DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1594-D
PAMPHLET ACCOMPANIES MAP

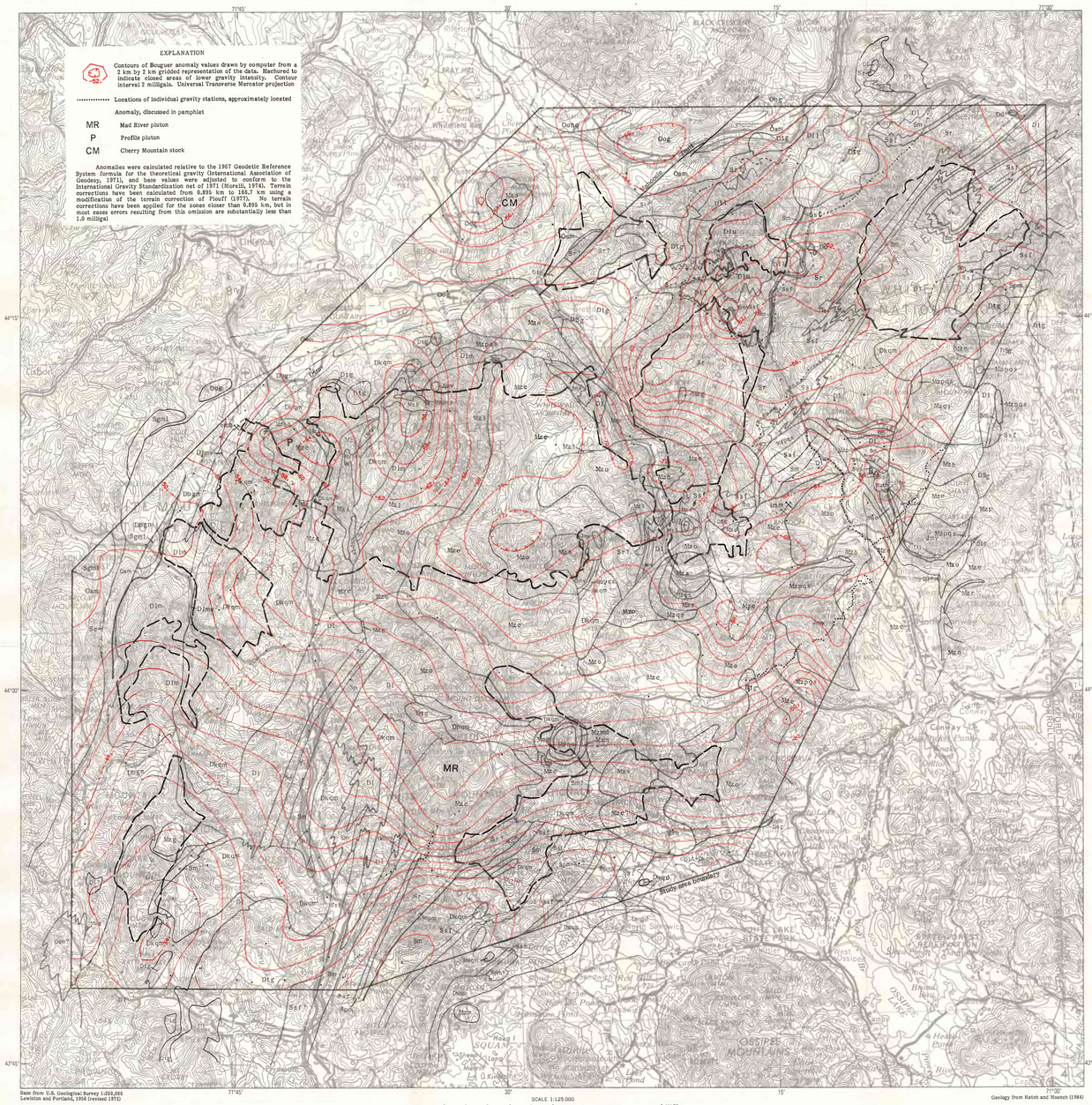


FIGURE 1.—BOUGUER GRAVITY MAP

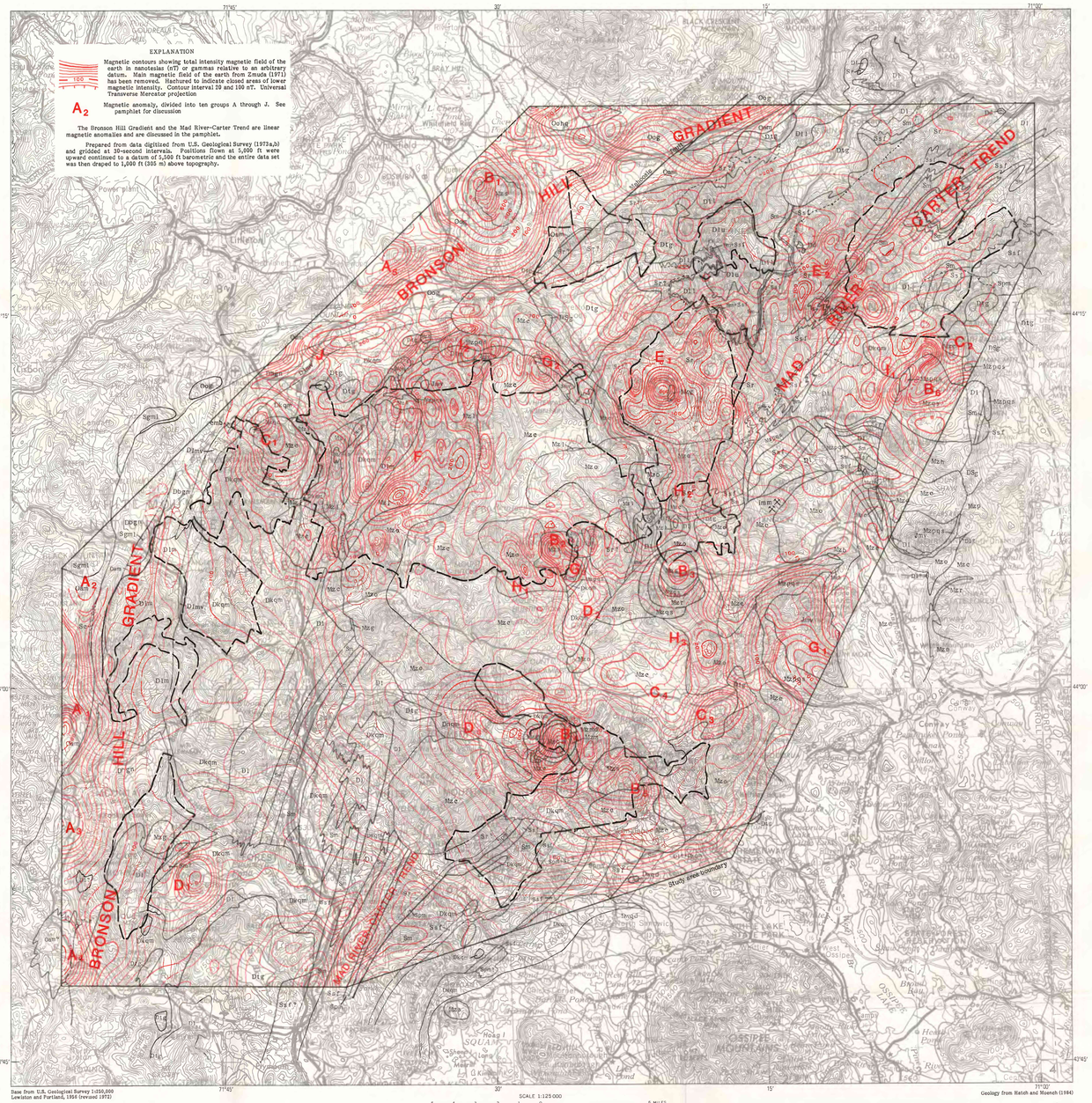
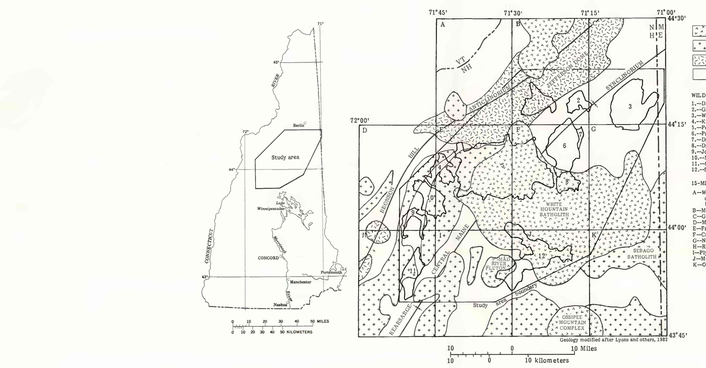


FIGURE 2.—AEROMAGNETIC MAP



Index map showing individual wildernesses and roadless areas (numbered), 15-minute quadrangles (lettered), and major geologic features of the White Mountain National Forest, N.H. In the explanation, U.S. Forest Service identification numbers are shown in parenthesis after the roadless area names and geologic references are shown after the quadrangle names.

DESCRIPTION OF MAP UNITS

The following descriptions are taken from Hatch and Moench (1984).

Notes: In the following descriptions, many established formal names for plutonic rocks are retained. The descriptions of these rocks, however, use rock nomenclature recommended by Streckeisen (1973). The two do not always agree. Thus, for example, the Kinsman Quartz Monzonite, a term which has been in use since 1937 (Billings, 1937) is here described, following Streckeisen, as a granite.

Mesozoic Plutonic Rocks Of The White Mountain Plutonic-Volcanic Suite

(Relative ages within this group are only locally known. Some rock units appear to have been emplaced at more than one time and thus may have more than one age relative to other units in the suite. All are unfoliated.)

Mzc Conway Granite—Medium- to coarse-grained, pink to tan biotite granite composed of pink microperthite, pale-gray quartz, white oligoclase, black biotite, and accessory sphene, zircon, allanite, fluorite, ilmenite, magnetite, and apatite

Mzi Intrusive breccia—Angular blocks and fragments of Kinsman Quartz Monzonite and metamorphic rocks in a matrix similar to Conway Granite consisting of quartz, microperthite, oligoclase, orthoclase, and biotite. Mapped in two small areas at Franconia Notch

Mzr Riebeckite granite—Medium-grained, white granite composed of microperthite, clear quartz, black riebeckite, and accessory ilmenite, fluorite, zircon, and sphene

Mzh Hastingsite granite—Medium-grained, light-gray to white granite composed of microperthite, quartz, oligoclase, and hastingsite with traces of biotite, apatite, zircon, fluorite, magnetite, and allanite. Locally includes some riebeckite granite

Mzb Black Cap Granite of Henderson and others (1977)—Fine-grained, pink, equigranular granite composed of microperthite, quartz, and minor plagioclase and biotite, plus accessory zircon, apatite, fluorite, and magnetite. Locally gradational with increase in grain size into Conway Granite

Mzo Mount Osceola Granite—Medium- to coarse-grained, greenish-gray, white-weathering granite containing greenish-gray microperthite, smoky quartz, ferrohastingsite, minor biotite, ferrohedenbergite, and fayalite, and accessory allanite, zircon, and sphene. May grade into Conway Granite with increase in biotite and decrease in other ferromagnesian minerals

Mzl Mount Lafayette Granite Porphyry—Gray, tan, or greenish-gray rock in which 3–8 mm phenocrysts of amber or smoky quartz and white microperthite and 0.5–1.4 mm phenocrysts of black hastingsite, fayalite, and hedenbergite are set in a finer grained matrix of quartz, microperthite, orthoclase, oligoclase, hastingsite, hedenbergite, fayalite, and biotite with accessory zircon, magnetite, fluorite, apatite, and allanite

Mzp Porphyritic granite at Robbins Ridge—A white granitic rock in which phenocrysts of microperthite are in a matrix of oligoclase, microperthite, quartz, amphibole, and biotite with accessory zircon, apatite, and hematite

Mzm Monzonite—Fine-grained, pink monzonite composed of andesine and microperthite plus about 6 percent hornblende and minor biotite. Includes medium-grained light-gray monzonite also composed primarily of andesine, microperthite, and hornblende and narrow outer band of fine-grained dark-gray quartz monzonite in which phenocrysts of plagioclase, hornblende, and augite are set in a matrix of oligoclase and quartz with minor biotite and hornblende. Mapped only on Mt. Tripyramid

Mzmd Monzodiorite—Medium-grained, light-gray monzodiorite consisting primarily of andesine with lesser microperthite, magnetite, biotite, and hornblende. Mapped only on Mt. Tripyramid

Mzqd Quartz diorite—Coarse-grained, gray quartz diorite composed of andesine, biotite, quartz, and hornblende. Mapped in one small body three miles south of Franconia Village

Mzs Syenite—Medium- to coarse-grained, generally greenish-gray but locally pink rocks composed primarily of microperthite with 5–10 percent sodic amphibole or hastingsite and minor hedenbergite, fayalite, or biotite. Includes Carrigain Syenite Porphyry of Henderson and others (1977) at Mt. Carrigain. Mapped in five widely scattered stocks

Mzqs Quartz syenite—Predominantly medium-grained, gray to greenish-gray, locally tan, generally equigranular but locally porphyritic rock composed of 80–90 percent microperthite (local minor oligoclase), 5–10 percent quartz, up to 13 percent hastingsite or hornblende, and minor local biotite. Gradational with decrease in quartz into syenite

Mzqps Porphyritic quartz syenite—Greenish-gray, tan- to gray-weathering rock in which 2–6 mm phenocrysts of amber to smoky quartz and 3–12 mm phenocrysts of white perthite are in a fine-grained groundmass of microperthite, quartz, oligoclase, ferro- hastingsite, hedenbergite, fayalite, and accessory zircon, sphene, fluorite, allanite, apatite, and pyrite. Includes Albany and Mount Carfield Porphyritic Quartz Syenites

Mzg Gabbro—Medium- to coarse-grained, massive, dark-gray to dark-green olivine-pyroxene gabbro, olivine gabbro, pyroxene gabbro, pyroxene-hornblende gabbro, and, in part of the body on Mt. Tripyramid, medium- grained hypersthene diorite

Mesozoic Volcanic Rocks

Jmv Moat Volcanics—Primarily rhyolitic flows, tuffs, and breccias. The flows are light-gray to reddish-gray rocks in which phenocrysts of light-gray or pink microperthite and smoky quartz are set in a dense to very fine-grained groundmass of feldspar and quartz. Biotite and hastingsite are rare. The tuffs are light- to dark-gray to red and are composed essentially of microperthite or oligoclase and quartz. The breccias consist of angular fragments 0.25 in. to as much as a few feet across of quartz, feldspar, slate (on Mt. Kearsarge North), quartzite, schist, two-mica granite, Kinsman Quartz Monzonite, and rhyolite in a matrix of microperthite and quartz. Minor trachyte on South Moat Mountain is red and consists of feldspar phenocrysts in a hematitic feldspar matrix. Minor andesite is present on Mt. Hale about 4 mi south-southeast of the village of Twin Mountain

Devonian And Possibly Younger Paleozoic Plutonic Rocks

Dtg Two-micа granite—Medium-grained, light-gray to white, poorly to non-foliated, equigranular to moderately porphyritic granite composed of potash feldspar, oligoclase, quartz, and variable proportions of biotite and muscovite. Commonly is cut by white pegmatite characterized by muscovite and biotite and local garnet and/or) tourmaline. Forms discrete plutons, and also occurs as countless dikes and sills invading somewhat less resistent metamorphic rocks, thus exaggerating its true abundance. Some contacts, particularly against gneissic metasedimentary rocks (DSg) are thus difficult to locate accurately. Includes rocks previously mapped as Concord Granite (for example, Moke, 1946), Concord Quartz Monzonite (Billings and Fowler-Billings, 1975), Bickford Granite (Williams and Billings, 1938), and binary granite (Billings, 1956)

Dd Diorite—Fine- to coarse-grained, gray, plagioclase-amphibole-biotite diorite. Forms two small bodies north of Carter Dome. Includes small body of quartz diorite in very northeast corner of map

Dwqd Winnepesaukee Quartz Diorite—Medium-grained, foliated, light- to dark-gray biotite granodiorite or, locally, tonalite

Dbgn Bethlehem Gneiss—Medium-grained, foliated, gray biotite-muscovite granodiorite gneiss

Dkqm Kinsman Quartz Monzonite—Medium- to coarse-grained, foliated, medium- to light-gray biotite or biotite-muscovite granite. Characteristically has abundant potassium feldspar megacrysts as much as 2 in. long

Dnqm Quartz monzonite of Norway Rapids—Medium- to coarse-grained, foliated, pink biotite quartz monzonite or granite

Devonian And Silurian Metamorphosed Stratified Rocks

Notes: Minerals of metamorphic rocks listed in generally decreasing order of abundance.

Lower Devonian Strata

Dl Littleton Formation, Undifferentiated (Lower Devonian)—Fine- to coarse-grained, poorly- to well-bedded, commonly graded bedded, dark-gray to light-gray aluminous schist and quartz-plagioclase-biotite granofels

Dlu Upper member—Medium- to coarse-grained, light-gray aluminous schist characterized by 2 to 3 in. long aggregates of muscovite and sillimanite pseudomorphous after andalusite, and quartz-biotite granofels. Forms beds generally 12 in. to 16 ft thick that commonly are well graded from granofels to mica schist. Distinguished only in the northern Presidential Range. Tentatively correlated with Sebocomook Formation of Moench, Pankiewbki and others (1982) in Maine

Dll Lower member—Medium-grained, light-gray-brown, aluminous schist locally characterized by 1 to 2 in. long aggregates of muscovite and sillimanite pseudomorphous after andalusite, and quartz-plagioclase-biotite granofels. Forms beds 2 to 18 in. thick that are commonly well graded from granofels to mica schist. Lenses of fine-grained pink garnet-quartz granofels 1 to 6 in. thick locally conspicuous. Distinguished only in the northern Presidential Range. Possibly correlative with Carrabassett Formation of Maine

Dlm Metagraywacke of Mt. Moosilauke septum—Fine- to medium-grained, gray, brown, or purplish-brown quartz-feldspar-biotite metagraywacke containing beds of metavolcanic amphibolite and feldspar gneiss and metapelite. Correlative with type area Littleton Formation on the basis of fossils near Kinsman Notch, N.H., but lithologically distinguished by lower percentage of aluminous rocks, characteristic purplish-brown metagraywacke, and widely distributed minor metavolcanic rocks. Recognized only in west part of map area

Dlmv Metavolcanic facies of metagraywacke of Mt. Moosilauke septum—Fine- to medium-grained, purplish-brown metagraywacke similar to that of Dlm, interbedded with about 30 percent volcanic amphibolite and minor metafelsite

Lower Devonian and Silurian Strata

DSg Undifferentiated gneiss—Medium- to coarse-grained, banded, well foliated, gray to gray-brown, generally non-rusty to slightly rusty pelitic and semi-pelitic quartz-feldspar-biotite-muscovite (garnet-sillimanite-staurolite) gneiss. Believed to represent intensely metamorphosed and locally partially melted rocks primarily of the Littleton, Madrid, and Rangeley Formations. Commonly includes pods of calc-silicate granofels 6–30 in. long interpreted as disrupted remnants of calcareous metasandstone beds probably of the Madrid or Rangeley Formations

Silurian Strata

Sm Madrid Formation (Silurian)—Fine- to medium-grained, distinctly bedded, white, green, and purple calc-silicate granofels consisting primarily of plagioclase, quartz, tremolite, diopside, garnet, and biotite in lower part. Upper part is fine-grained, thick-bedded to massive, light-brownish-gray plagioclase-quartz-biotite "salt and pepper" granofels

Ssf Smalls Falls Formation (Silurian)—Fine- to medium-grained, well bedded, thinly bedded, deeply rusty-weathered, sulfidic, commonly graphitic, slabby quartzite, mica schist, and calc-silicate granofels

Sgm Perry Mountain Formation (Silurian)—Fine-grained, white to light-gray quartzite in beds generally 1 to 6 in., rarely as much as 3 ft thick, interbedded with light-gray-brown mica schist. Characterized by relatively clean quartzites and by abrupt upward transitions between quartzite and schist in which grading can only locally be recognized

Sr Rangeley Formation (undifferentiated) (Silurian)—Medium-grained, light-brown, well bedded, commonly graded bedded, locally somewhat rusty weathered biotite quartzite and quartz-mica-garnet-sillimanite schist. Local thin beds of quartz-pebble conglomerate and grit in northernmost part of area. Locally contains pods of calc-silicate granofels

Sc Clough Quartzite (Silurian)—White to light-gray quartzite and quartz-pebble metaconglomerate. Mapped only on Mount Clough at west edge of area

Silurian(?) Plutonic Rocks

Sgm1 Granite at Moody Ledge—Fine-grained, white to tan, massive granite containing minor biotite, magnetite, and sphene

Ordovician Oliverian Plutonic Suite

Oog Undifferentiated granite and quartz syenite—Medium- to coarse-grained, gray to pink, commonly foliated, porphyritic to non-porphyritic granite and very local coarse quartz syenite containing biotite and minor muscovite or hornblende

Oohg Hornblende quartz monzonite—Medium- to coarse-grained, foliated, porphyritic quartz monzonite in which pink to white phenocrysts of potassium feldspar are set in a dark-gray matrix, and fine- to medium-grained equigranular gray quartz monzonite, quartz monzodiorite or granodiorite

Ordovician Metamorphosed Stratified Rocks

Oam Ammonoosuc Volcanics—Medium-grained, light-gray, brown or dark-green biotite gneiss, feldspar gneiss and amphibolite of presumed volcanic origin, and minor metasedimentary biotite schist and granofels. Commonly contains disseminated pyrite, locally as much as 3 or 4 percent of the rock

Contact
Fault
Approximate boundary of gneissic rocks
Approximate boundary of wildernesses or roadless areas (see index map)
Mines discussed in pamphlet
Iron Mountain mine
Coppermine Brook mine

BOUGUER GRAVITY AND AEROMAGNETIC MAPS OF THE WILDERNESSES AND ROADLESS AREAS OF THE WHITE MOUNTAIN NATIONAL FOREST, COOS, CARROLL, AND GRAFTON COUNTIES, NEW HAMPSHIRE

By
Wallace A. Bothner and Christian E. Jahrling II, U.S. Geological Survey and University of New Hampshire
and
Robert P. Kucks, U.S. Geological Survey

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