

To celebrate the measurement of the millionth bubble chamber event on the CERN HPDs we escape from the usual photograph of the machine or of an event and show instead a group of HPD pioneers captured on film at a meeting in 1960. Left to right: D. Maeder, H. Lipps, W.G. Moorhead, L. Kowarski, S. Nilsson, T. Lingjaerde, R.K. Böck, M. de Baets, F. Grard, L. Montanet, J. Derado, B. Aubert, P.V.C. Hough, D. Wiskott, B.W. Powell and Y. Goldschmidt-Clermont.

CERN machines measured 210 000 events from the 2 m chamber plus 65 000 spark chamber events in 1971.

The second session concerned the development of 'Minimum Guidance' systems. The only laboratory currently using this for physics is Amsterdam (60 000 events measured with reasonable success), although some other Laboratories are developing systems or have new ideas.

The session on large chambers grouped technical papers from several Laboratories on digitizing electronics. Test samples from the Argonne 12 foot chamber and from Mirabelle are being used to try out the systems. The conclusion was that, despite different approaches (some using lasers and some not), such film is digitizable on HPDs. There was no paper on software for track recognition. New geometry methods are being used on the first Mirabelle film, they await a large flow of events to be fully tested.

The meeting was a useful means of making contacts and exchanging information and was well and hospitably organized by Saclay. It is hoped to publish the papers early next year.

SKYLAB inaugurated

On 16 November the European Southern Observatory Sky Atlas Laboratory (ESO SKYLAB) was inaugurated at CERN. It is situated in a few ground floor rooms of Building 54 close to the barrack where the ESO Telescope Division is located for the duration of its collaboration with CERN (see May issue). In these rooms the painstaking task of amassing copies of an atlas of the sky in the southern hemisphere will soon begin.

The northern sky was mapped in the early 1950s using the 48 inch Schmidt telescope at Mount Palomar. It involved 1870 plates and copies of these have been used by astronomy



research centres throughout the world and have been of great importance in the research. Now the ESO 1 m Schmidt on La Silla in Chile is ready to start an equivalent exercise in the south and will soon be joined by a 48 inch Schmidt to be operated by UK astronomers at a site in Australia.

The ESO telescope will begin with a rapid survey, taking about a year, in the blue wavelength. Each plate will cover a region of $5.5^\circ \times 5.5^\circ$ requiring a total of 606 plates for the entire map. These negative plates will be on 1 mm thick glass and hence very fragile. A positive copy will be made in Chile and it is this positive copy which will travel to SKYLAB. Only a limited edition of thirty copies of this first rapid survey will be made and distributed to centres in the ESO Member States, the UK and USA.

Around May of next year, a longer and more thorough survey will begin in the red wavelength. This will take about two years to complete and involve fast plates to record faint objects. Again 606 plates will be taken and will form the red half of the definitive atlas of the southern sky.

The blue half will be provided by the Schmidt in Australia which will repeat the first ESO survey with greater resolution. Collaboration between the two observatories has ensured that the scale and the centring of the plates at the two telescopes will be identical. SKYLAB

will also handle the production of copies of the blue atlas.

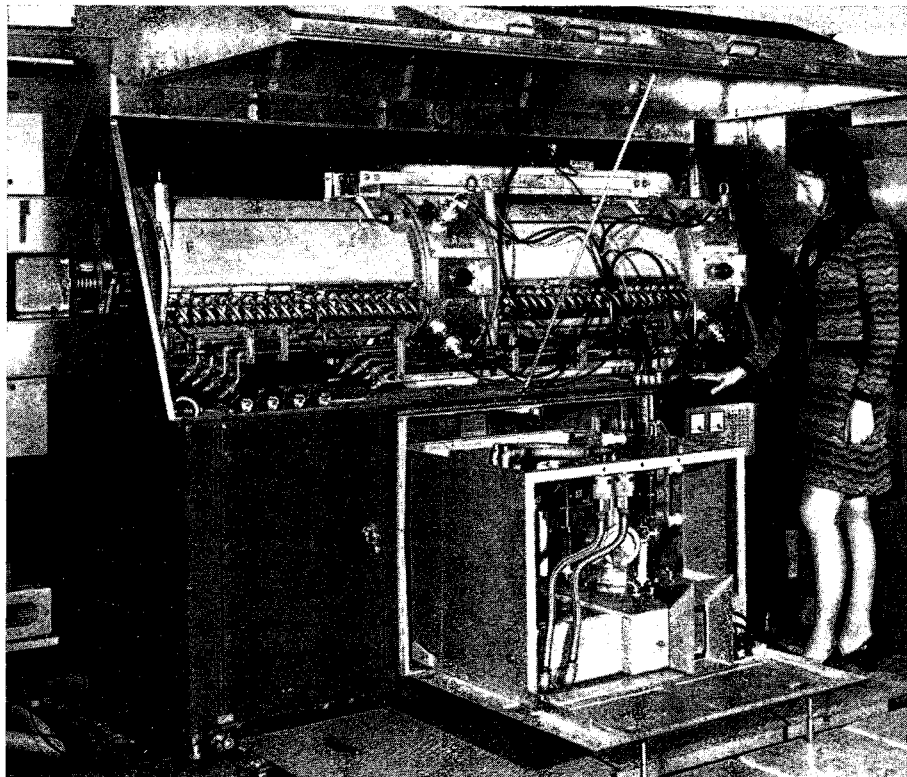
SKYLAB obviously has advanced photo developing and processing equipment with 'clean' enclosures, freon washing baths to remove tiny specks of dust, photometric control of exposures, automatic printing machines with vacuum presses, cold stores, etc... It has work to occupy four people for many years because 200 copies of the atlas are envisaged, each of 1212 films 40×40 cm². This corresponds to a film area of about 200 m² and over this area not one speck of a diameter about 15 μ m should either be missed or inadvertently introduced. That would mean a star too few or too many. We wish SKYLAB well as it begins its exacting task.

New r.f. cavities

The 28 GeV proton synchrotron has been operating since the middle of October with new r.f. accelerating cavities. This is the successful outcome of a project to replace the original cavities which was initiated in 1968.

The need for this replacement and the possible solutions which were examined were described in CERN COURIER, vol. 10, page 113. There were two main aspects. The first was the interest in doubling the accelerating voltage of the cavities

One of the ten new r.f. accelerating cavities installed in the main ring of the 28 GeV proton synchrotron. They can cope with the higher intensity beams, shortly to be available from the Booster, and can speed the acceleration cycle compared with their predecessors installed thirteen years ago.



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compared with the cavities with which the PS was fitted when it was built in the late 50s. The second was the need for a system which could accept and accelerate the high intensity beam from the 800 MeV Booster.

The new r.f. stations can accelerate a beam of high intensity (more than 10^{13} protons per pulse) even in conditions which are not ideal. The power of each r.f. amplifier has been increased by a factor of 20 to 90 kW, which is close to that of a powerful radio transmitter. The accelerating voltage per cavity is now 20 kV, the frequency variation rate is 500 MHz/s and the frequency range extends from 2.8 to 10 MHz.

In addition to the above improvements, the number of auxiliary components in the radioactive regions (which are inaccessible while the machine is running) has been reduced to a minimum by bringing components together at the centre of the ring.

This will make maintenance much easier. Whereas the original cavities needed twenty tubes each in their amplifier system, the new model has only two and the remainder of the system uses transistors.

The new cavities have been installed one at a time so as not to interrupt the running of the PS and have thus worked together with the old units. At the moment, ten new cavities have been brought into operation and there remain four of the old stations still in place in the ring (but not now in action). Fourteen new r.f. stations in all have been ordered. Siemens built the cavities, amplifiers and power units, while Philips supplied the ferrites.

This part of the PS improvement programme has been carried out on schedule and the new r.f. system is proving very reliable.

Around the Laboratories

BERKELEY Bevatron heavy ions

The Bevatron recently completed a very successful three week period of experiments with beams of heavy ions. During this period, beams of record intensities were achieved, a factor of ten up on the initial values. The run marked the first anniversary of heavy ion operation at the accelerator and was the fourth period of development and experimentation in this new area of research.

The run was particularly gratifying because extracted beams of elements up to oxygen were available in sufficient abundances for high energy physics, bio-physics and bio-medical research. It demonstrated the success of a development programme which aimed to increase the intensity of the heavy ion beams and extend to heavier elements. A major part of this programme was to reduce the ion loss due to recombination during acceleration. This was achieved by improving the Bevatron vacuum; cryogenic pumping panels were installed along the inner periphery of the vacuum tank and operated at 20 K. The pressure was reduced from about 1.5×10^{-6} torr to 3.5×10^{-7} torr. Improvements in the ion-source, linear accelerator and r.f. acceleration system also contributed to the increase in beam intensities.

The following types of ion are now available in the energy range of 0.25 to 2.1 GeV per nucleon and the number of particles per pulse at the target is indicated in brackets: ^2He (2×10^{11}), ^4He (2×10^{10}), ^{12}C (1×10^9), ^{14}N (1×10^7), ^{16}O (1.5×10^7), and ^{20}Ne (1×10^5).

With the beam intensities that are now available, and for ions up to and including ^{16}O , the improved beam phase and radius feedback loops of the acceleration system can be used in addition to the pre-determined r.f.