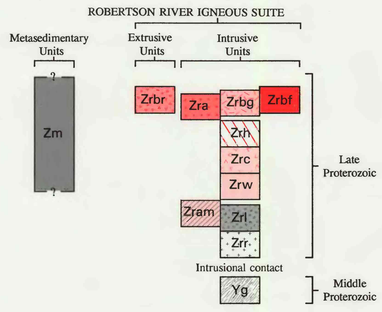
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF–2229
Explanatory pamphlet accompanies map

This map is a compilation of detailed field mapping (originally at a scale of 1:24,000), petrographic studies, and geochemical analyses of the Robertson River Igneous Suite. The distribution of the constituent units of the suite, all field stations, and sampling localities are depicted. Internal contacts of the suite are based on field, petrographic, and geochemical data and are drawn to separate areas underlain dominantly by a specific rock type (lithologic unit), as described on the map. The external boundaries of the suite are taken largely from previously published and unpublished studies (Luckert and Nuckols, 1976; Lukert and Halladay, 1980; J.F. Conley, Virginia Division of Mineral Resources, unpub. data, 1989), and have been field checked where appropriate.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

The first seven units listed below were compiled from literature sources and not mapped as part of this study. The sources are listed in the accompanying pamphlet and in the explanation to the Regional Geology and Quadrangle Location map.

JTRn Newark Supergroup, undivided (Lower Jurassic and Upper Triassic)--Red to dark gray sandstone, arkosic sandstone, siltstone, and shale with locally interbedded, poorly sorted conglomerate of alluvial origin. Locally includes dark gray basalt and diabase as flows and both sills and dikes, respectively

Ꞓh Harpers Formation (Lower Cambrian)--Bluish-gray, tan, and brick red phyllite interbedded with olive-gray, locally feldspathic sandstone, light-gray quartzite, meta-arkose, and conglomeratic quartz sandstone. Formation is locally divided into lower (phyllite interbedded with sandstone) and upper (phyllite, quartzite, meta-arkose, and conglomerate) members

Ꞓw Weverton Formation (Lower Cambrian)--Gray to light gray, medium- to coarse-grained quartzite, pebbly orthoquartzite, and quartz pebble conglomerate interbedded with olive- to greenish-gray, sandy phyllite. Quartzite and conglomerate occur in the lower and upper portions of the formation

Ꞓc Candler Formation (Lower Cambrian)--Gray, reddish-purple, and grayish-green phyllite and schist locally interbedded with pink to gray, fine- to medium-grained marble. Phyllite locally overlying the Catoctin Formation contains rounded pebbles of greenstone that may be indicative of a nonconformable contact

Zc Catoctin Formation (Late Proterozoic to Lower Cambrian)--Dark green, massive to locally amygdaloidal and (or) porphyritic greenstone and epidosite locally interlayered with purple-red phyllite, sandstone and greenstone pebble conglomerate. The greenstone is locally columnar jointed and contains rare pink to cream-colored metatuff

Zs Swift Run Formation (Late Proterozoic to Lower Cambrian)--Pale green, green, and purple-red metaconglomerate, metasandstone, and tuffaceous phyllite occurring at or near the base of the Catoctin Formation. The Swift Run is laterally discontinuous and locally nonconformable on Middle Proterozoic basement gneiss

Zfl Fauquier Formation (north) and Lynchburg Group (south), undivided (Late Proterozoic)--Gray, greenish-gray, and dark gray meta-arkose; metasandstone; phyllite; and conglomerate locally interbedded (in the north) with metarhythmite and metacarbonate. The Fauquier Formation rests nonconformably atop Middle Proterozoic basement. Concordant bodies of mafic and ultramafic rocks, including amphibolite and talc-tremolite schist, occur locally interbedded within the Lynchburg

Zm Mechum River Formation (Late Proterozoic)--Green to pale green, micaceous phyllite; meta-arkose; poorly sorted, pebbly arkosic conglomerate; and poorly-sorted boulder conglomerate of probable alluvial origin. Locally correlated with metasedimentary deposits interlayered with Robertson River rhyolite

ROBERTSON RIVER IGNEOUS SUITE (Late Proterozoic)

Battle Mountain Alkali Feldspar Granite--Includes rhyolite, felsite, and alkali feldspar granite

Zrbr Rhyolite--Light-gray to white, aphanitic to sparsely porphyritic (feldspar phenocrysts), fluorite-bearing rhyolite and poorly sorted rhyolite pebble conglomerate locally interlayered with poorly sorted boulder conglomerate of alluvial origin

Zrbf Felsite--Light gray to gray, fine-grained to aphanitic, equigranular to sparsely porphyritic (mesoperthite phenocrysts) felsite composed of alkali feldspar mesoperthite and quartz, with minor plagioclase, biotite, aegirine, fluorite, and rare earth element-bearing accessory phases including basnaesite. Locally displays flow banding (Reference Locality 13 - D5), miarolitic cavities (containing quartz), and probable lithophysae. Intrudes associated alkali feldspar granite

Zrbg Alkali Feldspar Granite--Light gray to gray, medium-grained, inequigranular alkali feldspar granite composed of alkali feldspar mesoperthite, albite, and quartz with minor biotite aegirine, zircon, fluorite, and rare earth element-bearing phases including basnaesite. Locally displays miarolitic cavities containing quartz

Zra Amissville Alkali Feldspar Granite--Light to dark gray, medium-grained, inequigranular to porphyritic (quartz phenocrysts) alkali feldspar granite composed of microcline mesoperthite, quartz, and plagioclase with aegirine, riebeckite, biotite, zircon, fluorite, and stilpnomelane. Euhedral quartz phenocrysts are diagnostic. Locally displays miarolitic cavities containing quartz. Intruded by fine-grained dikes of identical mineralogic composition

Zrh Hitt Mountain Alkali Feldspar Syenite--Light gray, coarse-grained to locally pegmatitic, inequigranular alkali feldspar syenite composed of microcline mesoperthite, quartz, and saussuritized plagioclase with hastingsitic amphibole, biotite, allanite, zircon, fluorite, stilpnomelane, apatite, and rare garnet. Amphiboles typically contain altered cores. Locally displays cumulate and pseudocumulate texture (Reference Locality 15 - F3). Typically associated with light gray, fine-grained, mineralogically similar alkali feldspar syenite which occurs as cross-cutting dikes. Locally contains dark-gray fine-grained enclaves of alkali feldspar syenite (Reference Locality 11 - E4)

Zrc Cobbler Mountain Alkali Feldpar Quartz Syenite--Light to dark gray, medium- to coarse-grained, porphyritic (mesoperthite phenocrysts) to seriate-equigranular alkali feldspar quartz syenite composed of microcline mesoperthite, quartz, and plagioclase with hastingsitic amphibole, biotite, stilpnomelane, zircon, allanite, fluorite, and rare aegirine-augite. Euhedral to subhedral feldspar phenocrysts are diagnostic. Locally displays miarolitic cavities containing quartz. Associated with pegmatitic dikes and pods within basement gneiss (Reference Locality 8 - B6)

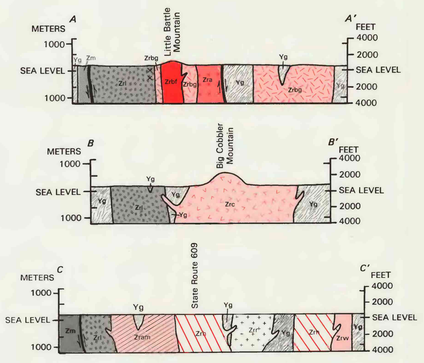
Zrw White Oak Alkali Feldspar Granite--Light gray to gray, coarse-grained, inequigranular alkali feldspar granite composed of microcline mesoperthite, quartz, and plagioclase with hastingsitic amphibole, allanite, fluorite, stilpnomelane, zircon, chlorite, and calcite. Unaltered surfaces display pronounced vitreous luster. Typically intermixed with light-gray, fine-grained, mineralogically identical alkali feldspar granite that is locally younger

Zram Arrington Mountain Alkali Feldspar Granite--Light gray, medium-grained, equigranular alkali feldspar granite composed of microcline mesoperthite, quartz, and plagioclase with hastingsitic amphibole, biotite, stilpnomelane, allanite, fluorite, zircon, epidote, apatite, and rare garnet and muscovite. Locally intruded by light gray, fine-grained dikes of mineralogically identical alkali feldspar granite

Zrl Laurel Mills Granite--Gray, coarse-grained, inequigranular granite composed of alkali feldspar mesoperthite, quartz, and plagioclase, with hastingsitic amphibole, biotite, stilpnomelane, zircon, apatite, ilmenite, magnetite, and sphene. Amphiboles are typically entirely to partially replaced by fine-grained intergrowths of quartz, biotite, stilpnomelane, magnetite, and titanite. Pale blue color of the quartz is locally diagnostic. Typically displays numerous, anastomosing, mesoscopic zones of deformation

Zrr Rivanna Granite--White, medium-grained, equigranular alkali feldspar granite composed of quartz, plagioclase, and microcline microperthite with biotite, allanite, fluorite, stilpnomelane, zircon, and rare muscovite. Low color index (average is less than 5) is diagnostic. Locally displays miarolitic cavities containing quartz and pyrite

Yg Gneisses and Granitoids (Middle Proterozoic)--Light to dark gray and pink, medium- to coarse-grained, inequigranular granitoid gneisses with dikes and pods of white to light gray, medium-grained, granitoids. Gneisses typically contain biotite and are variably foliated. Granitoids are non-foliated to slightly foliated and characterized by low color index (typically less than 5). Gneisses are intruded by granitoids of the Robertson River Igneous Suite at Reference Localities 6 (C6), 7 (B6), and 8 (B6). Pattern is shown only where the unit was mapped as part of this project



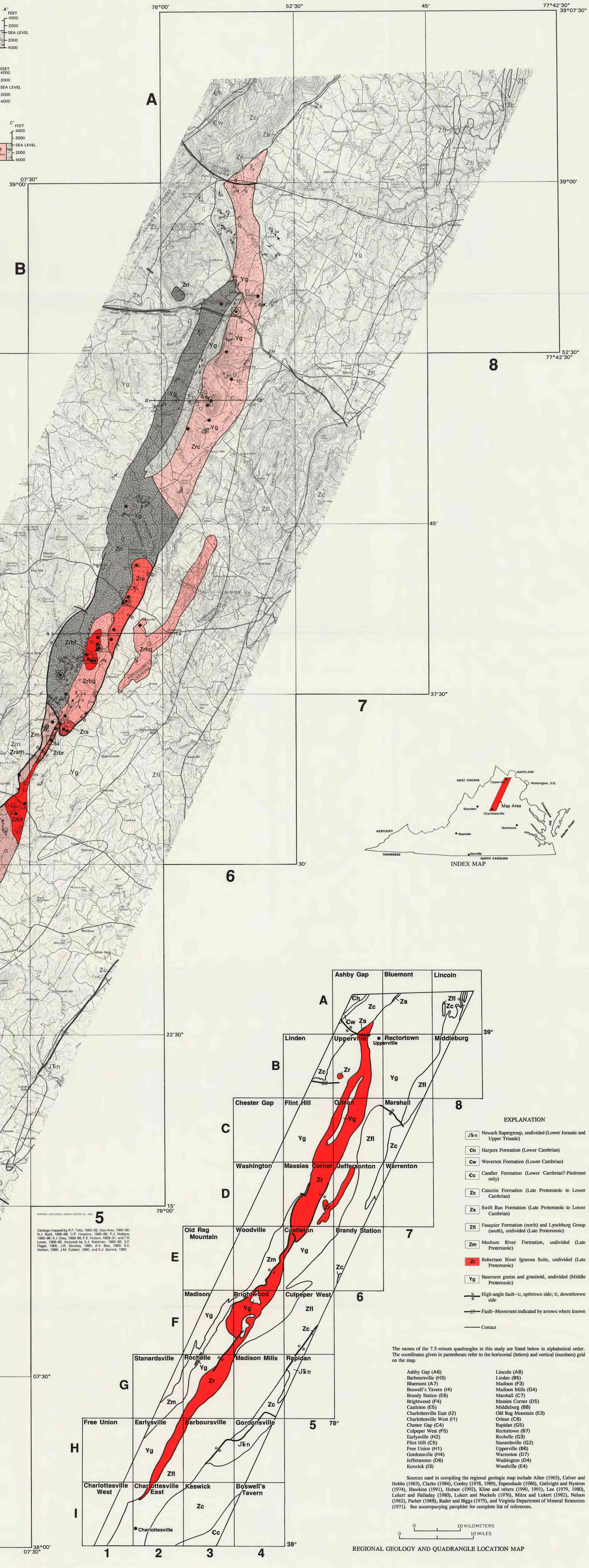
EXPLANATON OF MAP SYMBOLS

Localities
(Symbols may be combined)

- 8 Reference locality (see pamphlet for description)
- Petrographic sampling locality (point counted)
- Geochemical sampling locality
- Lithologic type locality (see table 2)
- Isotopic sampling locality

Structural Symbols

- Contact
- Fault--Movement indicated by arrows
- High-angle fault--U, upthrown side; D, downthrown side
- Strike and dip of bedding
  - Inclined
  - Vertical
- Strike and dip of foliation
  - Inclined
  - Vertical
- Strike and dip of vertical joints
- Strike and dip of quartz (q) vein
  - Inclined
  - Vertical
- Strike and dip of dike (f, felsic; g, greenstone; d, diabase)
  - Inclined
  - Vertical
- Strike and dip of cleavage
  - Inclined
  - Vertical
- Strike and dip of shear zone
  - Inclined
  - Vertical
- Xenolith zone



INDEX MAP

SCALE 1:100 000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND

EXPLANATION

- JTRn Newark Supergroup, undivided (Lower Jurassic and Upper Triassic)
- Ꞓh Harpers Formation (Lower Cambrian)
- Ꞓw Weverton Formation (Lower Cambrian)
- Ꞓc Candler Formation (Lower Cambrian?-Piedmont only)
- Zc Catoctin Formation (Late Proterozoic to Lower Cambrian)
- Zs Swift Run Formation (Late Proterozoic to Lower Cambrian)
- Zfl Fauquier Formation (north) and Lynchburg Group (south), undivided (Late Proterozoic)
- Zm Mechum River Formation, undivided (Late Proterozoic)
- Zr Robertson River Igneous Suite, undivided (Late Proterozoic)
- Yg Basement gneiss and granitoid, undivided (Middle Proterozoic)
- High-angle fault--U, upthrown side; D, downthrown side
- Fault--Movement indicated by arrows where known
- Contact

The names of the 7.5-minute quadrangles in this study are listed below in alphabetical order. The coordinates given in parentheses refer to the horizontal (letters) and vertical (numbers) grid on the map.

Ashby Gap (A6)	Lincoln (A8)
Barboursville (H3)	Linden (B5)
Bluemont (A7)	Madison (F3)
Boswell's Tavern (I4)	Madison Mills (G4)
Brandy Station (E6)	Marshall (C7)
Brightwood (F4)	Massies Corner (D5)
Castleton (E5)	Middleburg (B8)
Charlottesville East (I2)	Old Rag Mountain (E3)
Charlottesville West (I1)	Orlean (C6)
Chester Gap (C4)	Rapidan (G5)
Culpeper West (F5)	Rectortown (B7)
Earlysville (H2)	Rochelle (G3)
Flint Hill (C5)	Stanardsville (G2)
Free Union (H1)	Upperville (B6)
Gordonsville (H4)	Warrenton (D7)
Jeffersonton (D6)	Washington (D4)
Keswick (I3)	Woodville (E4)

Sources used in compiling the regional geologic map include Allen (1963), Calver and Hobbs (1963), Clarke (1984), Conley (1978, 1989), Espenshade (1986), Gathright and Nystron (1974), Hawkins (1991), Hutson (1992), Kline and others (1990, 1991), Lee (1979, 1980), Lukert and Halladay (1980), Lukert and Nuckols (1976), Mitra and Lukert (1982), Nelson (1962), Parker (1968), Rader and Biggs (1975), and Virginia Department of Mineral Resources (1971). See accompanying pamphlet for complete list of references.

REGIONAL GEOLOGY AND QUADRANGLE LOCATION MAP

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1994

Geology mapped by R.P. Tollo, 1985–92; Sara Aray, 1985–88; N.J. Byrd, 1985–86; D.P. Hawkins, 1985–88; P.J. Wallace, 1985–86; K.J. Gray, 1988–89; F.E. Hutson, 1989–91; and T.K. Lowe, 1989–90. Assisted by S.J. Kreitman, 1985–92; S.F. Flagel, 1985; J.R. Stockey, 1985; A.V. Bee, 1989; K.E. Ashton, 1989; J.M. Colbert, 1990; and S.J. Sernick, 1992.

Base from U.S. Geological Survey
Frederick, 1964; Charlottesville, Front Royal, Washington West, 1966

GEOLOGIC MAP OF THE ROBERTSON RIVER IGNEOUS SUITE, BLUE RIDGE PROVINCE, NORTHERN AND CENTRAL VIRGINIA

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