

cheap substitute for other materials, and before the introduction of the now well-known and fundamental water-cement ratio law first introduced by Abrams, the requirements for good concrete were not fully understood or appreciated. Consequently concreting was often carried out in a more or less haphazard way and generally by unskilled labour.

To-day, the design and control of concrete have become specialized activities founded on principles which are becoming so well established that the production of inferior concrete is now almost inexcusable. This does not mean that concrete is a complex science involving the use of intricate formulae and complicated procedure; on the contrary, in spite of the confusion of literature on the subject, it is a fairly straightforward and practical art.

With a thorough understanding of some basic principles, the observation of a few fundamental and often common-sense rules, and the exercise of certain reasonable precautions, the production of high-quality concrete becomes a relatively simple task.

There are many excellent books available on the subject of concrete, but the first impression given by Mr. Akroyd's book is that he has achieved a good balance between theory and practice. The book is well set out in a logical sequence, and although in his preface the author indicates that it is intended for students and graduate engineers, I am quite certain that this book will find a very much wider range of reader.

The opening chapter provides some concise and useful information on the properties of concrete and this is followed by a rather lengthy but important chapter dealing with the materials used for concrete manufacture. The chapter on mix design sets out some useful examples based on recognized methods. The chapter on concrete manufacture: handling and batching of materials, mixing and placing, compacting and curing, is most informative and always keeps the practical aspect well in mind. The short chapter on quality control is adequate for the purpose of introducing a statistical treatment of strength test results, and in again reminding the reader of the importance of good workmen and efficient plant. The remaining chapters dealing with resistance to deterioration, surface treatment, and special concrete are based on reliable sources of information.

The provision of a general index and a list of references after each chapter is extremely useful.

To summarize, I think this book will be very helpful not only to students and graduate engineers but to other concrete workers. I compliment the author on producing such a splendid balance between theory and practice.

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ENTOMOLOGY AT HIGH ALTITUDES

Introduction to High Altitude Entomology

Insect Life Above the Timber-line in the North-West Himalaya. By Dr. M. S. Mani. Pp. xix + 302 + 10 plates. (London: Methuen and Co., Ltd., 1962.) 42s. net.

PROF. M. S. MANI of Agra University has led a number of expeditions to the Himalaya and has found, in what at first appears to be an inhospitable expanse of snow or wind-swept rock at heights of 3,500–5,000 m, a surprisingly rich insect fauna.

The most conspicuous insects are the big alpine butterflies like *Papilio machaon* and the many species of *Parnassius* which feed on the bright flowers of the short alpine summer. Their larvae take shelter in rock crevices and feed on the low herbage. A few plant-feeding bugs and beetles are also dependent on these plants for food.

Readers unfamiliar with these places will be surprised to hear that the most numerous insects are scavenging Carabid and Staphylinid beetles, spring-tails and earwigs which are especially numerous in rock crevices near the melt line of the snow.

These are not so much dependent on the local plants for food as on the vegetable debris, pollen and insects originating in the subtropical plains to the south carried on the high air currents and deposited in cold storage on the snow-fields and glaciers. Careful watch gave a figure of two insects deposited per sq. m per min. At times the snow was littered with the corpses of flies, moths and aphids, and occasionally migrating swarms of butterflies were overtaken by bad weather and brought down.

As the snow-fields melt in summer, their surfaces and edges provide a rich harvest of preserved food which is taken by the active scavengers.

Another significant source of food is provided by the migrating ladybirds and other insects which form great aggregations at heights of over 4,000 m and return to lower levels after diapause. These are eaten by birds and even bears. The glacier snouts also disgorge in the short summer their accretions of food which at least partly explains the richness of the fauna of the torrents the water of which abounds with early stages of mayflies, stone flies, and countless fly larvae, many of which are filter feeders.

The fauna of the mountain sides is greatly influenced by aspect. North and south faces are characterized by different groups of species. The slopes remain very barren except where melt water or snow-fields are adjacent. The animals swarm under the rocks which are warmed by the Sun. Only a few centimetres down in crevices temperatures of 10°–25° C and high humidities may be available for long periods, while outside it is very cold and dry. Insects of the north slopes cannot find these hot-house conditions, but many of them can maintain activity close to freezing point or even at –10° C. Collembola may become so numerous and active on snow as to impart a sooty appearance to the snow-fields.

This book is in the nature of an interim report. Perhaps three-quarters of the insects caught have as yet not been named beyond the genus (the butterflies and a few groups of beetles being the only groups easily named to species). Doubtless there are many new species in the collections still to be named, and as more and more groups are worked out in the various museums many curious new facts of distribution and ecology will emerge.

Zoologists who have tended to equate the mountain flora and fauna in the tropical zones with the tundra of the far north will find the broad generalizations of this book very stimulating. It serves to emphasize that the mountains differ not only in the physical attributes of the environment such as the relative constancy of day-length, but in the amount of nutriment derived from the richer environments close by.

The book is attractively illustrated by photographs, some of which are in colour, and by many clear line drawings and diagrams. There is a detailed bibliography and a good index.

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