GEOLOGIC MAP OF THE UNITED STATES

BY THE
UNITED STATES GEOLOGICAL SURVEY
W. C. Mendenhall, Director

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Scale 1:2500000
Approximately 1 inch to 40 miles

Albers equal-area projection
North American datum

1932

STICHTING VOOR BODEMKARTERING WAGENINGEN BIBLIOTHEEK

IN MOUNTING OVERLAP TO LINE

TRIM TO LINE IN MOUNTING

MID-CONTINENT OIL FIELD

Blocks not represented in legends on this sheet

Ti, Ki; Cp4; Cp3; Cp2; Cp1; Cj; Cs; DSO; Ol; €uu; €ul; €

APPALACHIAN REGION AND EASTERN MISSISSIPPI VALLEY
(south of Great Lakes area, from eastern Iowa and Missouri to northern New Jersey)

TRIASSIC — Upper Triassic

- Ŧb — Brunswick shale in eastern Pennsylvania; Gettysburg shale in southern Pennsylvania and Maryland
- Ŧl — Lockatong formation
- Ŧs — Stockton formation in eastern Pennsylvania; New Oxford formation in southern Pennsylvania and Maryland

SOUTH OF MARYLAND
- Ŧ — Newark group
- Ŧd — Intrusive diabase (includes basalt lava flows; mostly of late Triassic age)

CARBONIFEROUS

Permian
- Cd — Dunkard group

Pennsylvanian
- Cmh — Monongahela formation
- Cc — Conemaugh formation
- Ca — Allegheny formation (Conemaugh formation included in the anthracite coal field, Pennsylvania, and in West Virginia)
- Cpv — Pottsville group

VIRGINIA TO GEORGIA
- Cg — Carboniferous (?) granite (unmetamorphosed granite intrusive in pre-Cambrian rocks)

Mississippian
- Cm — Mississippian rocks (Devonian, Silurian, and Upper Ordovician rocks included in narrow areas)

EASTERN MISSISSIPPI VALLEY
- Cmu — Rocks of Chester age
- Cmm — Rocks of St. Louis to Warsaw age (Chester included in east Tennessee; Osage and Kinderhook in Kentucky and southern Illinois)
- Cml — Rocks of Osage and Kinderhook age

DEVONIAN

NEW YORK
- Du — Catskill and Chemung formations
- Dm — Portage, Hamilton, Marcellus, and Onondaga formations

WEST TENNESSEE
- D — Devonian rocks

- Dmu — Rocks of Chemung to Onondaga age
- Dl — Oriskany and Helderberg formations (mapped with Silurian in places in Virginia and West Virginia)

EASTERN OHIO, SOUTHERN INDIANA
- Du — Rocks chiefly of Chemung to Hamilton age (New Albany shale in Indiana; Bedford, Ohio, and Olentangy shales in Ohio; Antrim shale in Michigan; Chattanooga shale to Onondaga limestone in Kentucky; some beds of Mississippian age included)
- Dm — Rocks of Hamilton to Onondaga age (Sellersburg and Jeffersonville limestones in Indiana; Columbus and Delaware limestones in Ohio)

SILURIAN

- S — Silurian rocks (Oriskany sandstone and Helderberg limestone included locally in Virginia and West Virginia and higher Devonian beds in Nashville Basin, Tennessee, and southern Kentucky)

INDIANA AND OHIO
- Su — Rocks of Cayuga and upper Niagara (Lockport) age
- Sml — Rocks of lower Niagara (Clinton) and Medina age (Brassfield limestone in Ohio and Kentucky)

EAST TENNESSEE, GEORGIA, AND ALABAMA
- SO — Silurian and Ordovician rocks (Devonian and Mississippian included in places)

ORDOVICIAN

CINCINNATI UPLIFT, OHIO, TO MINNESOTA
- Orm — Richmond group

- Ou — Shale of Maysville and Eden age (Oswego, Lorraine, and Utica shales in New York; some beds of Stones River age included in Tennessee)
- Om — Limestones of Trenton to Chazy age (thin beds of Maysville age included in Nashville Basin, Tennessee; St. Peter sandstone and Maquoketa shale included in southwestern Illinois)
- Ol — Beekmantown limestone

PENNSYLVANIA TO SOUTHWEST VIRGINIA
- Olm — Limestones of Trenton to Beekmantown age (some beds of Eden and Maysville age included in southern Virginia and east Tennessee; Peachbottom slate in southeast Pennsylvania and in Maryland and Quantico and Arvonia slates in Virginia, Ordovician ?, included)

SOUTHWEST VIRGINIA TO ALABAMA
- €O — Limestone of Upper Cambrian and Lower Ordovician age (Beekmantown, Copper Ridge, and Conococheague limestones; some older Cambrian beds included in Georgia)

CAMBRIAN

- €u — Limestone and shale of Upper and Middle Cambrian age (Conococheague and Elbrook limestones; Honaker and Nolichucky limestones in Virginia and Tennessee; Conasauga shale in Georgia; Potsdam sandstone in New York)
- €l — Limestone and shale of Lower and Middle Cambrian age (Waynesboro shale and Tomstown dolomite in north; Watauga and Rome shales and Shady dolomite in south; some younger Cambrian beds included south of Virginia)
- €q — Lower Cambrian quartzites and slates

EAST PENNSYLVANIA AND NEW JERSEY
- €b — Cambrian rocks (Conococheague limestone, Tomstown dolomite; Kittatinny and Allentown limestones; Chickies and Hardyston quartzites)

PRE-CAMBRIAN

Wissahickon schist
- Awh — Oligoclase-biotite schist (indicative of high-rank metamorphism)
- Awl — Albite-chlorite schist and garnetiferous phyllonite (indicative of low-rank and retrogressive metamorphism)
- Awi — Wissahickon schist with igneous injection
- Acs — Cockeysville marble, Setters formation, and associated volcanic rocks
- Agn — Older gneiss (Baltimore gneiss in Maryland and southern Pennsylvania, Franklin limestone, sedimentary mica gneiss, granite, and other intrusives to north; Losee, Pochuck, and Byram gneisses in New Jersey; some younger intrusives may be included)

Algonkian ? (Glenarm series)
- Agr — Granite, gabbro, and hornblende gneiss (included with older gneiss northeast of Reading, Pennsylvania)
- Agg — Mylonitized granite gneiss and hornblende gneiss (augen gneiss and granite mylonite; indicative of intensive differential deformation)

Archean ?
- Av — Volcanic rocks (metabasalt or greenstone and aporhyolite)

ATLANTIC AND GULF COASTAL PLAIN AND MISSISSIPPI EMBAYMENT

QUATERNARY

- Qs — Coastal and estuarine sand and gravel (mapped along coast and in larger estuaries; includes Beaumont clay and Lissie formation in Texas)
- Qa — Alluvium (mapped in larger valleys only)
- Ql — Marine limestone (Anastasia formation, Miami oolite, and Key Largo limestone in Florida)

TERTIARY

Pliocene
- Pc — Continental deposits (river and estuarine terrace deposits; Citronelle formation, Louisiana to Florida; Bone Valley gravel and Alachua formation in Florida)
- Pm — Marine shell marl (Caloosahatchee marl in Florida; Waccamaw marl in North Carolina and South Carolina)

Miocene
- My — Yorktown formation (Duplin marl in North and South Carolina)
- Ms — St. Marys formation
- Mct — Choptank formation
- Mc — Calvert formation (Trent marl in North Carolina; Kirkwood formation in New Jersey)

NEW JERSEY
- Mch — Cohansey sand

GULF AND SOUTHERN ATLANTIC STATES
- Mab — Alum Bluff group and younger beds (includes Choctawhatchee formation in Florida; Hattiesburg and Pascagoula clays in Mississippi and Alabama; Oakville formation in Texas)
- Mt — Tampa limestone (Catahoula sandstone in Mississippi, Alabama, Louisiana, and Texas)

Oligocene
- Φv — Vicksburg group

Eocene
- Ej — Jackson group (Barnwell formation in South Carolina and Georgia; Castle Hayne marl in North Carolina; Cooper marl and Santee limestone in South Carolina; Ocala limestone in Georgia, Florida, and Alabama)
- Ec — Claiborne group (McBean formation in South Carolina and Georgia; Nanjemoy formation in Virginia and Maryland; Shark River and Manasquan marls in New Jersey)
- Ew — Wilcox group (Black Mingo formation in South Carolina; Aquia formation in Virginia and Maryland; Vincentown sand and Hornerstown marl in New Jersey)
- Em — Midway group

CRETACEOUS

- Kr / Ks — Ripley formation and Selma chalk (Peedee formation in North Carolina and South Carolina)
- Ke — Eutaw formation (Black Creek formation in North Carolina and South Carolina, in part of younger age)
- Kt — Tuscaloosa formation (Middendorf formation, South Carolina, and contemporaneous deposits in North Carolina)

NORTH OF VIRGINIA
- Ku — Upper Cretaceous rocks (Monmouth, Matawan, Magothy, and Raritan formations)

NORTH OF NORTH CAROLINA
- Kl — Lower Cretaceous rocks (Potomac group, including Patapsco, Arundel, and Patuxent formations)

TEXAS, OKLAHOMA, AND ARKANSAS
- Kn — Navarro formation (Arkadelphia marl, Nacatoch sand, and Saratoga chalk in Arkansas)
- Ktr — Taylor marl (Marlbrook marl, Annona chalk, Ozan formation, and Brownstown marl in Arkansas)
- Ka — Austin chalk (Blossom sand and Bonham clay in northeast Texas, Tokio formation in Arkansas)
- Kew — Eagle Ford and Woodbine formations
- Kw — Washita group
- Ktf — Fredericksburg and Trinity groups

SOUTHERN TEXAS
- Ku — Upper Cretaceous rocks

SOURCES OF DATA BY STATES

Alabama: State map, 1:500,000, Alabama Geological Survey, 1926; crystalline rocks revised by A. I. Jonas, 1930, including data by G. I. Adams and Alabama Geological Survey.
Arizona: State map, 1:500,000, Arizona Bureau of Mines, 1924.
Arkansas: State map, 1:500,000, Arkansas Geological Survey, 1929.
California: State map, 1:500,000, compiled by G. W. Stose and O. P. Jenkins for publication by the State Division of Mines, 1931, from published maps and manuscript maps contributed by geologists, universities, and oil companies of the State.
Colorado: State map, 1:500,000, compiled by T. S. Lovering, W. S. Burbank, and R. D. George in cooperation with Colorado Geological Survey, 1931, for publication by U. S. Geological Survey.
Connecticut: Preliminary State map, 1:500,000, compiled for United States map by Mrs. E. B. Knopf, 1931, from manuscript maps by W. M. Agar, W. G. Foye, and Mrs. Knopf, and from State map, 1:250,000, Connecticut Geological and Natural History Survey, 1906.
Delaware: Compiled for United States map by U. S. Geological Survey, 1931.
Florida: State map, 1:1,000,000, Florida Geological Survey, 1929; revised by C. W. Cooke, 1931.
Georgia: Preliminary State map, 1:500,000, compiled for United States map by U. S. Geological Survey, 1931; Coastal Plain by C. W. Cooke in cooperation with Georgia Geological Survey; crystalline rocks by A. I. Jonas, including data by G. W. Crickmay and Georgia Geological Survey; Paleozoic from published maps.
Idaho: Compiled on 1:500,000 scale for United States map by C. P. Ross and O. A. Ljungstedt, including data by F. B. Laney and D. C. Livingston, 1931.
Illinois: State map, 1:500,000, Illinois Geological Survey, 1917; revised by M. M. Leighton, 1931.
Indiana: Compiled on 1:2,000,000 scale for United States map by U. S. Geological Survey from State publications, 1931, including data by E. R. Cummings.
Iowa: State map, 1:1,000,000, Iowa Geological Survey, 1912; revised by G. F. Kay, 1931.
Kansas: State map, 1 inch = 24 miles, U. S. Geological Survey, 1909; Carboniferous in region coordinated by R. C. Moore, 1931.
Kentucky: State map, 1:500,000, Kentucky Geological Survey, 1929.
Louisiana: State map, 1:1,000,000, compiled for United States map by L. W. Stephenson and C. W. Cooke, 1931.
Maine: State map, 1:1,000,000, compiled for United States map by Arthur Keith, U. S. Geological Survey, 1931.
Maryland: State map, 1 inch = 5 miles, Maryland Geological Survey, 1906; Coastal Plain revised by State Survey; crystalline rocks and basal Cambrian revised by A. I. Jonas and G. W. Stose, 1931.
Massachusetts: State map, 1:250,000, U. S. Geological Survey, 1916; western part revised by Mrs. E. B. Knopf, 1931, from manuscript maps by L. M. Prindle, Joseph Barrell, T. N. Dale, and Mrs. Knopf.
Michigan: State map, 1:750,000, Michigan Geological Survey, 1916; revised by R. A. Smith, 1931; Lake Superior region revised by C. K. Leith, 1932.
Minnesota: State map, 1:500,000, Minnesota Geological Survey, 1932; including data by C. K. Leith, 1932.
Mississippi: State map, 1:1,000,000, U. S. Geological Survey, 1928.
Missouri: State map, 1:500,000, Missouri Bureau of Geology and Mines, 1926.
Montana: Map of western half of State, 1:500,000, compiled by Montana Bureau of Mines and Geology with revision by J. T. Pardee, 1931; eastern half, geologic map, 1:500,000, Montana Bureau of Mines and Geology, 1921, revised, 1931, by A. J. Collier, Frank Reeves, and O. A. Ljungstedt, including data by W. W. Rubey.
Nebraska: State map, 1:2,500,000, U. S. Geological Survey, 1903; revised by N. H. Darton and G. E. Condra, 1931.
Nevada: Preliminary State map, 1:500,000, compiled for United States map by H. G. Ferguson and G. W. Stose from published maps and from manuscript maps by H. G. Ferguson, D. F. Hewett, T. B. Nolan, E. S. Silk, and C. R. Longwell, 1931.
New Hampshire: Compiled on 1:1,000,000 scale for United States map by U. S. Geological Survey from published maps including data by Marland Billings and G. W. White, 1931.
New Jersey: State map, 1:250,000, New Jersey Geological Survey, 1912.
New Mexico: State map, 1:500,000, U. S. Geological Survey, 1928.
New York: State map, 1 inch = 5 miles, New York State Museum, 1901; eastern part recompiled, 1:500,000, for United States map by Mrs. E. B. Knopf, 1931, from manuscript maps by C. P. Berkey, Arthur Keith, W. M. Agar, L. M. Prindle, Rudolf Ruedemann, T. N. Dale, and Mrs. Knopf; Adirondacks compiled from State Survey maps including data by Robert Balk, 1931.
North Carolina: Preliminary State map, 1:500,000, compiled for United States map by U. S. Geological Survey, 1931; Coastal Plain by L. W. Stephenson and C. W. Cooke; crystalline rocks and basal Cambrian from published maps and reconnaissance surveys by A. I. Jonas, 1930, and G. W. Stose.
North Dakota: State map, 1 inch = 20 miles, North Dakota University Quarterly Journal, 1917.
Ohio: State map, 1:500,000, Ohio Geological Survey, 1920; revised by Wilber Stout, 1931.
Oklahoma: State map, 1:500,000, by U. S. Geological Survey, 1926; revised by H. D. Miser, 1932.
Oregon: Preliminary State map, 1:500,000, compiled for United States map by Ralph Richards and G. W. Stose, including data by E. T. Hodge, F. D. Smith, R. E. Fuller, E. L. Packard, Eugene Callaghan, A. M. Piper, F. E. Laney, and D. C. Livingston, 1931.
Pennsylvania: State map, 1 inch = 6 miles, Pennsylvania Topographic and Geologic Survey, 1932.
Rhode Island: State map (with Massachusetts), 1:250,000, U. S. Geological Survey, 1916.
South Carolina: Preliminary State map, 1:500,000, compiled for United States map by U. S. Geological Survey, 1931; Coastal Plain by C. W. Cooke; crystalline rocks by A. I. Jonas.
South Dakota: State map, 1 inch = 20 miles, U. S. Geological Survey, 1908; revised by E. P. Rothrock, 1931.
Tennessee: State map, 1:500,000, Tennessee Geological Survey, 1923; crystalline rocks and basal Cambrian revised by A. I. Jonas and G. W. Stose, 1931.
Texas: State map, 1:500,000, compiled for publication by U. S. Geological Survey by N. H. Darton, L. W. Stephenson, and Julia Gardner in cooperation with the Bureau of Economic Geology of the University of Texas, oil companies of Texas, and geologists of the State, 1931.
Utah: State map, 1:500,000, in part compiled for United States map from manuscript maps by A. A. Baker, E. T. McKnight, C. H. Dane, James Gilluly, H. E. Gregory, R. C. Moore, and T. B. Nolan; and State map, 1 inch = 12 miles, by U. S. Geological Survey, 1919.
Vermont: Preliminary State map, 1:500,000, compiled for United States map by Mrs. E. B. Knopf, 1931, from manuscript maps by Arthur Keith, G. W. Bain, C. L. Richardson, C. H. Whittle, and Mrs. Knopf.
Virginia: State map, 1:500,000, Virginia State Conservation and Development Commission, 1928; Paleozoic revised by Charles Butts; crystalline rocks and basal Cambrian revised by A. I. Jonas and G. W. Stose, 1931.
Washington: Preliminary State map, 1:500,000, compiled by H. E. Culver and U. S. Geological Survey, 1931, from published and manuscript maps.
West Virginia: State map, 1:500,000, compiled for publication by West Virginia Geological Survey by G. W. Stose and O. A. Ljungstedt, U. S. Geological Survey, 1931.
Wisconsin: State map, 1:1,000,000, Wisconsin Geological Survey, 1915; revised by C. K. Leith and others, 1931.
Wyoming: State map, 1:500,000, U. S. Geological Survey, 1925.

NOTE

The explanation for the map is comprised in nine separate legends, each of which pertains to a specific region and is placed adjacent to the portion of the map covering that region. As the map is printed in four sheets, part of the region described in a legend may fall on another sheet, so that care must be taken to refer to the appropriate legend to interpret the map properly.

A capital letter is used in each letter symbol to indicate the geologic system or series to which the map unit belongs. As the map units of the Tertiary system are so numerous, a capital letter indicating the series is used instead of T (P for Pliocene, M for Miocene, Φ for Oligocene, and E for Eocene). The small letter used with the capital may indicate the name of the formation (as Cd for Dunkard) or the name of the series (as Cp for Pennsylvanian), or the upper, middle, or lower part of a system (as Ou, Om, Ol), which does not necessarily represent the accepted precise division of the system.

In order to simplify the color scheme, the same color or color pattern and the same letter symbol are used on certain parts of the map for units that are known to be not precisely equivalent. For this reason also it is imperative that the appropriate legend be used in interpreting any part of the map.

Faults are shown by heavy lines. Straight and angular lines are mostly normal faults. Overthrusts are mostly curved lines.