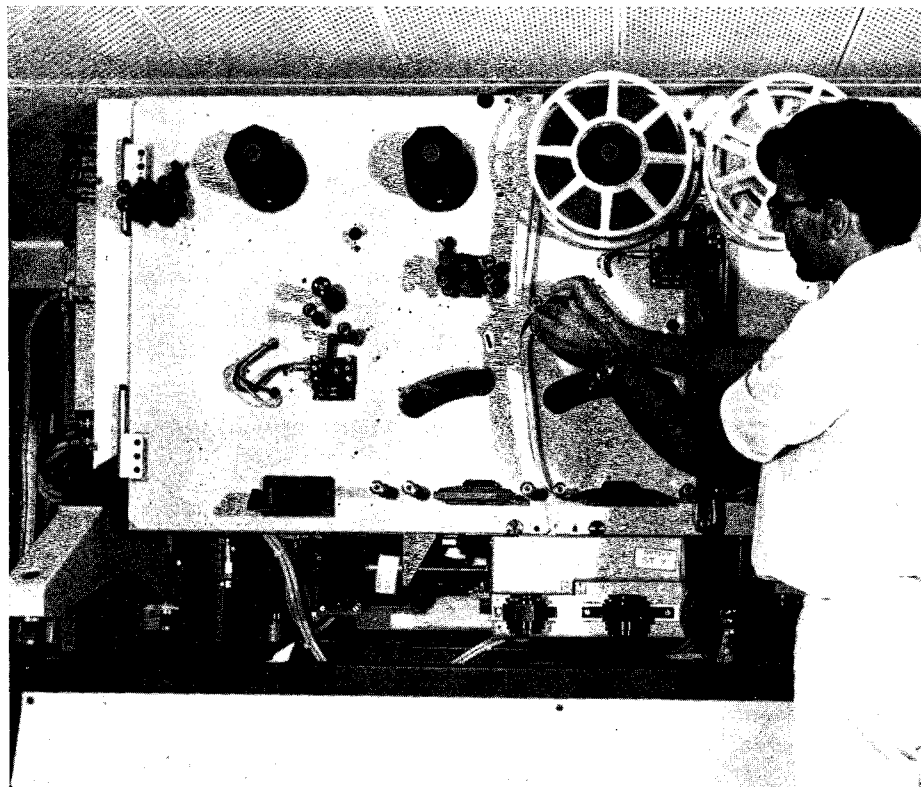




CERN/PI 43.7.70

but which could also be easily adapted for film from Gargamelle or the 3.7 m European bubble chamber. It has tortuously acquired the name 'ADAM and EVA' from the French 'Appareil de Dépouillement et d'Analyse pour Mirabelle et Eventuellement d'Autres Chambres' (scanning and analysing equipment for Mirabelle and possibly for other chambers). A group from the Data Handling Division led by C. Verkerk is responsible for its development.

'ADAM and EVA' is a highly automated, manually operated device combining the operations of scanning and measuring, to which is connected an on-line computer (CDC 3200) which immediately processes the data. (Several 'ADAM and EVA's could use the same computer). The operator has access to the results from the computer during the scanning and measuring process to give him a useful guide as to what is happening and he also has controls available which actuate certain semi-automatic operations. A keyboard is provided for communication with the computer.

'ADAM and EVA' has several other important features :

- 1) all movements are controlled via a PDP 8/L control computer ;
- 2) measurement is made in the film plane, giving greater accuracy ;
- 3) projection (at least in the version installed at CERN) is direct without the use of mirrors.

Optics: The ten lenses, giving a magnification of 17, are fitted in the same stage. The image is moved by movement of the stage and by coordinated movements of

the lamps, while the film remains stationary. An overlap is arranged between the projection of the different parts of the film so that the images follow one another exactly in the plane of the beam in the chamber. The image projected onto the table, can be further magnified up to three times by a television camera.

Movements : The lens stage can be moved accurately along x and y directions to within $\pm 2 \mu$ by means of Heidenhain linear encoders. Correspondingly, the lamps can be moved linearly along the y direction and with a tipping action along the x direction. The amplitude of the movements is such that each view can be brought directly in front of the operator.

Control computer : A PDP 8/L computer is used to centralize the control commands, whatever their origin (e.g. operator, on-line computer or the PDP 8/L itself) and to retransmit them uniformly. It also carries out the following operations :

- a) storing and counting the pulses from the encoders ;
- b) controlling the movement and correcting any errors in positioning compared with instructions received ;
- c) transmission of measurement data to the CDC 3200 on-line computer ;
- d) checking operation and providing warning signals.

Eventually, it is intended to use it to control the major part of the automatic track following.

Operation : After bringing the required exposure into position, the operator causes a fixed reticle with rotatable axes to coincide with the track to be measured by

View of the upper part (projector and lens carrier) of the 'ADAM and EVA' scanning and measuring equipment. The images are projected on to a table four metres below.

moving the film image. To do this, he uses a track ball for fine control together with a push button for coarser control and a reticle orientation control.

In an initial stage, it is intended to provide an aid to the operator in the form of a system for automatically causing the reticle to coincide with any point of which the coordinates have already been determined and are stored in the computer program — the Vertex, for instance. Eventually, an automatic track following device will be added.

The prototype 'ADAM and EVA' will be operational at the end of 1970 with its CDC 3200 on-line computer, but with an incomplete software system. It will then be possible to make initial measurements on film taken with Mirabelle at Saclay ; the first photographs taken at Serpukhov will not be available until later.

Various study programmes on the PDP 8/CDC 3200 interface and on the detailed method of guiding the operator during scanning and measuring (operator — CDC 3200 communication) are very close to completion.

Soviet scientists have already expressed interest in having several 'ADAM and EVA's', and Saclay has undertaken the construction of a 'Gallicised' version using certain pieces of French equipment which are cheaper than imported components. Initial contacts have been made with industry with a view to a small production run.

Teaching aid

Under the general title 'Travaux pratiques sur la physique des particules' a first brochure entitled 'Interactions de la particule K⁻' has been edited by J. Flechon and G. Baumann (Faculté des Sciences, Nancy University) and H. Annoni (Faculté des Sciences, Strasbourg University) in collaboration with CERN.

The brochure is available (at present in French only) together with a set of twelve slides, $5 \times 5 \text{ cm}^2$. It is designed to help science students become acquainted with the study of particle interactions. Teachers who would like to make use of this material should contact CERN, Ref. PIO/EM, 1211 Geneva 23, Switzerland.