Book review

Selected Papers on Engineering Geology and Geotechnics.

J. N. Hutchinson. Associazione Italiana di Geologia Applicata e Ambientale (AIGA). Livorno: Media Print, 2008, 413 pp. ISBN 978-88-903282-0-6. €48 plus postage, obtainable from www.sga-storiageo.it/products/publications2008

The preface to the book is by Professor Mario Del Prete, Università della Basilicata, Potenza, who explains: 'The idea of publishing a volume of papers selected from J. N. Hutchinson's *oeuvre* was born with the aim of making more accessible to students and researchers the significant results he has obtained in the field of the geotechnical characterization of geological bodies and slope stabilization.' Mario Del Prete describes Professor John Hutchinson as his 'mentor and master, for whom I have always had great respect and admiration ... for stimulating my interest in the researches on landslides and slope stabilization'.

To further their aim, AIGA have selected from Hutchinson's current total of 115 papers (listed in the accompanying bibliography) some 20, mainly on landslides, chosen 'partly on the technical interest of the paper and partly with regard to its ease of accessibility (papers published in *Géotechnique* and *QJEG* [sic] are thus not included). The works chosen include the classification and mechanics of landslides, the study and evaluation of methods of landslide hazard assessment and stabilization, the interpretation of relict periglacial mass movements, the evolution of gravitational processes in coastal cliffs ... and the study of flexural slip. It is hoped that the list of papers in the Bibliography also indicates to some extent the breadth of John's interest, including forays into Romano-British archaeology ...'.

The *Selected Papers* are in chronological order, and by my rough estimate some two-thirds are on landslides and their classification and mechanics (of which about a third are mainly on coasts), the balance being on geotechnics and geology/geomorphology. The selected 20 appear fairly representative of his life's work. Of his complete bibliography, I estimate broadly similar ratios, but perhaps with a little more on geology/geomorphology.

What are the wider implications of the book? John and I were youngish lecturers at Imperial College in the heady days for all geo-engineering subjects in the 1960s, and I began to believe that his work in the boundary area between geology (typically geomorphology) and geotechnical engineering, together with that of Professor Sir Alec Skempton (Skem), was probably the world's best in this area. Both approached their work with an exceptionally strong and clear understanding of geology/geomorphology—albeit principally the happenings and processes of the all-important-for-geo-engineers Quaternary Period. Today, good engineering geology papers typically are found in the *Quarterly Journal of Engineering Geology and Hydrogeology* (QJEGH) and good soil mechanics papers in *Géotechnique*, the latter often being nearly impossible for a geologist (and many engineers also I understand) to follow. These journals, I consider, represent the end members of the spectrum. From my geology base, I venture outwards a little towards construction engineering. A few top geotechnicians venture outwards well into geology/geomorphology from their engineering base far more than the average, but none of us, to my mind, sits halfway as brilliantly as Hutchinson and Skempton, as the book demonstrates, with mastery of the middle ground. Indeed, the middle ground is occupied mainly by engineers, not engi-

neering geologists. I believe, in part at least, sadly, that this is because too little fundamental research is being done by engineering geologists.

A beauty of John's papers is that typically they do not just pay some sort of lip service to the geological background; the geology is in the foreground, and intimately blended with soil mechanics and engineering, so they are inseparable parts of the problem and solution. Indeed, if I were to propose the best ever fundamental 'engineering geology/geomorphology' paper I would nominate John's paper (fortunately in the *Selected Papers*) 'Periglacial and slope processes' (1991).

How is it that Skem and John have achieved this? Both have first degrees in civil engineering, for which, I understand from past discussions, they both had two one-week long geology field courses and comprehensive geology lectures that whetted their understanding and interest even to the point of inspiration. Were this to happen today! My career has witnessed the squeezing and squeezing down of geology (and other basic courses) taught to young aspiring engineers. Of course, more than undergraduate geology is needed to produce a past master, and in Hutchinson (and Skempton) this aspiration has been driven by the tireless quest for understanding and detail, leaving no room for unquestioning acceptance.

It was suggested at the Skempton (Memorial) Conference 2004 that post-Skempton work at our senior universities with big geotechnical research schools continued Skem's engineering-with-geology research interests, and it was alive and well. I do not see this (except for John's work, and that of a very few others around the world), although its demise has taken a couple of decades. I believe that current trends in geotechnical research work, in the UK at least, are firmly based in the mechanics of soils. Geology, although often included, is not treated with the same intimacy of understanding and interlock with engineering as hitherto. In support, I cite comparison with more or less any of Hutchinson's *Selected Papers*. For example, those on slopes, with his sequence of publications, trace the history of the evolving art of slope movement research. This can be seen from the *Selected Papers*, and in the comprehensive commentary given in the book on the full bibliography.

His research history started with a year in Sweden in the late 1950s, and continued at the Norwegian Geotechnical Institute, where he worked under Laurits Bjerrum, initially on friction piles in soft clays but mainly on landslides in quick clays. Among other things, this led to the first measurement of the drained angle of shearing resistance of quick clay in terms of effective stresses.

Back to the UK in the 1960s he joined the BRS to study for a PhD at Cambridge on weak rock cliff stability, particularly on the coasts of South-East England. This work clearly underpinned his lifetime's interest in developing this subject, and papers on London Clay inland and coastal cliffs, Folkestone Warren and Isle of Wight cliffs regularly followed. Such papers (examples given in the 20 selected) fostered understanding of residual strength, slope stability and development in overconsolidated clays, and mudslide mechanisms. In 1969 Skem, with John, published the milestone state-of-the-art report on the stability of natural slopes and embankment foundations. This paper, together with other major publications, regrettably, is not in the *Selected Papers*. On balance, I think the deliberate omission of a few of his best major papers because they were published in the

more accessible journals is a pity, as it interrupts the sequence of his developing ideas, and diminishes substantially the practical convenience of having his landmark papers collated in one volume. However, this is my only negative view about the AIGA's well-thought-out and well-presented book, and they are to be congratulated on their initiative and the publication of the papers.

In the late 1960s and 1970s John investigated the nature and mechanisms of flow slides (including Aberfan, South Wales) and their great potential danger, as well as the huge, very rapid and catastrophic rock avalanches (sturzstroms) in the Peruvian Andes. In the 1970s and 1980s John's consulting work, often together with Professor E. N. Bromhead and Dr D. J. Petley, directed his attention more and more, with his influence-line approach, to corrective measures for landslides, typically by designed cuts and fills, counterfort drainage and ground anchors, resulting in many valuable feet-on-the-ground papers.

In the 1980s, in Italy, he started to work on the effects of earthquakes on landslides, and there and elsewhere on the influence and mechanics of tectonically induced flexural slips. Such work over the last two decades, illustrated in the *Selected Papers*, strengthened his experiences of geological processes and led to some of his best research. He has

worked on a fresh look at Vaiont, and has contributed to the further understanding of periglacial solifluction, frost action, thermokarst, cambering and valley bulging, pingos and the so-called 'scour hollows', for example in the Thames basin.

His more recent notable work (not in the *Selected Papers*) includes the Fourth Glossop Lecture (2000) on 'Reading the ground . . .', based on his huge and apposite field experience. John's most recent paper in the book (2006) explores massive rock slope failure, using a momentum transfer approach, with encouraging results. More papers are in the pipeline. At the age of 82 he is not yet fossilised, and is still preparing papers on Quaternary engineering geology.

Has his life's work all been worth it? Of course it has. His views and findings are pretty pervasive in all well-conducted slope schemes, Ventnor and Lyme Regis being outstanding examples. Regrettably not all such projects are conducted with so much care and insight. Education and experience will slowly improve that. I would certainly buy this impressive book, as I hope would a geologist, a geomorphologist or any geo-engineer, whether engineering geologist or soil mechanician. In this compendium the two disciplines are brought together in an exemplary manner; readers should not be disappointed.

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