on matters of scientific policy. It consists of a small number of members (11 in 1966, plus 4 ex-officio) selected for their scientific merit.

After the election of Professor B. Gregory as Director-General of CERN, Professor Leprince-Ringuet informed the CERN Council that he would not seek re-election as

Chairman of the SPC since he considered it better that the Director-General and the Chairman should not come from the same scientific background. The two Professors had been in close association during their scientific careers (See CERN COURIER, vol. 6, no. 2 (February 1966) p. 28).

Professor Gianpiero Puppi was born in Bologna in 1917. In 1950, he was appointed to the chair of theoretical physics at Naples University. From 1953, he has been Professor of higher physics and Director of the physics institute of Bologna University. In September 1962, Professor Puppi was appointed Directorate Member for Research at CERN, a post he held until the end of 1963. A detailed biography can be found in CERN COURIER, vol. 3, no. 10 (October 1963), p. 129.

Professor J. S. Bell has been appointed Deputy, ad interim, to the Leader of the Theoretical Study Division.

News from the USA

The USA Atomic Energy Commission asked the National Academy of Sciences to investigate 85 sites from the more than 200 put forward for the proposed 200 GeV accelerator. Using eight teams, this investigation was completed by 3 December 1965 and the results were presented to the NAS Site Evaluation Committee (under the Chairmanship of Dr. Piore). Five or six sites are expected to emerge shortly from this stage of the decision and the AEC Commissioners themselves will take part in the examination of the last few sites. The final choice is expected to be made in a few months' time.

The AEC has asked the Berkeley design team to look again at the possibility of reducing the costs of the machine (the present design estimate is \$348 million). Several suggestions, based on developments at lower energy machines, such as the Brookhaven AGS, have been put forward but the idea of building the accelerator in this way was rejected in the Ramsey Report which recommended the 200 GeV machine. However the Joint Congressional Committee on Atomic Energy has asked the AEC not to present its case for authorization until the cheaper possibilities have been explored again. A

decision about authorization of the project seems to have been put off for a further year.

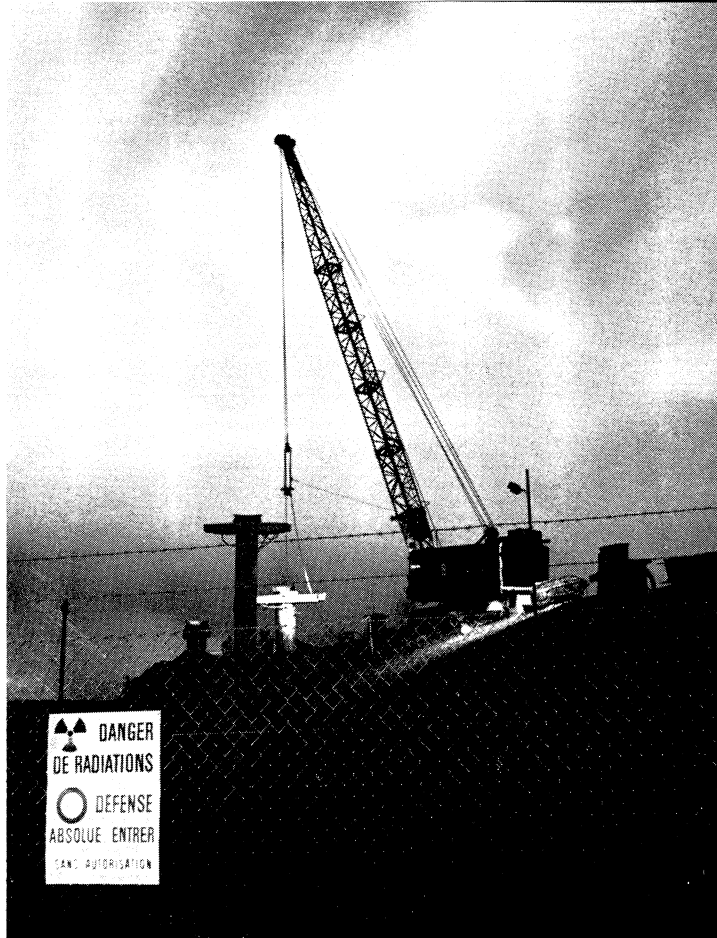
The Universities Research Association Inc. (URAI), which was set up in the summer of 1965 by 34 University Presidents, has offered its services to the government as 'contracting agency' for the construction and operation of the 200 GeV accelerator. This is an extension of the principle of University management of very large government supported projects which has worked well at Brookhaven (operated by Associated Universities Inc. — an association of 9 Universities).

Construction of the 2 mile long, 20 GeV electron linear accelerator at Stanford is nearing completion. Manufacture of the beam tube, a 4 in diameter copper pipe which is installed 25 ft underground, is complete. The original estimate of funds for the project, \$114 million still appears to be adequate. It is hoped that the first electron beams will be achieved in May.

\$450 000 has been made available to the University of Utah by the National Science Foundation for a natural neutrino research project. J. W. Keuffel leads the research team. The detection equipment will be located in a laboratory 1000 ft underground and construction is now under way.

Money has been provided for design work on a 'meson factory' at the Los Alamos Scientific Laboratory. The eventual project involves a linear accelerator 2000 ft long to provide a proton beam at 800 MeV with an average intensity of 1 mA. The cost of the project is estimated at \$55 million.

A radiofrequency separator, developed by H. Hahn and H. Halama, has been brought into operation at the Brookhaven 33 GeV synchrotron. The separator is used in a beam line which supplies kaons at a momentum of 12.8 GeV/c to the 80 in hydrogen bubble chamber. On average 10 kaons reach the chamber together with one unwanted muon. The separator consists of two 10 ft r.f. deflectors separated by a drift space of 130 ft. The beam line will be used for studies using kaons, antiprotons and pions in the momentum range 7 to 18 GeV/c. (For information on the principle of operation of r.f. separators and of the separator first used at CERN at the beginning of 1965, see CERN COURIER, vol. 5 no. 3 (March 1965) p. 35.)



Health Physics

by **J. Dutrannois**
Health Physics Group

There are radiation sources of all kinds on the site. Some are classical, such as the radioactive isotopes used to calibrate detectors, and those arising from the induced activity created during the operation of the accelerators. The latter, however, are rather different from those encountered in conventional nuclear industry, because complex families of isotopes are formed by the spallations due to high-energy particles, and the activity may be distributed inside the activated materials.

Finally, there is the radiation which comes directly from the machines when they are in operation, through the shielding, or from the experimental areas where there are secondary beams or extracted proton beams. The nature and energy distribution of this radiation varies from place to place and varies with the mode of operation of the accelerators. Moreover, the situation is a very special one, since the types of radiation encountered, and their energy, are found only at high-energy accelerators; this radiation is emitted in the form of low-frequency pulses in the case of the PS, which further increases the problems of detection. If one remembers in addition, that it is necessary to monitor the possible radioactivity of all machine components from the region of the beams, and also that there is a staff of over 2 000 to be monitored, it is easy to understand the increased importance of the work of the Health Physics Group.

At present it has 30 members, including seven physicists and many specialized technicians, and has 'feelers' at various crucial points in CERN. Its essential task is to know at all times the radiation level all over the CERN site, which entails constantly making a whole series of measurements. This exact knowledge of the

situation is communicated to the various responsible people and assessed by the group, which then gives advice as to the precautions to be taken to reduce the irradiation of staff, and the contamination of laboratories, to a minimum. A check has then to be made to ensure that these precautions have been taken and that they are as effective as predicted; the actual dose received by each member of the staff also has to be checked.

Methods and instruments

In order to estimate the radiation hazard, the radiation level must first of all be measured. The possible danger is of a type which man cannot feel or even suspect.

For classical radiation (from radioactive sources, whether natural or artificial, and from induced activity which is mainly found in the vacuum chambers of the accelerators during shut-down for maintenance or repairs) use is made of instruments and techniques which have been known for a long time (ionization chambers for on the spot measurements, and Geiger-Muller, proportional, or scintillation counters for measuring samples, dust, etc.) But, since the radiation produced when the accelerators are working is complex and of very high energy, it has proved necessary to develop new methods and instruments.

Measurement of the energy absorbed by living tissue can be made independently of the energy or type of radiation, by using the tissue-equivalent (TE) ionization

1. 'The Health Physics Group'. B. Wheatley, CERN COURIER 1960, 13-14.
2. 'Radiation Safety at CERN', J. Baarli, CERN COURIER, vol. 2 no. 1 (January 1962).