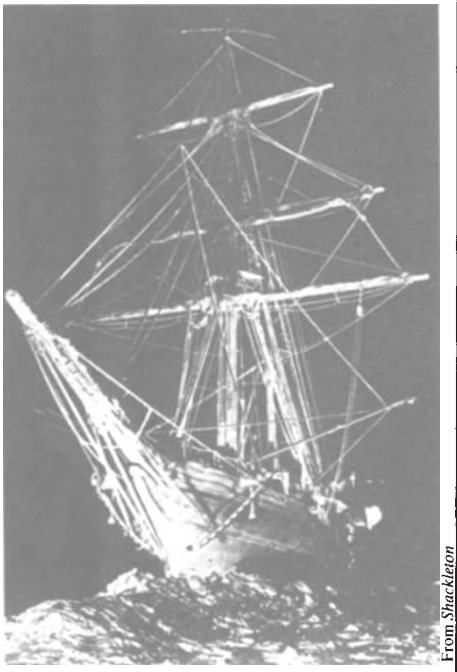
less intriguing figure of a man who mixed Irish dreaming and poetry with the power to inspire those who worked with and for him in a manner previously unknown in polar exploration. The differences between Shackleton and Scott are developed and the author sees the comparison between the upright, unsure naval officer and the breezy, extrovert Irish poet as illustrating how, in an age before technology came to dominate polar exploration, Shackleton's great achievement was to break by sheer power of leadership and commitment to his objectives the



From *Shackleton*

Ice-bound: Endurance *trapped by pack-ice in the Weddell Sea.*

mediocrity that had until then laid its dead hand over much British polar activity. It was not without reason his men called him simply, "Boss".

This is an impressive work and will surely stimulate new interest in a man whose achievements in the field of polar exploration have down the years been largely overshadowed by the tragic nature of his former leader's death.

On the crossing of South Georgia, which ended the journey for which above all else the world should remember Shackleton, he and his two companions felt they were accompanied by an extra person. This is a not uncommon experience for explorers under stress, and Shackleton's account of this phenomenon inspired a haunting reference in T.S. Eliot's poem, *The Wasteland*, "Who is the third who walks always behind you?".

Perhaps for "The Boss" it was the embodiment of the conventional hero, which his enigmatic spirit never quite embraced. □

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States of alteration

C. Ladd Prosser

Changes in Eukaryotic Gene Expression in Response to Environmental Stress. Edited by B.G. Atkinson and D.B. Walden. *Academic: 1985. Pp.378. $71.50, £60.*
The Adaptive Role of Lipids in Biological Systems. By Neil Hadley. *Wiley: 1985. Pp.319. $39.95, £41.40.*

ATKINSON and Walden are concerned with the control of protein synthesis and, as the basis for discussion, the contributors to their book have focused on proteins made in response to stress. It was observed 30 years ago that brief exposure to heat brings about puffs on salivary chromosomes of *Drosophila* and leads to the synthesis of several proteins in large quantity — the so-called heat-shock proteins. In *Drosophila*, seven proteins of different molecular weights have been identified and several have now been cloned. Although most information on heat-shock proteins is available for *Drosophila*, and this is reflected in the book, other chapters describe heat-shock proteins in a slime mould, sea urchin tissues, amphibians, birds and mammals, and in plants.

The heat-shock proteins in different organisms are of various sizes but the most prevalent one is of 70 K molecular weight. They are highly conserved and can be induced by heat exposure of isolated cells as well as of intact organisms. Control has implicated both translation and transcription but evidence from inhibitors emphasizes the increase in transcription of specific mRNAs as most critical. It appears that heat exposure turns on certain genes and one effect of the synthesis of heat-shock proteins is to repress action of mRNAs for other proteins. The chapter by Lindquist and Didomerico on gene expression in *Drosophila* uses synthesis of the mRNA for the 70 K protein as a model for gene regulation in general. The *in vitro* induction of heat-shock proteins in avian red blood cells is covered in chapter by Atkinson and Dean. In mammals, a fever of only 2°C is sufficient to induce heat-shock proteins in the brain.

Synthesis of these proteins is stimulated by other stresses, particularly toxins and drugs, hence the term stress proteins may be more appropriate than heat-shock proteins. Less is known of their synthesis in plants than in other organisms, but maize seedlings and soybean embryos do produce them. There seems no doubt that synthesis of heat-shock proteins is associated with increased resistance to heat stress. Although much is known of the sequence of specific gene activation and protein synthesis, the mechanisms by which heat-shock proteins protect against the lethal action of heat remain mostly speculative. But Atkinson and Walden have succeeded well in integrating the groundwork essential for a final answer to the question of mechanism within the seventeen chapters of the book.

Adaptation in a different system is the topic of the volume by Hadley. He has considered the adaptive function of lipids in a number of biological roles. The book could serve well for one part of a course in comparative physiology. The treatment of biochemistry of lipids is adequate for physiology students but probably not sufficient for lipid chemists. Lipids, predominantly phospholipids, constitute 25–75% of cell membranes by weight. The lipid composition of plasma and organelle membranes can be altered by nutrition and by temperature, but the way in which membrane lipids modify the functioning of membrane proteins remains an unsolved problem

A useful chapter on surface waxes precedes a detailed discussion of the role of waxes in the water relations of terrestrial plants and animals. Their protective role against evaporative loss of water is made clear, but the significance of the diversity in composition of surface waxes — hydrocarbons, ketones, esters, alcohols, sterole and triterpenes — is not explained.

Lipids, especially triglycerols, are stored as fuel that can be accumulated at certain times, for example at the pre-migration stage in insects and birds. Several roles for fat tissue are further described. Brown fat is a ready source of heat, present in most mammalian neonates and hibernants. Because fat has low thermal conductivity it is an insulator, especially in aquatic and cold-dwelling mammals. Some marine plants and animals are neutrally buoyant because of low-density fats. Buoyancy is implemented by an increase in total body lipids and by deposit of lipids of low density. A use of lipids not often considered is in chemical communication, especially in pheromones; some esters of plants are insect repellents. A final chapter deals with medical aspects — pulmonary surfactants, bile salts, fat absorption.

The overall impression to be gained from this book is of the extreme diversity of structure and function of biolipids. Clearly, this is a field of research in which comparative biochemists and ecophysiologists can profitably cooperate. □

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• *Ancestors: The Hard Evidence*, the proceedings of a symposium held in April 1984, has been published by Alan R. Liss/Wiley. The meeting was attended by leading workers in palaeoanthropology and was reported in *Nature* 208, **309** (1984). Editor of the book is Eric Delson, price is $49.50, £38.