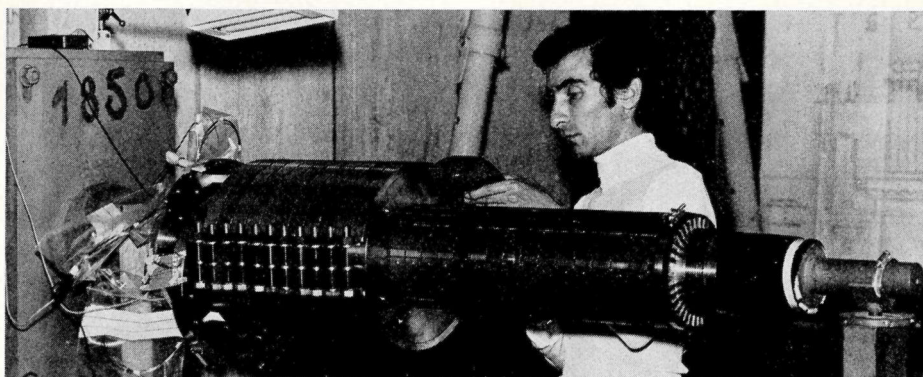
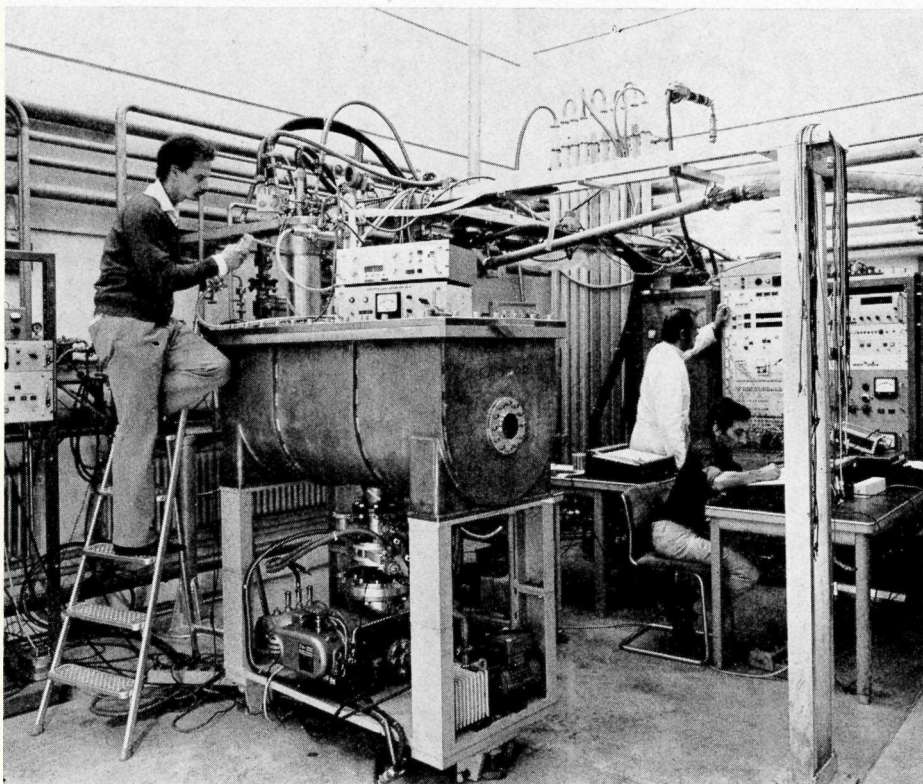




CERN 350.6.72

Construction of the prototype superconducting quadrupole nearing completion. At this stage the central stainless steel bore has been surrounded by insulation, the superconductor has been wound on in quadrupole form, the structure to allow helium cooling channels is in place and the surrounding iron is being clamped around.

Below: The completed superconducting quadrupole in its cryostat during tests. The control system can be seen in the background.



CERN 227.8.72

cryostat together with the helium transfer line, when the magnet is powered, do not exceed 5 W.

The quadrupole is 1 m long with a 10 cm bore (the bore is at room temperature rather than cooled to helium temperature like the magnet itself). It is designed to provide a field gradient of 50 T/m which is several times higher than is available from conventional quadrupoles. The high focusing power will be a great help in handling higher energy beams.

The nominal current of 810 A, corresponding to an overall current density in the winding of about 300 A per mm², was reached on 21 August in the first test. 'Training' has been observed — the current rose progressively after each quench as the magnet was powered — suggesting that the magnet was settling down mechanically. It is hoped to learn more about the origin of the training effect during subsequent tests. Field

measurements in the magnet aperture are in excellent agreement with the values expected from computation.

The intrinsically stable superconductor has niobium-titanium filaments of 53 µm diameter, 361 filaments being twisted with a 25 mm pitch in a copper conductor of 1.3×1.8 mm² cross-section. The conductor was provided by IMI, UK. Some idea of the construction techniques can be obtained from the photographs. The construction has been under the direction of A. Asner and D.F. Leroy.

Pop physics

How to give insight into the concepts of particle physics? How to show to the general public something of the inherent fascination and fundamental importance of a subject which seems so far removed from ordinary affairs and so dependent on advanced

mathematics? This was the problem confronting Dennis Postle, of Tattooist International, the producer of a film which CERN has made as a co-production with the British Broadcasting Corporation, London.

The project started nearly three years ago after Postle had come to Geneva to make a film on CERN for the regular BBC science programme 'Horizon'. This film, like others before it, talked about CERN, about the machines and about the physicists, but the physics remained for the most part in the background, intangible and inaccessible.

We needed a new style, a new approach and we had to be selective in the phenomena we described. It was pointless to try to cram into forty minutes of film a course in physics which most students find difficult enough when spread over as many months. In any case, few members of the public wish to turn themselves into physicists over-night. But the public is interested in knowing what particle physics has to do with them and how it relates to their day to day affairs. It wants to know what this research reveals.

In the production of the film, CERN has provided the physics know-how and many people have spent a lot of time and effort in trying to explain in simple terms the principal themes of present-day research — none more so than R. Hagedorn. The BBC, in the person of Peter Goodchild, editor of Horizon, has provided expertise on presentation and has been the final arbiter on audience acceptance. Postle as producer has turned the talk into a theme, pictures and text. In the process, compounds have become bubble rafts, atoms concert halls, protons motor cars, pions small boys, interactions dances and quarks a series of moves in a special game of chess. The accelerators, the ISR and the big detectors remain in the back-

Physics on film — shots from the film to be released in November :

Hadrons (vehicles), pions (boys) and kaons (adults) prepare for interactions. The last two carry zero hadronic charge. They are black, grey, white for negative, zero, positive electric charge. Unfortunately from a photograph it is not possible to hear the hypercharge !

Below, Jeremy confronts the quark model on a special chess board.

ground giving place to a machine gun and paper target which provided the participants at least, with a lot of fun. The music has been composed and is played by Pete Townshend of 'The Who'.

The film is meant to be entertaining, but it is, nevertheless, a serious attempt to show something of the methods behind the research and to give some impression of the surprising order and harmony which the physics reveals as underlying the disorders and divisions which are usually more apparent in our daily lives.

For the BBC it represented a new approach both in technique and organization. For Tattooist it was a challenge to get to grips with a subject that must be one of the most difficult to portray. For CERN it is another experiment — if not in physics this time, at least in physics communication.

Copies are being produced in English, French, German and Italian and the first public transmission to U.K. audiences in the new TV Horizon series is provisionally scheduled for 2 November. A limited number of copies will be available on loan from the Public Information Office at CERN for showing to non-paying audiences soon after. It is hoped too that other TV networks will be interested in screening the film. For such transmissions, BBC Television Enterprises will be handling the negotiations.

Footnote : Comment from a physicist on seeing one of the many drafts 'We risk making high energy physics crystal clear to the public and totally obscure to the physicist !'

