Groundwork

Stephen Nortcliff

Soils of the British Isles. By B.W. Avery. *CAB International: 1990. Pp. 463. £67.50, $118.*

IT has always been with some embarrassment that we in the United Kingdom have had to explain to visiting soil scientists that there is no official classification for the soils of the United Kingdom, but rather separate systems for Scotland, England and Wales, and Northern Ireland. Of these systems, Avery the author of this text has had the greatest responsibility in developing the system for England and Wales. This system incorporates many of the currently accepted approaches to the classification of soils. The classification used in the book is not this scheme however, but a modified version based on his experiences with the system since its introduction. In many respects experience is the hallmark of this text. It is written at the end of a long and successful career in soil science and soil survey, and this clearly snows through in the authoritative and comprehensive style.

The nine chapters of the book are conveniently divided into two groups. The first group of three chapters is a broad introduction to the nature and pattern of soils and soil development and the manner in which attempts have been made to map the soil patterns and classify the soils, with a major emphasis on Britain and British soils. The second group of six chapters deals in turn with one of the major soil groups identified as the highest level of the soil classification. These chapters are not solely lists of soil properties, but include brief introductory discussions of the relevant soil processes and environmental influences on soil development, together with the subdivisions of soil groups and subgroups. Although the soil descriptions may be widely available from other published sources, what gives the text a distinctiveness is the manner in which the soils are discussed and placed in a broad context. These discussions are supported with a number of black and white photographs of the landscapes within which the soils are found together with clear line drawings. There are relatively few photographs of soils; 16 small colour photographs are included in four pages of colour plates together with a small number of within text black and white photographs. This limited number of photographic illustrations is the only negative point I would make about the text, and even this is offset to a large degree by the excellent soil descriptions.

In conclusion, this is an excellent text which will serve for many years as a reference base for anyone involved in the study of soils in the British Isles. It is comprehensively and clearly written and a most welcome addition to the soil science literature. □

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Igloos, built from blocks of wind-packed snow cut with long knives and stacked up in a spiral fashion, can last for several weeks in the polar winter. This picture is taken from *North Pole, South Pole* by Bernard Stonehouse, which examines life at the poles and polar issues. Published by Prion, price is £17.95. □

All tied up

John D. S. Jones

The Geometry and Physics of Knots. By M. Atiyah. *Cambridge University Press: 1990. Pp. 78. £6.95, $14.95.*

ONE of the arts in doing mathematics is to find the right point of view — from which things become clear — the elegant solution. Taken to extremes this becomes the purist's search for the ultimate elegance and style and it usually obscures essential issues, but in the right measure this search is one of the most important things in mathematics — in its simplest terms the most elegant explanation is usually the most convincing one. Mathematics is full of deep interactions between seemingly different questions and these links do not usually become clear until one has the right point of view.

Michael Atiyah's book is a brief and rapid introduction to the incredible mixture of mathematical ideas and techniques in the work of Vaughan Jones and Edward Witten relating knots and quantum field theory, and it is a superb example of how the right point of view can be so revealing. This material is at the forefront of the current, deep and exciting interaction between geometry and physics and, in particular, of the way quantum field theory appears to involve very significant features of geometry and topology in three and four dimensions. Many of the insights which led to this renaissance are due to Atiyah, so it is particularly interesting to read him expressing some of his ideas on the subject. It is also quite extraordinary to realize that the theory of knots should provide one of the focal points in the present interaction between geometry and physics.

Knot theory is the branch of mathematics that studies simple closed curves in space. Simple means the curve does not cross itself and closed means the curve ends where it started — imagine taking a piece of string, tying a knot in it and then sewing the two ends together so you cannot slip the knot off. You will immediately get the right impression of the complexity of the subject if you experiment. In 1984, Vaughan Jones discovered a new technique in knot theory which led to a flurry of activity and many new insights. In its simplest possible terms, Jones' method is to draw a diagram of the knot on a piece of paper, indicating undercrossings and over-crossings in the usual way, and then to read off, from the pattern of crossings, a polynomial. This polynomial is an invariant of the knot, which means that two different diagrams of the same knot yield the same polynomial. Most important of all, it is extremely good at distinguishing between different knots.