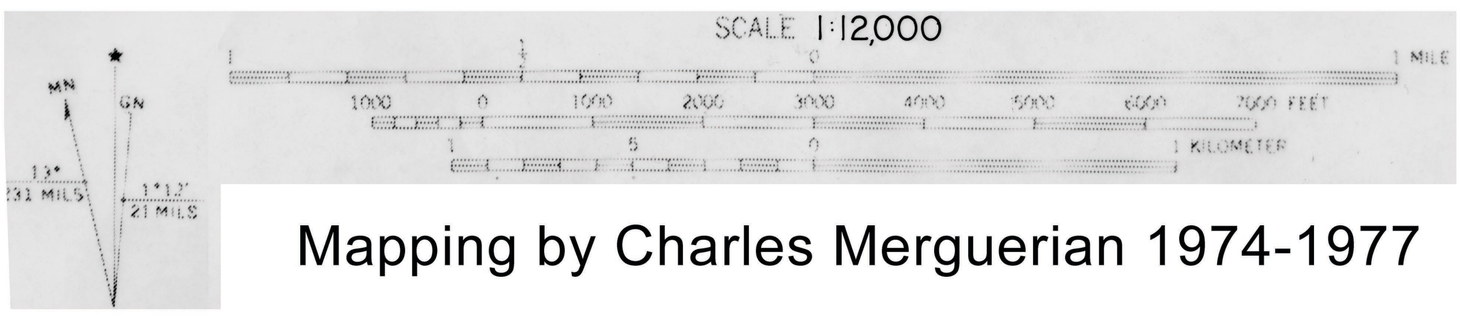
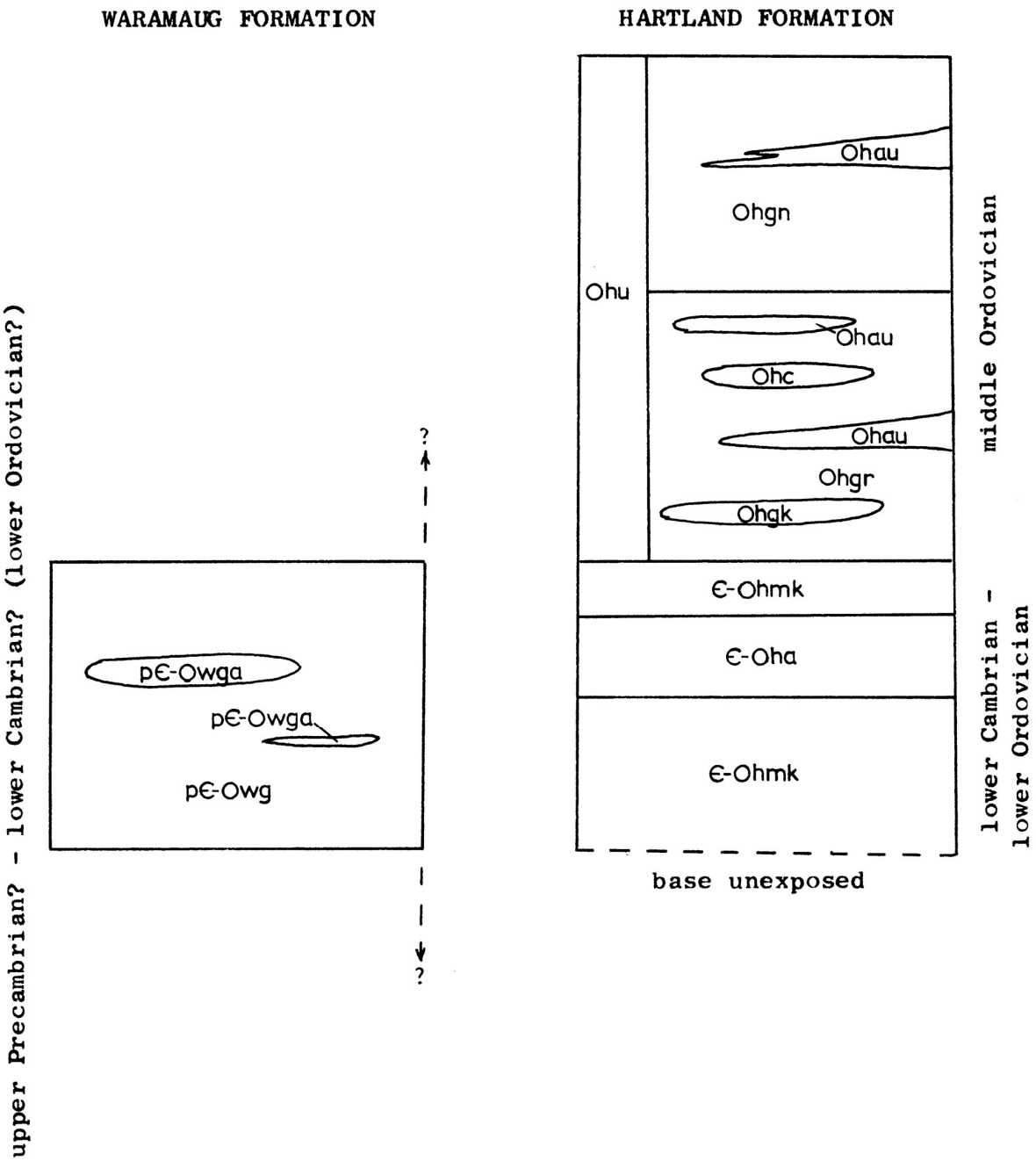


Mapping by Charles Merguerian 1974-1977

PLATE 2 - Geological Map of a Portion of the West Torrington quadrangle, Connecticut

STRATIGRAPHIC COLUMN

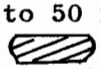


EXPLANATION

META-IGNEOUS ROCKS

Minerals are listed in order of decreasing abundance. Those in parentheses are not found in all exposures.

p

Pegmatites - Medium to coarse grained, gray weathering to iron-stained, chalk white, pinkish white to orange white, albite-microcline-quartz-muscovite-biotite pegmatite and granite with accessory (biotite)-(tourmaline)-(ilmenite)-(beryl)-and (garnet). Best developed near and west of the Tyler Lake Granite, areas of closely spaced pegmatite in pods ½ inch to 50 feet in thickness are shown by a special symbol  . Contact relations are both concordant and discordant with respect to the regional schistosity or gneissosity (S_2) with most pegmatites exhibiting a faint shear or micaceous foliation as an S_4 fabric.

Tg

Tyler Lake Granite - Fine grained to pegmatitic, well foliated, gray weathering, quartz-microcline-plagioclase-muscovite-biotite-(garnet)-(chlorite) granite that shows evidence of metamorphic recrystallization in the form of aligned micas. In some instances the Tyler Lake Granite appears rhythmically layered with more finer grained and foliated granite which is more typical of the mass. The Tyler Lake Granite includes zenoliths of regionally foliated schist and appears to be syn-tectonic with respect to F_3 folds.

early Devonian - middle Devonian (?)

THE HODGES COMPLEX
Intrusive into the Waramaug and Hartland Formations

P_p

Meta pyroxenite-hornblendite - Highly altered, medium grained to pegmatitic, dense, deeply iron-stained, silver-green to dark green to black rocks consisting of varying proportions of olivine-hypersthene-enstatite-augite-hornblende-cummingtonite-tremolite-actinolite-anthophyllite-biotite-chlorite-(plagioclase)-(epidote)-(magnetite)-(ilmenite)-(zircon)-(apatite)-(sphene)-(talc)-(serpentine). Types noted are Hornblende orthopyroxenites, Biotite-Tremolite-ortho-pyroxenites, Orthopyroxene hornblendites, Hornblendites, Biotite hornblendites, Hornblende gabbros, Hornblende diorites, Porphyritic hornblende diorites, and serpentinites. Detailed descriptions of igneous and metamorphic textures and mineralogy are within the text. Rocks are broken with great difficulty and tend to break along pre-existing iron-stained cracks that are not immediately visible on the weathered surface. Outcrops are rounded and show evidence of spheroidal weathering. Much ultramafic float is observed southeast of the Hodges Complex.

early Devonian (?)

late Ordovician -

Meta-diorite - Medium to very coarse grained, dark to light gray weathering, iron-stained, gray-green to black and white banded hornblende-plagioclase-biotite-opaque-(quartz)-(epidote)-(sphene)-(apatite)-(garnet) diorite that has a layered aspect composed of sub-parallel, subhedral to euhedral hornblende and plagioclase. This layering is interpreted as flow layering. Garnets occur as large euhedral crystals (often deformed) up to 100 feet away from contacts with intruded metasediments. Flow layering is generally parallel to the regional schistosity (S_2) of the enclosed metasediments but in some instances diorite flow layering truncates these structures. Late anastomosing dikes of identical mineralogy are most common.

Di

Meta-gabbro - Medium to very coarse grained, dark gray weathering, iron-stained, speckled, gray-green to black and gray-white, hornblende-plagioclase-biotite-opaque-(quartz)-(sphene)-(apatite)-(chlorite)-(zircon) gabbro that shows evidence of post-magmatic recrystallization. Labradorite (An_{50-55}) is less abundant than or equal to hornblende with both of these minerals comprising about 90% of the total rock volume. Textures vary from blotchy, obviously recrystallized areas of hornblende and plagioclase, to facies where euhedral crystals of hornblende are in a granular plagioclase matrix. Flow layering is generally only measureable at or near contacts with older rocks. Outcrops are generally massive but can be broken with little difficulty. Minor areas of pegmatitic hornblende gabbro are present. Areas of poikilitic hornblende gabbro or diorite with large plates of hornblende up to ½ inch in diameter exhibiting a porphyritic texture are only recognized in gabbroic and ultramafic areas.

Hg

METAMORPHIC ROCKS

Hartland Formation (upper member) - Gneiss, granulite, amphibolite, schist member. Occurring as a continuous belt through the Hodges Complex, with great variation in thickness from 600 feet to 2300 feet between the Waramaug Formation and the lower member of the Hartland Formation, the upper member can be divided into the following sub-members:

Ohu

Gneiss member - A lustrous, typically non-rusty weathering, gray, quartz-plagioclase-muscovite-biotite-(graphite) gneiss and minor schist often with crumbly feldspathic interlayers up to 6 inches thick. Alternating quartzofeldspathic bands and thin micaceous folia impart a pin-striped appearance in some areas while in others, smoky-gray quartz layers up to 2 inches thick and dark quartz layers are present. There is a scarcity of aluminosilicate minerals in these rocks.

Ohgn

middle Ordovician (?) = (Moretown equivalent)

Ohau

Amphibolite member - Fine to medium grained, rusty and non-rusty weathering, gray-green or whitish on weathered surfaces, dark-green to green-black hornblende-plagioclase-biotite-(quartz)-(epidote)-(chlorite)-(ilmenite)-(pyrite) amphibolite. Amphibolites within the Hartland Formation upper member are typically dense, dark green rocks composed of prismatic hornblendes aligned within the regional schistosity. Alternating bands of plagioclase and minor clear, recrystallized quartz separate hornblende rich laminations. In comparison to amphibolites of the Hartland lower member, these rocks show less diversity in mineralogy and tend to be epidote poor.

Ohgr

Granulite member - A slabby, well bedded, faint to strongly brown weathering, quartzofeldspathic granulitic gneiss or granulite with mica. Minor interlayers of muscovite-plagioclase-quartz-biotite schist are also present.

Ohau

Amphibolite member - Identical to rocks described above (Ohau).

Ohc

Quartzite, coticule, calc-silicate member - Mica quartzite, quartz-garnet granulite, and calc-silicate rocks that are well bedded and generally separated by thin, continuous micaceous layers $\frac{1}{4}$ inch to 3 feet in thickness. Mica quartzites are punky weathering, well laminated and vitreous with tan muscovite on fresh surfaces. Coticule rock is rusty to gray weathering, compact and well bedded with alternating bands of metallic gray, bluish-gray, tan and whitish and disseminated garnet. Calc-silicate rock is green to brown-green in color, non-rusty weathering with an outward appearance not unlike that of amphibolitic rocks mentioned above. All of these types are fine grained except for some mica quartzites. They occur within the granulite member (Ohgr) and are surrounded by a distinctive purple-gray quartz-biotite-plagioclase granulite and granulitic gneiss.

Ohau

Amphibolite member - Identical to rocks described above (Ohau).

Ohgk

Kyanite schist member - A fine to medium grained, locally rusty weathering quartz-plagioclase-muscovite-biotite-kyanite-garnet schist and schistose gneiss that, when present, invariably occurs near the Hartland Formation lower member contact as discontinuous layers or lenses.

lower Cambrian - lower Ordovician = (Rowe equivalent)

€-Ohl

Hartland Formation (lower member) - Muscovite-kyanite schist and amphibolite member. Occurs as a 1000 foot thick sequence in the study area and can be divided into the following sub-members:

€-Ohmk

Muscovite-kyanite schist member - A highly lustrous, phyllitic to schistose, gray weathering, medium to coarse grained, quartz-muscovite-plagioclase-biotite-opaque-garnet-(ilmenite)-(kyanite)-(staurolite)-(apatite)-(chlorite) schist that often contains mega-porphyroblasts of kyanite, staurolite, garnet, and more rarely plagioclase and biotite giving the rock a knotted appearance. Fresh surfaces reveal a mirror-like finish of intergrown quartz and muscovite. Quartz and muscovite are roughly equivalent in proportion and together comprise more than half of the rock volumetrically. Rocks generally part with little difficulty along the regional schistosity and in the presence of planar slip cleavages will often break into slender, feet long splintery masses that have been used as fence-posts in the past. Granular, clear to smoky gray quartz pods are most conspicuous and generally found elongate within the regional schistosity. The lower member becomes markedly hornblende, chlorite, and/or biotite rich near contacts with its interlayered amphibolite member and often these minerals are incorporated into elliptical quartz pods. Some zones are non-porphyroblastic while others more typically contain spongy 3 inch staurolite and 4 inch kyanites in random post-regional schistosity growth. Minor discontinuous interlayers of a hornblende-chlorite quartz granulite are present near the lower member schist amphibolite contact. With an increase in plagioclase content and a decrease in micaceous minerals, the lower member grades, with some lensing, into the upper member.

€-Oha

Amphibolite member - Fine to medium grained, rusty and non-rusty weathering, gray-green or whitish on weathered surfaces, lime-green through dark green to green-black hornblende-plagioclase-biotite-(quartz)-(epidote)-(chlorite)-(opaque)-(ilmenite)-(garnet)-(thulite) amphibolite. Amphibolites consist of interlayered and laterally variable lithologies characterized by one of the four lithic types listed below. Contacts are gradational.

1. a tri-colored, pin-striped amphibolite with foliation planes of white or yellow-white, light green and dark green, all intimately alternating to compose a dense but easily parted rock.
2. a light green to yellow-green epidote rich amphibolite with a layered appearance due to compositional variations. Epidote is locally up to 50% of the total rock volume. Individual layers are up to 6 inches thick.
3. a dense, iron-stained, dark green rock composed of felty, prismatic, lieated hornblendes aligned within the regional schistosity. Some zones weather into a crumbly mass of hornblendes but retain their green color. Alternating bands of plagioclase and minor clear, recrystallized quartz also define the regional schistosity.
4. a well bedded, green, pink and tan, actinolite-plagioclase-quartz granulitic amphibolite with interpenetrant, radiating laths of actinolite set in a quartzofeldspathic fine grained matrix.

Waramaug Formation - A heterogeneous assemblage of brown and gray weathering, poorly foliated and generally indistinctly bedded gneisses with minor schists and amphibolites. Two types have been noted although their stratigraphy and structure is not understood at present:

pЄOwg

- a granular quartz-biotite-plagioclase-muscovite-garnet-opaque gneiss which can be distinguished by its light gray color on fresh surfaces and often the presence of zoned plagioclase porphyroblasts within the gneissosity.
- a quartz-plagioclase-biotite-garnet-muscovite-opaque-(kyanite)-(staurolite)-(chlorite)-(tourmaline) gneiss and minor schist which can be distinguished by its nubby surface and spindly appearance due to differentially weathered aluminosilicate minerals.

Zones of non-mapable extent include gray quartzite interlayers varying from 1 inch to 3 inches thick, biotite-quartz-plagioclase schist, quartz-plagioclase-muscovite-biotite schist, tremolite-quartz-calcite granulite (special symbol - trem. X). Some zones are sulphitic consisting of yellow stained, rust colored, friable rocks with a sulphur odor. Maroon weathering is also locally present. Granulites, lithically identical to Hartland upper member types are locally present. The Waramaug is most granular and biotitic at or near Precambrian contacts while in facies away from the Precambrian rocks, a heterogeneous admixture of the previously mentioned types co-exist.

At present no detailed stratigraphy has been traced for the Waramaug Formation.

lower Ordovician (?)

upper Precambrian - lower Cambrian (?) ~

Amphibolite and amphibolitic gneiss - Fine grained, gray to steel gray weathering hornblende-plagioclase-biotite-opaque-(garnet) amphibolite occurs as continuous and discontinuous streaks, lenses and layers from inches up to 100 feet thick (although higher values may be due to repitition by folding). The amphibolites lack the great variety of the Hartland types and are less well developed in comparison. Those occurring are typically gray-black to gray-green with plagioclase and minor quartz comprising laminae (where observable). These minerals vary from less than 5%, up to 20% of the total rock volume. In other places amphibolite appears devoid of felsic material in outcrop and is a dense, compact rock that is broken with difficulty. Amphibolitic gneiss often represents a transition from pelitic rock to amphibolite. A complete transition from mica gneiss through amphibolitic gneiss (occurring within 10 feet) gives way to amphibolite in its more typically massive character. In other places amphibolite contacts are sharp.

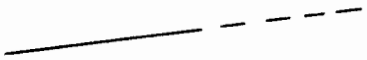
pЄOwga

Precambrian

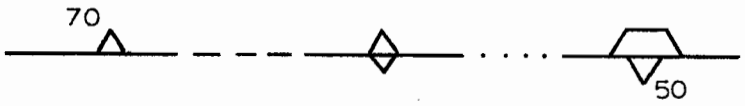
Precambrian - Undivided and unmapped in the present study. Surface distribution from Gates and Christensen, 1965.

pЄ

SYMBOLS



CONTACT
Dashed where approximately located



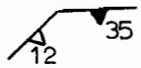
inclined vertical overturned

THRUST FAULT (Cameron's Line)
Dashed where approximately located
Dotted where traced through igneous rocks

FAULT
Dashed where approximately located
U=upthrown side, D=downthrown side
Barb shows dip direction and angle of dip

PLANAR FEATURES

Symbols may be combined with coexisting features
The point of intersection denotes the point of observation



S_o - Strike and dip of bedding shown by quartzite interbeds

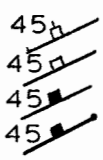
S_1 - Strike and dip of early schistosity or gneissosity and parallel compositional banding in gneisses and in amphibolites

S_2 - Strike and dip of regional schistosity, locally with parallel compositional banding

S_3 - Strike and dip of crenulation cleavage or slip cleavage or spaced foliation

S_4 - Strike and dip of late crenulation cleavage or slip cleavage or spaced foliation

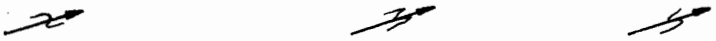
Strike and dip of igneous flow layering



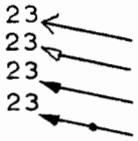
Strike and dip of axial surfaces of F_1 folds
Strike and dip of axial surfaces of F_2 folds
Strike and dip of axial surfaces of F_3 folds
Strike and dip of axial surfaces of F_4 folds

LINEAR FEATURES

Drag sense of minor folds as viewed in profile down the plunge
Generation indicated by proper fold axis symbol



left-handed assymetric right-handed



Bearing and plunge of F_1 fold axis
Bearing and plunge of F_2 fold axis
Bearing and plunge of F_3 fold axis
Bearing and plunge of F_4 fold axis

Bearing and plunge of L_1 lineation - quartz ribbing, hornblende lineation or streaking in amphibolites, mineral lineation in igneous terrains

Bearing and plunge of L_2 lineation - streaking of S_2 on S_1 in gneisses and schists, hornblende lineation or streaking in amphibolites

Bearing and plunge of L_3 lineation - trace of S_3 on the regional schistosity (S_2) (Some data plotted was calculated from oriented samples)

Bearing and plunge of L_4 lineation - trace of S_4 on the regional schistosity (S_2) (Some data plotted was calculated from oriented samples)

Abandoned Mine or Quarry

p=pegmatite	Cu=copper
gr=gravel	s=soapstone
g=granite	Ni=nickel

Well Data