Batavia comes into normal use in about 1974. (The intersecting storage rings at Cern will operate at 1,500 GeV but at a vastly reduced flux and versatility.) France tends to view the assembly of the 6 metre hydrogen bubble chamber (Mirabelle) at Serpukhov as something of a climax in the Serpukhov programme.

Experiments have been under way at Serpukhov since 1968, and already some interesting results have emerged. Cross-sections for negative pions and kaons on both protons and neutrons have been measured for momenta up to 70 GeV/c, and have been found against expectation to be independent of energy. This work was carried out by a joint team from Serpukhov and Cern. Two separate experiments to look for quarks with charges of 2/3 and 1/3 that of the proton have proved unsuccessful, thus supporting the belief that these "particles" have only mathematical significance. Further experiments are planned to tie down the cross-sections for positive pions and kaons at the high energies available on the Russian machine.

Several of the more delicate experiments cannot be carried out until the hydrogen bubble chambers have been installed. The key to these experiments is the interaction of secondary particles, produced by bombarding a target with protons from the accelerator, with the hydrogen nuclei in the bubble chamber. Tracks of the resulting particles can then be photographed in the bubble chamber. The very high speed of the protons issuing from the accelerator makes the use of large bubble chambers imperative for these studies, and considerable expertise is required to design a chamber in which such a large volume of hydrogen is maintained in a stable and uniform state. It will probably be the middle of 1971 before the first experimental results from Mirabelle are available.

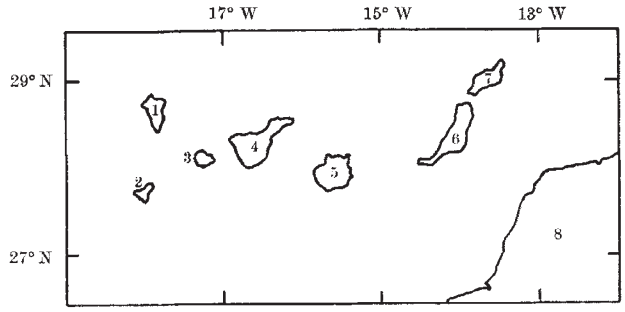
ISLANDS

Origin of the Canaries

from our Geomagnetism Correspondent

THE origin of the Canary Islands archipelago has long been a source of speculation—conclusions have ranged from identification with Atlantis to the assumption that it forms part of the African mainland. Seismic and gravity data, the first in the area, obtained by Dash and Bosshard (*Earth Planet. Sci. Lett.*, **4**, 169; 1969) show that the archipelago is neither completely oceanic nor completely continental, but contains crust of both types. The three western islands, La Palma, Hierro and Gomera, appear to lie over oceanic crust, while the two eastern islands, Lanzarote and Fuerteventura, are underlain by continental crust. The crust beneath the central islands, Gran Canaria and Tenerife, is transitional between the two. The five western islands are thus not related structurally to the African continent.

The principal evidence is refraction and reflexion seismic data. East of Gran Canaria these indicated the presence of four layers above the mantle—a surface layer with a velocity of 3·2 km s^{-1} followed by three intermediate layers with velocities in the ranges 3·9 to 4·7 km s^{-1}, 5·6 to 6·0 km s^{-1} and 6·6 to 6·7 km s^{-1} or 7·0 to 7·1 km s^{-1}. The surface layer may be correlated with the tuffs and clastic material known to surround the pillow lavas which form the core of the



The Canary Islands. 1, La Palma; 2, Hierro; 3, Gomera; 4, Tenerife; 5, Gran Canaria; 6, Fuerteventura; 7, Lazarote; 8, Africa.

submarine part of marine volcanoes. The 3·9 to 4·7 km s^{-1} layer may be correlated with the so-called oceanic layer 2, although its precise nature is uncertain. The same velocity may be attributed to consolidated sediments, of course, but these are unlikely to be present. For one thing the next layer down has a velocity most appropriate to basalt, which would mean a thick (2–4 km) consolidated sediment layer sandwiched between two volcanic layers. This sediment would have taken several million years to accumulate after the end of the first volcanic activity. More important, because the only major source of sediment in the area is the African mainland, any supposed sediment layer would be expected to get thinner as the distance from Africa increased. In fact, the reverse is true—the greater thickness occurs at the greater distance from the continent.

The fourth layer is more complicated in that it does not possess a common velocity. West of Gomera the velocity is in the range 6·6 to 6·7 km s^{-1} which is typical of lower oceanic crust. But in the central area (Gran Canaria, Tenerife) the velocity range is higher at 7·0 to 7·1 km s^{-1}. Material of 7·0 to 7·6 km s^{-1} is commonly found under continental margins, so that the presence of the 7·0 to 7·1 km s^{-1} layer but the absence of the 6·6 to 6·7 km s^{-1} layer in the central Canaries suggests a mixture of mantle-like material with oceanic crust. In short, the crust here is probably transitional.

Seismic determinations of the depth of the Moho show that the crust thickens eastwards towards the African continent by about 2·5 km from La Palma and Hierro to Tenerife. This agrees roughly with the interpretation of gravity anomalies which indicates a crustal thickness increase of about 3 km from La Palma to Gran Canaria. The gravity data also show that several NE–SW faults cut the central area. The downtrending of the Moho towards the African continent is thus probably stepped rather than smooth; and the faults may have caused the intrusion of mantle-like material to produce the transition crust in the central area.

ELEMENTARY PARTICLES

Strong Photons

from a Correspondent

THE vector dominance interaction model, already successful in other fields of high energy physics,