lagoons, in close contiguity but differing considerably in hydrology, flora and fauna.

The very rural surroundings of the Field Centre, where some acres of orchard and meadow are under the control of the Council, are well suited for studies in the biology of many species of birds. It is proposed to make special studies of the life-histories of a few common species. Visiting workers will find birds of these species already colour-ringed and so individually recognizable. The technique of field experiment will also, it is hoped, be much used, with special reference to problems of perception, recognition and sign stimuli.

The major interests of the Centre have been briefly discussed; but it is hoped to avoid any undue specialization, and gradually to accumulate such a record of the fauna and flora of the locality as shall provide a synoptic view of the potentialities of the area to visiting research workers in many groups and subjects. It is felt that only if there be many and frequent visits from serious naturalists (and in the country of Charles Darwin it is to be hoped that many of them will always be amateurs) will the Centre be able to claim that it is, indeed, promoting field studies.

Contributions to knowledge, by the Centre's own research programme and by assistance to visiting biologists, must ever have pride of place in the interests of Flatford Mill. Besides this, it has an important educational function to perform among undergraduates and senior pupils of schools. The educational side is inspired by the belief that natural history can provide that foundation in the art of inductive thinking which cannot be obtained from physics and chemistry as taught in schools. In the study of animals and plants there are few certainties, and the pupil can only be told what he may find. Nor is failure to make the discovery a proof of incompetence or sloth. In school physics the correct answer to each experiment described is printed at the back of the text-book, with a resulting temptation to 'adjust' the figures in the note-book. Again, in natural history, the subjects of study have no neat labels attached as have the bottles of chemicals in the school laboratory, and the end-product of an experiment cannot be identified deductively.

It is hoped to make the concept of natural selection the centre of all biological teaching. The student will be encouraged to review each discovery in terms of relation to the environment, and constantly to speculate on the nature of the adaptation—the contrasts of the most perfect and the least imperfect fitness. The occupation of ecological niches will be considered not only in terms of structural adaptation, but also in the presence or absence of extra-specific competitors. By such means it is hoped to emphasize that natural selection is a present, active and urgent force, and not only something immeasurably antique which long ago shaped the amphibians of the Devonian and the dinosaurs of the Trias.

Since many students attending courses come from urban environments, it is hoped to give them a glimpse of the autonomy of country interests and of the inflexible rhythm of seasonal changes on which all human life depends. The review of the myriad small, complex and intricately connected lives moving in the sunshine of a summer's day may bring a realization that the world was not, after all, made by the local education authority. Perhaps the final lesson of all natural history is that "God hath upon Him a terrible majesty".

THEORY OF SORPTION COLUMNS

THE recent communications on theory of sorption columns[1] by Sillén and by Ekedahl, Högfeldt and Sillén direct attention to the excellent Swedish work in this field, which has not hitherto been as well known to workers in Great Britain (including myself) as it deserves. Probably unintentionally they have, however, given the impression that their work represents the latest stage in the development of this theory.

The use of v/x as a variable, now named the 'ψ-condition' by Sillén, goes back to Wilson[2], DeVault[3] and Weiss[4], who described the phenomena leading to Sillén's equations (2) and (3) in full detail, and it has been extensively employed in discussions of the column behaviour of single solutes of all types of isotherms[5a]. The integration of the equation $dq/dc = v/x$, with several solutes simultaneously present, using both specific and general isotherms[5b,5d,6-8] has given an almost complete picture of what can happen in an 'ideal' chromatographic column, both for development and displacement[9] analysis. In these treatments the term v/x receives its full share of importance. But it is also apparent that the v/x term, while affecting the position of the boundaries, does not always give information on where these boundaries begin and end, and other factors have been taken into account as well in order to complete the picture.

The application to ion-exchangers[5a,5b,10,11] and the phenomena occurring in non-equilibrium processes[5c,12] have been described more realistically than by Sillén's equations (9) and (10), which give symmetrical S-shaped boundaries (see his Fig. *c*) for a Langmuir isotherm, whereas experiments with ion exchangers[5c,10] give an asymmetrical S-shape which has been theoretically explained[5c,12]. The reason for this discrepancy is that Sillén[13] implicitly assumes the reaction-rate as the rate-determining factor, whereas in non-gaseous systems the rate is invariably controlled by diffusion[14,15].

A full appreciation of the papers mentioned above and of others quoted in ref. 12 leaves the impression that practically every aspect of column theory is now known or can be dealt with, with the exception of the effect of non-equilibrium and other disturbing factors on the shape of ideally diffuse boundaries, for which cases the differential equations do not permit of a general solution. We can therefore expect little further development of column theory, apart from simplifications by neater mathematics or by useful approximations.

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