This volume is a status report on the great body of knowledge that exists about Illinois geology. Assembling and condensing this knowledge into a single tome involved the synthesis of information dispersed in thousands of reports and maps published over the last hundred years. We salute those original authors whose research discovered and whose writing documented the geology of Illinois. We also salute the authors and editors of this volume, whose syntheses of this information have produced a magnificent result, a substantial work that celebrates and commemorates the 2005 centennial of the modern Illinois State Geological Survey (ISGS).

There is no end in sight for geological discovery or service in Illinois. Even after a century, much remains to be discovered, and the demand for geological insight and information is more urgent than ever for the economy of the state and the well-being of its citizens. The practical value to Illinois of the cumulative knowledge about the state’s geology, represented in this volume, lies in the application of that knowledge to the major issues of economic development, environmental protection, resource conservation, sustainability, and hazards mitigation. The tasks of applying and continually adding to that geological understanding are fundamental to the mission and legislative mandate of the ISGS and the state’s universities and are conducted cooperatively with the support of its industry, government, and citizens.

When this book project was conceived, the programmatic emphases of the Survey were environmental quality, groundwater and waste disposal issues, and expansion of detailed geological mapping of priority areas. Shortly thereafter, however, energy resource scientists recognized the need to help Illinois government and industries reduce the release of greenhouse gases from stationary sources, such as coal-fired power plants. A new line of research, with state and federal funding and industry cooperation, supported large-scale demonstration projects to lay the groundwork for possible industrial-scale sequestration of carbon dioxide in subsurface geological reservoirs in Illinois.

A century of geological research had provided the basis for and a headstart on sequestration and a wide range of future projects. Studies, especially those in support of the coal and petroleum industries on the composition, distribution, and characteristics of the rocks and fluids deep in the Illinois Basin, provide unique information to guide key strategies and decisions. These and other studies have added substantially to the state’s large archive of geological samples; huge volumes of descriptive, analytical, and geophysical data; and hundreds of maps and reports on the detailed aspects of the geology. These form a strong technical basis for selection and characterization of sites for large-scale tests of geological sequestration of carbon dioxide or other future needs.

What will be the geological challenges of the next century? They will likely include

- the geochemical legacy of hundreds of years of human habitation, industrial production, and waste disposal in Illinois;
- the environmental impacts of a century of oil production and coal mining;
- growing demand for groundwater for an increasing population;
- expanding alternative energy and biofuel production;
- new transportation systems and corridors to carry people and freight;
- restoration of wetlands and floodplains along major rivers;
- sustained aggregate production in and near major metropolitan centers;
- agriculture adapting to the effects of changing climate; and
- the hazards of floods, landslides, and earthquake activity.

Whatever the future, geologists will continue to gather, map, and provide important, relevant, accessible, and usable geological knowledge and information to Illinois’ citizens, industries, and governments apprising them of opportunities and challenges related to protecting their environment, ensuring their energy supplies, and minimizing impacts of geological hazards.

—E. Donald McKay III, Ph.D.
Director, Illinois State Geological Survey