Further observations have revealed secondary calcium carbonate in the parent material of Coral Rag, but not in the soil horizons derived from it. A striking example of secondary deposition of calcium carbonate was also observed in the glauconitic green-sand of the Upper Greensand formation. In the upper layers of the parent material were numerous concretions of soft calcium carbonate, up to half an inch in diameter, which showed a ringlike structure in cross section. Evidently deposition had taken place around some non-calcareous material. Large amounts of calcium carbonate were also deposited in old root channels and round dead roots, showing up as a very striking white network in the greenish-grey parent material.

I suggest that secondary deposition of calcium carbonate will always occur in southern England when the parent material is calcareous. This calcium carbonate may lie within the soil itself or below it, at a variable depth in the otherwise unaltered parent material. The intermittent nature of the calcium carbonate accumulative horizon is considered to be caused by differences in moisture movements within the soil, due to small differences in the micro-relief, texture, etc. Calcium carbonate is deposited on upper rock surfaces, in cracks in the rock, in old root channels, and in the form of concretions. It is observed that these concretions are often deposited at the depth to which calcium carbonate is leached from the soil; this was also the case with most of the Rumanian soils examined.

It is of interest to note that Dr. C. F. Shaw, chief of the Californian Soil Survey, when on a visit to Great Britain for the Third International Soil Congress in 1935, observed what he described as an "apparent zone of lime accumulation" in a chalk profile in Kent. He goes on to say that this profile showed essentially the characteristics of the soils of an arid region, and ends up by asking "is there a region of arid soils in England?"

Since in England secondary deposition of calcium carbonate has not been observed in soils developed from non-calcareous parent material, I prefer to regard the phenomena in this country as a function of the calcareous nature of the parent material.

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April 12.

Adaptation Energy

ANIMALS continuously exposed to a uniform damaging stimulus (a drug, exposure to cold, excessive muscular exercise, etc.) at first display the symptoms of the 'alarm reaction'[1] and later pass into a resistant phase; sooner or later, however, the power of resistance is exhausted and the symptoms reappear. It has now been found that this third stage of the general adaptation syndrome may be reached more regularly and more promptly by withholding food.

Sixty female rats, two months old, were adapted to a temperature of 1° C., another group of sixty similar rats was treated with 0·2 c.c. of 4 per cent formaldehyde thrice daily, subcutaneously, while a third similar group was forced to run for 15 minutes thrice daily in 12-inch wheel cages rotated at 18–12 revolutions per minute. Six animals of each group were killed after 1, 6, 12, 24 hours and 2, 4, 6, 10, 17 and 22 days respectively. In another series of exactly parallel experiments, the rats were fasted for the last twenty-four hours before they were killed. It was found that fasting intensified the alarm reaction symptoms in the groups killed during the first forty-eight hours of treatment, but did not visibly affect those killed between the second and the tenth day. The rats killed after 17 or 22 days, and fasted, showed a return of alarm reaction symptoms; pronounced thymus and pancreas atrophy, adrenals brown and enlarged, multiple gastric ulcers and hypoglycæmia; while their non-fasted controls showed adrenals rich in lipids, less marked thymus and almost no pancreas atrophy and no gastric ulcers.

The eventual reappearance of such symptoms gives further support to the conception[2] that for adaptation the organism is dependent upon a special hitherto unrecognized type of energy. The present experiments show that while fasting is harmful during the stage of the alarm reaction when adaptation energy is not yet mobilized, and at the onset of the stage of exhaustion when adaptation energy is depleted; yet the animal in the resistant stage learns to perform adaptive functions more economically and with less dependence on the caloric energy derived from food.

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[1] Selye, Hans, NATURE, 138, 32 (1936); *Brit. J. Exper. Pathol.*, 17, 234 (1936); *Endocrinology*, 21, 169 (1937); *Arch. Internat. de Pharmacodynamie et de Ther.*, 55, 431 (1937).

[2] Selye, Hans, *J. Path. and Bact.*, in the press.

The Piltdown Bone Implement

I IMAGINE that few archæologists who have made a study of palæolithic cultures, will dispute the Abbé Breuil's recent conclusion[1] that bone was much more extensively used in the earlier of these cultures than has been generally supposed. But his claim that the Piltdown bone implement owes its shaping to gnaw ing "by carnivores or rodents", is not, I think, likely to receive much support. The pointed end, and the butt-end, of this specimen are formed by a considerable number of facets which have every appearance of being produced by man. Some of these facets exhibit what may be termed a 'stepped' fracture, and this, I fear, has caused Breuil to conclude that animal's teeth have given rise to them.

In the experimental shaping of bone with sharp-edged flints and other stones which I carried out years ago, I found that this stepped fracture appeared frequently. A similar type of fracture is shown by certain flints, broken by some form of natural tension, in various deposits. Personally, I regard the Piltdown specimen as affording remarkably clear evidence of having been shaped by man—but I would be much interested to see the bones referred to by Breuil which have been gnawed by carnivores or rodents, and are said to mislead archæologists into believing that these bones are artefacts. I must confess that I am unfamiliar with such specimens.

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[1] NATURE, 141, 651 (April 9, 1938).