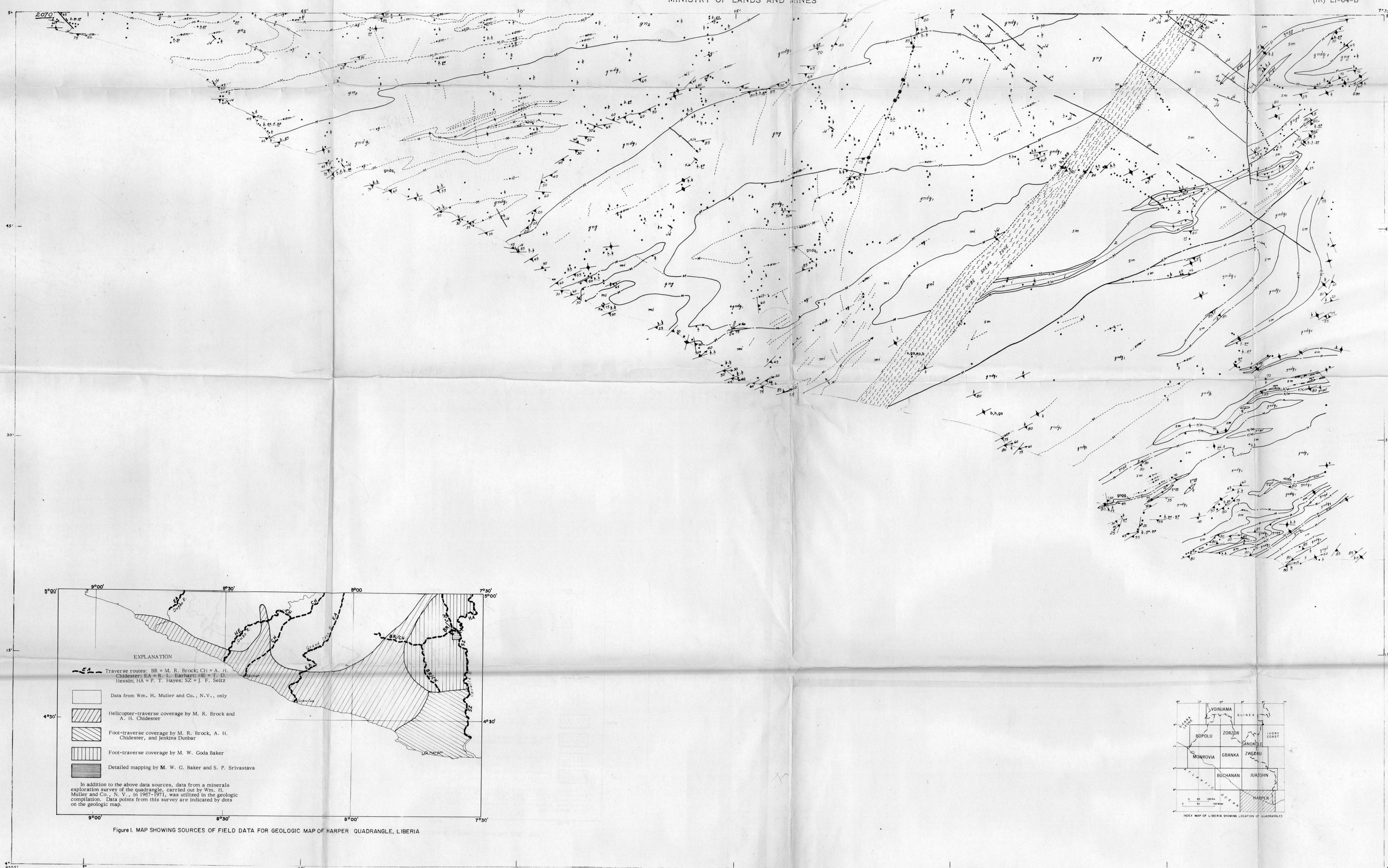


(200)
R290
no. 74-310

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

REPUBLIC OF LIBERIA
MINISTRY OF LANDS AND MINES

USGS OPEN-FILE REPORT
(IR) LI-64-B



EXPLANATION
Correlation of Map Units

Kja	Kjb	Cretaceous or Jurassic
Jd	sm	
q	am	Metamorphic rocks
gnq	gnq	
gnl	gnl	Precambrian
gnl	gnl	

DESCRIPTION OF MAP UNITS

Kja Andesite porphyry. Medium gray, aphanitic dike rock with phenocrysts of andesite and hornblende as much as 1 cm long.

Kjb Basaltic porphyry. Pinkish-brown, aphanitic dike rock with abundant phenocrysts of andesite as much as 3 mm long and of hornblende as much as 2 mm long.

Jd Diabase. Dark gray dike rock chiefly diabasic but locally gabbroic in texture; consists primarily of calcic plagioclase and clinopyroxene, with minor amounts of magnetite and ilmenite.

z Composite unit. A unit comprising predominantly schist but also abundant amphibolite and quartzite, which impart distinctive linear magnetic anomalies of moderately high amplitude; associated with reported occurrences of iron formation and itabirite.

sm manganiferous garnet rock and carbonate facies (quartz-manganese carbonate rock). Sooty black rind on weathered surfaces.

l Iron formation. Iron-rich schists including itabirite and silicate-facies iron formation. Associated with composite unit (z) in schist belt and delineated on the basis of strong magnetic anomalies.

is Iron formation, silicate facies. Dark greenish-gray iron-rich grunerite-hornblende-quartz schist.

it Iron formation, oxide facies (itabirite). Medium to dark gray, finely laminated quartz-hematite-magnetite rock.

am Amphibolite. Dark gray to dark greenish-gray, coarsely foliated rock with approximately equal proportions of hornblende and plagioclase; accessory sphene ubiquitous. Distinct layering reflects variations in proportions of essential and accessory minerals, and in grain size. Some layers contain minor amounts of quartz.

q Quartzite. Dark to light-gray, medium-grained rock with quartz generally in excess of 90 percent. Locally contains accessory garnet, magnetite, and pyrite.

sm Mica schist. Gray, medium- to coarse-grained quartz-muscovite schist predominates. Sillimanite is common, staurolite and tourmaline locally conspicuous, and garnet generally sparse but locally abundant. Contains numerous small lenses and irregular masses of pegmatite rich in coarse muscovite, and generally minor but locally abundant interstratified biotite schist, quartzite, amphibolite, and gneiss of predominantly quartz diorite composition. Outcrops generally sparse and deeply weathered.

ml Migmatite. Hybrid rock consisting of foliated mafic rock fragments, lenses, and layers (paleosome) in a granular or weakly foliated leucocratic matrix (neosome). Paleosome is commonly amphibolite, but biotite-rich gneiss is not uncommon. Neosome ranges from quartz diorite to granodiorite and granite in composition.

gnq Composite gneiss. Predominantly biotite quartz diorite with abundant interstratified amphibolite and quartzite. Graphite and garnet common and locally abundant; magnetite locally imparts distinct magnetic character. Moderate to strong magnetic contrasts are characteristic of the unit, and small local high radiometric values near the northern border of the quadrangle suggest the presence of numerous small granite bodies.

gnl Leucocratic gneiss. A map unit distinguished on the basis of broad low magnetic contrasts.

gnld Quartz diorite gneiss. Biotitic and hornblende quartz diorite gneiss, generally with strong foliation parallel to distinct layering that reflects variation in content of mafic minerals. Biotitic and hornblende phases locally interlayered at outcrop scale. Contains appreciable interstratified amphibolite and minor amounts of schist.

gnr Granitic gneiss. Mostly biotite gneiss ranging from granodiorite to granite in composition, with minor amounts of quartz diorite gneiss and amphibolite. Contains zones with abundant porphyroblasts and augen of microcline. Weakly foliated, commonly displays strong joint system.

gnrd Granodioritic gneiss. Predominantly biotitic granodiorite gneiss with minor local granitic bodies. Weak foliation reflects predominantly the orientation of biotite.

gnr Granite gneiss. Biotite granite gneiss characterized by high radiometric and low magnetic values.

MAP SYMBOLS

Field data are shown by conventional symbols; other data sources are indicated by letters adjacent to appropriate symbols, or at least of the symbol applies:

W, aeromagnetic data; P, photo interpretation; R, radiometric data

Constant

Fault—right, upthrown side; D, downthrown side

Thrust fault—asterisk on upper plate

Normal fault—asterisk on lower plate

Fault zone or shear zone

Fault intruded by dike

Antiform—arrowing trace of structural plane and direction of plunge

Overturned anticline

Synform—arrowing trace of structural plane and direction of plunge

Overturned syncline

Strike and dip of axial plane of fold

Inclined

Vertical

Strike and dip of beds

Inclined

Horizontal

Vertical

Strike and dip of parallel foliation and bedding

Inclined

Horizontal

Vertical

Strike of foliation, no dip determined

Strike and dip of axial plane

Inclined

Horizontal

Vertical

Strike and dip of planar features determined

From photo interpretation (P) or aeromagnetic data (W)—none, low, or some strike indicate

Strike, surface, or strike dip

10

Direction and plunge of lineation—marked arrow indicates

Graben axis or intersecting foliations; white arrow indicates general lineation

Structural trend based on photo interpretation

Structural trend based on magnetic

Observed outcrop

Marker bed distinguished by rock symbol or index mineral

Index minerals:

ad andalusite	en enstatite	k kyanite
an anthophyllite	ep epidote	m muscovite
as aragonite	gr garnet	py pyrite
bi biotite	grt garnet	py pyrite
cl clinochlore	h hornblende	st staurolite
co corundum	ky kyanite	ta tourmaline
cr corundum	ky kyanite	ta tourmaline
d diopside	il ilmenite	ta tourmaline

Fault locality

Invertebrate

Plant

2000

radiometric map in m. p.

Boundary between paleozoic and pre-Cambrian

Photo-drainage, 500-1000 m. p.; drainage, 1000-2000 m. p.; drainage, 2000-3000 m. p.

Dark, green, clay, or glassy pit—B, barite; D, diamond; G, gold

Mine or quarry—B, barite; stone or road metal; C, clay; L, lime

Prominent pit—B, barite; K, kaolinite

U. S. Geological Survey
OPEN FILE REPORT 74-310
This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

GEOLOGIC MAP OF THE HARPER QUADRANGLE, LIBERIA

by
M. R. Brock, A. H. Chidester and M. W. G. Baker

PREPARED BY THE U.S. GEOLOGICAL SURVEY AND THE LIBERIAN GEOLOGICAL SURVEY UNDER THE JOINT SPONSORSHIP OF THE GOVERNMENT OF LIBERIA AND THE AGENCY FOR INTERNATIONAL DEVELOPMENT U.S. DEPARTMENT OF STATE

