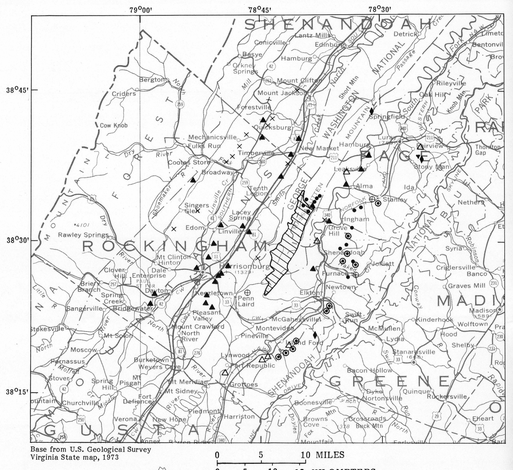
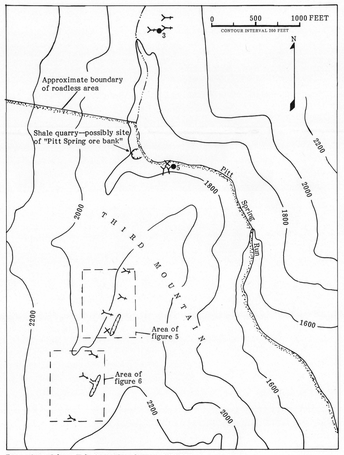


EXPLANATION

- • Iron mine or prospect
- ▲ Limestone or dolomite quarry
- ⊛ Manganese-iron mine or prospect
- △ Sand and gravel pit
- × Zinc mine or prospect
- ⊕ Ocher mine or prospect
- ♦ Sandstone quarry

Figure 1.—Index map showing location of the Southern Massanutten Roadless Area (patterned) and some mines, prospects, and quarries in the region. (Mines, prospects, and quarries from Allen, 1967; Brent, 1960; and Herbert and Young, 1956.)



Base adapted from U.S. Geological Survey, 1:24,000
Tenth Legion, 1967

EXPLANATION

- Open cut
- Caved adit
- × Prospect pit
- ●3 Sample locality (see also table 1)

Figure 4.—Pitt Spring mine.

Table 1.—*Chemical constituents of iron-mineralized samples from mines and prospects in and near the Southern Massanutten Roadless Area*

[Symbols used: c, chip sample of bedrock; b, channel sample of bedrock; d, grab sample from mine dump; NT, not tested. Analysis methods for samples 3, 5, 6, 7, and 9: Fe and Mn—atomic absorption; S, SiO_2, and P—colorimetry.]

Sample number	Percent Fe	P	Mn	SiO_2	S	Sample type, locality
[1]3	38.9	0.23	0.86	33.0	0.09	d, Prospect adit, 250 ft east of Pitt Spring Run
[1]5	24.5	.27	3.44	47.0	.01	d, Prospect adit, 100 ft south of Pitt Spring Run
[1]6	50.5	.95	1.05	10.5	.01	c, North cut, Pitt Spring mine
[1]7	46.9	.80	.22	17.0	.02	c, Prospect pit near north cut, Pitt Spring mine
[1]9	49.9	.10	1.32	13.0	.10	b, South cut, Pitt Spring mine
[2]-	55.2	.17	trace	3.97	.09	†, "Pitt's Spring ore bed near Catherine Furnace"
[3]	40.1	.36	1.06	21.6	NT	†, "Pit Spring mine, a mile NW from the furnace..."

[1] Reported in Wawro and others (1982, p. 21).
[2] Reported in Hotchkiss (1878, p. 20).
[3] Reported in Holden (1907, p. 433).

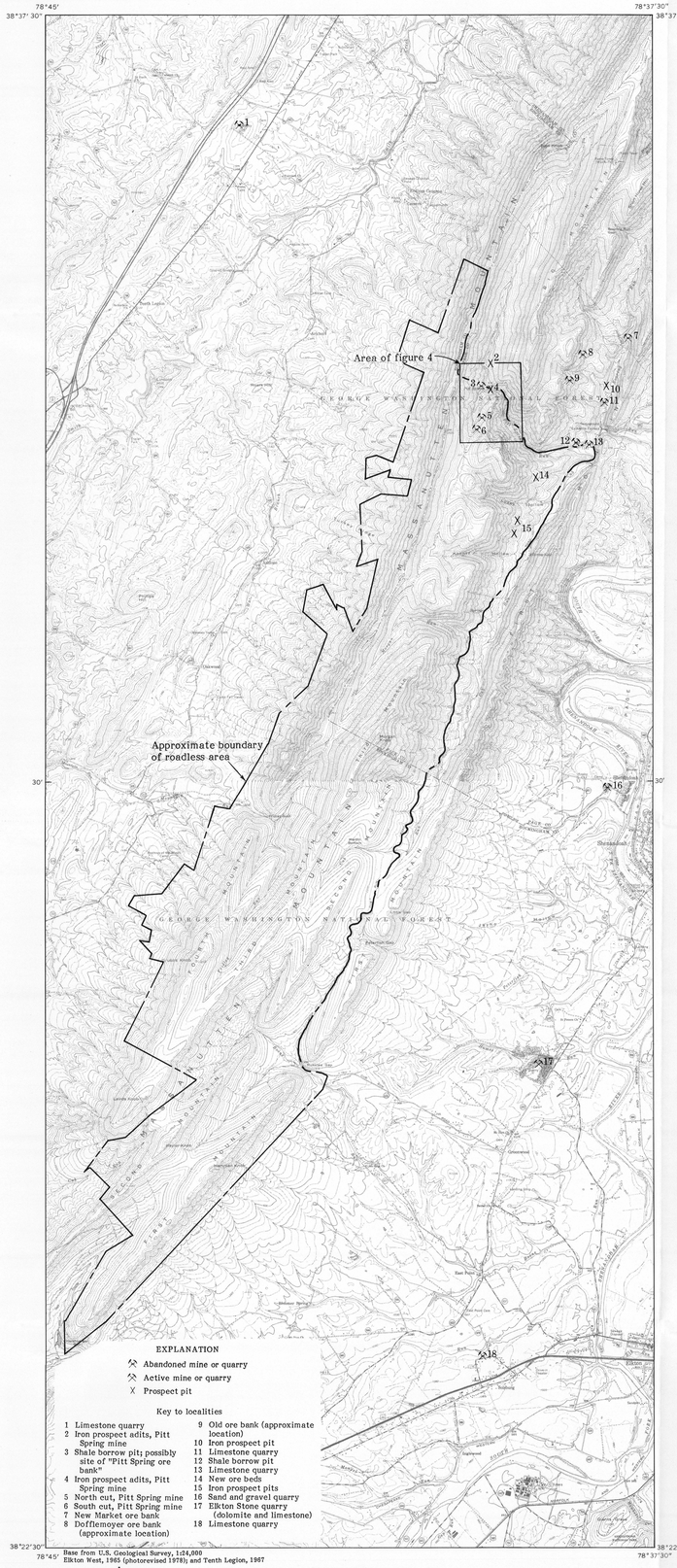


Figure 2.—Iron mines and prospects and rock quarries in and near the Southern Massanutten Roadless Area.

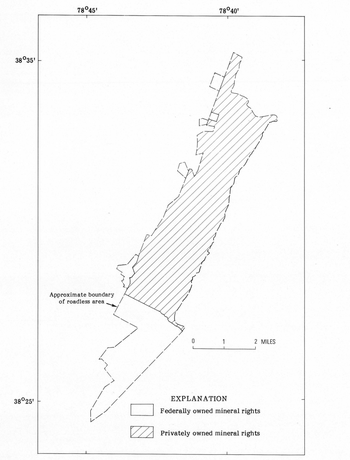
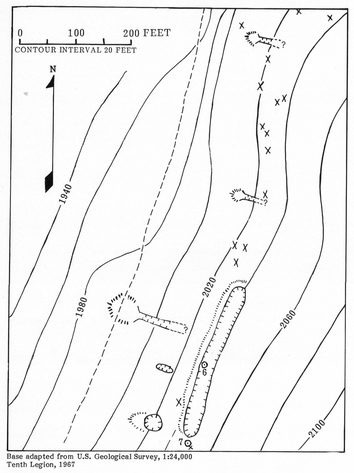


Figure 3.—Mineral-rights ownership in the Southern Massanutten Roadless Area.

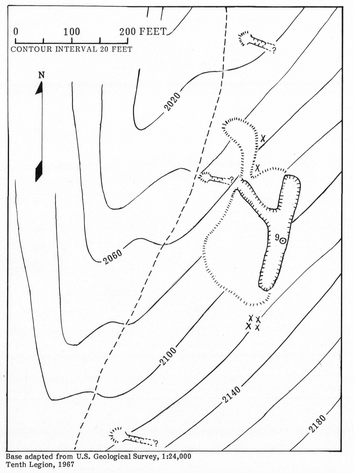


Base adapted from U.S. Geological Survey, 1:24,000
Tenth Legion, 1967

Figure 5.—Detail of the north cut, Pitt Spring mine.

EXPLANATION FOR FIGURES 5 AND 6

- Open cut
- Caved adit of unknown length
- Mine dump
- X Prospect pit
- ⊙6 Sample locality (see also table 1)
- Foot trail



Base adapted from U.S. Geological Survey, 1:24,000
Tenth Legion, 1967

Figure 6.—Detail of the south cut, Pitt Spring mine.

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine the mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mines and prospects survey of the Southern Massanutten Roadless Area (08-175) in the George Washington National Forest, Page and Rockingham Counties, Virginia. The Southern Massanutten Roadless Area was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

INTRODUCTION

The Southern Massanutten Roadless Area contains about 11,800 acres in the George Washington National Forest in the Valley and Ridge physiographic province of west-central Virginia. The area, which is 13 mi long and 1 to 2 mi wide, is in Page and Rockingham Counties on the eastern side of the Shenandoah Valley, between the North and South Forks of the Shenandoah River. The north end is 11 mi southwest of Luray and the south end is 7 mi east of Harrisonburg (fig. 1). The roadless area is characterized by a series of long sandstone ridges collectively called Massanutten Mountain. Ridge crests are 1,100 to 1,900 ft above the Shenandoah Valley floor, and are composed principally of resistant Massanutten Sandstone, which is overlain by thin shales and limestones bearing iron mineralization. The Martinsburg Shale and several limestone rock units underlie the Massanutten Sandstone (Brent, 1960, pl. 1; Allen, 1967, pl. 1). The entire sequence has been folded into a synclinorium (Brent, 1960, p. 81).

Although many of these strata have been mined in the Shenandoah Valley, production of mineral commodities from within the roadless area has been minimal (fig. 1).

Past and present investigations

Iron mining in the vicinity of the roadless area was described in the mid-1800's by Lesley (1859). Hotchkiss (1878) visited the region a few years later, in an attempt to rekindle interest in iron ores during a period of mining inactivity. His work included a map of previously mined and prospected sites on lands that now contain the roadless area.

Holden (1907) recorded the first published information about the Pitt Spring mine. Mining activity around Massanutten Mountain is described in King's (1950) historical summary of iron and manganese mines in the Elkton, Va., area.

U.S. Bureau of Mines personnel T.J. Wawro, P.T. Behum, and M.L. Chatman mapped previously mined sites in the roadless area and in narrow stream valleys to the north (fig. 2) during 1980 (Wawro and others, 1982). Outcrops of the iron-rich zone were sampled where available. Dump material near mine sites was collected for analysis.

MINERAL-RIGHTS OWNERSHIP

Mineral rights in the roadless area have been controlled by several iron development interests. There were several owners in the late 1800's, including William Milnes and Co., Shenandoah Iron, Lumber, Mining, and Manufacturing Co., Shenandoah Furnace Co., and Empire Steel. Allegheny Ore and Iron Co. acquired most of the land in 1902, selling the surface rights to the U.S. Government between 1912 and 1915 under the Weeks Act, but retaining mineral rights on a tract of approximately 8,400 acres of the roadless area (fig. 3). As of 1983, Allegheny Ore and Iron was a subsidiary of Lukens Steel Co., Coatesville, Pa. Remaining mineral rights are controlled by the U.S. Government.

MINING

Iron

Iron from within the roadless area was produced from replacement zones in the Upper Silurian and Lower Devonian limestone, with a total production that probably did not exceed 10,000 long tons of iron. Iron and manganese that have been mined from the Blue Ridge foothills east of Elkton and Shenandoah, Va., occur in rock strata that are not present in the study area. No manganese was mined in the roadless area.

Pitt Spring mine—"Limonite" iron oxides were produced from open-cut trenches at the Pitt Spring mine (fig. 4). Several adits that were developed down dip from the surface cuts, and perpendicular to the iron-zone strike, suggest the possibility that there was limited underground development at the mine. The adits have caved, prohibiting examination.

The most extensive mining took place from two cuts on the northwest slope of Third Mountain, the local name of a mountain ridge in the study area (figs. 4, 5, 6). Records of mining by the Allegheny Ore and Iron Co. have been discarded (R.D. Thomas, Lukens Steel Co., Coatesville, Pa., oral commun., 1980). Open-cut dimensions suggest that approximately 16,000 yds^3 of material were removed from the two large cuts on Third Mountain. Analyses of five samples of the iron-rich zone collected in this study and of two samples collected in previous studies are reported in table 1.

Iron deposition was structurally and stratigraphically controlled, limiting the mineralized zone to the eastern side of a synclinal fold in Silurian and Devonian limestones. Limestone was replaced by the iron, which formed an "Oriskany" type iron deposit—a common occurrence in northwest Virginia (Lesure, 1957, p. 80-105).

The recorded history of the Pitt Spring mine is incomplete. Hotchkiss (1878) named the "Pitt Spring ore bank" (fig. 4) and although a shale borrow-pit containing minor amounts of limonite is present at this site, no evidence of an iron mine was observed. That Hotchkiss did not map mines on Third Mountain suggests that the north and south cuts (figs. 5, 6) were probably not begun until after Allegheny Ore and Iron Co. acquired the land in 1902. No iron was mined in the Shenandoah Valley region after about 1905 (King, 1950, p. 64), suggesting a short life for the Pitt Spring mine.

Mines in the Roaring Run valley—Limonite mines in the Roaring Run Valley are 0.5 to 1.5 mi north of the roadless area. Deposits were formed under structural and stratigraphic controls similar to those pertaining to the iron deposit at the Pitt Spring mine. Ore from the mines along Roaring Run was smelted at the charcoal-type Catherine Furnace in the mid-1800's (Lesley, 1859, p. 68). The Roaring Run area was inactive at the time of the Hotchkiss (1878, p. 35, 37) reconnaissance, and it is not known if mining was reactivated when the main cuts at the Pitt Spring mine were opened.

Names of individual mines along Roaring Run (fig. 2) are from Hotchkiss' (1878) map. Sites of the Old ore bank and the Dofflemoyer bank may have been reclaimed, and locations can only be approximated. The New Market ore bank is a trench approximately 100 ft by 20 ft and 20 ft deep that is now heavily overgrown by vegetation. Small limestone quarries (locs. 11 and 13, fig. 2) along Roaring Run supplied flux for the iron-smelting operation.

New ore beds and related prospecting—Iron prospect pits on the lower eastern slope of Third Mountain (locs. 14 and 15, fig. 2) reveal an extension of the iron mineralization zone of Roaring Run southward into the roadless area. This prospecting was not observed in the field investigation by the Bureau of Mines. F.G. Lesure (U.S. Geological Survey, written commun., 1982) field checked the Hotchkiss (1878) location of the New ore beds and related prospecting and reported a group of small pits, as much as 30 ft in diameter and 15 ft in depth. It is doubtful that any significant production occurred here.

Construction materials

Road construction material was produced from two small shale quarries (locs. 3 and 12, fig. 2) and used for local forest roads. Minor amounts of sand and gravel have been quarried in the vicinity of the roadless area. Allen (1967, p. 64) reported an inactive quarry 13 mi to the north of the area, from which Massanutten Sandstone was produced for building material.

Limestone, dolomite, and zinc

Limestone, the iron-mineralization host rock in the study area, was quarried at a few localities for flux that was used in local iron-smelting operations (fig. 2). Limestone and dolomite are currently quarried in the region surrounding the Southern Massanutten Roadless Area (fig. 1). Several operations around Harrisonburg, Va., quarry a thick sequence of Ordovician limestones that cover the Shenandoah Valley floor and underlie the roadless area at depth. This sequence includes the Edinburg Formation, a stratigraphic unit that crops out along the western boundary of the Southern Massanutten area (Brent, 1960, pl. 1). Dolomite is produced near Elkton, Va. Zinc sulfide mineralization associated with fractured carbonate rock, primarily the upper Beekmantown Dolomite (Herbert and Young, 1956, p. 5), has been prospected at several localities in the Shenandoah Valley. A small amount of sphalerite was produced at the "Timberville mine", or Weatherholtz prospect, 3.8 mi northeast of Timberville, Va. (fig. 1), in 1949 and 1950 (Herbert and Young, 1956, p. 24; Good and Allen, 1972, p. 2). Brent (1960, p. 127) reported zinc production at the Bowers-Campbell mine, 1.9 mi northwest of Timberville, Va. (fig. 1) (Herbert and Young, 1956, p. 26). Sphalerite occurs at the Wiseland prospect, 2 mi due west of the Southern Massanutten Roadless Area (fig. 1).

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MAPS SHOWING MINES AND PROSPECTS IN THE SOUTHERN MASSANUTTEN ROADLESS AREA, PAGE AND ROCKINGHAM COUNTIES, VIRGINIA

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1986

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