Near-Surface Geophysics, edited by D. K. Butler. ISBN 1-56080-130-1, SEG, 2005, 732 pp., $139, $89 (members).

The book *Near-Surface Geophysics* edited by Dwain K. Butler is a massive tome of 732 pages organized into 31 chapters with two parts. The book is beautifully printed on high-quality gloss paper with many color figures.

Part 1 (Chapters 1–12) deals with the specific challenges presented to near-surface geophysics, such as the complex structures of rock formations and the variability of the physical properties of rocks. The rock properties dictate the mix of geophysical methods used to tackle a given problem. A short history is given of each of the methods, their fundamental concepts, and theoretical structure. A wide variety of methods (potential, seismic, electromagnetic, etc.) is handled at a level relevant to graduate courses in exploration geophysics. There is an excellent tutorial (Chapter 12) on downhole logging, which discusses 13 different logs used. Another excellent tutorial (Chapter 11) covers ground-penetrating radar. The tutorial on inversion for applied geophysics (Chapter 5) provides a thorough, clear, succinct treatment of the subject, which can be downloaded from the Web site; however, I was unable to get the programs to work.

Part 2 (Chapters 13–31) deals with the investigations of real subsurface problems and details their case histories. Here the great advantage of using a combination of methods clearly shows up. Each of the chapters is written by current, active geophysicists, who are well known contributors to journals such as GEOPHYSICS and *Geophysical Prospecting*. The general form of each chapter begins with a short historical outline, followed by the field procedures and the mathematics necessary to calculate the measured signal resulting from the source body. In most cases, the theory presented is very much up-to-date and generally only to be found in current journals. The use of a combination of different but suitable methods is stressed. The interpretation of the data is compared with the actual subsurface conditions found subsequently. With 31 chapters in the book there are too many to enumerate here, but suffice it to say that all variety of methods are expeditiously covered. For example, Chapter 15 examines the use of gravity and seismic tomography to direct a well-designed drilling program for the Sydney-Harbor Tunnel Projects. The problem was to locate accurately paleochannels cut through the sandstone. It was most important to find every paleochannel prior to tunneling, because the tunnels were to be cut by a boring machine. The tunneling is now completed, and the predicted geologic structure is close to the actual subsurface conditions. Every chapter has its own list of references, but there is a single index for the entire book which is particularly complete.

The book is not designed to be a textbook for seniors taking a course in geophysics, but it forms an excellent source book for professors giving a course. For graduate students it provides an excellent theoretical treatment of a subject with field examples, plus a bibliography of current authors. The book is a must for libraries of organizations dealing with civil engineering, mineral prospecting, and archaeology, and also water companies and government resource planning departments.

The editor (Dwain K. Butler) is to be congratulated on the quality of the editing. The book is not a set of diverse articles—it has the feel of well-crafted unity. For $139, it represents real value for the money.

—RON GREEN
Fitzroy, Australia