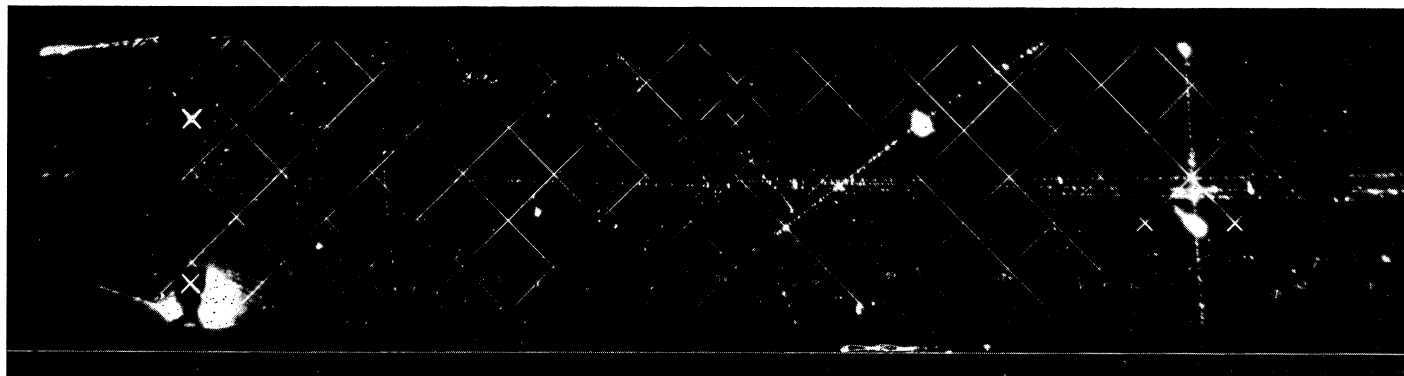


A photograph taken in the 3 m streamer chamber, built by Orsay/Ecole Polytechnique, in use for an experiment on the hyperon beam. A negative psi hyperon enters from the left and decays into a negative pion and a lambda (a neutral particle which does not leave a track). About 45 cm further on the lambda itself decays into a proton and another negative pion so that three charged particle tracks can be seen emerging from the chamber.



frequently in sigma decays, do not give a signal) and there is then a second streamer chamber in a 0.8 T magnetic field 1.4 m long. This detector is used to measure the momenta of the electron and the charged decay products of the lambda. Proton counters give further handles on the lambda decay products and a neutron detector, consisting of optical spark chambers interleaved with thick iron plates, catches the neutron from the decay.

This battery of detectors ensures that the required information is collected and avoids, as far as possible, collecting information about the many other types of event which, with a smaller array of detectors, could be mistaken for the events which are to be studied.

The physics interest lies in obtaining coupling constants for axial and vector currents with greater precision than has been achieved previously. It is predicted that only the axial vector current is involved in the sigma lepton decay to a lambda. Also it should be possible, with the accuracy which the experiment hopes to achieve, to see the breakdown of the Cabibbo model of weak interactions. The model takes SU3 as an exact symmetry whereas in fact it should be broken within about 10% limits. The experiment could register the effect of the symmetry breaking.

An experiment on sigma minus decays is also gathering data with the

hyperon beam at Brookhaven. The experiment is carried out by a Brookhaven, NAL, Yale collaboration.

Another interesting demonstration that yesterday's hypothesis can become today's commonplace, is the fact that the Brookhaven hyperon beam is yielding on observable omega minus hyperon at the rate of about one per hour. Less than ten years ago the omega minus was just a gleam in theoretical eyes and prior to the hyperon beams only 30 of them had ever been identified.

Minnie

In the last issue we carried a piece on 'Bessy' a scanning and preliminary measuring machine specifically designed to cope with film from the 3.7 m European bubble chamber, BEBC. That device has proved extremely popular and has been ordered by many European research centres. Another machine, which like Bessy has been designed with economy very much in mind and with film from a particular chamber in view, is one called 'Minnie'.

'Minnie' is used for scanning and for measurement in the image plane of film from the heavy liquid bubble chamber Gargamelle. The efficient analysis of experiments in Gargamelle requires apparatus with rather complicated features in general but a good portion of the analysis can be done

without them. 'Minnie' supplements the existing apparatus when these features are not required. It was designed and built at CERN very rapidly (about six months having elapsed between the first tests and the appearance, in September 1971, of the prototype which has been in uninterrupted production since then).

The machine could be manufactured in the workshops of most physics laboratories. The prototype without the measurement device cost about 10 000 Swiss francs for materials and about 800 hours work. At the moment, twelve are planned or are being built in various European research centres.

Many of the simplifications used in 'Minnie' are the same as those used by 'Bessy' (see last issue page 127). But it was also necessary to find a simple way of handling the complicated film format of Gargamelle which takes eight views spread out on two films for each photo. Views of the same photo are separated by sixteen other views of other photos. Instead of each film undulating like a Loch Ness monster between separate film gates it is wound in a spiral so that the views of the same photo are adjacent and all 8 can be held in a single film gate 675 mm long and 70 mm wide. The eight lenses are also on a single plate.

With a magnification of $12 \times$ this compact arrangement makes it possible to hang the projector from the roof in a room of normal height without

Professor Margaret Burbidge, Director of the Royal Greenwich Observatory, giving the introductory lecture at the Conference on Auxiliary Instrumentation for Large Telescopes. Professor Burbidge reviewed some major areas of research, where large optical telescopes are likely to play an important part in a few years' time, picking out instrumentation problems that will have to be overcome in order that full advantage can be taken of the new telescopes.

'Minnie', the scanning and measuring machine which is used on film from the heavy liquid bubble chamber, Gargamelle. The use of a mirror is avoided in a very compact machine which can be accommodated in a room of normal height.

exceeding a projection angle of 26° , thus dispensing with the mirror. This is an important saving and also avoids the distortions inherent in reflection. The precision is $100\text{ }\mu\text{m}$ in the image or $8\text{ }\mu\text{m}$ in the film plane. The film reels are at table height and all manipulation of the films takes place at this level.

Although 'Minnie' is designed as an image plane device for Gargamelle it would be possible to make it into a simple film plane measurement system and also to adapt it to film from other chambers.

Telescope Conference

From 2 to 5 May about 180 scientists, predominantly astronomers, came together at CERN to take part in the ESO/CERN Conference on Auxiliary Instrumentation for Large Telescopes. The Conference was organized jointly

by the European Southern Observatory, CERN and the large telescope projects of France (INAG) and the Federal Republic of Germany (MPIA).

Many of the telescope projects in the 3 to 4 m range have matured to the point where attention needs to turn to the question of instrumentation. It is necessary to foresee what the research programmes are likely to require in a few years' time and what developments in instrumentation techniques can be absorbed to meet the requirements.

Most of the Conference concentrated on spectrographs and spectrographic methods (grating spectrographs and spectrometers, interferometric spectrometers) and there was a session on electronographic photometry. It is obvious that, to make good observations on many of the astronomical features which are currently of interest, detectors with much higher efficiencies than the photographic

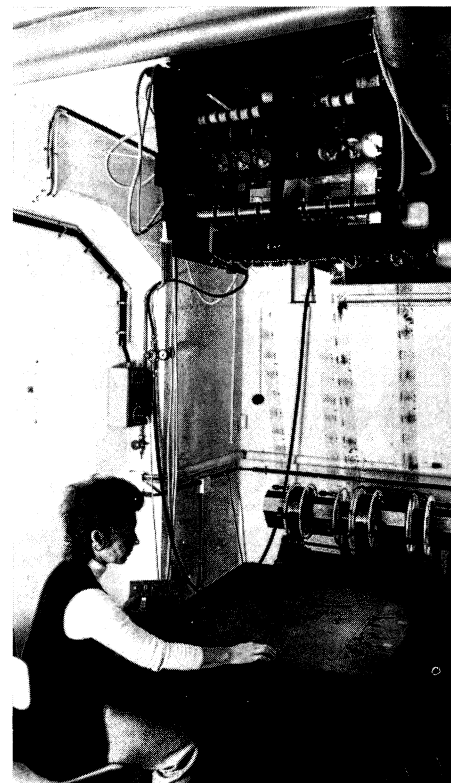


plate are going to be needed. There are already devices such as image tubes (where the phosphor can be scanned in less than the decay time of the effect of the incoming light and where integration over long times is possible) and tiny diode arrays (converting light input directly to electronic information) which are under development in Europe and the USA. It seems inevitable, though in many ways sad, that even the astronomer will soon be observing the Universe via computer output.

The exchange of up-to-date information on progress in this field proved very stimulating and is likely to have considerable impact on the large telescope projects just as did the Conference one year ago on telescope design.

In the beginning was the Linac

In today's high energy physics environment, the concept of an experiment is of such complexity that the man who carries out his own experiment is different enough to merit being assigned to a separate subspecies. Aside from the complexity, there is an additional difference in that *homo sapiens solus* has only himself to blame when things go wrong. *Homo sapiens collegium* on the other hand



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