

GEOLOGIC MAP OF THE VIRGINIA PORTION OF THE STAUNTON 30 X 60 MINUTE QUADRANGLE

Geology compiled by E. K. Rader and G. P. Wilkes
2001

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UNPUBLISHED FIELD MAPS FROM THE FILES OF THE VIRGINIA DIVISION OF MINERAL RESOURCES

Field mapping by: Charles Butts, R. S. Edmondson, E. K. Rader, and G. P. Wilkes

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This map was compiled digitally. Digital cartography by Elizabeth V.M. Campbell and Kevin B. Jones. The geographically referenced files are available from the Division of Mineral Resources, P. O. Box 3667, Charlottesville, VA 22903.

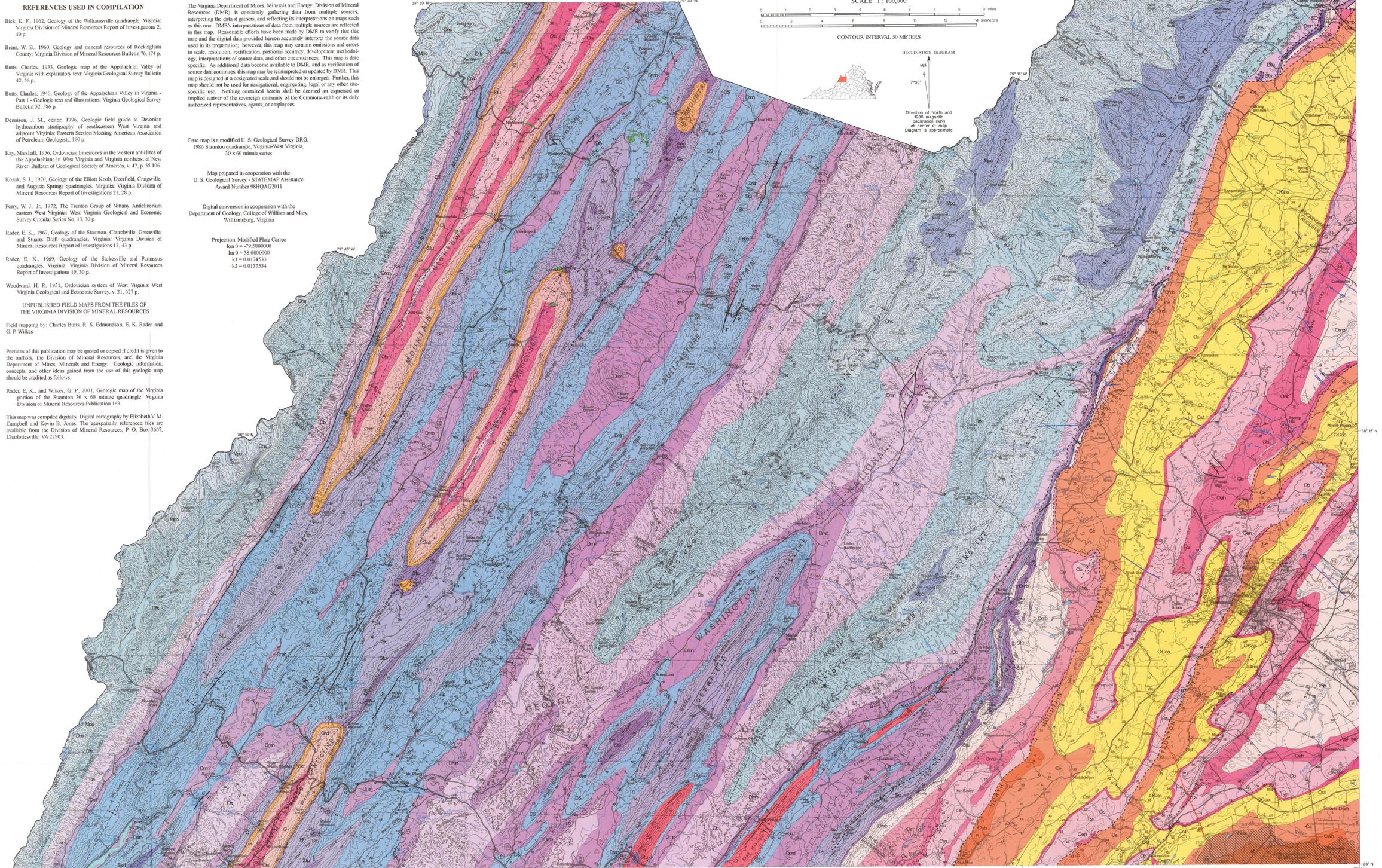
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Base map is a modified U. S. Geological Survey DRG, 1986 Staunton quadrangle, Virginia-West Virginia, 30 x 60 minute series

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Digital conversion in cooperation with the Department of Geology, College of William and Mary, Williamsburg, Virginia

Projection Modified Plate Carree
lon 0 = -79.5000000
lat 0 = 38.0000000
k1 = 0.0174533
k2 = 0.0175734



EXPLANATION

SURFICIAL DEPOSITS

Alluvial fan
Sand, cobbles, clay, and silt deposits west of Blue Ridge. Thickness ranges from 0 to 300 feet.

INTRUSIVE ROCKS

Andesite and basalt dikes and diatremes
In Highland and Bath Counties. Only larger bodies depicted because of scale.

Nepheline syenite, teschenite, and teschenite-pierite dikes
Located in Augusta County.

Diabase dikes
Located in Augusta County.

PALEOZOIC ROCKS

MISSISSIPPIAN
Pocomo Formation
Sandstone, white to medium-gray, fine- to coarse-grained, medium- to thick-bedded, often cross-laminated in thick sets. Thickness: 500 to 700 feet.

Hampshire Formation
Shale, mudstone, siltstone, and sandstone. Shale, mudstone, and siltstone: dusky- to grayish-red, in part micaceous. Sandstone, medium- to brownish-gray, thin- to thick-bedded, cross-laminated, in part micaceous and feldspathic, 6-inch to 3-foot beds of conglomerate common near the top, no exposures. Basal contact placed above the youngest fossiliferous sandstone and shale of the Forknohs Formation overlain by redbeds. Thickness: approximately 2000 feet.

Forknohs Formation
Sandstone, siltstone, and minor shale, interbedded. Sandstone, brownish-gray, medium- to coarse-grained, medium- to thick-bedded, in part cross-laminated, conglomeratic beds common, sandstone most abundant in the upper part of the formation; many beds very fossiliferous. Siltstone, medium- to thick-bedded, dominant in lower part of unit. Shale, interbedded with sandstone and siltstone throughout section. Brownish-red shale common in upper half of section. Basal contact mapped at the base of fossiliferous sandstone underlain by micaceous shale and thin-bedded siltstone of the Brallier Formation. Thickness: approximately 2200 feet.

DEVONIAN

Brallier Formation
Shale, siltstone, and minor sandstone, interbedded, dark-gray to greenish-gray, micaceous, weathers light-brownish-gray; grain size increases upward in section; sandstone more abundant in upper part of section, thin- to medium-bedded, sparsely fossiliferous. Base of formation placed at the top of black to gray shale of the Millboro Shale. Thickness: 1000 to 1800 feet.

Millboro Shale, Tioga Ash, and Needmore Formation, undivided
Millboro Shale: shale, black, fissile, weathers in thin papery plates, contain abundant pyrite, fossiliferous layer of limestone or calcareous concretions locally present (Parell Member). Thickness: 400 to 500 feet. Tioga Ash: alternating gray, silty shale and siltstone, brown, botite-bearing, calcareous tuff, and fissile black shale. Thickness: 10 to 20 feet. Needmore Formation: dark-greenish-gray fossiliferous shale and calcareous mudstone with thin (3 to 8 feet) black shale at base. Thickness: about 120 feet. Base of the map unit placed at top of the Ridgeley Sandstone.

unconformity

Devonian and Silurian rocks, undivided

Ridgeley Sandstone: quartzarenite, light- to yellowish-gray, fine- to coarse-grained, locally conglomeratic, thin- to thick-bedded, generally cross-laminated, calcareous cement, friable when weathered, fossiliferous, commonly contains molds of shells; thickness: 50 to 100 feet. **Helderberg Group:** limestone, light- to dark-gray, fine- to coarse-grained, laminated to thick-bedded, with black, nodular chert and white to light-gray, blocky chert; upper portion of the unit argillaceous, lower part of the unit sandy (locally a sandstone, Healing Spring Sandstone Member), base defined by a coarse-grained, gray limestone with large white to pink crinoid stems, locally very fossiliferous; thickness: 100 to 200 feet. **Keyser Limestone:** medium- to dark-gray, fine- to coarse-grained limestone with abundant fossils, reefal mounds, Clifton Forge Sandstone and/or Big Mountain Shale Members), 10 to 45 feet thick, near middle: argillaceous near base, may contain laminated beds similar to the underlying Tinkloway Limestone in lower portion, sparse, small black chert nodules common; thickness: 75 to 150 feet. **Tinkloway Limestone:** upper and lower members, medium- to dark-gray, fine-grained, laminated, mudcracked limestone with sparse fossils (ostracods and rare brachiopods); middle member, medium-gray, fine- to medium-grained, abundant algal structures; thickness: 200 to 300 feet. **Wils Creek Formation:** light- to medium-gray, fine- to coarse-grained, fossiliferous limestone; gray calcareous siltstone; greenish-gray calcareous mudstone; all lithologies weather to a yellowish-gray shaly residue; thickness: about 120 feet. **Williamsport Sandstone:** quartz sandstone or siltstone, with *Arthropycus* near the base; thickness: 15 to 25 feet. **McKenzie Formation:** medium-gray, yellowish-weathering, calcareous shale and limestone, locally very fossiliferous; thickness: about 165 feet.

SILURIAN
Keefe Formation
Sandstone, light-gray, fine- to coarse-grained, locally conglomeratic, cross-laminated, quartz cement or overgrowths, thin green to purple shale beds near base, sparsely fossiliferous (*Scolithus*, *Arthropycus*); thickness: 70 to 75 feet, thickens in a southwestern direction.

Rose Hill Formation
Sandstone and shale. Sandstone, light-gray to dusky-red, fine- to coarse-grained, cross-laminated, gray sandstone similar to the overlying Keefe and the underlying Tuscara, very resistant to weathering, makes ledges, and ferruginous sandstone (Casper of older reports). Shale, green, yellowish-brown, and dusky-red, commonly contains laminitic lenses from the weathering of thin limestone beds; fossiliferous; thickness: 300 to 500 feet.

Tuscara Formation
Sandstone and quartzite. Sandstone, light-gray, weathers rusty-brown, fine- to coarse-grained, commonly conglomeratic, class 0.25 to 0.5 inch, thin- to thick-bedded, cross-laminated, quartz cement, matrix less than 1%. Quartzite, light-gray, fine- to medium-grained, cemented by overgrowths, thick-bedded. Thin red, green, or purple shale near base and top of unit. Sandstone generally overlain by quartzite. Contacts gradational, basal contact mapped at the base of the oldest thick sandstone bed, upper contact mapped at the first thick shale sequence overlying a thick quartzite. Thickness: 75 to 125 feet.

Junata and Oswego Formations, undivided
Junata Formation: sandstone, dusky-red, fine- to medium-grained, cross-laminated, in part feldspathic. Shale and mudstone, dusky-red, weathers lumpy. Sandstone, light-gray to white, fine- to medium-grained, thick-bedded, cross-laminated, base often contains red shale clasts. Thickness: 250 to 300 feet. Oswego Formation: sandstone, greenish-gray, fine- to coarse-grained, conglomeratic with chert, quartz, and lithic clasts, medium- to thick-bedded; minor interbeds of olive-gray shale. Thickness: 50 to 100 feet.

Reedsville Shale and Dolly Ridge Formations, undivided
Reedsville Shale: upper 50 to 100 feet: brown, medium- to coarse-grained, sandstone, fossiliferous. Lower 300 to 400 feet: calcareous gray shale and mudstone with interbedded lenticular fossiliferous limestone. Dolly Ridge Formation: upper 300+ feet: interbedded argillaceous limestone and dark-gray shale; k-beniamonis present, fossiliferous. Lower 100 feet: interbedded argillaceous limestone and olive-gray claystone (Eggleston Limestone of previous reports).

ORDOVICIAN

Keefe and Rose Hill Formations, undivided
Keefe, Rose Hill, and Tuscara Formations, undivided
Tuscara, Junata, and Oswego Formations, undivided

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Devonian and Silurian rocks, undivided

Beekmantown Formation
Dolostone, medium- to light-gray, weathers very light-gray, fine-grained, medium- to thick-bedded, weathered surfaces exhibit a "honey block" structure; limestone, medium-gray, fine-grained, lenses and thick beds of chert; thickness: approximately 2400 feet, thinner in western anticlines.

Stonewall Limestone
Upper Stonewall: medium- to dark-gray and black, fine- to medium-grained limestone, thin beds of macerated fossil debris; thickness: 400 to 500 feet. Lower Stonewall (Stoufferstown Member): dark-gray to black, fine-grained limestone with thin, sheet-like partings, partings crinkly; thin beds of coarse-grained, bioclastic limestone; thickness: 50 to 100 feet.

Conococheague Formation
Light- to dark-gray, fine-grained, laminated dolomitic limestone and dolostone with flat-pebble conglomerate beds; cycles of (from base to top) oolitic, coarse-grained calcareous, siltstone, ribbon-bedded limestone and dolostone, commonly containing mudcracks; sandstone beds in uppermost part of formation. Big Spring Station Member (lower 200 to 500 feet): light-gray, fine-grained dolostone; medium- to dark-gray, fine-grained, laminated limestone and dolomitic limestone; gray, brown-weathering, coarse-grained sandstone and dolomitic sandstone. Thickness: 2200 to 2600 feet.

Elbrook Formation
Dark- to medium-gray, fine- to medium-grained limestone, dolomitic limestone, dolostone, and dolomitic shale; lithologies commonly occur as cross-surface-bedded sequences of algal limestone overlain by laminated dolostone; thickness: 2000 to 2500 feet.

Waynesboro Formation
Dusky-red to olive-gray, fine- to medium-grained sandstone and dark-red to gray shale; medium- to dark-gray, saccharoidal dolostone and fine-grained limestone; preserved thickness: about 500 feet.

Breccia
Tectonic blocks of dolostone, limestone, and shale along the Staunton Fault in a "crushed conglomerate" matrix. Blocks from Beekmantown, Stonewall, Conococheague, Elbrook, and Waynesboro Formations.

Edinburg Formation and Lincolnshire and New Market Limestones, undivided
Edinburg Formation: black, fine-grained to aphanitic limestone with black shale and medium- to light-gray, fine- to coarse-grained, nodular limestone with thin black shale partings, fossiliferous; thickness: 400 to 500 feet. Lincolnshire Limestone: limestone, light- to very-dark-gray, fine- to coarse-grained, medium- to very-thick-bedded, black chert nodules, usually parallel to bedding; light-gray, coarse- to very-coarse-grained limestone (Murat lithofacies); thickness: 25 to 250 feet. Unconformity. New Market Limestone: lower unit: medium- to dark-gray, fine-grained, thin-bedded, argillaceous, in part dolomitic, biomattured, carbonatic pebble conglomerate at base; upper unit: medium-gray, aphanitic, thick-bedded limestone with sparry calcite crystals; thickness: 0 to 150 feet.

Edinburg Formation
Limestone, light- to dark-gray, very-fine- to coarse-grained, locally with black chert nodules and thin beds, several K-beniamonis, fossiliferous; lower 100 to 150 feet dolostone or dolomitic limestone with thin soft gray shale beds, black and gray chert nodules; thickness: 500 to 800 feet.

Middle Ordovician Limestones, undivided

unconformity

KEY

- CONTACTS**
Solid where exposed or approximate, dotted where covered or inferred
- FAULTS**
Solid where exposed or approximate, dotted where covered or inferred. Thrust faults: T on the upper plate, tick marks indicate dip direction; strike-slip faults: arrows indicate direction of movement
- FOLDS**
Trace of anticlinal axis; arrow denotes plunge direction
Trace of synclinal axis; arrow denotes plunge direction
Trace of overturned synclinal axis
- ATTITUDE OF ROCKS**
Strike and dip of inclined bedding
Strike and dip of overturned bedding
Horizontal bedding
Strike of vertical bedding