form an unusually elegant means of studying these complexes. When a second substance is injected into the aqueous solution underlying a monolayer of a pure substance, a large increase in surface pressure is found if complex formation occurs accompanied by penetration of the second molecular species into the monolayer. If the reaction is between polar groups only of the two molecular species, there may be no change of surface pressure, but there will be a change in the electrical potential across the film. If there is no complex formation of any type, no change in either surface pressure or potential occurs. Complex formation of the type revealed by these surface techniques has been shown to be of importance in the mechanism of red cell lysis, and in the permeation of some membranes by such substances as phenols. For example, the penetration of hexyl resorcinol into *Ascaris lumbricoides*, according to Trim and Alexander, may be accelerated by a factor of about fourfold by adding low concentrations of detergents, with which the resorcinol forms complexes. The mechanism of this acceleration is not yet understood, and may well repay detailed study.

Interesting complexes are formed between some carotenoids and certain proteins. Astaxanthin exists in the eggs and integument of lobsters, crabs, etc., as a blue-green pigment. The carotenoid is readily oxidized to astacene in the dead animals. When the association between carotenoid and specific protein breaks down, a colour-change ensues. The association may be destroyed by boiling, which denatures the specific protein, or by addition of sodium soaps. In

the latter case, the change is reversible, restoration of the original complex being achieved by addition of calcium (Peters and Wakelin). Visual purple also appears to be a complex of this type, namely, protein-carotenoid. One theory of the action of light upon visual purple is that it oxidizes a terminal CHO group of a polyene chain to the corresponding aldehyde. Monolayer studies show that on conversion of a CHO group to a CO group, a large change of surface potential occurs. It is therefore possible that, if the carotenoid of visual purple also forms part of the lipid layer of the cell membrane, the photo-oxidation will produce a change in surface potential sufficient to cause electrical excitation of the cell. These relationships are at present all highly speculative, but it is in harmony with recent developments in cell physiology to adopt the working hypothesis that the stimulation of retinal cells by light is produced by a surface photo-oxidation of the visual pigment incorporated in the cell membrane, and that the change in surface potential produced by this reaction temporarily discharges the resting potential of the cell, causing an electrical response.

These reflexions on the topics of Prof. Rideal's lecture show that a pathway for investigation of many biological problems has already been secured by the study of reactions at interfaces. So numerous are these possibilities that the rate of investigation of these fields is likely in the immediate future to be determined almost entirely by the number of investigators available; all such investigators will find a source of inspiration in Prof. Rideal's lecture.

OBITUARIES

Prof. Ernest Shearer

A NATIVE of the island of Stromness in Orkney, Ernest Shearer was brought up to farming; but he could also sail a boat and follow the maritime pursuits of his Viking ancestry. A 'lad of parts', he was thoroughly schooled in mathematics and classics and went on to the University of Edinburgh where, between 1897 and 1904, he studied and graduated M.A. with honours in economics and B.Sc. in agriculture. His first appointment was to the Indian Agricultural Service, where in five years he reached the grade of assistant inspector-general. In 1911 he was appointed under the Egyptian Government as principal of the Giza Higher College of Agriculture and in 1919 he was made chief technical officer in the Egyptian Ministry of Agriculture.

In 1924 Shearer accepted the post of principal in the Edinburgh and East of Scotland Agricultural College; two years later he was made professor of agriculture in the University, thus becoming the first head of the Edinburgh School of Agriculture. During his tenure of office the proper utilization of land and the teaching of young farmers became more and more of national importance, and he rose to eminence as an authority on agricultural education. He reached this position by reason of his training and experience, but also because of inclination, for he had a great interest in, and sympathy for, young people. When he retired from his academic posts in the autumn of 1944 he became secretary to the Mid and East Lothian Agricultural Executive Committees, and thus continued to serve the farming community until the time of his death.

Shearer was a large and genial man, entirely free from affectation, with a strong sense of humour and great personal charm. Completely at ease in any situation, he would pass an hour as happily with his gardener as with his fellows on the Senate. He handled a brilliant pen and possessed great strength of character and determination. Not only was he thus well qualified for leadership but he could also be relied on to fight for any right cause and to stand like a bulwark in the interests of his people.

His hobby was the propagation of fine fruits and beautiful flowers. He had planned to retire to his beloved Orkney and to devote himself to the production of plants which would bring both amenities and profit to the island farmers. His untimely death is, therefore, as much a loss to his native land as it is a grievous blow to his friends and colleagues.

J. A. MORE.

Mr. L. E. Adams

LIONEL ERNEST ADAMS, who was well known to an earlier generation as an active and enthusiastic observer of the natural history of the British Isles, died at Ryde, Isle of Wight, on September 20, at the age of ninety.

Adams was the nephew of Henry and Arthur Adams, famous in their day for their researches on the molluscs, and joint authors of "The Genera of Recent Mollusca". Circumstances did not allow him to follow his uncles' wider sweep, and he had to confine himself to the British land and freshwater species, on which he became an authority of repute.