

KEVIN F. KERN | GREGORY S. WILSON

OHIO

A HISTORY OF THE
BUCKEYE STATE

SECOND EDITION

WILEY Blackwell

Ohio

Ohio

A History of the Buckeye State

Second Edition

Kevin F. Kern
and
Gregory S. Wilson

WILEY Blackwell

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Preface

“The problem with history,” a historian once said, “is that it keeps on happening.” When the first edition of this volume came out in 2014, it was the first new survey of Ohio history in a generation. Yet in some ways it was already getting outdated: the years-long production process that is normal for a book like this meant that most of the text had been written a few years earlier. Since that time, much has happened—both in Ohio history and in the scholarship surrounding it. This new edition is meant to update the text in both areas.

The biggest addition to the book is the history that kept on happening after the first edition. The final chapter now incorporates the many social, political, and economic developments that have shaped the state over the past dozen years or so. In terms of scholarship, the past ten years have seen many new and useful contributions to the Ohio historical literature from pre-history to the present, including important archaeological discoveries, biographies of major figures, and research concerning various previously-understudied topics. We have attempted to incorporate this literature into the new edition throughout. Extensive updating is also evident in Chapter 1—which includes more recent statistics on Ohio’s production of minerals and commodities—and wherever the text refers to contemporary matters (such as the value of money adjusted for inflation into current dollar amounts). Other chapters saw changes to the structure and the information.

In addition, we have attempted to stay current with trends in historical scholarship regarding standard terminology. For example, most previous treatments of Ohio in the 1700s refer to an Indigenous group called the “Mingo,” a term meaning “stealthy” or “treacherous” applied to them by other people, and which they did not use themselves. This and other names of Native groups have been updated to represent more accurately who these groups were and what they called themselves. We also benefited from feedback from readers and reviewers and addressed many of the editing and proofreading gaffes from the first edition, although we expect attentive readers to see additional ways to improve the text.

We hope these and other changes will serve to make this volume more useful both as a survey of Ohio history and as a reference work, even as Ohio history “keeps on happening.”

Acknowledgments

Although this book may have only two authors, literally hundreds of people have contributed to it in one way or another. In some ways, this makes writing the acknowledgments section more daunting than writing certain chapters: the text of every historical survey probably neglects to mention figures who ought to have been included, but most of those people are usually immune from feeling undeservedly slighted. To anyone not mentioned below who deserves to be, please accept our apologies.

Contributing most visibly to the look and experience of the book was the Ohio History Connection (formerly the Ohio Historical Society), which supplied the lion's share of images and was supportive of the project above and beyond what we had even hoped it would be. In particular we'd like to thank Janice Tallman who went the extra mile in securing images and getting permissions and Jillian Carney, who approved the entire set for our use. Thanks, too, to Victor Fleisher and his staff at the University of Akron Archives for their help in supplying images at extremely short notice.

We have been extremely fortunate to find ourselves surrounded by colleagues in the historical community who have made this project much less difficult than it might have been otherwise. First and foremost, George Knepper was of inestimable inspiration and gracious support to us ever since we took over teaching Ohio History upon our arrival at the University of Akron (UA). The fact that it has taken two of us to do this gives some indication of the size of the shoes we have been trying to fill. Similarly, Andrew Cayton's (Miami University, Ohio State University) research and writing should be an inspiration not just to all Ohio historians, but also to all historians anywhere. The field is fortunate to have had a scholar of his caliber bend his considerable talents its way, just as we are fortunate that he generously shared his time and expertise with us. We also must thank Bil Kerrigan (Muskingum University) and Donna DeBlasio (Youngstown State University), who provided invaluable suggestions after reading a draft of the first edition. We would also like to thank our former colleague at the University of Akron, John Green, who took time out from his many media interviews during election

seasons to offer advice and suggestions for research. Finally, we would like to offer our sincerest gratitude to our colleagues in the History Department at the University of Akron during the years we prepared and revised this manuscript: Shelley Baranowski, T.J. Boisseau, Connie Bouchard, Rose Eichler, Lesley Gordon, Evi Gorogianni, Michael Graham, Steve Harp, Walter Hixson, Janet Klein, Mike Levin, Elizabeth Mancke, Gina Martino, Martha Santos, Michael Sheng, Martin Wainwright, Zachery Williams, and Gang Zhao. The fact that we have had the good fortune to work every day with such talented historians and collegial supporters has made our time at UA something approaching a dream job.

We would also like to thank our students in our Ohio History classes and Greg's Public History classes at the University of Akron. While you learned from us (we hope), you may not have realized that we learned from you as well. Not only have your thousands of term papers and other class projects contributed to our understanding of Ohio history, your course evaluations and individual meetings with us have helped us understand the best ways to form an Ohio History learning community every semester.

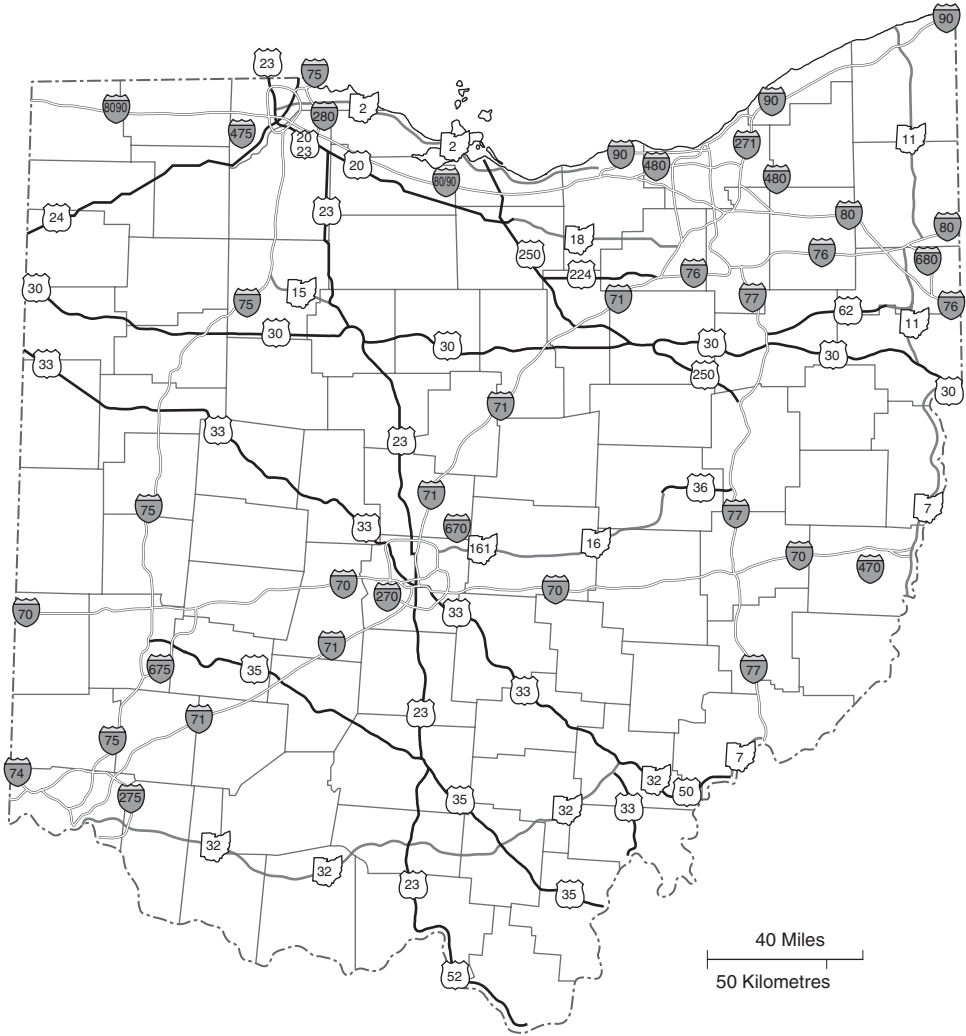
The people most directly responsible for the production of this book, though, are the truly gifted people at Harlan-Davidson and Wiley with whom we have had the great privilege to work. Sincere thanks to Annie Jackson and Carol Thomas who had this project put on their respective plates relatively late in the process but nevertheless pushed it through with utmost professionalism and stunning alacrity. Linda Gaio and Andrew Davidson probably deserve a page of acknowledgments of their own for their tireless efforts on this project (and their incredible patience with us). There is no one else with whom we would have rather worked to bring this book to fruition, and we feel that any thanks we could possibly give to them would still be insufficient. We also must thank Bruce Way and Arthur Moliterno for their substantive helpful suggestions for the second edition, as well two other anonymous readers who offered valuable suggestions. For the second edition, Liz Wingett guided us through the process with great skill from her London office, with help from Anya Fielding.

In addition to the many people we must jointly thank, both Greg and Kevin also would like to express sincerest thanks to a number of people who have inspired us individually. Dr. G. Richard Kern instilled an intense interest in history in his son from a very early age and provided a wealth of material for him when he first began to teach Ohio History. He also contributed suggestions for the second edition, and he is still Kevin's favorite historian. Kevin's mother, Marilyn Ruth Rayle Kern, was not only always tremendously supportive of his every endeavor, but also always reminded him (as Macaulay said) that "no one who is correctly informed as to the past will be disposed to take a morose or desponding view of the present." His brother Christopher Garrett-Kern and his sisters Kathleen Kern and Carolyn Schlicher have long been the most supportive siblings one could ever wish for, even if he does not tell them nearly enough. Without even knowing it, Kevin's children Jace and Kenton have kept him going on many days when he might have otherwise quit. And last, sincerest thanks and love must go to Kevin's wife Kristie, who bore the burdens of the countless late nights and weekends Kevin devoted to the project with grace and endless patience. With no offense intended to Greg, Kevin thinks that his life with Kristie has been his greatest and most satisfying collaboration.

Greg became interested in Ohio history by working on his dissertation (later book), which dealt in part with deindustrialization in Ohio and the nation. He then began teaching at the University of Akron, taking over the Ohio History course (along with Kevin) from the

legendary George Knepper. He also worked with Kevin to start the *Northeast Ohio Journal of History*. Starting the journal and teaching the course – and doing so in the former rubber capital of the world, helped fuel the desire to contribute to a new book on Ohio’s history. Perhaps the single most important intellectual and professional activity that inspired Greg’s work was his great fortune of having co-written and helped to run three Teaching American History grants. Work on these TAH projects and with the many people who made them possible deepened his knowledge and enthusiasm for Ohio history, and teaching and learning more generally such that this book and these grants are intertwined. Funded through the federal Department of Education, these programs brought K–12 teachers together with historians and professional staff from historical sites and organizations to train teachers in U.S. history content. Of special note are the two project directors: Sharon Hays and Erin Stevic. They each combined skill, grace, and patience with a deep knowledge of history and enthusiasm for learning. The partners over all three grants at the Akron Public Schools, the Cuyahoga Valley National Park, the National Constitution Center, the Ohio History Connection, the Summit County Educational Service Center, and the Stark County Educational Service Center – especially Jody Blankenship, Mark Butler, Pat Clayton, Betsy Hedler, Dave Irvine, Gail Martino, Adam Motter, and James “Kimo” Tichgelaar taught him so much about teaching, learning, and Ohio history. The grant evaluators, Doug Clay, Carole Newman, and Isadore Newman, added further to his knowledge and understanding. Finally, Greg thanks all of the staff and volunteers at the many sites we visited in Ohio, Maryland, Pennsylvania, Virginia and Washington D.C. and the many scholars who led seminars and workshops. Without them, neither these grants nor this book would have been possible.

On a personal level, Greg’s wife, Laura Hilton deserves his deep thanks – and a medal. She endured many days and nights of being a “grant widow” as he traveled with teachers during the academic year and in summers as part of the TAH projects. Busy with her own professional concerns as a historian and department chair, she listened to ideas, offered criticism, and provided the support and encouragement he needed to see both editions of the book (and the grants) through. Greg’s daughter, Kate, provided much needed support and encouragement.



Map of the highways of Ohio.

Ohio Before Ohio

State Geology and Topography

The history of Perry County, which sits in predominantly rural south central Ohio, is in many ways representative of the history of the state as a whole. The northern half underwent several phases of glaciation while the southern half lies in the more rugged unglaciated Allegheny Plateau. Lying just to the south of the famous ancient Newark Earthworks and Flint Ridge quarries, the county has numerous Woodland-period mounds as well as much older outcrops of the Flint Ridge and Upper Mercer flints that Ohio's earliest inhabitants prized highly. The county boasts several locations on the National Register of Historic Places, including Somerset's Saint Joseph's Church (the state's first Catholic Church) and Old Courthouse (the oldest continuously used public building in the Northwest Territory). Although agriculture has always been important to the county, other commercial pursuits have traditionally driven its economy. The National Ceramic Museum and Heritage Center in Roseville celebrates only one of the many industries that once flourished in the area. Salt-making, centered in McCuneville, was the county's first industry, followed soon thereafter by lime production in Maxville. By the middle of the nineteenth century mining started in earnest, and for a while Perry was the largest coal-producing county in the state, with major operations in the "Black Diamond" region of Shawnee, Congo, and New Straitsville. This combined with locally produced lime and the iron ore (found primarily in the southern part of the county) gave rise to a significant smelting industry with as many as seven blast furnaces operating within the county by the late 1800s. Commercial production of gas and oil in Corning and Junction City had augmented this economic boom by the early 1890s with the county reaching its peak population in the 1920s. As with the rest of the Appalachian region, Perry County faced increasingly difficult times starting with the Great Depression and has never fully recovered from the decline of its mining and iron industries. By the late twentieth century the county experienced increasingly low median incomes and high unemployment. Nevertheless, the county is still home to some of its historic industries, including the ceramic manufacturers Petro Ware in

Crooksville and CertainTeed Corporation/Ludowici Roof Tile in New Lexington (the world's largest roofing tile firm).

However well Perry County may represent the highs and lows of Ohio's social and economic development it is an even better exemplar of the significance of Ohio's geology to its development. The flint obtained from Flint Ridge, which was such a valuable resource for early Indigenous groups, was a product of a unique set of silicon dioxide deposits made during the Pennsylvanian period. The saltwater that created Perry County's early salt mining industry was a remnant of Silurian period seas that covered the area, and one can trace its lime industry to the shells of the creatures that lived in those seas. The clays that formed the basis of the county's enduring ceramic industry—as well as the bricks that make up Saint Joseph's Church and Somerset's Old Courthouse—were drawn from deposits made by Mississippian and Pennsylvanian seas and by glaciers that came hundreds of millions of years later. The iron ore processed by Perry County blast furnaces, as well as the coal that made them run, came from the Pennsylvanian period, while the limestone used as flux to remove impurities from the iron came primarily from the Devonian and Mississippian periods. Life forms from these periods probably formed the gas and oil that Ohioans began to use in the late nineteenth century. The 39 percent of Perry County's land that is used for agriculture has a complex geological signature with the rich soil having developed from both the erosion of ancient rock strata and relatively more recent glacial deposits. Although most residents there probably give it little thought, Perry County's history has been at least half a billion years in the making.

This case study of just one of Ohio's eighty-eight counties shows how important an understanding of Ohio geology is to understanding its history. To comprehend what Ohioans did through the ages, it is first necessary to appreciate what went on beneath their feet. Their stories and lives, explored in this book, are inextricably entwined with the nature of the land.

Geology

The substructure of Ohio can be thought of as a kind of multilayered cake that has been pushed up from the bottom and shaved off at the top, leaving slanting edges of layers exposed on the surface. This differential exposure has given different regions of Ohio different surface rock types and resources. Each of these exposed strata, plus others that remain buried far beneath the surface, are the product of millions of years of geological processes. Figure 1.1, a geologic map of Ohio, shows its deep and surface formations.

Precambrian era

The oldest, "basement," layer of Ohio's substructure is a several-mile-thick and multi-layered sheet of igneous and metamorphic rocks laid down between 1.5 billion and 800 million years ago. The most notable feature of this layer is the eastern edge of the Granite-Rhyolite Province, an uprising or "superswell" in the earth's mantle under what



Geologic system (million years before present)

- Permian (286–245)
- Mississippian (360–320)
- Silurian (438–408)
- Pennsylvanian (320–286)
- Devonian (408–360)
- Ordovician (505–438)

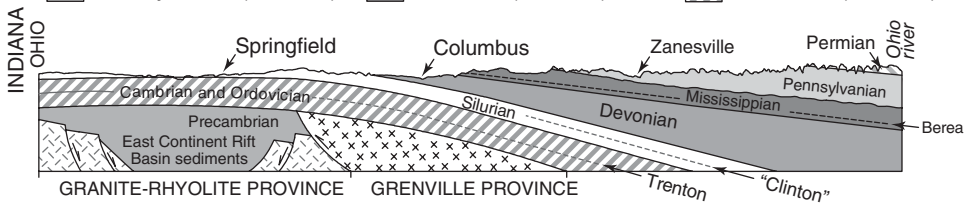


Figure 1.1 Geologic map and cross-section of Ohio.

Source: Ohio Department of Natural Resources, Division of Geological Survey

is now Ohio and states farther west. This extending and splitting of the crust created a deep feature called the East Continent Rift Basin. At about the time that the superswell activity ceased, the continent that would become North America—of which Eastern Ohio lay on the edge—collided with another protocontinent to the east. The impact caused significant compression of the crust, the formation of faults, and an ancient range (known as the Grenville Mountains) that was gradually worn down over the following hundreds of millions of years.

Ohio's Precambrian layer is not visible anywhere in the state, lying anywhere between 2,500 and 13,000 feet below the surface. Although it cannot be seen sometimes it can be felt. The relatively minor earthquakes that sometimes occur in Ohio arise from the rifts and faults of its basement layer.

Paleozoic era

At the end of the Precambrian era (about 570 million years ago) the continent that became North America began to separate from the one it had collided with 300 million years earlier. Sitting on the edge of the continent, Ohio was engulfed by the body of water geologists call the Iapetus Ocean. For most of the next 300 million years much or all of Ohio lay under water. This era is known as the Paleozoic and it was marked by the proliferation of multicellular marine life forms worldwide. This era is the most significant to Ohio geology, not only because of the various resources these life forms left behind, but also because nearly all of the strata that comprise Ohio's current surface were laid down during this time.

Cambrian and Ordovician periods

When the Iapetus Ocean flooded what is now Ohio it brought new geologic processes to bear on the landscape. It deposited layer after layer of silt, sand, mud, as well as shells and skeletons of countless sea creatures over the course of what is known as the Cambrian period. During the early Cambrian period most of Ohio was under a relatively shallow, tropical ocean shelf that left a thick layer (as much as 400 feet in some places) of sandstone. An above-water feature that geologists call the Kerbel Delta formed in north and central Ohio during the middle Cambrian period. At the same time ocean waters began to rise. By the late Cambrian and into the Ordovician period (505–440 million years ago), the entire state was again covered by a warm, shallow sea. Although low muddy islands emerged periodically in the western part of the state the sea eventually reclaimed all of the state by the later Ordovician. At this time, a growing abundance of more complex life forms appeared and flourished. Sponges, jellyfish, bryozoans (and their coral cousins), brachiopods (clamlike creatures), trilobites (one type of which, *Isoletus*, is Ohio's official state fossil), cephalopods (ancestors of octopi and nautilus), echinoderms (related to sea stars), snails, and even primitive fish left their traces in the geologic record—not only as fossils, but also as the ever-deepening layers of calcium carbonate from their shells and skeletons. These became the earliest layers of Ohio limestone, hundreds of feet thick in some places. It was upper Ordovician strata that formed a large island known as

the Cincinnati Arch in southwest Ohio. Sitting at the top of the Precambrian super-swells these layers are the oldest surface rocks in the state.

Silurian and Devonian periods

At the end of the Ordovician, an ice age in the southern hemisphere (where Ohio was then located) reduced sea levels, making Ohio into dry land by the beginning of the Silurian period (440 million years ago). Warm shallow seas returned and by the middle Silurian they deepened and blanketed all but the most southeastern part of the state. By the late Silurian the seas abated again and had all but dried up by the time the Devonian period began (about 410 million years ago). The retreating Silurian seas left behind vast beds of halite (salt) and gypsum as well as more layers of limestone and shale. By the early Devonian period most of Ohio and parts of Kentucky and Indiana were part of a large island surrounded by tropical waters that lapped the eastern Ohio shore. The first true land plants grew in Ohio at this time. By the middle Devonian period shallow seas once again covered Ohio. The remnants of the shells and large coral reefs of this period became another thick layer of limestone, this time with numerous fossils of fish embedded in it. By the late Devonian period, increased volcanic activity from mountain building to the east not only blanketed the area with toxic ash but also created fast-flowing rivers that dumped immense amounts of mud into the increasingly stagnant and lifeless late Devonian sea. These deposits make up the Ohio Shale, which also contains numerous iron concretions and pockets of natural gas (see Figure 1.2 for Ohio's major shale regions). Silurian and Devonian strata make up much of today's western Ohio surface stone.

Mississippian and Pennsylvanian periods

The ebb and flow of prehistoric seas continued for the rest of the Paleozoic era. The increasingly muddy waters of the late Devonian period continued into the early Mississippian (starting about 360 million years ago) and then eventually gave way to more silt and sand deposits as the period progressed. The early Mississippian mud turned into the Bedford Shale, while the later sandy deposits became the Black Hand and Berea sandstones. A late Mississippian sea laid down more limestone before retreating at the end of the period. Land plants became increasingly abundant during the periods of sea retreat, a trend that continued into the Pennsylvanian period (325–286 million years ago). As the Mississippian sea retreated, much of eastern Ohio became a large delta onto which flowed the pebbly erosion from mountains to the north and east. This eventually created an abundant rock known as the Sharon Conglomerate. In time, a vast tropical swamp forest stretched throughout much of the Pennsylvania, Ohio, West Virginia, Kentucky, and Indiana areas, leaving millions of years of organic deposits. Advancing seas periodically overtook these forested swamps, burying the plant and animal material under layers of sand and clay, with the cycle repeating many times. The marine-formed strata became new layers of limestone—the silica-rich Middle Pennsylvanian Vanport Limestone in particular—that formed the famous Flint Ridge flint. The Upper Mercer Limestone of the Pottsville formation, which created the prized black flint from Coshocton County, also came from this period. As the layers from



Figure 1.2 The extent of shales in Ohio.

Source: Courtesy of the State of Ohio Environmental Protection Agency

the advancing and retreating seas accumulated over the course of the Pennsylvanian period, they created enough pressure on lower strata to convert the trapped swamp forest-life deposits into coal.

Most of the surface rocks seen today in eastern Ohio were created during the Late Pennsylvanian period. Known as “the coal measures,” these alternating layers of shales, sandstones, limestones, clays, and coals—up to 2,000 feet thick in some places—suggest numerous episodes of the swamp forest-to-sea cycle. The seas retreated from nearly all of Ohio permanently at the end of the Pennsylvanian and, apart from a narrow band in extreme southeastern Ohio that was a coastal swamp during the Permian period (286–248 million years ago), no further geological strata developed in what became Ohio. However, over the next quarter of a billion years many other processes altered the Ohio landscape significantly.

Topography

Several major factors since the Permian period helped to create Ohio's current landscape. The most significant of these have been orogeny (mountain building) and glaciation (the formation and movement of glaciers) and their effects that include erosion, river and lake formation, and the creation of soil through the deposition of material brought by glaciers (glacial till) and vast amounts of wind-blown silt that accompanied them (loess).

Allegheny uplift

To the east of what is now Ohio the tectonic plate that carried most of North America began to collide with another one as early as the Late Mississippian period to help create the supercontinent of Pangea. Over the next several tens of millions of years these plates ground together, folding and thrusting up the earth at its boundaries to create the Allegheny Mountains. These were originally much higher and rockier. This process continued until the Late Permian period when what is now the North American continent began to move north from its traditionally tropical latitudes on its way to its present location. Although the mountain formation did not occur in what is now Ohio the process significantly altered Ohio's topography. First, the tectonic collision uplifted the entire area, which helped to cause the final retreat of the seas that had periodically flooded Ohio during most of the Paleozoic era. Today, Ohio's mean elevation is 850 feet (259 meters) above sea level. Ohio's lowest point (on the Ohio River where it exits the state) has an elevation of 455 feet (139 meters). Second, over the course of the Mesozoic and Cenozoic eras that followed the Paleozoic, the uplifted plateaus of eastern Ohio began to receive rivers and erosion from the new mountain chain to the east, as well as experience their own weathering and erosion. These forces created the hilly Allegheny Plateau, the characteristic topography of eastern Ohio.

Teays River

At some point during the Tertiary period of the Cenozoic era (roughly 65 to 2 million years ago) a great river rose on the western side of the Appalachians in what is now western North Carolina near Blowing Rock and flowed north and west. Geologists call this river and its tributaries the Teays River system. At one time it drained much of the east-central United States, including Ohio. Entering Ohio in Scioto County and proceeding north, the Teays then proceeded west through the state to Mercer County on the Indiana Border, ultimately flowing into an arm of the Gulf of Mexico that at one time extended up the current Mississippi Valley to southern Illinois (some geologists suggest that the river instead continued to flow north to an extinct river system where Lake Erie is now). As wide as two miles in places, this river cut a broad swath through the Ohio countryside and carved a number of flat-bottomed valleys, some of which are still the beds of contemporary rivers in the southern part of the state. Now buried as

much as 500 feet deep in places in northern Ohio, the old Teays riverbed still serves as an aquifer supplying well water to communities living above it.

Glaciation

The reason there is no Teays River today—and indeed the reason why there is an Ohio River instead—can be attributed to the last major event that dramatically affected Ohio's topography: the advance and retreat of glaciers. By the late Cenozoic period the North American continent had more or less arrived at its present latitude, and the climate was considerably cooler than it had been for most of the previous eon. In addition, by the middle of the Pleistocene period (about 2.58 million to 11.7 thousand years ago) the climate of the entire earth began to cool, and ice caps began to form on earth's polar regions. The Laurentide Ice Sheet to the north began a series of glacial advances southward and retreats northward that did not cease in Ohio until about 14,000 years ago. Glaciers are huge juggernauts of ice that move very slowly but scour and rearrange the earth's surface dramatically in their wake. As a result, scientists know relatively little about the specific effects of most early glacial episodes because subsequent glaciers scraped away much of the evidence their predecessors left behind. They do know, however, that these numerous ice sheet advances and retreats significantly altered Ohio's landscape through both erosion and deposition, and the legacy of the glaciers largely explains most of the topography of northern and western Ohio.

Pre-Illinoian and Illinoian stages

The first period of glaciation was a series of as many as eleven separate glacial events collectively known as the Pre-Illinoian stage from about 2.5 million to about 200,000 years ago. Although much of the evidence of this event in Ohio became obscured by subsequent episodes, part of Hamilton County in southwest Ohio untouched by other ice sheets reveals evidence of this earliest set of glaciations. This area is marked by ground moraines, which are gently rolling hills of material deposited under the moving ice (see Figure 1.3). Similarly, a larger section of southwest Ohio and a ribbon of territory stretching northeast from Ross to Richland counties (see Figure 1.1), as well as another thin sliver in Stark and Columbiana counties, shows evidence of unsorted rocks, gravel, and other material (till) left over from the Illinoian Stage of glaciation (two periods lasting from about 200,000 to 130,000 years ago).

Besides scraping and redepositing material throughout the north and western parts of the state, these early glacial periods also fundamentally changed other aspects of Ohio's landscape. The Pre-Illinoian stage glaciers, for example, destroyed the Teays River system by blocking its path and covering its bed with as much as 500 feet of sediment. Dammed by the glacier, the waters of the Teays created a vast lake in southern Ohio and parts of West Virginia and Kentucky. Called "Lake Tight" by geologists, it was nearly 900 feet deep and up to 7,000 square miles in size (about 70 percent the size of modern Lake Erie). Lasting thousands of years, Lake Tight not only deposited large quantities of clay in central Ohio but it also eventually overcame ancient drainage divides and redirected new drainage channels to the south. This new drainage pattern (known as "Deep Stage") was the beginning of the modern Ohio River.

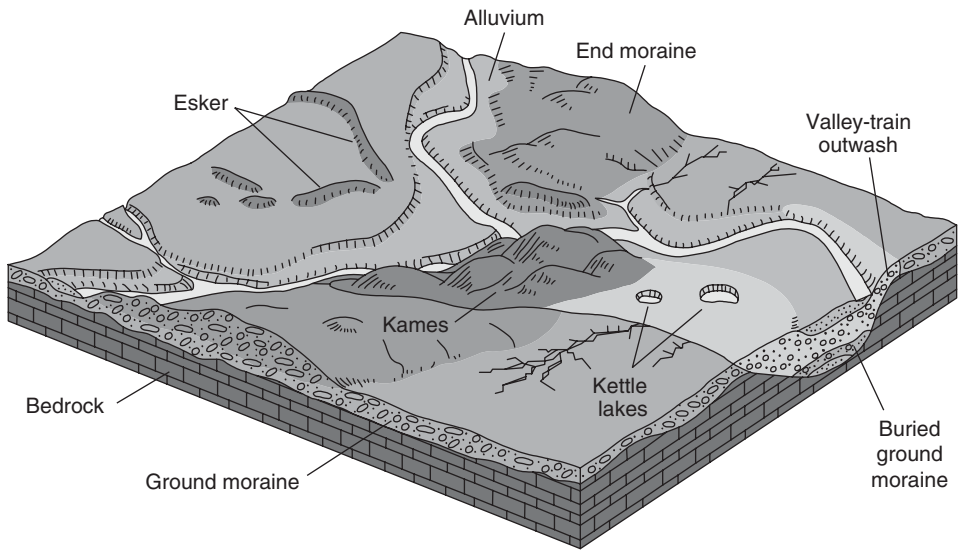
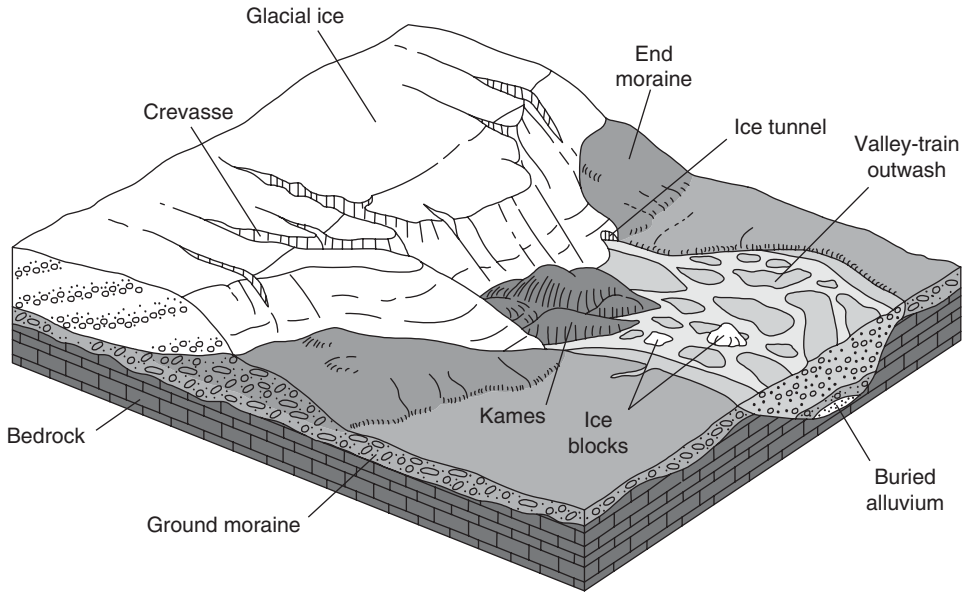


Figure 1.3 Landscape form at the maximum extent and after the retreat of ice.

Source: Ohio Department of Natural Resources, Division of Geological Survey

Wisconsin glaciation

The last major advance of the Laurentide Ice Sheet started about 40,000 years ago and is the most recent stage of the Wisconsin glaciation. Moving about 160–220 feet per year it took the glacier 6,000 years to make its way into Ohio and another 12,000 years to make it to the middle of the state. It advanced irregularly, with major lobes protruding down the Miami and Scioto River valleys, and smaller ones advancing up the Killbuck Creek and Grand River valleys to the east. At its peak, the Wisconsin Glacier

was at least a mile thick over modern-day Cleveland and 50–200 feet thick at its edge, which stretched from Hamilton County in the southwest to Columbiana County in the northeast. This stage of glaciation ended in Ohio about 14,000 years ago, but it continued to have an effect on the state's environment and landscape for thousands of years afterward.

Glaciation fundamentally altered the landscape of much of Ohio. The scraping action of rocks and debris trapped in the glacier scouring the surface below can be seen most dramatically in the deep grooves cut into rocks on Kelleys Island in Lake Erie (see Figure 1.4). However, these same phenomena had a much larger impact: broadening and deepening entire river valleys and eroding hills wherever the glaciers advanced, and depositing their collected materials in various ways as they retreated. Apart from spreading vast general deposits of till found throughout the northwestern part of the state, the glaciers also left numerous topographical features. “Terminal” and “recessional” moraines are elongated ridges of till left from the edge of glacial advances that can be as high as 100 feet. The Wabash Moraine, for example, is a glacial ridge that stretches from Celina on the western side of the state all the way to Akron on the east. The Defiance Moraine (Ohio's northernmost), runs from the south of Cleveland to Defiance and is the reason for the large ridge that runs through the otherwise fairly-flat landscape of Seneca and Hancock counties.

Some of the topographical features left by the Wisconsin glaciers were caused by the melting process as a glacier retreated. Kames, for example, are large mounds of material



Figure 1.4 The glacial grooves on Kelleys Island in Lake Erie demonstrate one of the powerful ways in which glaciers could change the landscape. Here, they scoured deep gashes hundreds of feet long into the limestone bedrock of the Island before retreating.

Source: Ohio Department of Natural Resources, Division of Geological Survey

deposited by water melting at the edge of an ice sheet. The highest concentration of kames in Ohio lies in Portage, Stark, Summit, and Geauga counties, but they can also be found in dozens of other counties throughout the state. Kames are often accompanied by kettles, small ponds or lakes formed by melting blocks of ice left in depressions among kames by a retreating glacier. The waters from retreating glaciers also left their marks on the landscape, distributing sands, clays, gravels, and other debris in outwash areas of the glacial edge. These waters eventually fed and deepened the new streams and channels that became Ohio's modern river system. The redirection of the old Teays drainage into the more recent Ohio River Valley is just one manifestation of the transformative nature of glaciers on Ohio's natural drainage. Ohio's current "continental divide"—a line that runs across the northern third of the state and marks the boundary between waters that ultimately flow to the Atlantic via Lake Erie and those that end up in the Gulf of Mexico—is a product of glacial action (see dotted line on Figure 1.5).

One of the most significant changes caused by glaciation in Ohio was the effect it had on the formation of the Great Lakes, particularly Lake Erie. By scouring and deepening the lake basin from a previous river valley and filling it with melting water, the Laurentide ice sheet essentially created Ohio's "North Coast." "Lake Maumee," which these melt waters created about 14,000 years ago, was a larger presence in Ohio at one point, keeping much of the northwestern part of the state underwater for thousands of years. Not only did this extension of what became Lake Erie deposit a layer of silt that gave northwest Ohio its distinctive soils, but it also left the Great Black Swamp in its wake, a feature that existed until settlers drained it in the nineteenth century.

Thus, the current topography of Ohio is the product of events stretching from hundreds of millions to just a few thousand years ago. Straddling both the Appalachian and Central Lowlands systems of North America, contemporary Ohio features five distinct landform regions as defined by geologists. The largest of these is the Till Plains, which make up most of the western part of the state (see Figure 1.5). Generally characterized by flat or rolling landscape, the Till Plains get their name from the vast amounts of till deposited there when the region was glaciated. The Lake Plains stretch from the southern shore of Lake Erie deep into the Maumee Valley of northwest Ohio. Predominantly flat and covered with the sediments of various stages of lake development, the Lake Plains hold many features that reflect their origin including terraces left by fluctuating lake levels, beach ridge formations, and elevated sand ridges where prehistoric beaches once stood.

The plains of the western part of Ohio give way to the Appalachian Plateaus of the east, of which the Allegheny Plateau is a major sub-region. The Glaciated Plateau, an ever-widening band stretching from Ross County in south-central Ohio to encompass most of the northeastern part of the state, is composed of the part of the Allegheny Plateau once covered by glaciers. Here, the glaciers leveled the topography by eroding hills and filling valleys. They also created new topographical features by leaving kames, kettles, and new watercourses as well as expanding and deepening other valleys. The Unglaciated Plateau is the most southeastern quarter of the state that remained untouched by the various glacial episodes of the Pleistocene series. As a result it is still a very rugged and hilly remnant of the uplift and erosion of the Appalachians. Soil quality is relatively poor here apart from the river valleys that cut