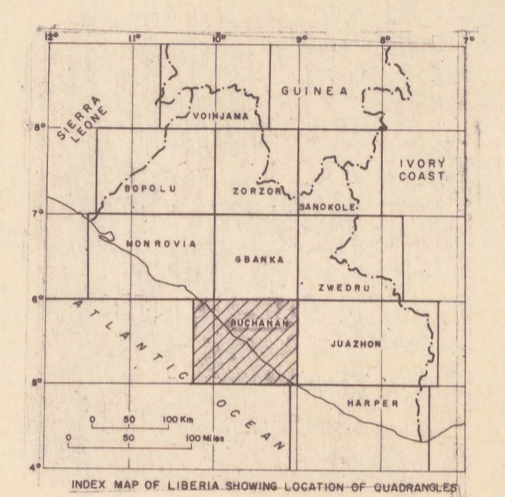
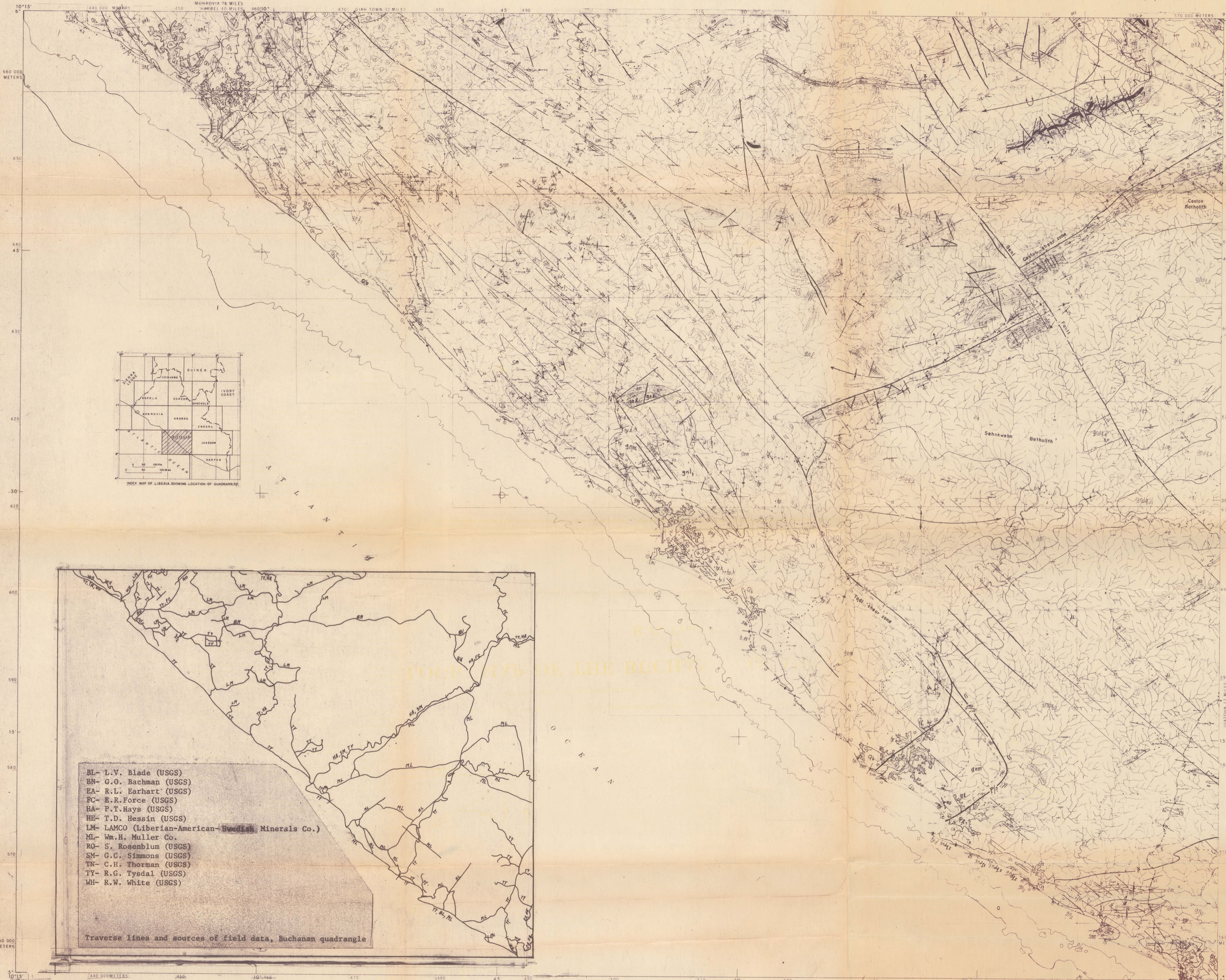


(200)
R290
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BL- L.V. Blade (USGS)
BN- G.O. Bachman (USGS)
EA- R.L. Earhart (USGS)
EC- E.R. Force (USGS)
HA- P.T. Hays (USGS)
HE- T.D. Hessin (USGS)
LM- LAMCO (Liberian-American Minerals Co.)
ML- M.H. Muller Co.
RG- S. Rosenblum (USGS)
SM- C.C. Simmons (USGS)
TN- C.H. Thorman (USGS)
TY- R.G. Tysdal (USGS)
WH- R.W. White (USGS)

Traverse lines and sources of field data, Buchanan quadrangle

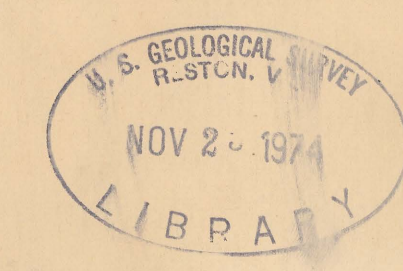
Compiled by photo-planimetric methods from aerial photographs taken 1968-69
The international boundary must not be considered authoritative
Form lines have no consistent interval and show only the general shape of terrain
Geographic graticule and rectangular grid based on Hotine's Rectified Skew Orthomorphic projection

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

GEOLOGIC MAP OF THE BUCHANAN QUADRANGLE, LIBERIA

U. S. Geological Survey
OPEN FILE REPORT 74-308
This report is preliminary and has
not been edited or reviewed for
conformity with Geological Survey
standards or nomenclature.

by
R. G. Tysdal



EXPLANATION
Correlation of Map Units

Q1	Holocene	Quaternary	Contact
Qb	Pleistocene (?)		
Te		Tertiary	Fault--(1) upthrown side; 2, downthrown side Thrust fault--sawtooth on upper plate Fault zone or shear zone Fault truncated by dike Antiform--showing trace of orignal plane and direction of plunge
Kf			
Kfc		Cretaceous	Overtured anticline Synform--showing trace of trough plane and direction of plunge
Jd			
grg	diq	Stratigraphic succession not implied for the following units	
ch		Plutonic igneous rocks	Strike and dip of axial plane of fold Isolined Vertical
sm	s		
q	om	Metamorphic rocks	Strike and dip of beds Isolined Horizontal Vertical
gndq ₂	z		
gnl	gnm	Precambrian	Strike and dip of foliation--open symbol indicates foliation truncating earlier foliation or bedding; solid symbol indicates relation to bedding unknown Isolined Horizontal Vertical Strike and dip of parallel foliation and bedding Isolined Horizontal
gnl ₂	mi		

MAP SYMBOLS
Field data are shown by conventional symbols; other data are indicated by letter symbols adjacent to structure symbols, or at limit of line segment to which the symbol applies.
M, aeromagnetic data; P, photo interpretation; A, radiometric data

DESCRIPTION OF MAP UNITS

- Q1 Lagoon and beach deposits--unconsolidated silt, sand, and mud of present coastal marshes and, locally, river levees.
- Qb Beach deposits--unconsolidated sands. Includes white well-sorted nearly pure quartz sands of savannahs and yellowish brown poorly sorted fine- to coarse-grained sand in beach ridges and some sand flats. Also includes local present-day beach sands.
- Te Edina Sandstone--brownish-yellow medium- to coarse-grained locally conglomeratic quartz sandstone. Commonly well-sorted and locally crossbedded. Beds cemented by clayey limonitic material.
- Kf Farmington River Formation--brown to dark green sandstone consisting of poorly sorted to moderately sorted fine- to coarse-grained angular to subrounded grains of quartz, feldspar, mafic minerals, and lithic fragments in matrix of quartz, chlorite, sericite, and calcite. Fragments of gastropod and pelecypod shells and carbonized plant debris present locally.
- Kfc Farmington River Formation conglomerate--dark green conglomerate with well-rounded cobbles of granitic rock, gneiss, amphibolite, quartz, quartzite, and diabase in sandy matrix. Moderately well cemented.
- Jd Diabase--dark gray, chiefly diabasic but locally gabbroic in texture. Consists primarily of calcic plagioclase and clinopyroxene, with minor amounts of magnetite and ilmenite. Locally contains orthopyroxene. Forms dikes.
- ch Charnockite--olive green medium- to coarse-grained massive hypersthene-bearing granite. Minerals include potassium feldspar, plagioclase, quartz, hypersthene, and hornblende.
- diq Quartz diorite--gray-green to dark gray medium- to coarse-grained hornblende quartz diorite. Hornblende content averages about 20-30 percent of rock. Massive, forming rounded outcrops. Locally, medium- to coarse-grained massive biotite quartz diorite.
- grg Granite--light gray to pink medium- to coarse-grained hypidomorphic biotite granite. Generally massive. Locally, outcrops of coarse-grained granite contain megacrysts of potassium feldspar.
- z Composite unit z--comprises rock units associated with itabirite, and itabirite for which there is insufficient data to map separately or the units are too small to do so. Also includes: iron silicate rocks (e.g., garnet-hornblende-garnet-quartz schist), quartzite and quartz-rich schists, pelitic schist, and gneiss. Amphibolite is commonly present in the unit and actinolite schist occurs locally.
- it Iron formation, oxide facies (taibirite)--dark gray, brown to brick red finely laminated quartz-hematite magnetite rock.
- om Amphibolite--black fine- to coarse-grained foliated to massive rock consisting of about equal amounts of plagioclase. Quartz and garnet abundant in some outcrops. Typically resistant, forming ridges. Spheroidal weathering is common.
- q Quartzite--fine- to coarse-grained quartz rock of probable meta-sedimentary origin. Quartz content commonly greater than about 95 percent; minor minerals include chlorite, graphite, magnetite, garnet, or feldspar. Locally includes as much as 30 percent feldspar.
- s Schist--mainly pelitic schists, but also locally includes mica schist and hornblende schist. Major minerals are staurolite, quartz, and feldspar; mainly plagioclase; minor minerals include garnet and biotite. Unit is generally weakly resistant to erosion.
- sm Mica schist--well foliated fine- to coarsely crystalline schist. Dominant minerals are biotite, quartz, plagioclase. Locally contains minor hornblende. Commonly not resistant to weathering.
- mi Migmatite--original country rock is commonly fine- to coarse-grained rock of quartz diorite to granodiorite composition, but may be any other metamorphic rock. Later formed rock is fine- to coarse-grained and ranges in composition from granitic to dioritic; texture may be pegmatitic, aplitic, or granitic.
- gnm Composite gneiss unit 2--unit is dominated by light to dark colored fine- to medium-grained graphite biotite quartz diorite gneiss. Graphite content ranges from a trace to 20 percent. Contains sillimanite and/or garnets locally. Interbedded quartzite present locally. Amphibolite bodies common and locally contain clinopyroxene or orthopyroxene.
- gnl Leucocratic gneiss--light colored medium- to coarse-grained biotite- and locally hornblende-bearing gneiss largely of quartz diorite composition, but locally granodiorite composition. Amphibolite bodies are common. Includes minor quartzite, itabirite, and schist.
- gnl₁ Leucocratic gneiss unit 1--similar to above but contains more granodiorite gneiss and has abundant, large amphibolite bodies.
- gnl₂ Leucocratic gneiss unit 2--light to medium colored medium-grained micaceous kyanite- and sillimanite-bearing gneiss. Commonly deeply weathered.
- gndq₂ Quartz diorite gneiss--dark colored medium- to coarse-grained hornblende quartz diorite gneiss. Hornblende locally ranges from 20 to 35 percent of rock. Biotite quartz diorite gneiss is present locally.

- 10 bearing and plunge of lineation--barbed arrow indicates strike axis or intersecting foliations; solid arrow indicates general lineation
- Structural trend based on photo interpretation
- Structural trend based on magnetics
- Observed outcrop
- Marker bed distinguished by rock symbol or index mineral
- Index minerals:
ad andalusite en enstatite k kyanite
an anthophyllite ep epidote
au augite eu enstatite m muscovite
b biotite ga garnet py pyrite
cl chlorite gr graphite px pyroxene
cg cummingtonite h hornblende s sillimanite
gr garnet by hypersthene st staurolite
d diopside il ilmenite ta tremolite-actinolite
- Fossil locality
Invertebrate
Plant
- K, 2000 Radiometric age in m. y.
K=K₂O; Ar; R=Rb-Sr
- Liberal, Bahamas Boundary between radiometrically-determined age provinces--
Palaeocene, 200-200 m. y.; Eocene, 100-200 m. y.;
Liberal, 270-300 m. y.
- Drill site for offshore well (abandoned)