Fig. 2.1 GEOLOGICAL MAP OF THE CENTRAL LUZON

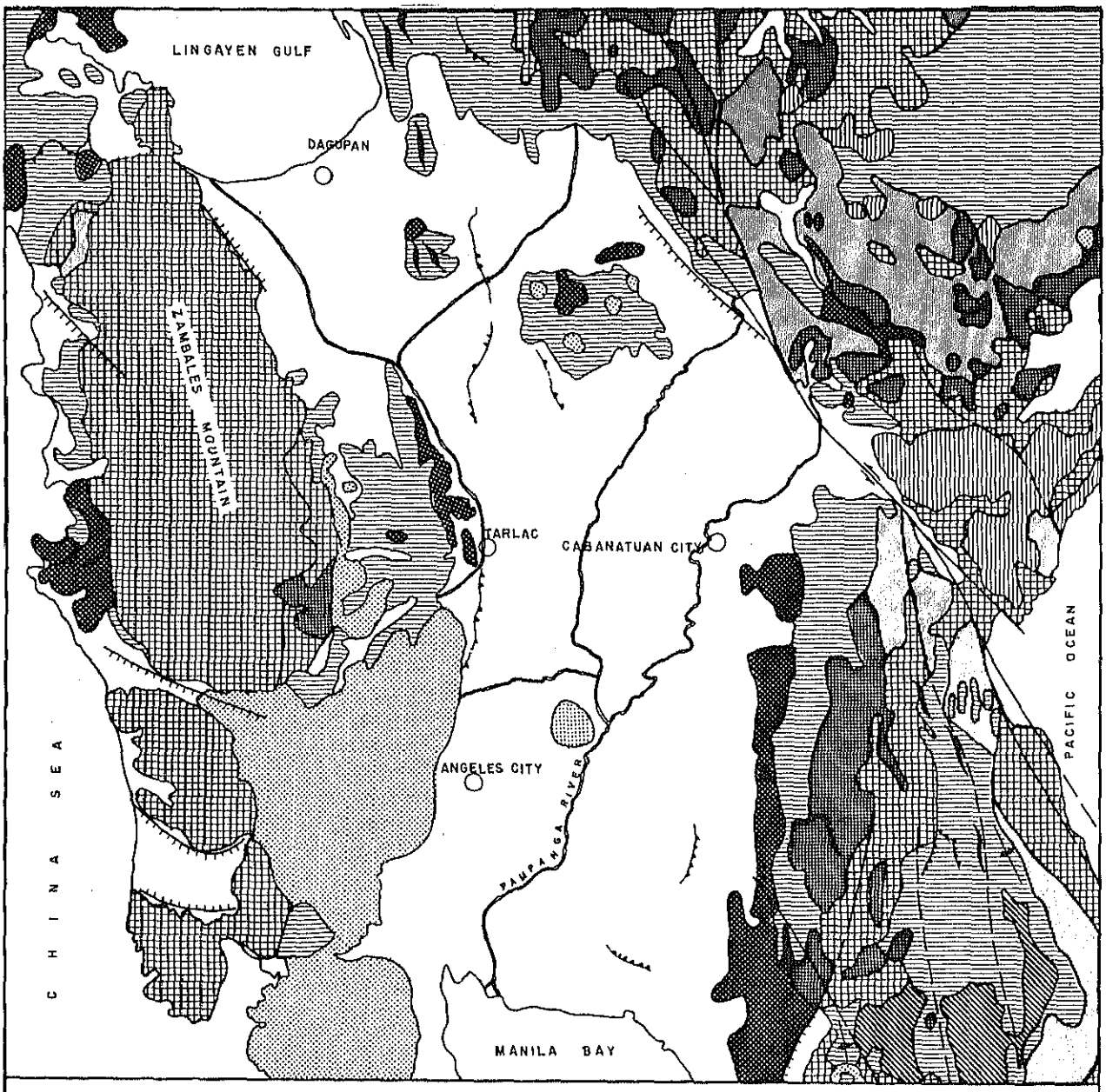


Fig. 2.2(1) GEOLOGICAL MAP OF THE OBJECTIVE AREA

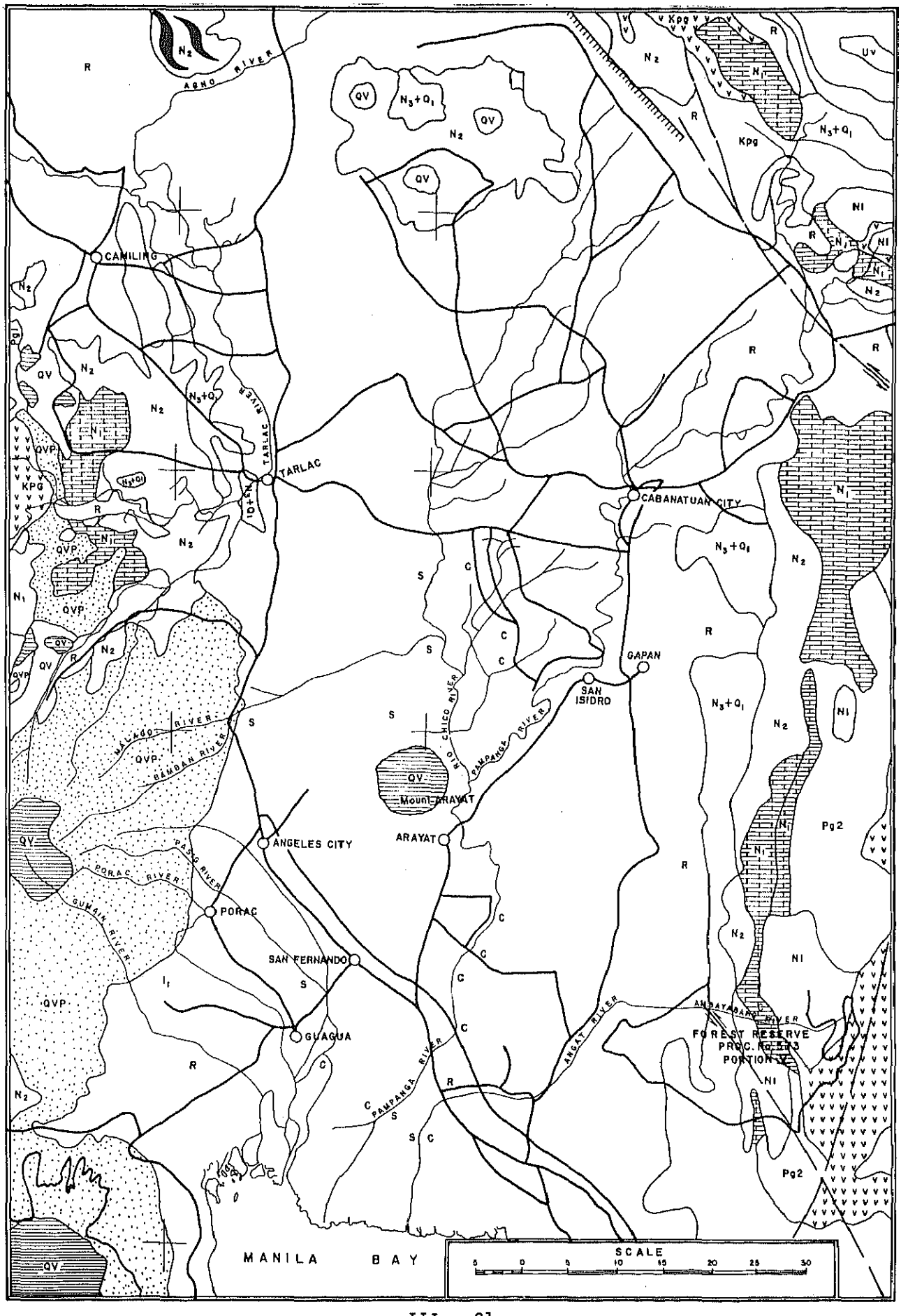
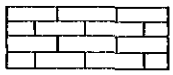


Fig. 2.2 (2) LEGEND

SEDIMENTARY AND METAMORPHIC ROCKS

R	RECENT	Alluvium, fluviatile, lacustrine, paludal, and beach deposits; raised coral reefs, atolls, and beachrocks.
N_3+Q_1	PLIOCENE-PLEISTOCENE	Marine and terrestrial sediments (molasse). Associated with extensive reef limestone in Bicol region, Visayas, and Mindanao; with pyroclastics in western and southern Central Basin and in northern Bicol Lowland. Predominantly marl and reworked tuff in places. Sporadic terrace gravel deposits in some coastal and fluvial tracts. Plateau red earths and/or laterites in some elevated flat land surfaces. Deformation limited to gentle warping and vertical dislocation.
N_2	UPPER MIOCENE-PLIOCENE	Largely marine clastics (molasse) overlain by extensive, locally transgressive pyroclastics (chiefly tuff, tuffites) and tuffaceous sedimentary rocks. Associated with calcarenite and/or silty limestone in some parts of Luzon central Visayas, and Mindanao Reef limestone lenses intercalated with dacite and andesite flows in Zamboanga (western Mindanao). Chiefly arkose and arenite in Palawan. Local bog iron, laterite deposits in some elevated near-peneplaned surfaces.
N_1	OLIGOCENE-MIOCENE	Thick, extensive, transgressive mixed shelf marine deposits, largely wackes, shales, and reef limestone. Underlain by conglomerate and/or associated with paralic coal measures in places. Sometimes associated with basic to intermediate flows and pyroclastics within Luzon, Visayas, and and Mindanao. Largely arkosic and quartzitic clastics miogeosynclinal type?) in southern Mindoro and Palawan. Generally well indurated. Folded and locally intruded by quartz diorite. The epidermal cover of many folded mountains. In some places probably includes Oligocene.
Pg_2	OLIGOCENE	Minor limestone and/or wackes and shales. Generally associated with keratophyre and andesite flows. Limestone remnants in Cebu.
Pg_1	PALEOCENE-EOCENE	Thick, extensive, transgressive mixed shelf and deeper water marine deposits, largely wackes and shale (flysch) associated with minor basal conglomerate; reef limestone and calcarenite, sometimes with dacitic and/or andesitic flows and pyroclastics, with intertongues of paralic coal measures in Catanduanes. Largely arkosic and quartzitic clastics in southern Mindoro and Palawan. Generally moderately folded and intruded by quartz diorite.
KPg	UNDIFFERENTIATED	Largely graywacke and metamorphosed shale interbedded and/or intercalated with spilitic, basic and intermediate flows, and/or pyroclastics. Undifferentiated as to age. Probably, Cretaceous and Paleogene.
BC	BASEMENT COMPLEX (PRE-JURASSIC)	Undifferentiated amphibolite, quartzofeldspathic and mica schist, and phyllites-slates frequently associated with marble and quartzite (?). Broadly folded; some narrow zones of close folding broken by upthrusts. Prevailing schistosity generally parallel, some oblique and/or perpendicular to bedding.

Fig. 2.2 (3) LEGEND



This pattern assigned to various sedimentary rock units indicates major limestone bodies of the same age.

IGNEOUS ROCK

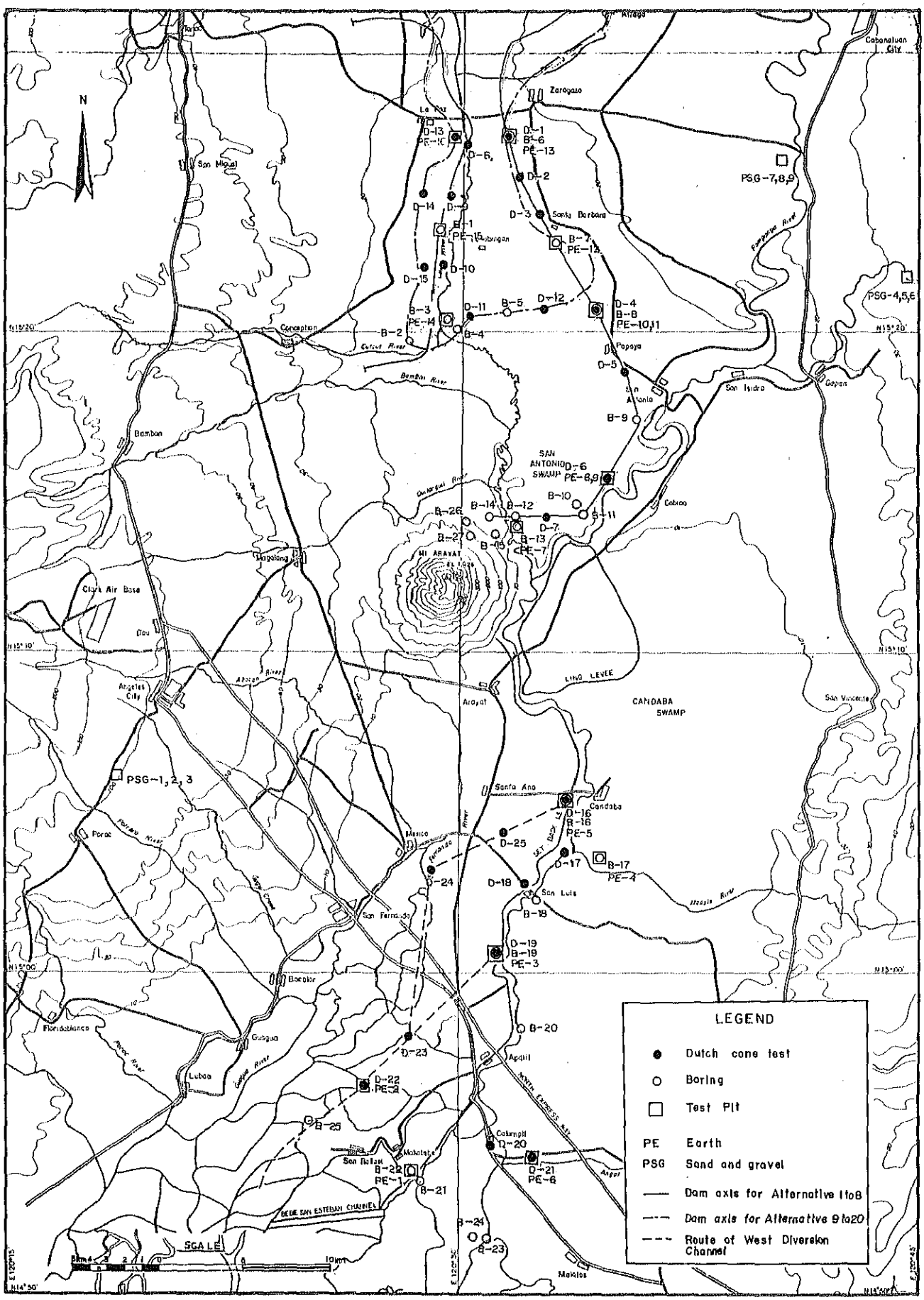
INTRUSIVE ROCKS

NI	NEOGENE	Largely intra-Miocene quartz diorite Mostly batholiths and stocks, some laccoliths, also sills, dikes, and other minor bodies. Include granodiorite and diorite porphyry facies and late Miocene dacite. Pervasive in Paleogene and Mesozoic, less widespread in early Miocene rock sequences.
UC	CRETACEOUS-PALEOGENE	Undifferentiated ultramafic and mafic plutonic rocks. Predominantly, peridotite assocaited with late gabbro and/or diabase dikes. Complex layered type in Zambales. Generally thrusted or upfaulted into Tertiary and older rock formations. Most bodies probably late Mesozoic to early Tertiary.
QVP	PLIOCENE-QUATERNARY	Volcanic plain or volcanic piedmont deposits. Chiefly pyroclastics and/or volcanic debris at foot of volcanoes. Plateau basalt in Pagadian and Lanao regions, Mindanao, associated with pyroclastics north and east of Laguna de Bay, Luzon.
QV	PLIOCENE-QUATERNARY	Non-active cones (generally pyroxene andesite), also dacitic and/or andesitic plugs. Basaltic dikes in Binga, Mt. Province, Luzon, and in Misamis Oriental, Mindanao.
UV	UNDIFFEREN-TIATED	Metamorphosed submarine flows, largely spilites and basalts, some keratophyres and andesites. Confined to structural highs and/or principal mountain ranges. Often designated in early literature as "Metavolcanics". Most units probably Cretaceous and Paleogene.
K	CRETACEOUS-PALEOCENE	Essentially spilitic and basic flows. Usually intercalated with graywackes. Transgressive on "basement" rocks. Some are included with Cretaceous sedimentary rocks in this map.

GEOLOGICAL SYMBOLS

	Close fold
	High angle fault Dashed where inferred; arrow indicates strike-slip movement
	Normal fault Dashed where inferred; hachures on downthrown side
R	Alluvium deposits
S	Sand
C	Silt and/or Clay

Fig. 3.1 LOCATION MAP OF SUB SOIL SURVEY SITE



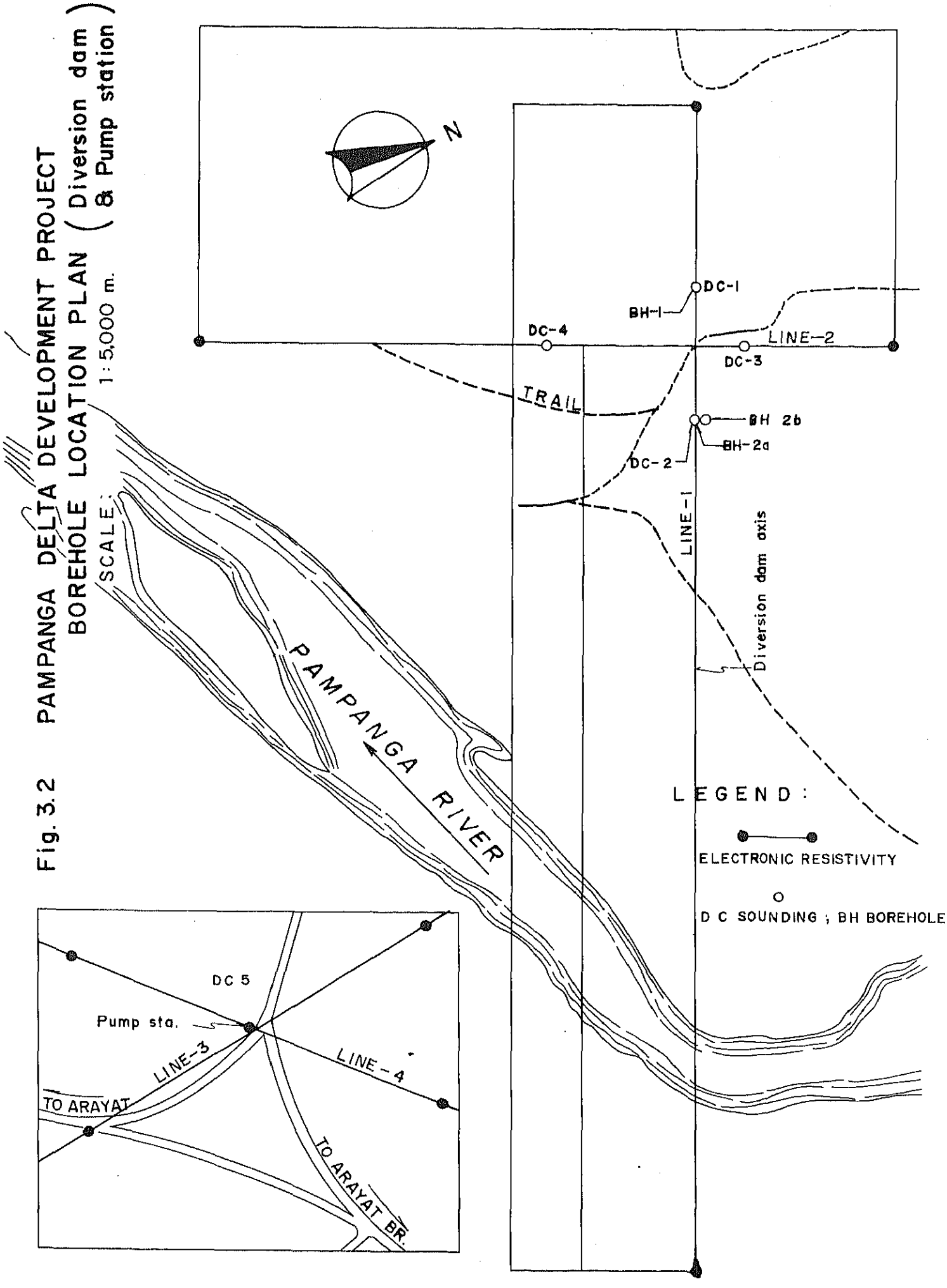
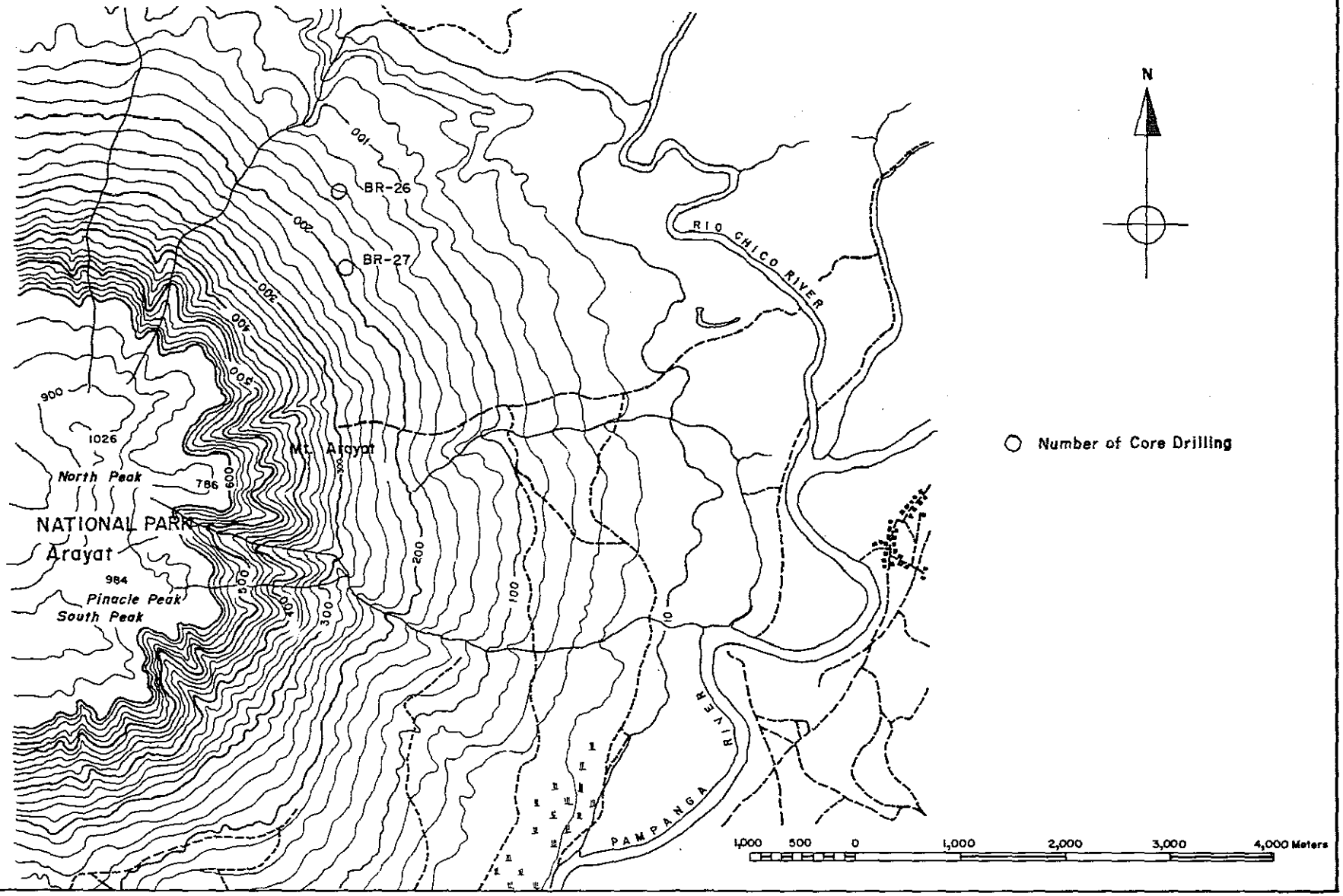

PAMPANGA DELTA DEVELOPMENT PROJECT
BOREHOLE LOCATION PLAN (Diversion dam & Pump station)
SCALE; 1:5,000 m.
N
DC-1
BH-1
DC-4
LINE-2
DC-3
TRAIL
BH 2b
BH-2a
DC-2
LINE-1
Diversion dam axis
PAMPANGA RIVER
LEGEND :
ELECTRONIC RESISTIVITY
D C SOUNDING ; BH BOREHOLE
DC 5
Pump sta.
LINE-3
LINE-4
TO ARAYAT
TO ARAYAT BR.

Fig. 3.2

Fig. 3.3 LOCATION MAP OF QUARRY DRILLING



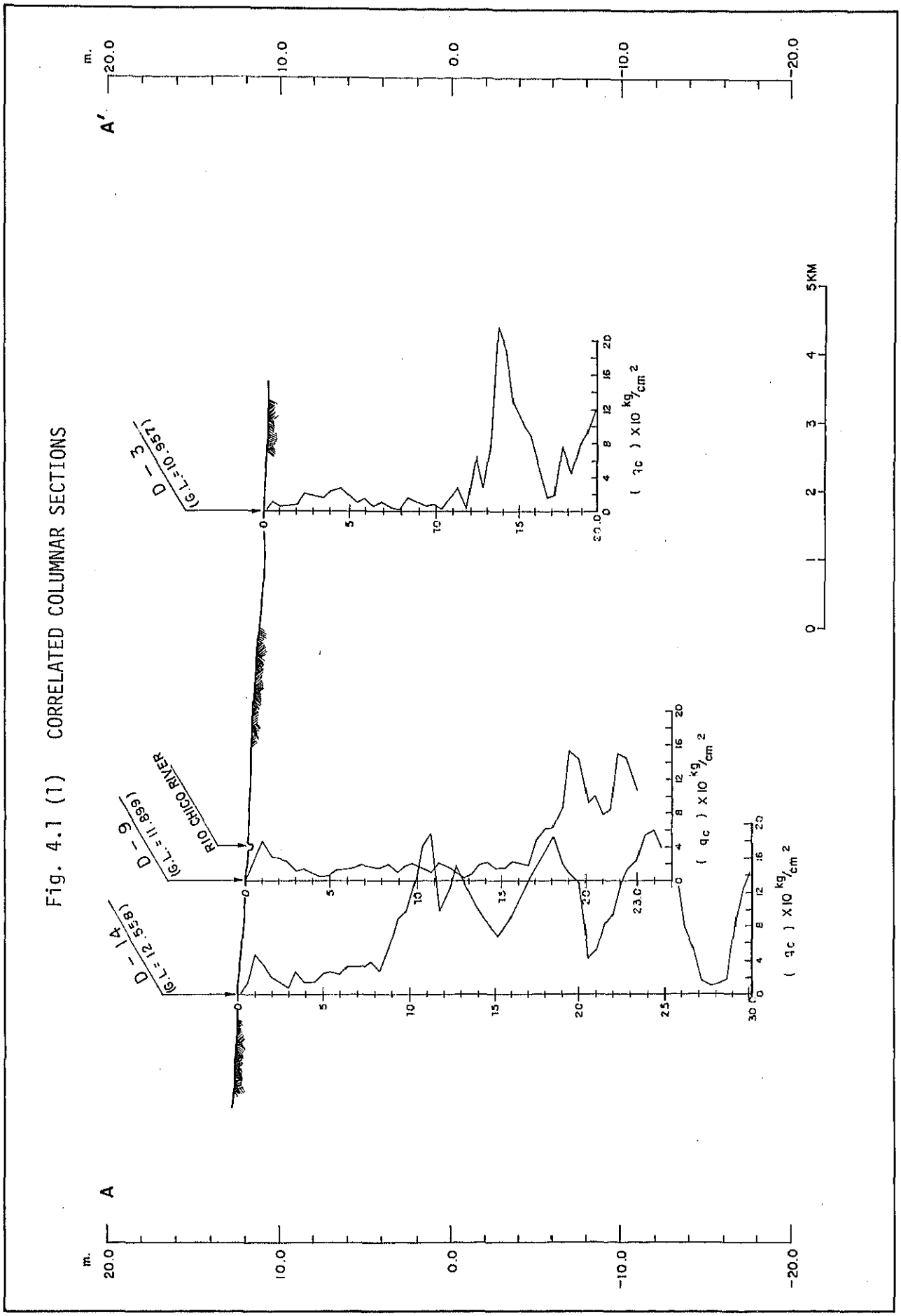


Fig. 4.1 (1) CORRELATED COLUMNAR SECTIONS

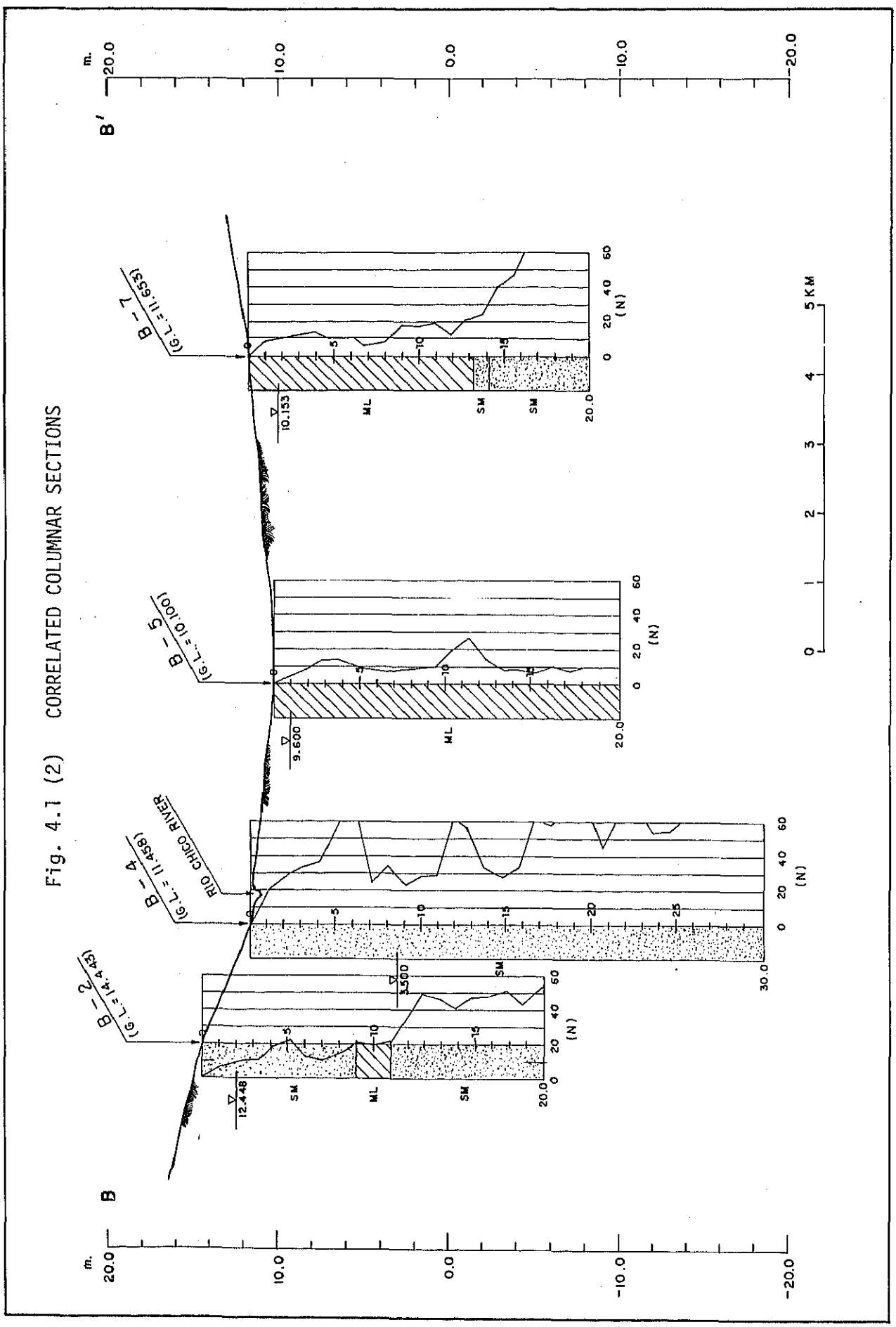
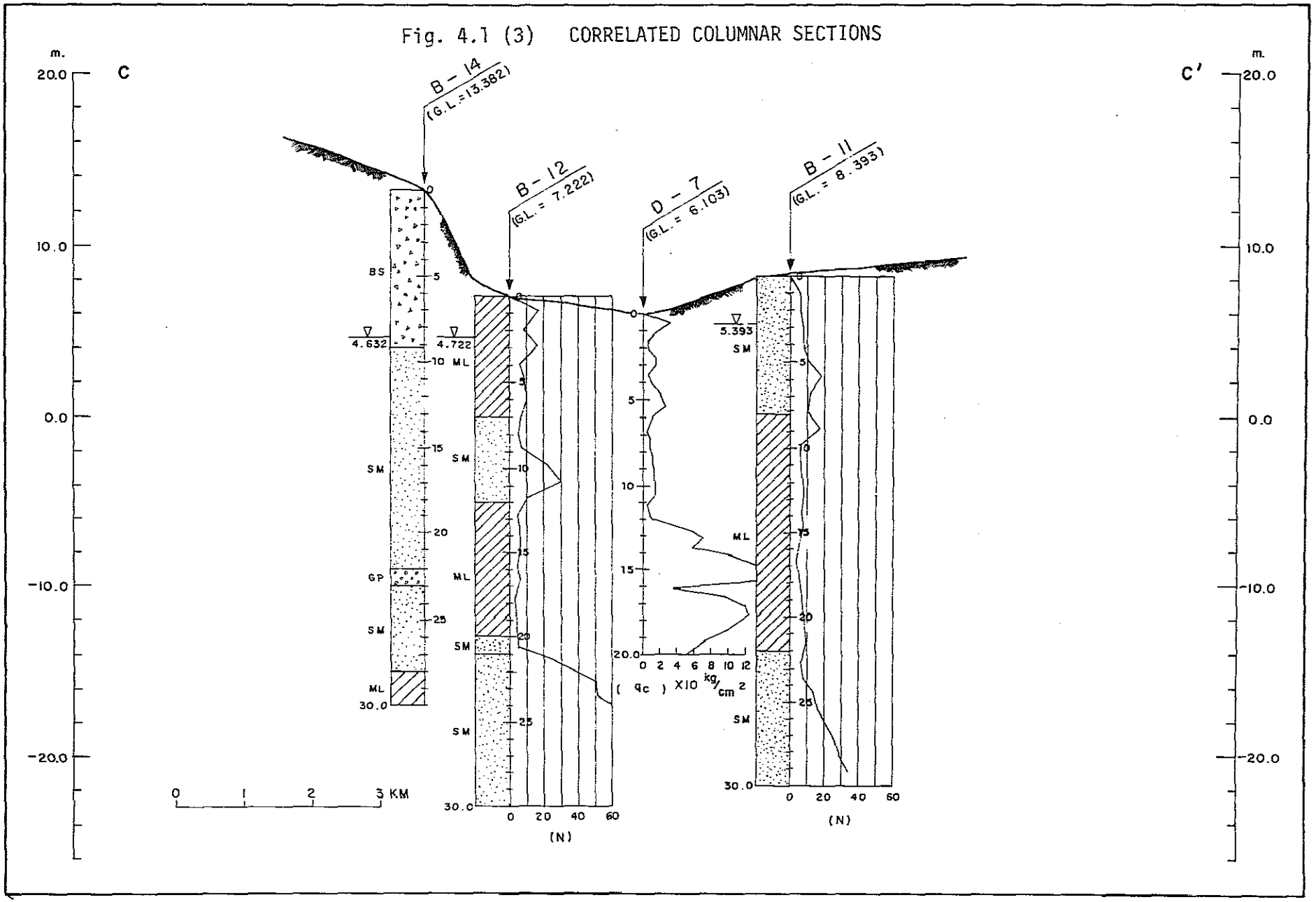


Fig. 4.1 (2) CORRELATED COLUMNAR SECTIONS

Fig. 4.1 (3) CORRELATED COLUMNAR SECTIONS



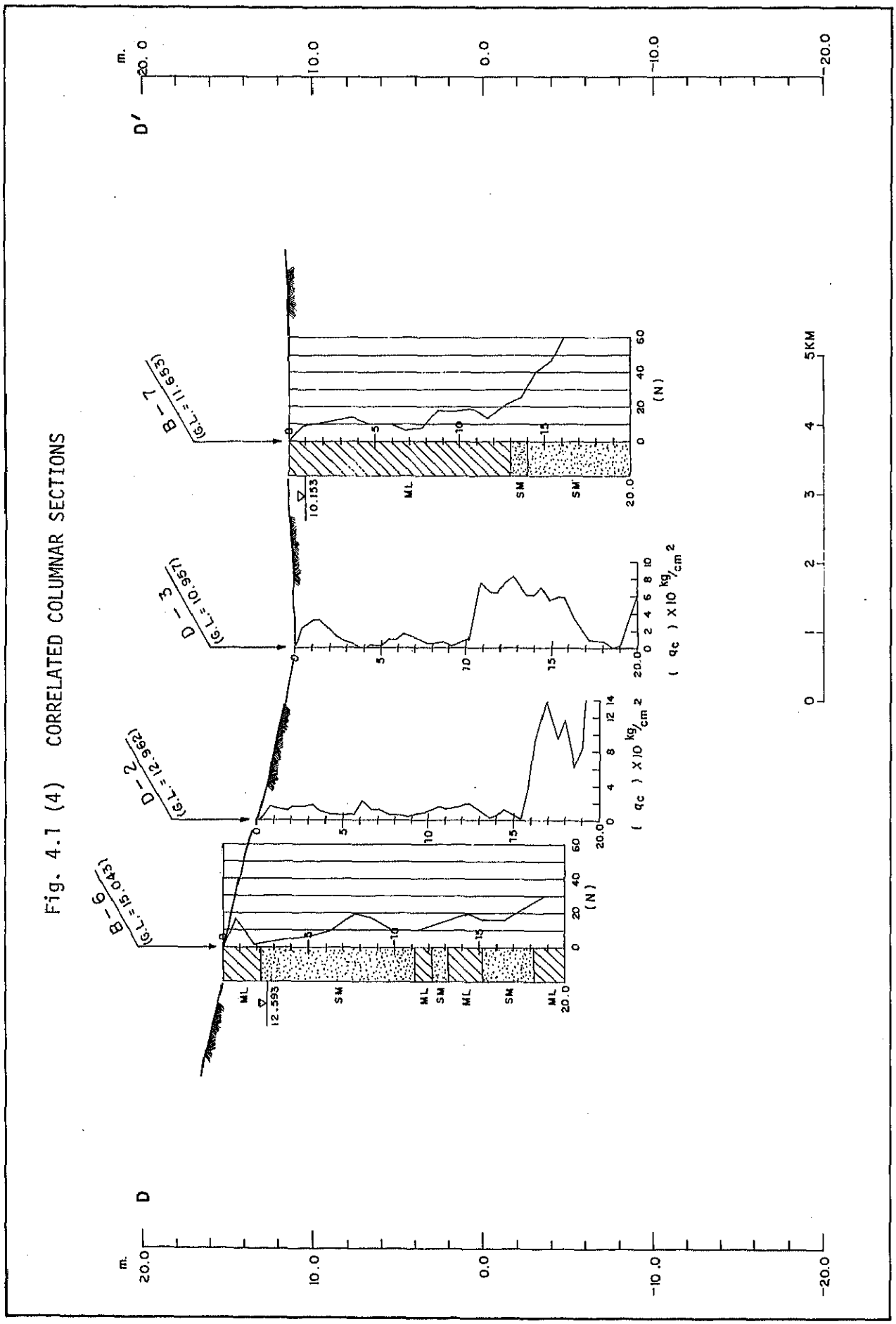


Fig. 4.1 (4) CORRELATED COLUMNAR SECTIONS

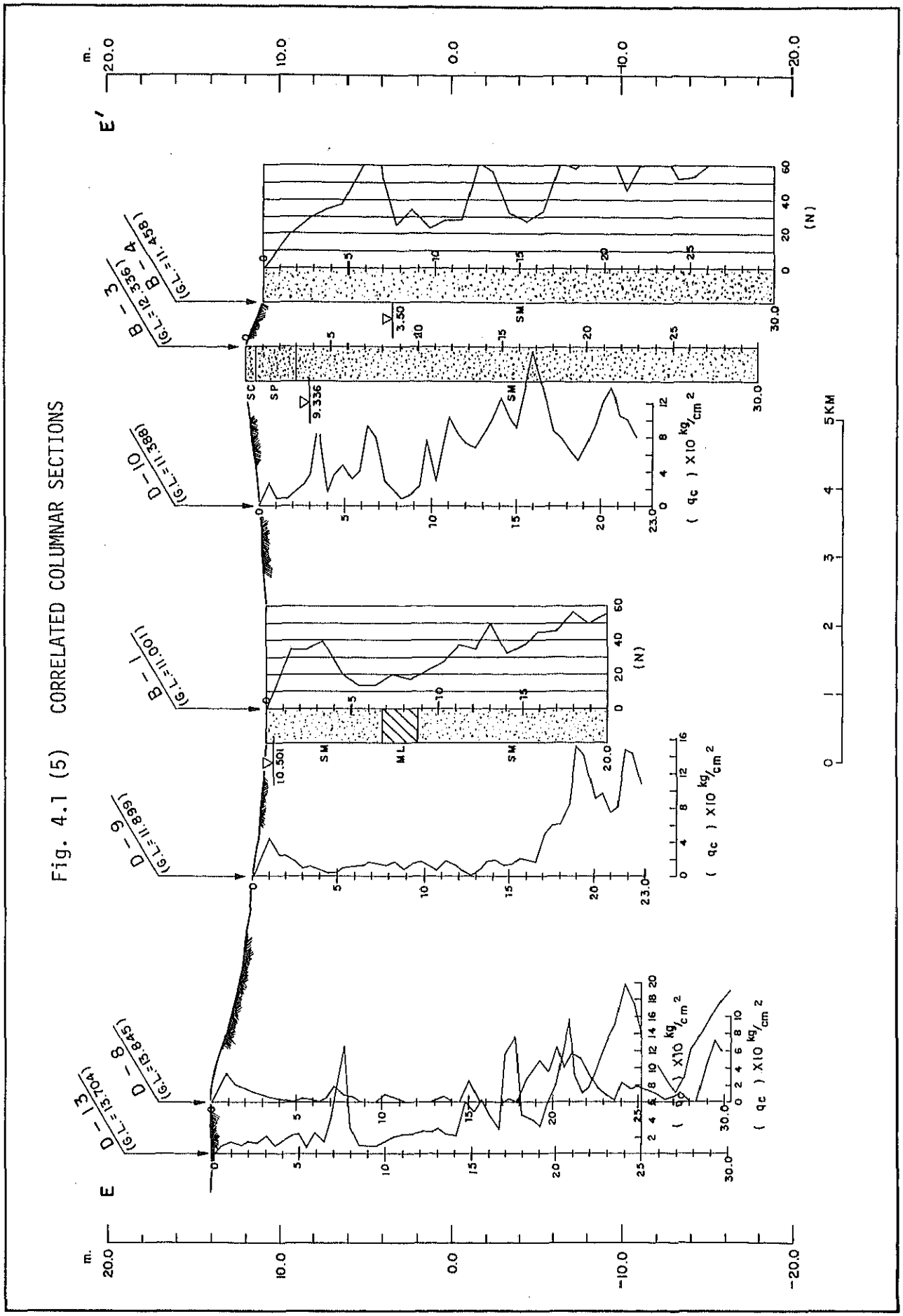


Fig. 4.1 (5) CORRELATED COLUMNAR SECTIONS

Fig. 4.1 (6) CORRELATED COLUMNAR SECTIONS

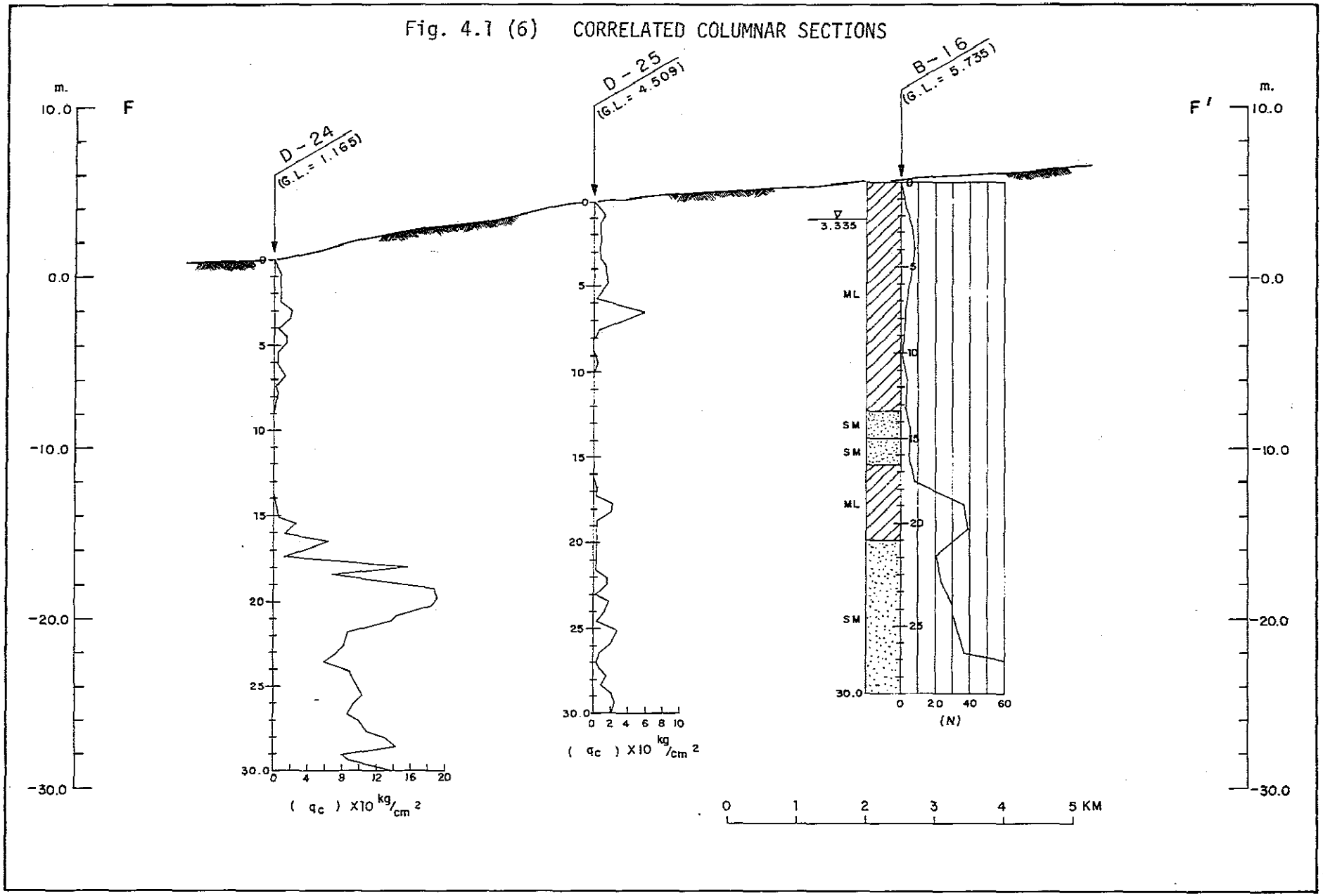
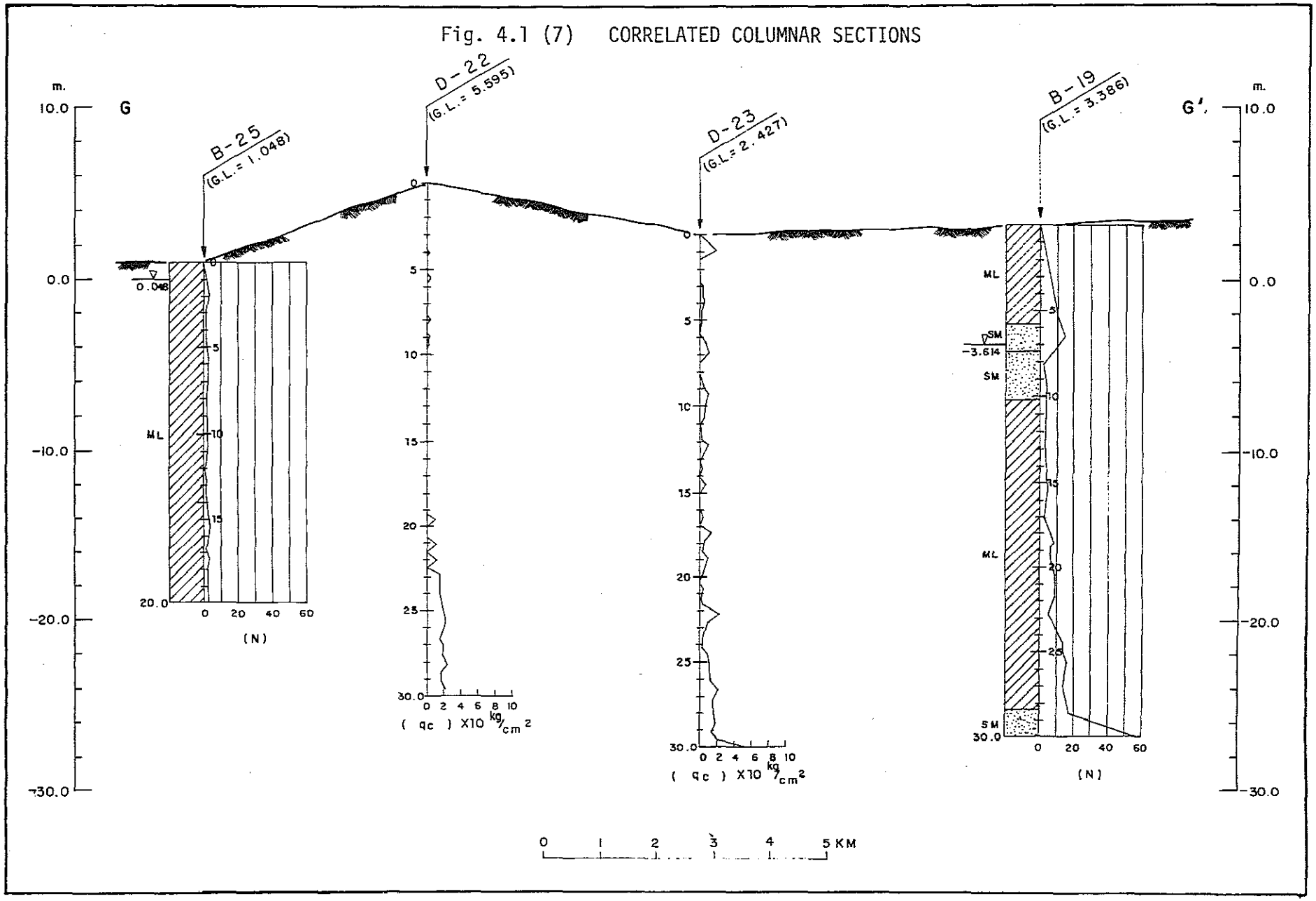


Fig. 4.1 (7) CORRELATED COLUMNAR SECTIONS



Feb. 4.1 (8) CORRELATED COLUMNAR SECTIONS

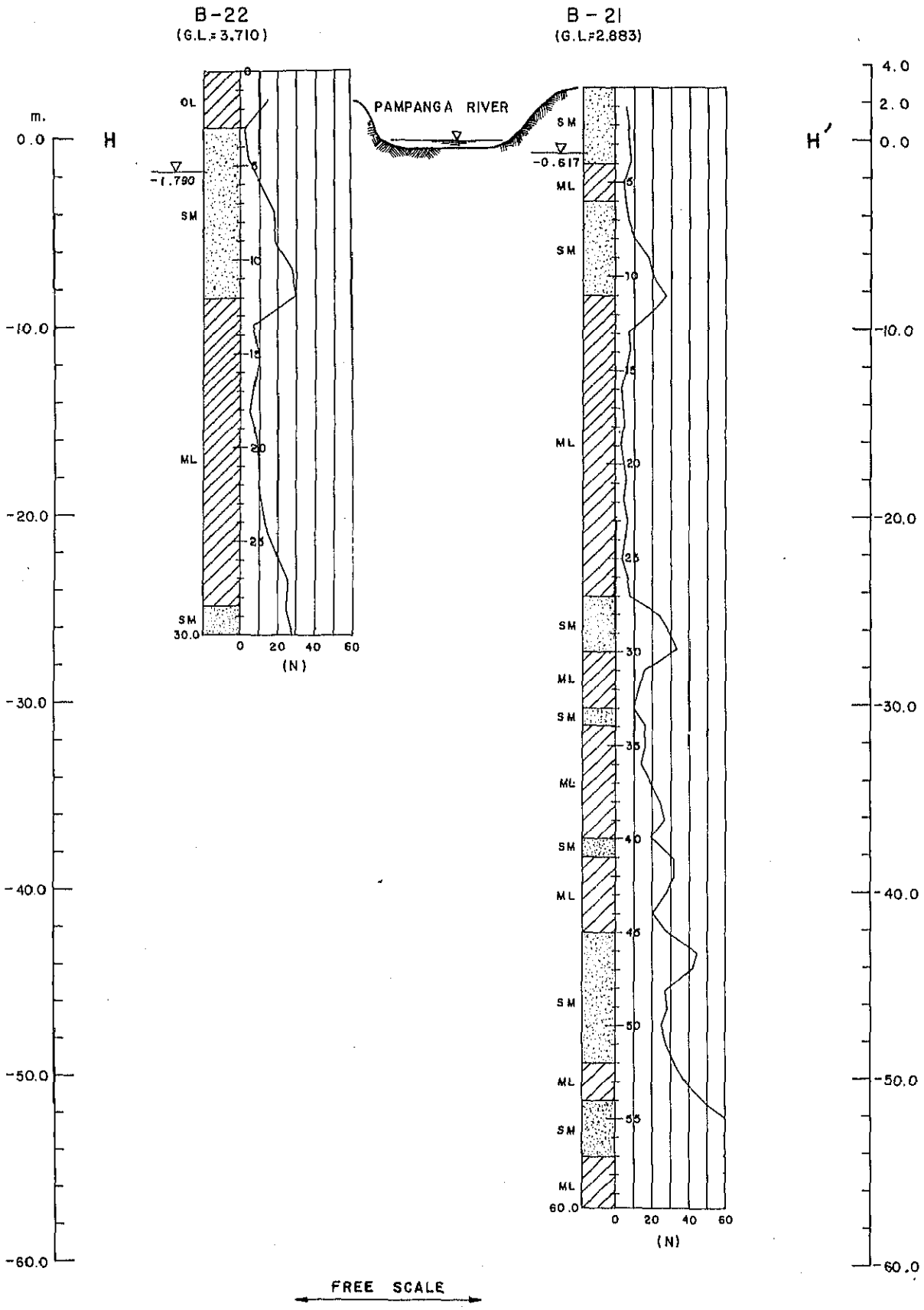
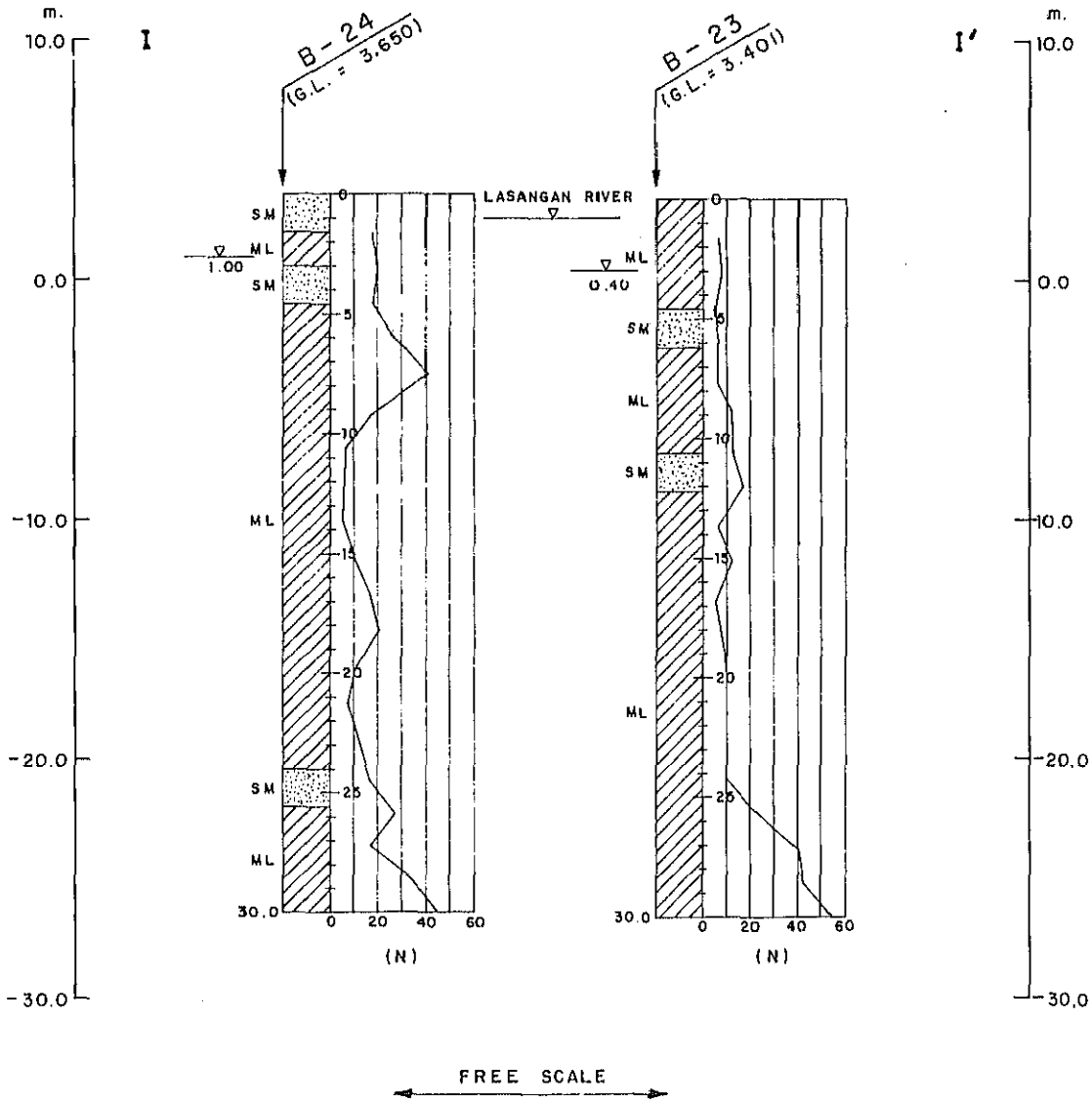


Fig. 4.1 (9) CORRELATED COLUMNAR SECTIONS



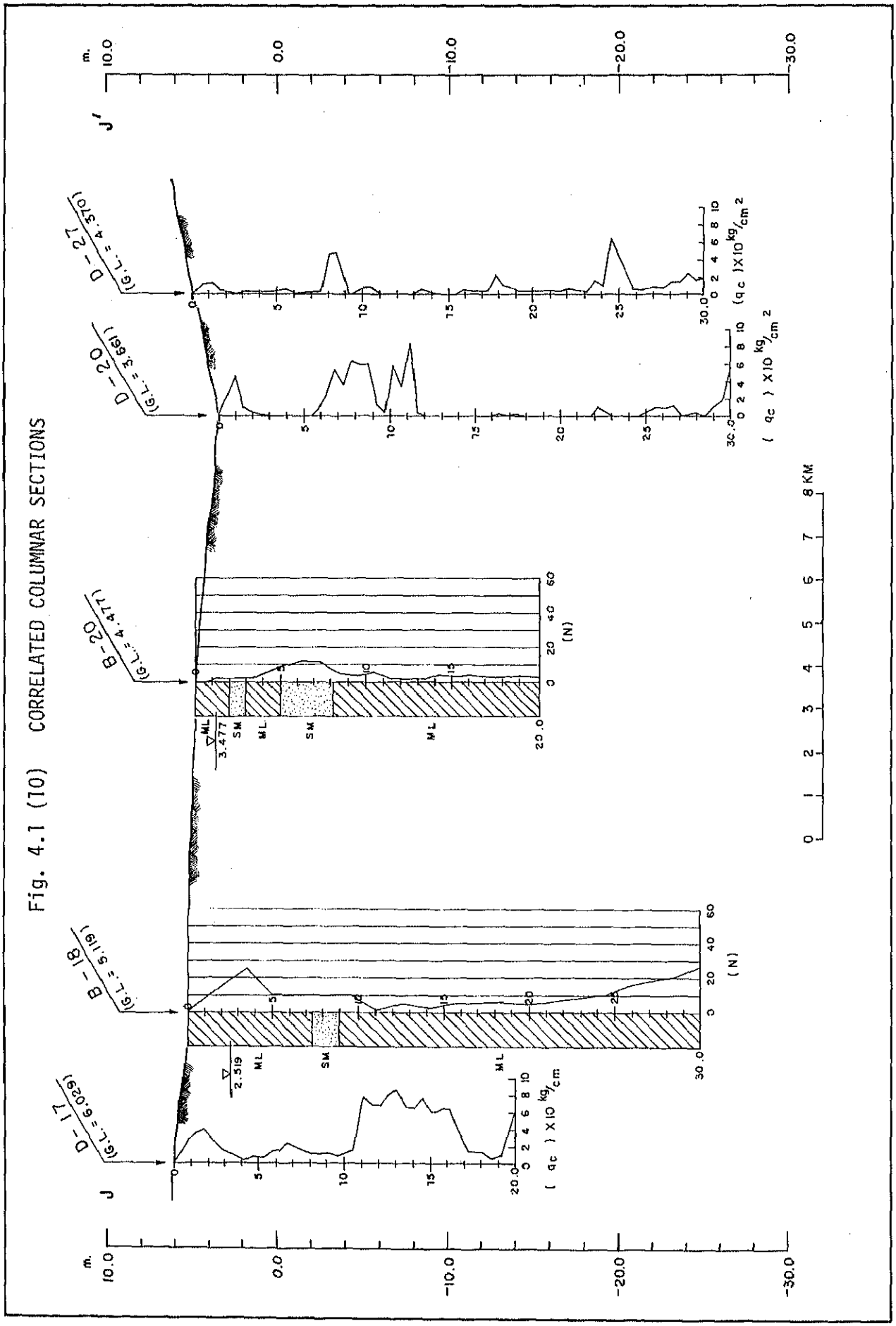


Fig. 4.1 (10) CORRELATED COLUMNAR SECTIONS

Fig. 4.2 (1) SUBSURFACE SOIL PROFILE (DIVERSION DAM AXIS)

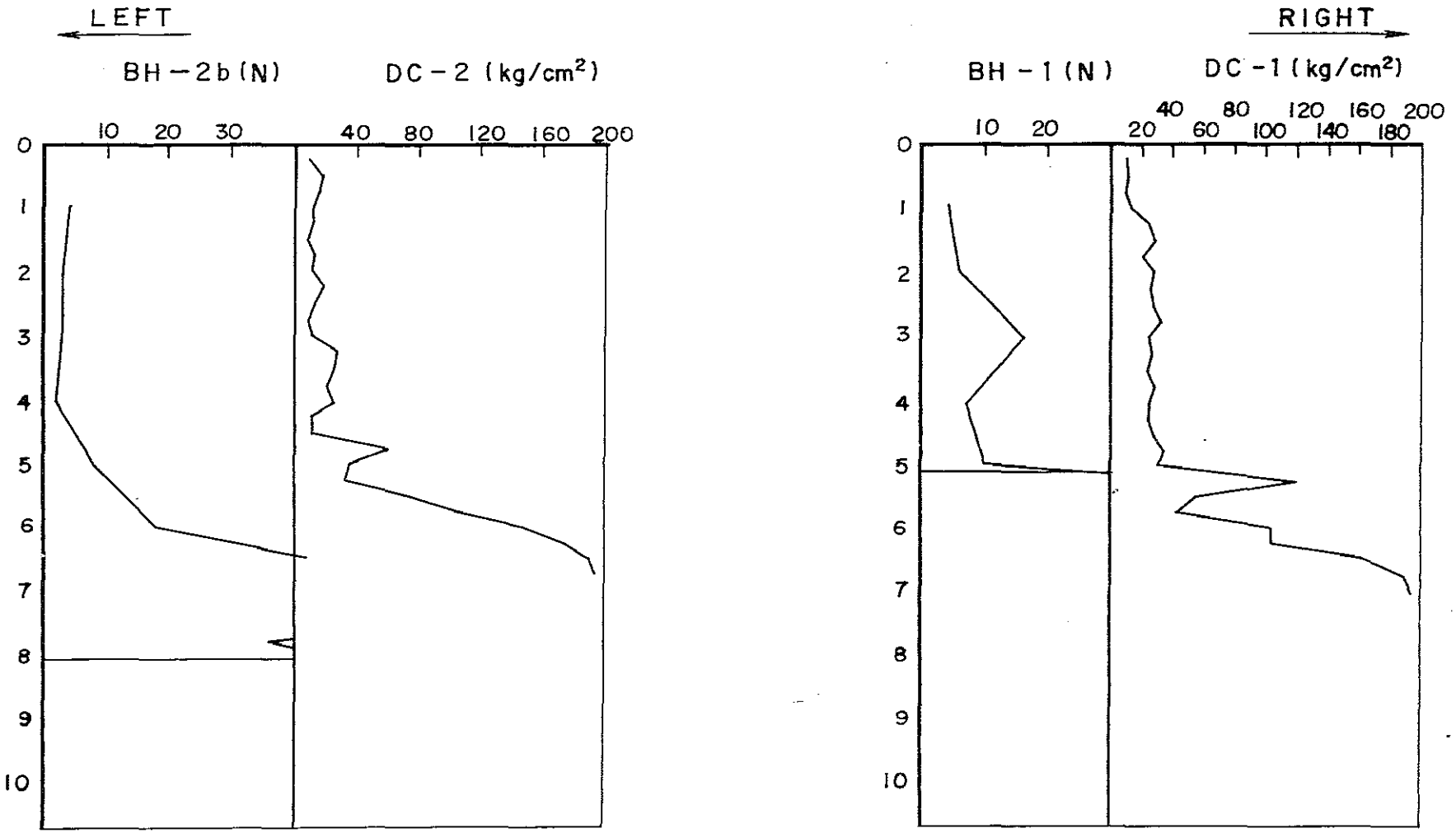


Fig. 4.2 (2) DIVERSION DAM

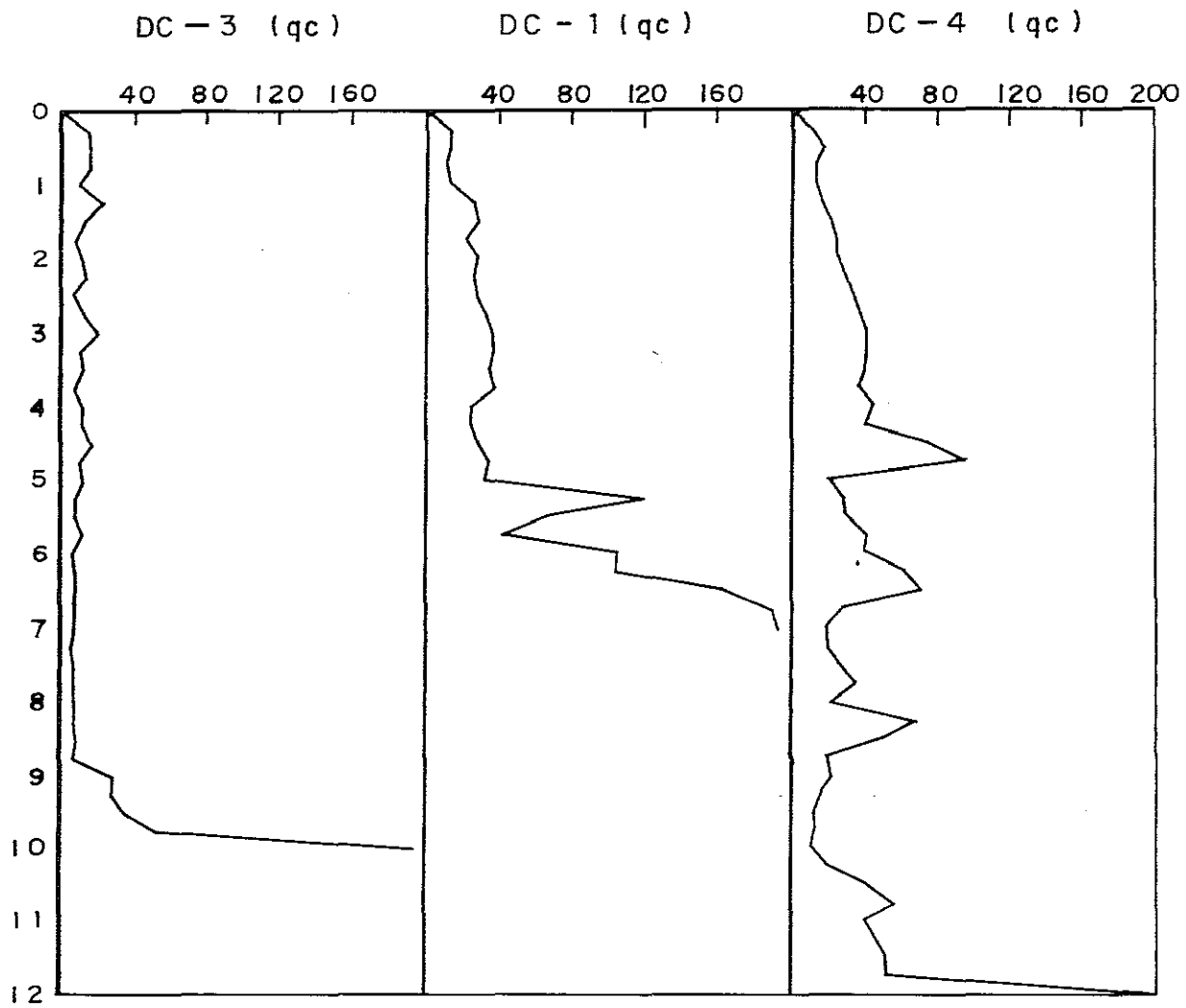


Fig. 4.3 PUMPING STATION

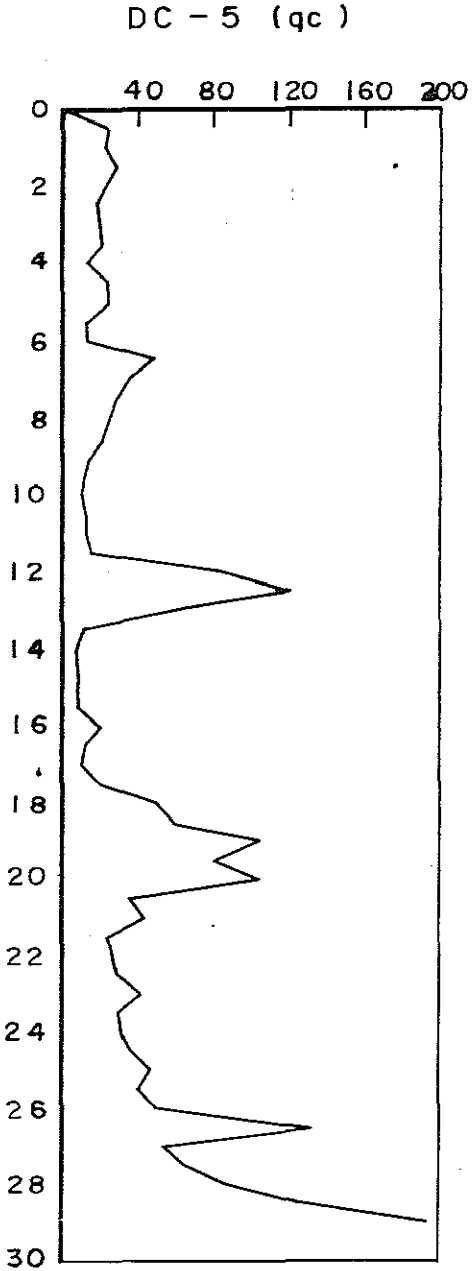


Fig. 5.1 LOG OF TEST PIT OF EARTH

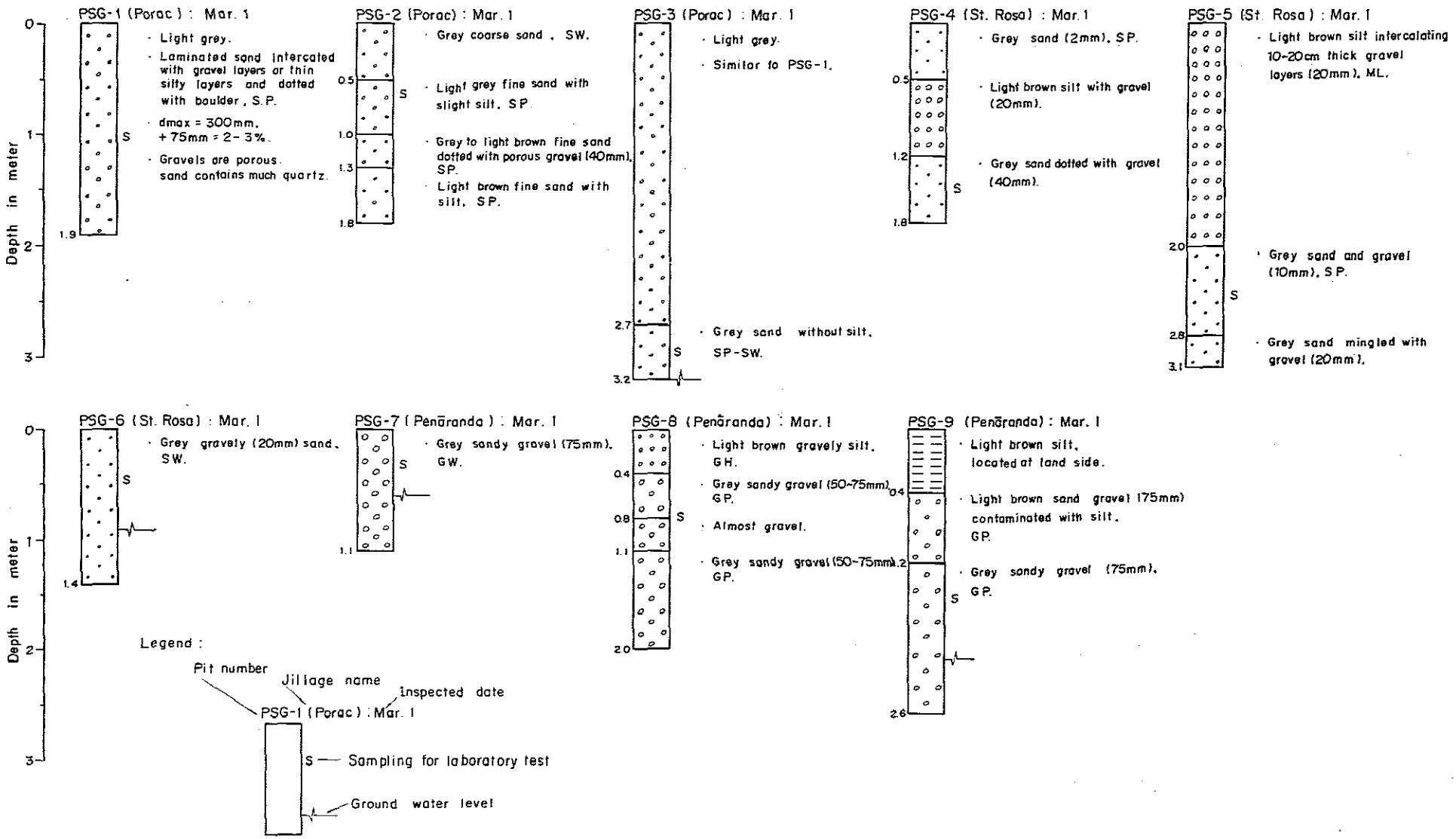
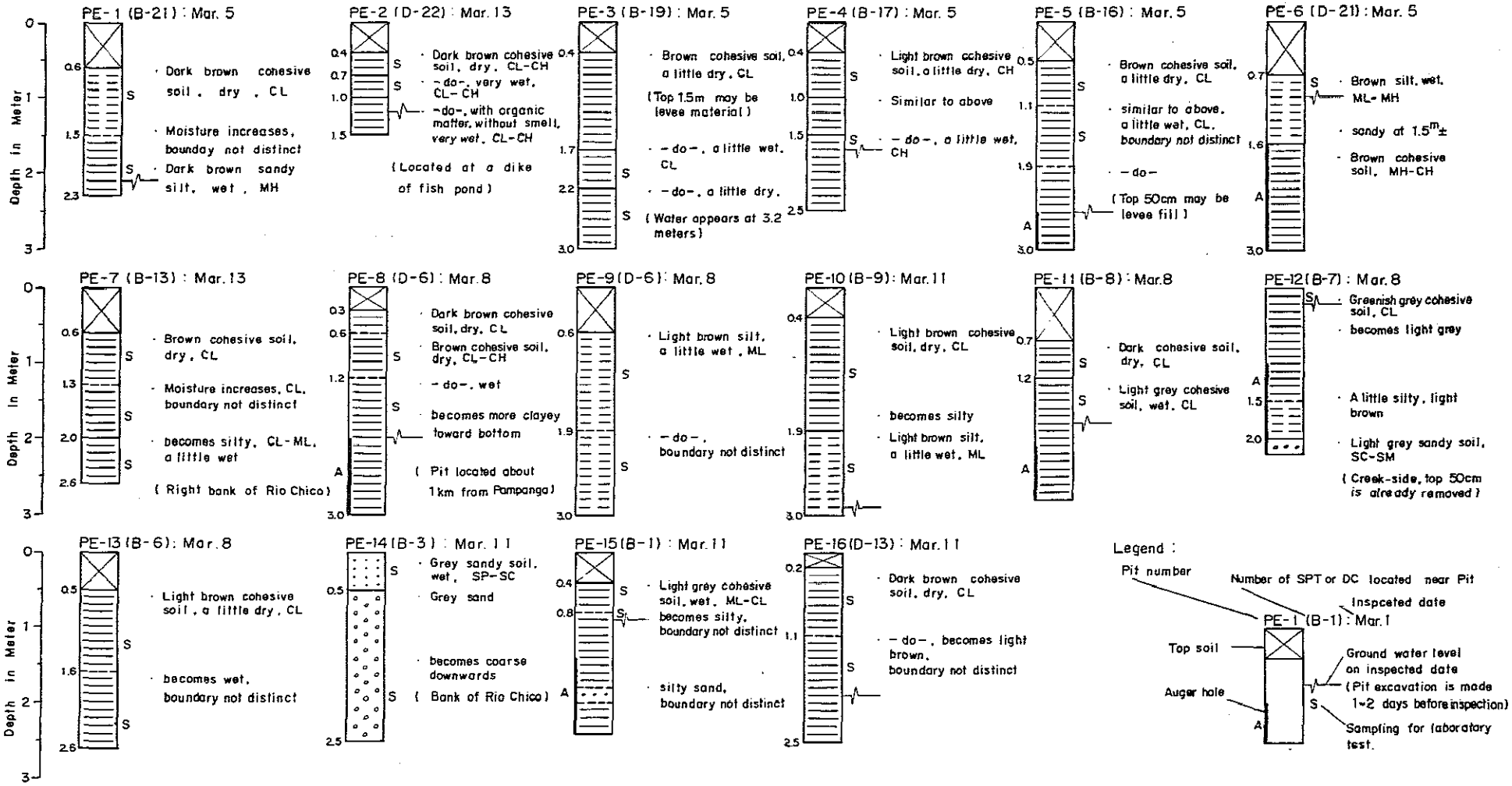
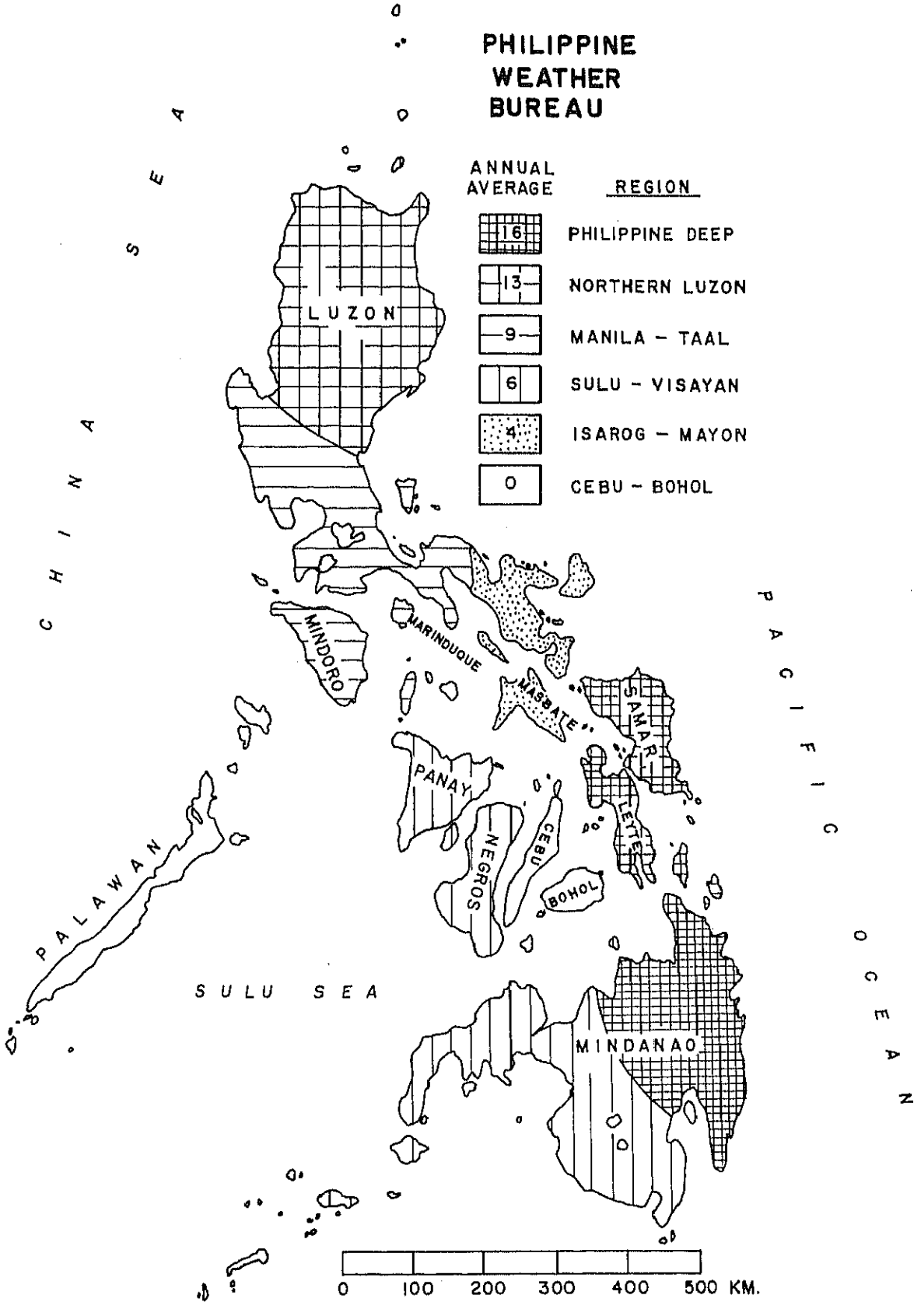


Fig. 5.2 LOG OF TEST PIT OF SAND-GRAVEL



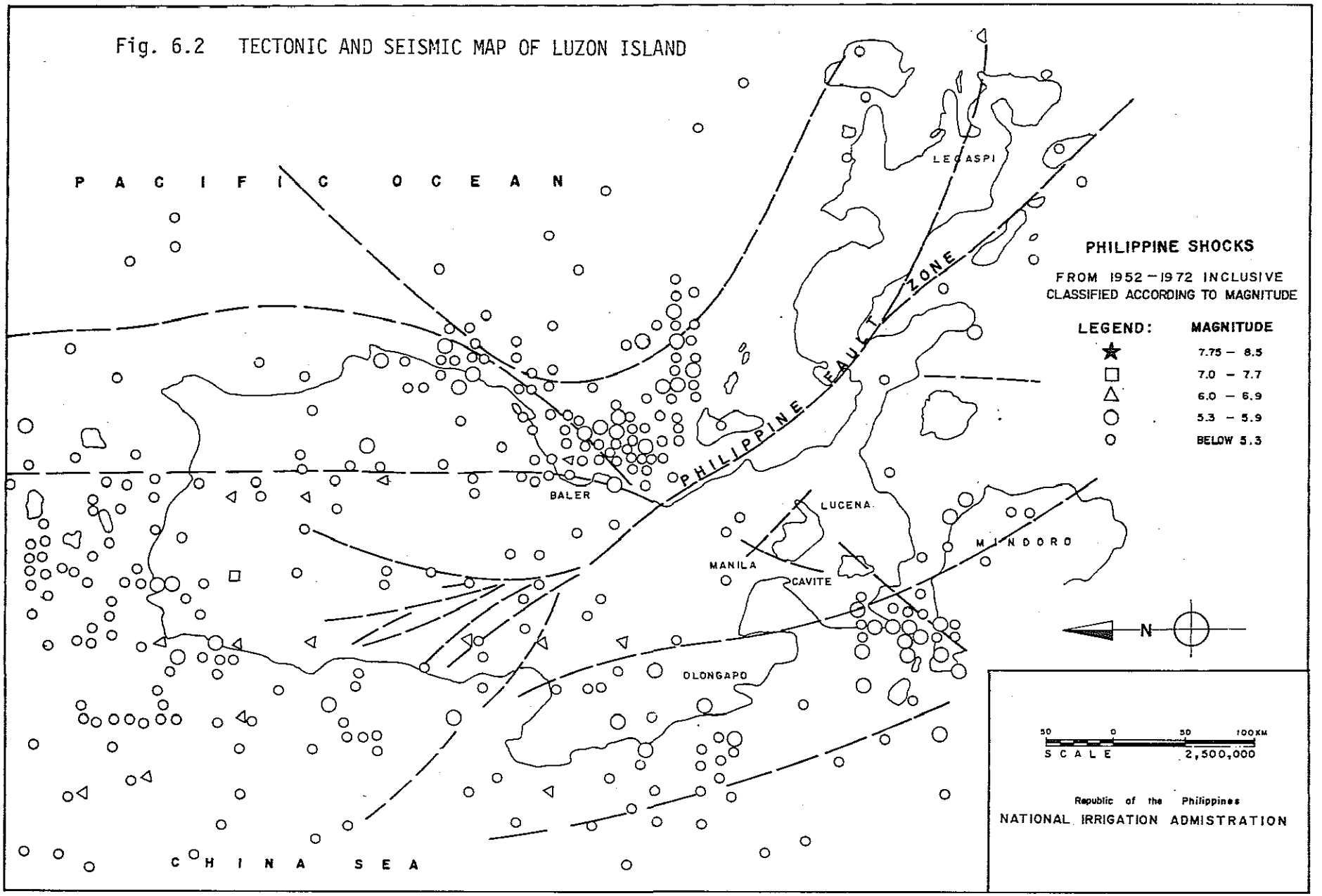
Date (1) Description on material follows to obrervation at inspection only, not considering the laboratory test results.
(2) Moisture condition, dry or wet, suggests difference to optimumum water content.

Fig. 6.1 ANNUAL AVERAGE OF FELT SHOCKS EARTHQUAKE



Annual Average of felt shocks in the period 1862 – 1918, as determined by the Philippines Weather Bureau.

Fig. 6.2 TECTONIC AND SEISMIC MAP OF LUZON ISLAND



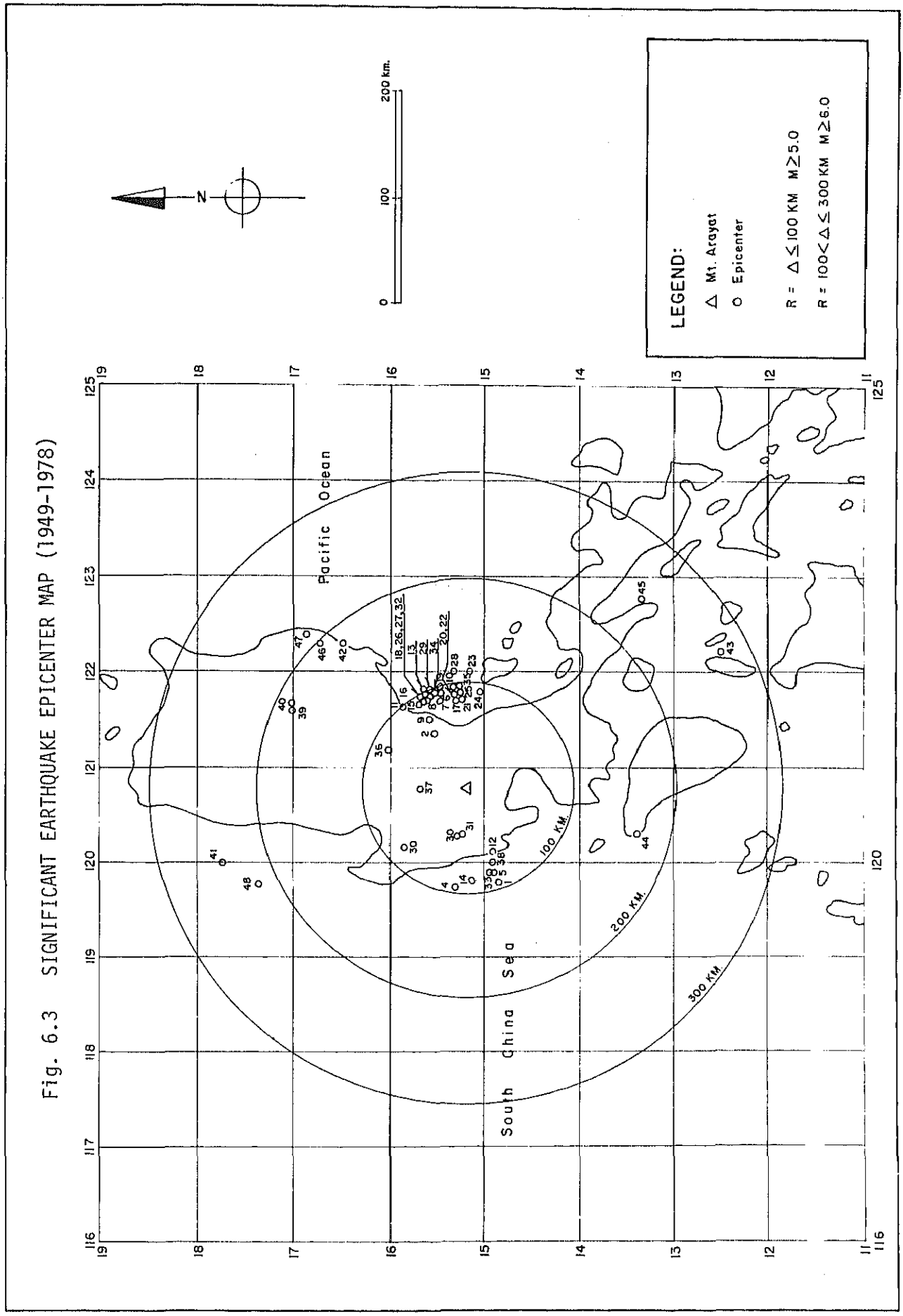


Fig. 6.3 SIGNIFICANT EARTHQUAKE EPICENTER MAP (1949-1978)

Fig. 6.4 PLOTTING POSITION OF NON-ANNUAL EXCEEDENCE SERIES