the Department with adequate plant material, and also give space for growth experiments, etc. The garden will lie between the greenhouse and the chemistry wing, facing west, and will include a water garden.

The lecture theatre has accommodation for an audience of 120 on tiered benches; but for class teaching only the front rows are used, and these have tops broad enough to take the drawing boards and books required for normal class-work. Black-out is fitted, and the room is equipped for cinema-, still- and micro-projection.

The museum is intended to house teaching collections of animals, the school herbarium collection and the results of work done on the annual Easter expeditions.

The Physics Department (together with a staff room and library) occupies the rest of the first floor, and comprises two large laboratories, one for elementary work up to Ordinary Level of the General Certificate of Education examination and the other for more advanced work. As annexes to the latter, there are an advanced laboratory proper and a dark-room for optical experiments which will between them accommodate about twenty boys, and in which the apparatus for a lengthy piece of work can be left undisturbed. There are also two tiered lecture rooms, each with 16-in. dial ammeter, voltmeter and centre-zero galvanometer mounted above the blackboard, and one containing a 'dry' cupboard for electrostatics apparatus. The electrical installation provides d.c. variable between 4 volts and 108 volts, from lead–acid cells charged by a rectifier unit; and also low-voltage (12-volt or 24-volt) 50-cycle a.c. Sufficient working points are available for class experiments on alternating current. The physics workshop, with wood-working bench, lathe, power-drill and glass-blowing table, is equipped for the making of most ordinary pieces of apparatus, as well as for routine repair and maintenance work.

SPATIAL ASYMMETRIES IN π–μ DECAY

SOME interesting observations on the decay of pions at rest in a nuclear emulsion, made by a group of physicists at the Institute of Atomic Physics at Bucharest, were recently presented to the French Academy of Sciences*. The emulsion was exposed to pions produced by the large synchro-cyclotron at the Institute of Nuclear Research near Moscow. The π–μ decay events were classified into two groups, depending on whether the muon momentum was directed forwards or backwards with respect to the pion momentum immediately before stopping. In a total of 3,595 events, 2,199 backward and 1,396 forward decays were seen. If the angular distribution is of the type $(1 + b \cos \theta)$, where θ is the angle between the two momenta, then b is found to be $-0{\cdot}447 \pm 0{\cdot}032$. Such a large asymmetry parameter b, differing from zero by more than 14 standard deviations, clearly cannot be ascribed to a statistical fluctuation.

An asymmetry in π–μ decay could mean that the pion has a finite spin (most plausibly 2 units of $h/2\pi$) with which to 'remember' its direction of motion before stopping. Such a conclusion would be quite contrary to all previous ideas about pion phenomena, which are easily and consistently interpreted on the basis of zero spin for the pion. It should also be noted that a longitudinal polarization of the pion beam used in the experiment would almost certainly mean that parity was not conserved in the production process, although it is possible to imagine an unusual magnetic-field arrangement which would invalidate this conclusion. Non-conservation of parity in a 'strong' process such as pion-production would be hard to reconcile with the observed conservation of parity in nuclear forces.

Alternatively, and much more drastically, the effect could mean that current ideas about space, which lead to connexions between angular momenta and spatial probability distributions, are false. This would be an extremely fundamental conclusion, but recent experience with the parity hypothesis has taught physicists to be cautious about rejecting all idea of changes of this kind.

At the International Conference recently held in Padua and Venice, several groups working with nuclear emulsions reported finding various kinds of anisotropy in π–μ decays. In each case, however, the experiment had been extended to the electrons afterwards emitted in μ–e decay. The angular correlation in the μ–e decay is well known and comparatively small in nuclear emulsion (asymmetry parameter numerically smaller than $-0{\cdot}20$). It follows that the π–e correlation, through two decay processes, should be much smaller than the simple π–μ correlations. This was not found to be true, indicating that the effects observed were not physical, but due rather to hitherto unsuspected distortions or scanning biases in nuclear emulsion work.

At the same conference, Prof. L. M. Lederman, of Columbia University, New York, reported some work using counters and electronic recording of the events (Garwin, Gidal, Lederman and Weinrich, unpublished). In the horizontal plane, they find an asymmetry parameter in the π–μ process of $0{\cdot}025 \pm 0{\cdot}025$, essentially a zero result. The up-down asymmetry parameter was $-0{\cdot}016 \pm 0{\cdot}012$, again showing insignificant deviation from isotropy.

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* Hulubei, H., Ausländer, J., Balea, E., Friedländer, E., Titeica S., and Visky, T., *C.R. Acad. Sci., Paris*, **245**, 68 (1957).

A GEOCHEMICAL HYPOTHESIS OF THE EARTH'S STRUCTURE*

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GOLDSCHMIDT'S view that the interior of the Earth resembles the hearth of a smelting furnace and that the Earth is zonal in its structure, with each zone characterized by certain dominant elements, has long prevailed in geochemistry. In recent years, however, these views have been critically examined, and many scientists, such as V. N. Lodochnikov, consider a chemically homogeneous, non-zonal globe much more probable.

In two recent papers[1] I have examined this problem in detail and here I would like to give a brief summary of the conclusions I have reached.

* Summary of a paper read at the Symposium on Geochemistry held in Paris in July 1957.