

COUNCIL FOR THE PROMOTION OF FIELD STUDIES

3. DALE FORT FIELD CENTRE

By J. H. BARRETT

Warden

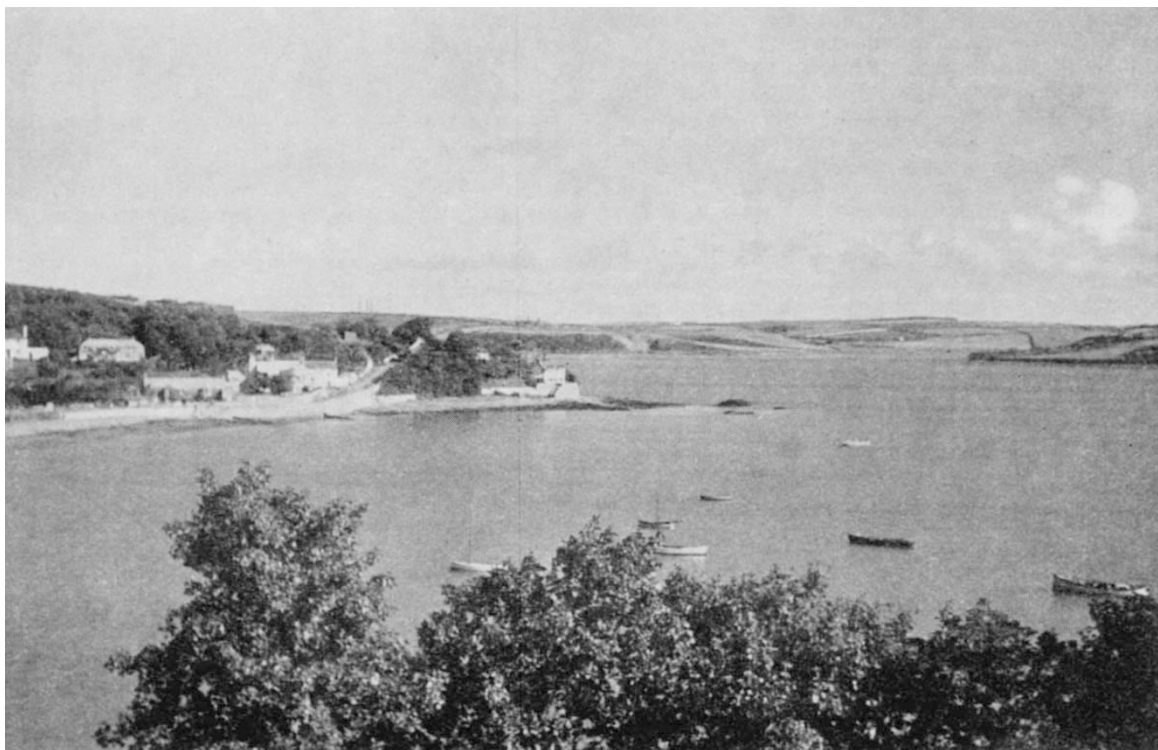
DALE FORT stands on the tip of a promontory overlooking the waters of Milford Haven in Pembrokeshire. When establishing its series of field centres, the Council for the Promotion of Field Studies carefully selected sites in a wide variety of regions. At Dale Fort there are facilities for all those studies based on a coast. Within three miles of the Centre are beaches of every degree of exposure, from sheer cliffs pounded by Atlantic gales, through rocky coves and sheltered bays to the shingle and mud of the flats where the Gann stream goes quietly down to the sea. Inevitably marine biology bulks larger in the life of the Fort than anything else, although the geographical interest of the county presents a challenge to the geographer as clearly as the coastline does to the zoological and botanical research worker. Perhaps the only danger inherent in the superb site of the Fort is that the work of the Centre might tend to become too specialized. While making the most of its local opportunities, the Centre must always welcome workers in any subject, for the Council's scheme includes historians, artists and archaeologists as well as zoologists and botanists. No week is more stimulating than when artists, specialist research workers, amateurs and school parties are there together, all doing different things and each contributing some point of view in discussions that is fresh to the others. Any idea that the amateur naturalist is not welcomed would be dismissed if the

doubter had once seen how important to a Centre is the enthusiasm of an amateur for his chosen study.

Skokholm Bird Observatory is an integral part of the Centre. For four years an ecological survey has been in progress. An island of only 250 acres has peculiar advantages for this type of research work. The primary botanical maps are complete. Detailed analysis of the composition of certain fresh- and salt-water communities is progressing. Micro-climate stations are maintained. A mass of information on the distribution and population changes of many animals has been accumulated. Research workers will find much background information readily available. Amateur naturalists who visit the Observatory, in numbers, learn how much more interesting their subject becomes as soon as a plan of work is defined and developed. No teaching is organized on the island; this is the responsibility of the main centre at Dale Fort.

More than a thousand students visit each of the Council's field centres every year, a student being defined as anybody wishing to know more of the subject that already interests him. A larger number go to Dale to learn about the intertidal fauna and flora than are accommodated in any other marine station in Britain; they are mostly undergraduates and from school sixth forms.

The unique diversity of animal life on the sea-shore is well known. The intensity of the struggle



Dale Road and Village

[Photo: E. Dudley C. Jackson]

for existence is increased by the hazards of an intertidal life. Many different solutions to the problems have been evolved. The minutely delicate adaptations, the mechanisms of efficiency, the puzzling and beautiful arrangements within a natural community frequently stir students to curiosity and so lead them to the unique pleasures of discovery. Only in a few cases can schools succeed in teaching discrimination. It is a sad result of the present formal educational system that, if left to themselves, most of those from school sixth forms pay more regard to words and diagrams written on a blackboard than to the evidence of their own senses. The marine biology courses at Dale require students to observe critically for themselves, to record accurately and to interpret honestly—and quite incidentally something is learnt that is useful when facing examiners.

The same principles underlie all the courses. Geographers are sent about the peninsula to collect geographical information. Journeys include frequent stops to inspect particular features. The whole week is designed, however, as something more than an unco-ordinated series of simple exercises. The attempt is made to integrate the effects of geology, of meteorology and of man upon the natural scene; to show how man, like any other animal, has adapted himself to his surroundings, and how an unbroken thread of continuity binds the details of the landscape together and so imposes a pattern on the life of man himself. In seeing this for themselves, the sixth formers have suddenly progressed from the uncritical and automatic digestion of facts presented in tidy parcels during 45-minute lessons to an understanding of the real meaning of learning lessons at all. "In understanding is our only emancipation." Hundreds of undergraduates and sixth form students take their first critical look at anything while among the Dale seaweeds or puzzling over some detail in the Pembrokeshire landscape. At Dale there is no formal presentation of factual information. Each student must make the discovery for himself. Help is always available, but the short cut for the faint-hearted is never provided; the more that is asked the more is given. The Council's centres are by no means another patent aid to the passing of examinations.

The small staff at the Centre is kept busy. Forty-five students are in residence at one time, and the warden and assistant warden share the teaching between them. Not only do they have to understand, but also they must be able to transmit understanding. Their scope is limited only by their ability to acquire knowledge in subjects far outside their training. The nature of the work forces them to take a very wide view, with the underlying danger that they may become jacks of all trades and masters of none. A Centre cannot function properly without the assistance of specialists. Any teaching establishment suffers if no research work is in progress within it. The teacher who has ceased to learn has probably also lost his interest in teaching. The Centre's staff is saved from this calamity by all that goes on around them. Whether they want to or not, they must go on finding out things, if only to answer the questions from students who are interested in the zonation of gastropods, cold fronts, microliths or the breeding behaviour of redshanks. Increasing their general knowledge of the region will, for several years, absorb what little time might otherwise have been available for research in their own subject. It is not anticipated that, however skilfully they may be directed, quite inexperienced students in residence for only a week

can ever produce results of scientific value. To a great extent it is left to pure research workers who use the Centres to contribute not only their attitude to a problem (which is an important contribution) but also the results to the Centres' store of local knowledge.

The original plans of the Council were that many of the parties visiting its centres would have leaders responsible for the programme of work. Experience at Dale is that very few teachers are prepared to teach their own sixth form in the field the most rudimentary natural history. With their large classes and tight schedules of work to be got through, they in general find it hard to acquire the knowledge that can only be got from looking at Nature in the field. The Centre, in fact, has to teach the teachers, and at Dale special courses are given each year to demonstrate the simple techniques involved. Some training colleges now include in the syllabus a week at Dale as a proper complement to the work done in laboratory and library. The influence of the Centre is spread very widely in this way, and the responsibilities are correspondingly great. Quite apart from the course itself, these various kinds of people gain something from being for a week in a building on the edge of the sea and far from the smoke of chimneys.

Most of the students are themselves quite strange to rural natural surroundings. Perhaps ten per cent of those still at school have never spent a night away from a town before they come to Dale, and find it difficult to realize that the inhabitants of a remote village are not only content but actually prefer their village to the so-called amenities of the towns. This realization cannot be allowed for on the Centre's programme; but it represents an important part of the work. For seven days students' movements are controlled by tides and not by a watch. They are living amid natural beauty. Slowly they become aware that the whole scene is greater than the sum of its parts. Whenever possible, discussions, teaching and demonstrations at Dale are attempts to shine a light upon the great mystery and unity of Nature. In doing so, certain details stand out clearly and are understood. The schoolboy feels less strange, less lost in what is really his natural habitat; just occasionally the reward is to see a boy transformed.

CRYSTALLINE FORMS OF MYOGLOBIN FROM HORSE HEART

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THE small molecular size of muscle haemoglobin¹, presumably indicating correspondingly simple structure, makes this protein particularly attractive for analysis by X-ray crystallography². Nevertheless, although myoglobin was first crystallized in 1932 (by dialysis against ammonium sulphate), the only habit reported for some years was that of thin needles, occurring in 'wheat-sheaf' bundles³. In 1942, however, crystals of beef myoglobin as minute, triangular 'plates' were obtained from this medium⁴. Although Rees⁵ discovered later that large, relatively wide, 'plate'-like crystals could be obtained by permitting crystallization from a concentrated phosphate buffer, these were still very thin. The long exposures to the