Books

Bedrock Geologic Map of Maine

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P. H. Osberg, A. M. Hussey, and G. M. Boone, Jr. (Eds.), scale 1:500,000, Maine Geological Survey, Augusta, 1985.

Surficial Geologic Map of Maine

W. B. Thompson and H. W. Borns, Jr. (Eds.), scale 1:500,000, Maine Geological Survey, Augusta, 1985.

Reviewed by John B. Lyons

For the tectonic, structural, or surficial geologist, a geologic map is the ultimate document, encompassing within its bounds a concise display of the current status of geologic information for the region that it embraces. Because the state of Maine, areally, is half of the New England region, the new bedrock and surficial maps of that state, produced under the direction of State Geologist Walter Anderson with the collaboration of 13 bedrock area compilers, 12 surficial areal compilers, and aided by funding from the U.S. Department of Energy and the Maine Geological Survey, are important contributions to our knowledge of this portion of the northern Appalachian Mountains. These maps follow closely upon recently published bedrock maps of Massachusetts (E.-A. Zen et al., U.S. Geological Survey, Washington, D.C., 1983) and Connecticut (J. Rodgers, Connecticut Geological and Natural History Survey, Hartford, 1985). Revisions of maps for the other New England states are in progress.

In addition to being a major update of its 1967 predecessor and accounting for a very large amount of new data, the bedrock map also shows a stratigraphic correlation chart; smaller tectonic, regional metamorphic, and major structural features maps; eight cross sections; and a citation list of 248 references. To account for the 275 (or so) formations and members shown on the principal map, both colors and patterns are used, but the unique feature is that the patterns represent the protoliths and the colors represent the ages. Another laudable innovation is that the petrography of the igneous rocks is indicated by a number keyed to the Streckeisen classification scheme, with small letters for textural or mineralogical features. That this is all accomplished on one 4.75 × 3.50–ft. (~1.45 × 1.07–m) sheet of paper is a tribute to the ingenuity and skill of those who planned and organized this project. It is also an enormous relief and a great convenience to the reader to have everything on one chart, rather than having to wrestle with the two to three–sheet format that now seems to be standard for most new state maps.

The surficial map, which is really the first of its kind for Maine, upholds the same high standards. The explanation section lists 18 map units and tabulates the material(s), topography, and origin of each. Geologic symbols, radiocarbon-dated sites, a correlation chart, a map of the inferred extent of ice cover during deglaciation, a list and brief description of 31 sites of special interest, and a bibliography of 109 entries are also included. Althought there is one radiocarbon age of more than 38,000 years B.P. reported from Maine, the editors have wisely made no effort to distinguish pre-Wisconsin deposits from those of Wisconsin age, and most of the surficial features may be taken (on the basis of the available radiocarbon ages) to be younger than 14,000 years. This map is of the same size and scale as the bedrock map.

In the long run the surficial geology map will probably be the more useful of the two from the point of view of its utility as an indicator of sand and gravel resources (the most valuable mineral products in the New England states) and its importance in the location and exploitation of groundwater resources. The widespread glaciomarine Presumscot formation of coastal Maine is also an economic target for the brick industry.

Notwithstanding these facts, the bedrock geology holds a fascination for many geologists of both tectonic and economic interests. Two large, massive sulfide deposits have been discovered within the past decade, and although they are currently not fully exploited, they will undoubtedly be mined in the future. Maine also has an advantage in that because of the relatively low level of metamorphism of some of its features, paleontologic control is comparatively good. Projections of the geology to the southwest of these areas therefore will ultimately decide the fate of several of the controversies still extant (despite new maps) in the remainder of New England. This is not to imply that Maine itself is without its own unresolved problems; only that some of theirs are more tractable than those in the higher-grade metamorphic terranes to the south. In addition to questions concerning ages and correlations of many nonfossiliferous formations in Maine and their structural settings, there are broader problems such as the locations (if any) of suspect terranes and their time or times of accretion; the age, significance, and relative motion along major structural discontinuities such as the Norumbega Fault; the nature and age of the basement below the Phanerozoic; the extent of allochthons such as those that are now indicated by the U.S. Geological Survey deep seismic profile across the state; the extent and nature of the recently identified Alleghenian metamorphism; and the locations and ages of all the major tectonic subdivisions.

A geological map is, after all, a state-of-the-art, or progress, report. For both the 1985 bedrock and surficial maps of Maine, the progress that they represent for the past 2 decades of effort by scores of geologists is truly impressive. The maps themselves likewise set a standard that will be difficult to match.

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New Publications

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Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Processes and Resources of the Bering Sea Shelf (Probes), D. W. Hood (Ed.), Pergamon, New York, iv + 291 pp., 1985, $44.00.

The Propagation of Radio Waves, K. G. Budden, Cambridge University Press, London, xvi + 669 pp., 1985, $89.50.

The Second Creation: Makers of the Revolution in Twentieth-Century Physics, Robert P. Crease and Charles C. Mann, Macmillan, New York, xi + 480 pp., 1986, $25.00.

Seismic Wave Propagation in Stratified Media, B. L. N. Kennett, Cambridge University Press, London, vi + 342 pp., 1985, $24.95.

The Solar System: Observations and Interpretations, Margaret G. Kivelson (Ed.), Prentice-Hall, Englewood Cliffs, N.J., vi + 436 pp., 1986, $43.95.

South Atlantic Paleoceanography, K. J. Hsu and H. J. Weissert (Eds.), Cambridge University Press, London, 350 pp., 1985, $69.50.

The Utility of Regional Gravity and Magnetic Anomaly Maps, William J. Hinze (Ed.), Society of Exploration Geophysicists, Tulsa, Okla., xiii + 454 pp., 1985, $75.00.

Valuing Environmental Goods: An Assessment of the Contigent Valuation Method, R. G. Cummings, D. S. Brookshire, and W. D. Schulze, Rowman & Allanheld, Totowa, N.J., xiii + 270 pp., 1986, $49.50.

Velocities in Reflection Seismology, Jean-Pierre Cordier, D. Reidel, Hingham, Mass., xii + 201 pp., 1985, $38.00.

Vertical Seismic Profiling and Its Exploration Potential, Peter Kennett, D. Reidel, Hingham, Mass., 1985, xix + 442 pp., $69.00.