

Stacking laminations for the 1 m model of a B2 type magnet for the SPS. This model (and a B1 type which is also under construction) is being used for careful magnetic measurements to ensure that the required field configuration and precision can be achieved.

SPS progress

A few items from Laboratory II where the move to actual hardware for the accelerator to produce energies of several hundred GeV is well under way. Civil engineering work has started in the site itself, across the road from CERN Laboratory I; magnet models are being produced; the design report has been published.

The first site operations to get under way were the excavations for the main buildings and assembly hall which will be ready for occupation at the beginning of 1973. Serious work has now begun on the main ring. Two 40 m deep access shafts are being dug: PP1, is number one of the six permanent access shafts equally spaced around the ring just inside the circumference while the so-called PGC is directly over the beam injection tunnel, TT10. The PP1 shaft will be 5 m diameter and will provide the access into the main ring through which the boring machine will be lowered. The PGC shaft, is 8.80 m diameter and it will be down this shaft that the various parts of the train which follows the boring machine will be lowered to be assembled down below, there to begin the 7 kilometre crawl around the ring. The train including the precast concrete slabs erection system will be of the order of 100 m in length. From this same shaft, the tunnel spoil will be evacuated and dumped with other spoil on the site used during the ISR excavations.

Work has also begun on the construction of the tunnel which will house the ejected beam line to the North experimental areas. As this is a tunnel which slopes progressively down from near ground level to the main ring depth, it is being excavated from the exit end and will terminate in a



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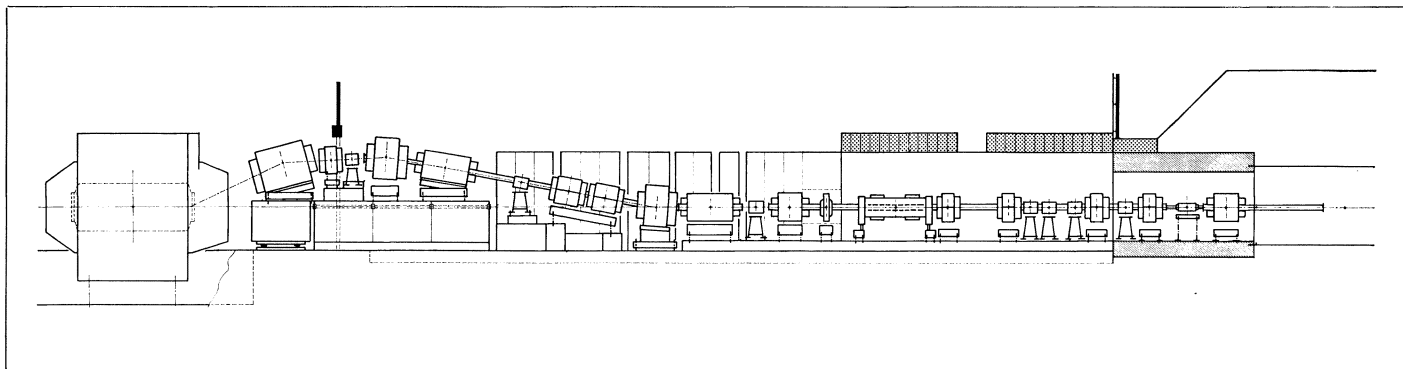
large cavern where the ejection systems are located. This tunnel which will be used only in the second stage of the project is bored now so as to be able to excavate in time the enlarged section.

By the end of February a 1 m model of a B2 type bending magnet is scheduled for completion. The cores were built from steel left over from ISR magnet construction and the coils were manufactured in the Laboratory I main workshop. A B1 model, also 1 m long, will be ready mid-March so that magnetic measurements can be carried out on both types.

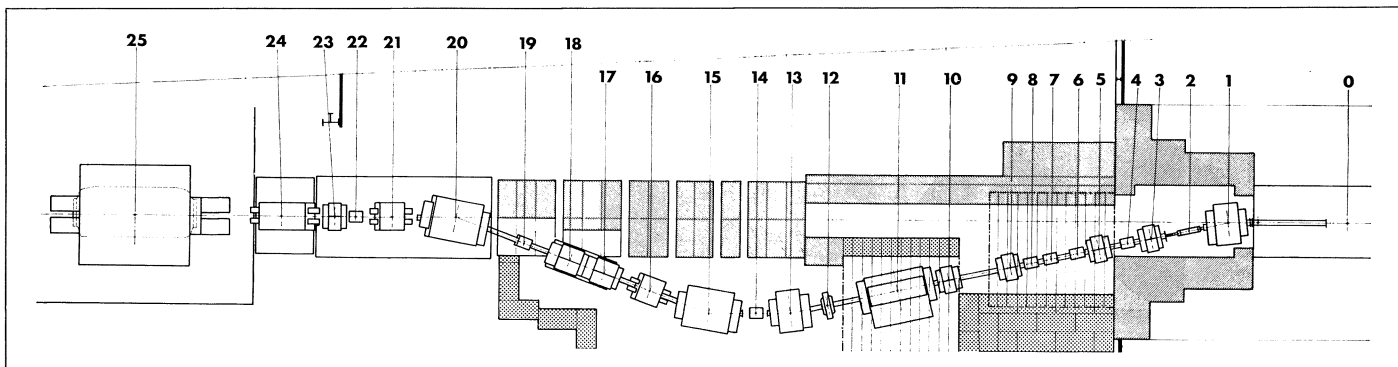
Full-scale models (about 6 m long) are also to be built by mid-year particularly to check construction techniques. For these models, B2 laminations are being stamped by an outside manufacturer and B1 laminations are being machined at CERN. A touch of trans-Atlantic collaboration has entered in here — a stacking table has

been borrowed from Batavia through the good offices of the NAL Business Manager, P.J. Readon. The table has been modified to match the SPS magnet profile. NAL has also lent two tanks for impregnating the magnets.

When the decision to construct the SPS was taken at the CERN Council meeting on 19 February 1971, Laboratory II was required to produce the design report of the machine within a year. This design report, which has the title 'The 300 GeV Programme' and the document number CERN 1050, was issued mid-February. Both English and French editions are being made available. It supercedes the pre-decision report ('A Design of the European 300 GeV Research Facilities', document number MC/60). Copies are being widely distributed to libraries, other accelerator Laboratories, etc.



1.



2.

To convey a beam of antiprotons to the heavy liquid bubble chamber, Gargamelle, without disturbing unduly the carefully built shielding used in neutrino experiments, and to bring the beam into the chamber at the correct angle, a beam-line performing three dimensional contortions around the shielding has been built.

(1) shows the view from the side and (2) the view from above. The indicated components are : 0 - beam target ; 1, 13, 15, 16, 20, 21 - bending magnets ; 2, 3, 5, 9, 10, 12, 17, 18, 23 - quadrupoles ; 4, 6, 7, 8, 14, 19, 22 - collimators ; 11 - electrostatic separator ; 25 - Gargamelle itself.

Developments in developing

A building with a total area of some 1600 m² is going up behind the East Experimental Hall. About 1100 m² of its area will be used for a laboratory where all the developing of bubble chamber film will be carried out. It will be possible to deal there with around 8000 km of film a year.

CERN has had in action for some time a machine for developing film from the 2 m hydrogen chamber and the 81 cm hydrogen chamber (now in retirement), and a smaller one which was used for the 1.2 m heavy liquid chamber (now in retirement) and, temporarily, for the first film from the large heavy liquid chamber, Gargamelle. With the commissioning of Gargamelle and (soon) of the European hydrogen chamber, BEBC, it was decided, rather than to set up additional developing centres, to concentrate the work involved in dealing with film from all the chambers in

one centre with improved equipment. (For example, the 'laboratory section' has a new very useful instrument known as a 'microdensitometer' for accurate measurement of film quality.)

Construction of the building began early in 1971, and the fitting-out stage has now been reached. The first stage consists of installing two machines, manufactured by Photomec, which have already been delivered and which will be used for the first time during this coming summer. They will be joined later by the machine already in use for the 2 m chamber film. There will then be equipment to process 35, 50 or 70 mm gauge film.

The new film development centre (known as Laboratory 27) has been designed to combine efficiency with safe working methods. It has storage space protected from heat for about one year's supply of film, developers, equipment for measuring and mixing the various chemicals, room where emulsion quality can be controlled, equipment for determining the right proportion of bath regenerator to give the best results for each type of film, etc. Since the atmosphere in many of the rooms is corrosive, the structural materials (concrete) and the materials used for the fittings were chosen with this in mind ; acid-resistant paints and coatings are widely used and there is a powerful ventilation system.

Antiprotons for Gargamelle

From April to July of this year, the heavy liquid bubble chamber, Gargamelle, will no longer be fed with neutrinos as it was during its first year of operation but with antiprotons with momenta of 1.6 and 2.6 GeV/c. Antiproton interactions in the chamber producing many neutral particles will be studied taking advantage of the heavy liquid's ability to 'materialize' neutral particles.

A beam to provide the antiprotons is now being installed in Hall 175. Based on the former beam m10 and known as beam m12, it has a single separation stage (2 m electrostatic separator with a gradient of 100 kV/cm over a 6 cm aperture) and will enable antiprotons with a momentum defined to within 0.5 % to be obtained.

As the particles must enter Gargamelle from above at an angle of 26° to the horizontal (in order to compensate for the effect of the chamber's fringe field on the low momentum particles) and since momentum separation takes place in the horizontal plane, the beam is being taken through some spectacular three dimensional contortions. In its last section four magnets, three quadrupoles and two collimators enable it to scale and skirt round the neutrino shielding. The beam axis climbs to 3.7 m above ground level.