With the kind co-operation of the London and North Eastern Railway a study of the varying abundance of insects along a line of country was begun last summer by using collecting nets on railway trains between York and Hull. By changing the nets at definite points along the line and repeating the lines of observation throughout the summer, the variations in population densities have been studied in relation to meteorological data. Marked distributional changes are observed over quite short periods of time. It is hoped that the experiments may be extended over a wider area in the future.

A first full report will be published in the *Journal of Animal Ecology*.

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[1] NATURE, **139**, 510 (1937).
[2] *J. Econ. Ent.*, **27**, 320–327 (1934).
[3] *Ann. Soc. Ent. France*, **104**, 73–96 (1935).

## Distorted Mountain Strata in Relation to Final Isostasy

ISOSTATIC equilibrium ensues only after disturbances have ceased. The strata of mountains must originally have been deposited horizontally. They may be held to have attained to heights much greater than now exist. As they accumulated locally gravity would be disturbed by their weight, and if they rested on a much deeper foundation of slightly viscous but more dense material they would gradually sink down into it until they floated in hydrostatic equilibrium. It is assumed that this sinking is a slower process than the deposition of the strata. As the result, if a level datum surface is imagined as traced in the viscous foundation, at a level below the sunk roots of the deposited strata, hydrostatic equilibrium along it requires that the weight of material in all columns standing on this surface should be uniform. This is the observed isostasy; thus, beneath a more elevated region its roots of lighter density would penetrate deeper and so compensate the extra column aloft. The depths of these floating roots should even exceed the heights of the elevations, so the height of the original deposited strata would have been much greater than that of the present compensated mountains. In the deep sinking of such horizontal local strata they would be broken up, with result reminiscent of the distorted fragmentary mountain strata that are observed. But an analogy to the breaking up of an Arctic ice-floe would be excessive.

This order of ideas may doubtless be entertained with reluctance, but it appears to offer the only path by which the actual recognized degree of isostasy can have been arrived at. For the case of a linear mountain range the sinking of the strata would be smoother on the two sides of the central axis. It may be that the main part of the mass has been pushed up from below, but it has still to fall back into isostasy, which any sedimental part clinging to it will show by warping.

After an inconclusive survey by Bouguer in the Andes, the earliest effective exploration in that direction was by Maskelyne and Cavendish on the wedge-shaped isolated mountain Schiehallien in Scotland, made with a view to estimating the mean density of the earth from the deviation of the plumb-line by the horizontal attraction of this mountain mass of perhaps roughly ascertainable density. If the mountain rests on floating roots less dense than the average the horizontal attraction would thereby be diminished, so that the apparent result for the earth's mean density would be increased from the true value: but actually the result was considerably less. Formal isostatic discussion was initiated from the early surveys of the corps of Royal Engineers in the Himalayas as analysed by Archdeacon Pratt of Calcutta. They revealed defects of density beneath the mountains. The principle of compensation was more recently extended as a working hypothesis to the whole earth, mainly by Hayford in America. It is now submitted that the undoubted facts of isostasy may provide the clue, however unexpected, to the inner mystery of mountain structure, so that only the later stages of mountain carving are due to atmospheric denudation.

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## Coenzyme of the *d*-Amino-acid Oxidase

IT has been shown by Das[1] that the soluble amino-acid oxidase of Krebs[2] requires for its activity the co-operation of a thermostable factor or coenzyme which can be obtained from animal tissues and from yeast.

The object of this investigation was to determine the nature of this factor. This could only be achieved after separation of the enzyme system into its two components: the thermolabile enzyme and thermostable coenzyme, followed by their purification. While this work was in progress, Warburg and Christian[3] announced in a preliminary note that they have succeeded in separating this enzyme system into its two components, and in purifying the coenzyme. They have not, however, revealed their method of preparation and purification of these components.

I propose to give here the main results of my work on amino-acid oxidase, together with a description of the methods used in the preparation and purification of the enzyme and coenzyme.

*Preparation of Enzyme.* Finely powdered acetone-dried pig's kidney is extracted with 20 vol. water and the insoluble residue centrifuged off. To each 100 c.c. solution is added 1 gm. tricalcium phosphate gel, which is centrifuged off together with adsorbed inactive protein. To every 100 c.c. of this solution is added 22 gm. ammonium sulphate, and the mixture left standing 12 hours at room temperature. The precipitate is dissolved, reprecipitated in the same way, redissolved in water, dialysed and centrifuged. The solution is adjusted to *p*H 6·5, the enzyme is adsorbed on alumina gel (*A*) and eluted with phosphate buffer *p*H 7·8, giving an almost colourless solution of enzyme, inactive in absence of coenzyme but highly active ($Q_{O_2}$ = 1,000) in its presence, and oxidizing the unnatural isomers of alanine and proline.

*Preparation of Coenzyme.* Horse heart muscle is minced and washed twice in 10 vol. tap water. 1 kgm. of washed mince is extracted with a mixture of 850 c.c. acetone and 150 distilled water at 50° C.