REPORT OF SURVEYS FOR NATURAL GAS EXPLORATION IN BURMA

JAPANESE GAS SURVEY TEAM
DISPATCHED BY
OVERSEAS TECHNICAL COOPERATION AGENCY
OF JAPAN

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C O N T E N T S

P R E F A C E

We, "Japanese Gas Survey Team" were dispatched of the Overseas Technical Cooperation Agency, and conducted three kinds of surveys, namely, photogeologic, gravimetric, and geological survey in Kyangin district during the period from February to April 1963.

This report has been prepared by compiling data obtained in these surveys, and is desired to sarve as the basis of future exploration of natural gas in the said district. The report beeing compiled by each member in charge of respective survey, independent views, without necessary adjustment are shown in each survey. To supplement this, we have arranged to show a generalized view in the last item titled "Opinion".

On this occasion, we should like to extend our thanks to the Government of Burma and PMDC and all those who have assisted us in our stay in Burma.

October 1963

Akira Matsuzawa

Head, Japanese Gas Survey Team

Organization of the Survey Team

The Survey Team was composed of the following members

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1. Survey area

1-1 The survey area

The area surveyed is situated along the Irrawaddy River, about 170 miles NWN of Rangoon, in the north-west corner of the South Burma Plain, which developes towards south in a triangle shape between the Arakan Yoma and the Pegu Yoma, and corresponds to the transitional part from the mountainous district to the plain. This area is bounded by the lines of 18° N. Lat. and 19° N. Lat. ; 95° E. Long. and 95°30' E. Long.

The Irrawaddy River runs through the centre of this area from the north to the south, and from Shwedaung to Kyangin this stream projects to the west. In the east of this river two rows of hills lie in N-S direction forming thin forest areas; the one is the Prome Hill of which height is 330-380 feet ranging from Prome and Showedaung to Kyangin on the opposite bank, and the other is the low hills, 230-330 feet in height, ranging from Mayaman through Shwenat-Taung to Ku-Taung. The rest plain area is occupied mostly by rice field.

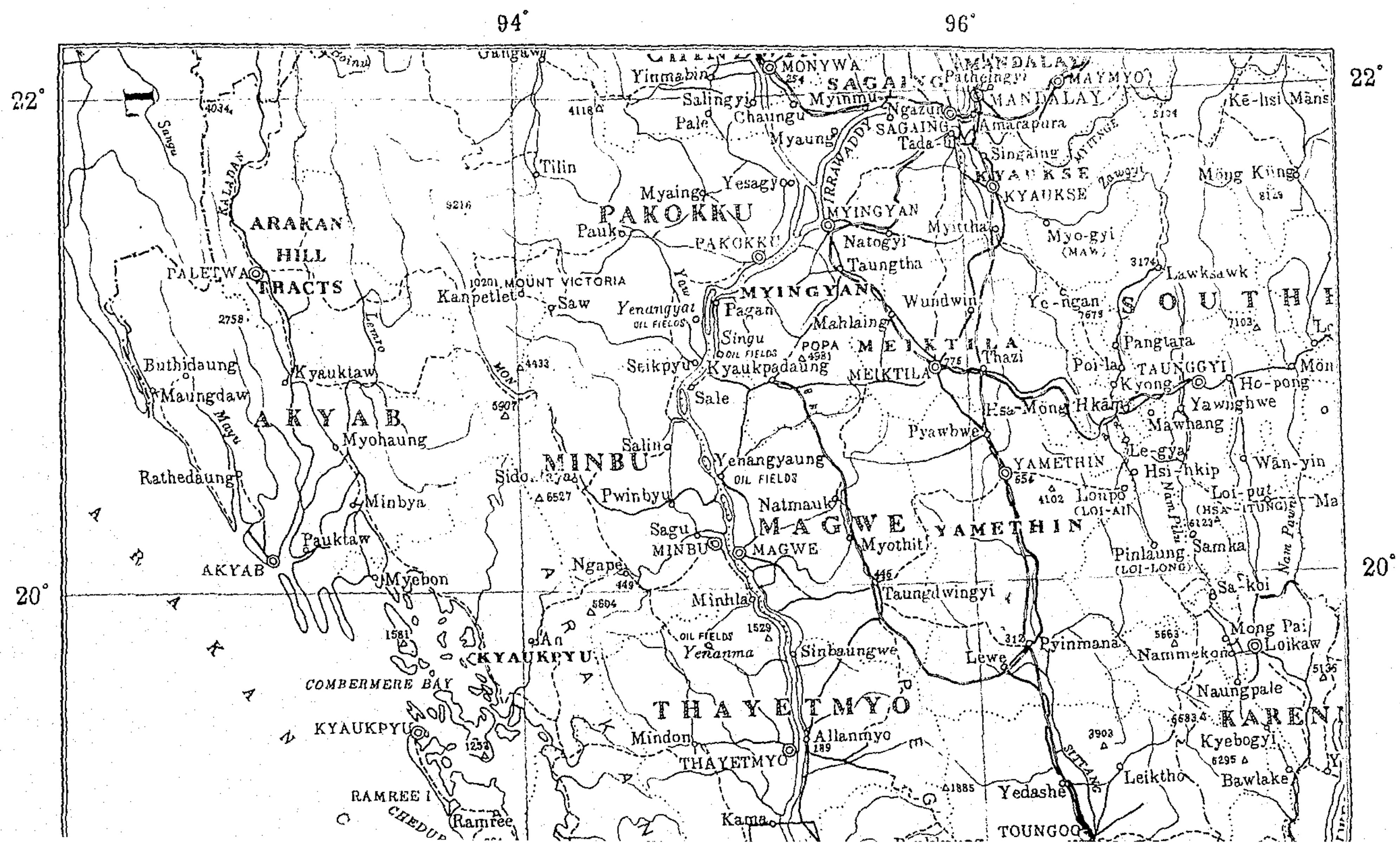
In the west bank of the Irrawaddy, the south part of Kyangin and Myanaung forms an open plain chiefly of rice field. On the west side of this plain, there are hills with outcrops of limestone ranging about 20 miles in length from Tondaung (690 feet in height) in N-S direction. The north end of this hill is cut by the Pashin Chaung flowing easterly and in the farther north of this, the hill is diminished in height to below 500 feet with broad width. To the west of these hills, the belt of the rice field, extending in N-S direction passes into the thick forest of the Arakan Yoma.

The road condition along the route of gravimetric survey in the dry season was as follows, but in the raing season, the length of the road which is possible to pass the car will be diminished to 10-20 % of that in dry season.

Road Conditions	Lengths of traverse	Percentage	Mean Velocity of Motercar
	miles	%	miles/hour
Paved	37	9.2	40 - 60
Unpaved	57	14.2	20 - 30
Barely passable for car	202	50.5	5 - 15
For walker	104	26.1	0
Total	400	100	-

The facilities of communication from Rangoon to the surveyed area was as follows:

Station	Communication	Necessary Time	Distance
Rangoon - Prome	rail-road	6.5 hrs	about 180 miles
Rangoon - Prome	motercar	6 - 8	about 180
Rangoon - Tharrawaw - Henzada - Kyangin	rail-road-connecting steamer -rail-road	12	about 170



94°
96°
22°
20°
MONYWA
SAGAING
MANDALAY
MAYMYO
Yinmabin
Salingyi
Myinmu
Ngazun
Pale
Chaungu
Myaung
SAGAING
Amarapura
Tada-u
Singaing
KYAUKSE
Tilin
Myaing
Yesagyo
PAKOKKU
Pauk
MYINGYAN
Natogyi
Myittha
Taungtha
Mõng Küng
Myo-gyi
Lawksawk
ARAKAN
HILL
TRACTS
PALETWA
10201 MOUNT VICTORIA
Kanpetlet
Saw
Yenangyat
OIL FIELDS
Pagan
Singu
Mahlaing
Wundwin
Ye-ngan
SOUTH
POPA
MEIKTILA
Thazi
Pangtara
Buthidaung
Maungdaw
Kyauktaw
Seikpyu
Kyaukpadaung
MEIKTILA
Poi-la
TAUNGGYI
Kyong
Ho-pong
Sale
Hsa-Möng Hkam
Yawnghwe
AKYAB
Myohaung
Pyawbwe
Mawhang
Salin
Le-gya
MINBU
Yenangyaung
OIL FIELDS
YAMETHIN
Hsi-hkip
Wan-yin
Rathedaung
Sidoktaya
Minbya
Pwinbyu
Natmauk
Loi-put
Paukfaw
Sagu
MAGWE
YAMETHIN
MINBU
MAGWE
Myothit
Pinlaung
Samka
AKYAB
Ngape
Myebon
Taungdwingyi
Sa-koi
ARAKAN
Minhla
OIL FIELDS
Yenanma
Sinbaungwe
Pyinmana
Lewe
Mong Pai
Loikaw
An
KYAUKPYU
Nammekon
COMBERMERE BAY
Naungpale
KAREN
THAYETMYO
KYAUKPYU
Mindon
Allanmyo
Kyebogyi
THAYETMYO
Leiktho
Bawlake
Yedashe
RAMREE I.
Ramree
Kama
TOUNGOO

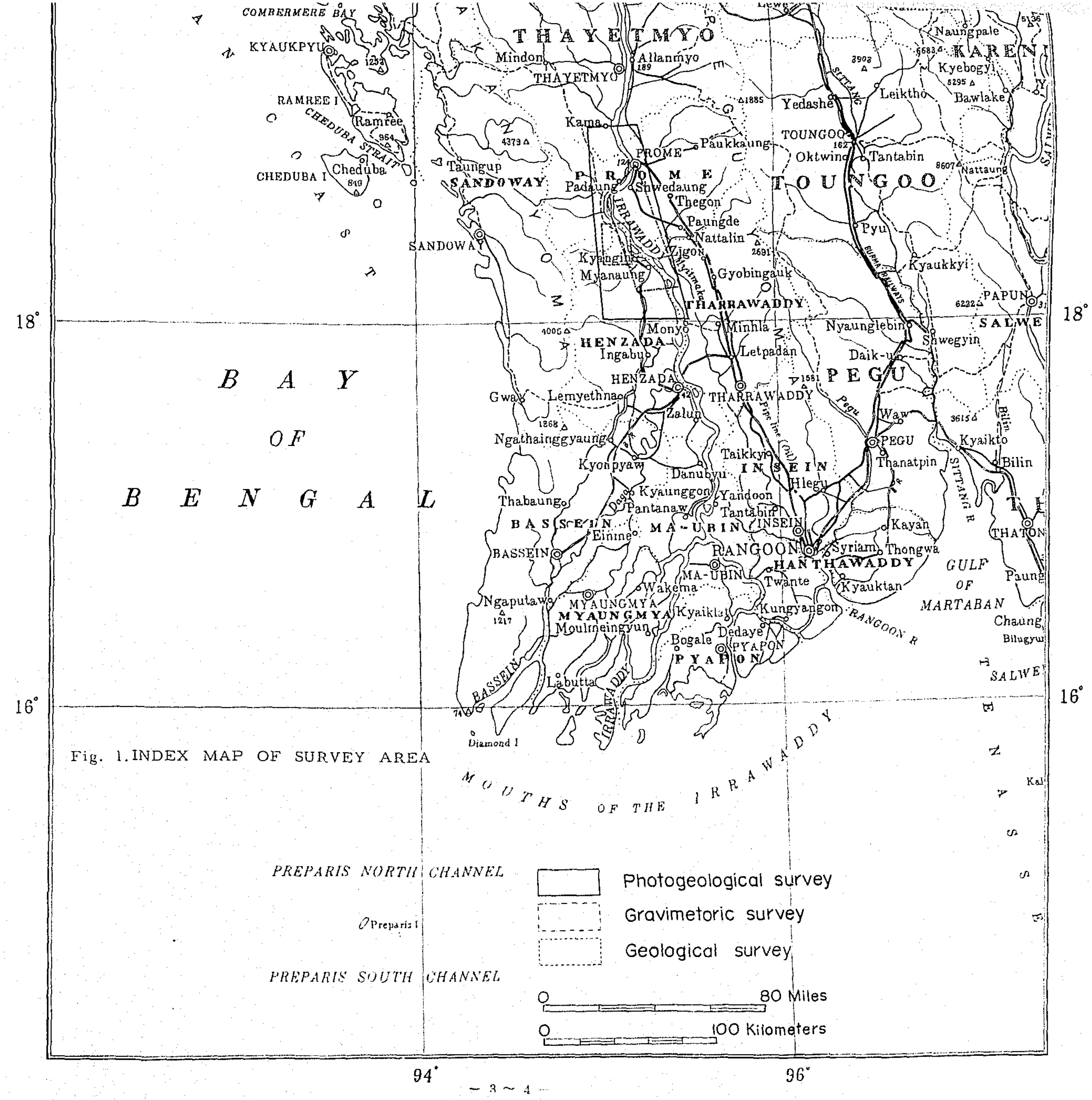


Fig. 1. INDEX MAP OF SURVEY AREA

2. Summary

2-1. Photogeologic survey

i) Stratigraphy

From the facts obtained on the aerialphotograph, the rock formation in this area could be divided into 10 rock units named from A to J (see Table I_{A-C}). The each rock unit was correlated to the each formation, using the data of B.O.C, [1] as shown in Table II. In the west of Kyangin, the names of stratum corresponding to the each rock units B, D were not decided in the data of B.O.C. ; so that it was impossible to determine them except solely by the photogeologic interpretation, but tentatively the correlation was made mechanically.

Table PH-1 Photogeologic units and thir correlation

Rock unit	Formation (B.O.C)	
J I	Terrace Deposits Plateau Gravels	Quaternary
H G F E	Irrawaddy Series Obogon Alternations Kyoukkok Sandstones Pyawbwe Clays	Tertiary
D C B	Okhmintaung Sandstones Padaung Clays Shwezetaw Sandstones Yaw Stage	
A	Negrais Series	Cretaceous

As shown in the Photogeologic sketch map (Fig. PH-3), of the distribution of rock units, generally in the western part, rock unit A forming the Arakan Yoma outcropped and contacted by fault or unconformity with the rock unit B, and aparted from the mountainland, the rock units E and D outcropped respectively, and in more eastern part, the rock units I and J covered them unconformably.

ii) Structure

By the results of photogeologic survey, the following structures worthy of prospecting were newly found besides the well-known structures of Kyangin and Tondaung.

(* Parts of these structures were formerly expected.)

a. Kyithe - Mayaman structure
b. Prome Hill structure *
c. Tantabin structure *
d. Myanaung structure
e. Kogwe Hill structure *

The forms of these structures must be studied further by other method, but in due consideration from the results of the survey, it is assumed that Prome ill structure is the stable anticlinal structure next to Myanaung and Kogwe structures, but the structures of Kyithe - Mayaman, Kyangin and Tondaung are very complex anticlinal structures.

2-2 Gravimetric survey

The results of the density determinations of surface samples are available for interpretation of the Gravity Anomaties. The natural densities of Kyaukkok Sandstones were very large in compared with those of Obogon Alternations of the upper bed and Pyawbwe Clays of the lower bed. From this result it is assumed that the local gravity anomaly is considerably affected by the distribution of Kyaukkok Sandstones. It is also generally inferable that in the case that the distribution of Kyaukkok Sandstones is continuous under the surface, the high gravity anomaly will be indicated in the anticlinal structure but in case of discontinuous distribution of this sandstones cropping out on the surface or under the unconformity plane, the high gravity anomaly will be found in the exposed area of this formation.

From the results of gravimetric survey, the following three structural trends showing high gravity anomaly were recognized. These three structure series are not always the indication of the anticlinal structure. The outline of it will be shown in the following.

(1) Prome Hill structure series

This series can be divided into four parts, that is, the north part, the middle part, the south part and Myanaung structure. In the south of the middle part, Kyaukkok Sandstone distributed continuously under the ground, so that this structure is assumed to be the high gravity anomaly zone indicating the anticline.

This structure become higher elevation towards the north and the Tertiary formation cropped out near the apex of the anticline in the middle part of this structure, while the south part and Myanaung structure are covered by the Quaternary sediments.

(2) Mayaman and Tayokhmow structure series

This structure series are also divided into the four structures, i,e., Mayaman, Kyauk-aing, Tayokhmow and Kazingyi. In the area south of Tayokhmow, Kyaukkok Sandstones of high density are outcropped, and in the north the area of Mayaman and Kyauk-aing structures are covered by Quaternary sediments.

From these conditions, in these structure series the high gravity anomaly may be the indication of the Kyaukkok Sandstones exhibited over the area of its outcrops and is independent of the acnticlinal structure.

(3) Kyithe structure series

This structure series is unknown as it is outside of the survey area, except the Kyithe structure. It is considered that the high gravity anomaly zone will not continue southward to the Tantabin anticline but to the east part of the exposed area of Kyaukkok Sandstones in the west side of the former, This gravity anomaly is corresponding to the case of Fig. Gr 7 B and was supposed to be a indication of the low density Pyawbwe Clays in the top of the anticline. As the vicinity of Kyithe structure is covered by the Quaternary sediments, the structure is not clarified.

In the case that the Kyaukkok Sandstones continued without lacking on the top of this structure as shown in Fig. Gr-7 A, the anticlinal structure is formed, but in the case of lacking on the top of this structure as shown in Fig. Gr-7 B, the low gravity region between Kyithe and Myaman structure is situated on the anticline. In any case, this structual series is supposed to have a very complex form.

2-3 Geological survey

The formations of the surveyed area are divided into 9 formations of A - I, except the sediments, of the terrace. It is considered that these formations can be correlated to Aquitanian by the data of paleontology, and hence the age and the correlation of these formations are different from the data hitherto used, so that there arose many problems to be solved.

It was observed that parts of B and D formations and C and E formations are good as the source rocks, while parts of B and D strata and F and G strata afforded the good oil and gas reservoirs. From the indication of oil and gas, the development of the oil and gas bearing Tertiary sediments is considered possible enough.

The Kyangin and Tantabine anticlines are accompanied by the faults and the both wings are steep, so-called cherron folding and the C formation is outcropped in the cores of these culminations. For these reasons, it was assumed that the values of these anticlines as gas field are low. The Prome Hill structure was only preliminarily surveyed this time. The value as oil and gas field differed according as the character of the faults in the west wing of the anticline. As the core of this anticline is composed of G formation, the formations below F became the object for exploration of oil and gas.

2-4 Opinion

It is possible that the anticlines in this survey area are of good character for natural gas, and the more detail exploration is significant. The two systems of anticline, one from Prome to Myanaung and the other from Kyithe through Tantabin and Kyangin to Tondaung, were recognized.

By the upheaval movement of the Arakan Yoma, the latter is generally complex in structure and besides in this anticline the upper part of Tertiary sediments is lacking, therefore, though these structures are to be considered as the object for the trial exploration, its merit is low. From the view points or the stable structure and the stratigraphy, the former is thought to be the important structures most worthy of prospecting in this survey region.

The desired plans for the further survey are to clarify the structures of each anticline included in the structure from Prome Hill to Myanung by means of seismic survey etc., and to expand the like survey as the present fundamental survey to the south and east of this survey area, in consequence, to make contribution to the evaluation of the sedimentary basin of the South Burma.

3. Photogeological survey

3-1 Introduction

For the purpose of exploring natural gas resources in Kyangin region of Burma, it was considered most effective to practise the photogeological survey over large area to grasp the outline of geological stratigraphy and structure. Initially, this plan has been formed using the air-photographs of the scale cf 1 : 40,000, but on the spot of the survey, the air-photographs offered by the Burma authorities were those of the scale 1 : 24,000.

Hence the air-photographs for the investigation amounted to about three times (about 800 sheets) as many as that expected (about 300 sheets). Accordingly, the quantitative interpretation was given up and the qualitative interpretation was chiefly done for giving the priority to the selection of the test boring places.

Favourably, the air-photograph offered had the sufficient accuracy for this purpose, and the surveying region was fit for the photogeological survey, so that the desired object could be attained.

3-2 Abstruct

1) The area of the survey (see Fig. PH-1)

The area was bounded on the north by Kama, Thabyegwin on the south, foot-hill of the Arakan Yoma on the west and the Prome Hill on the east, and covered about 1900 sq. miles.

2) The sir-photographs and instruments for survey

The air-photographs offered by the Burma authorities were those taken in a period between 1953 and 1954, from the flying height of about 4,000 m using Metrogen lens (the focal length : 152 m/m) and printed in a scale of about 1/24,000.

Numbers of photographic sheets covering the whole area of the survey amounted to 796. Four sets of air-photograph were used for mosaic observation, stereoscopic observation, field checking survey and reserve. Besides, photo-index (scale : 1/126,000) covering the area of the survey was also used.

For stereoscopic observation, Mirror stereoscope manufactured by Tokyo Kogaku Co., Ltd. and photogeological outfit manufactured by Mikasa Shokai Ltd. were used.

Fig PH-1 INDEX MAP OF PHOTOGEOLOGIC SURVEY

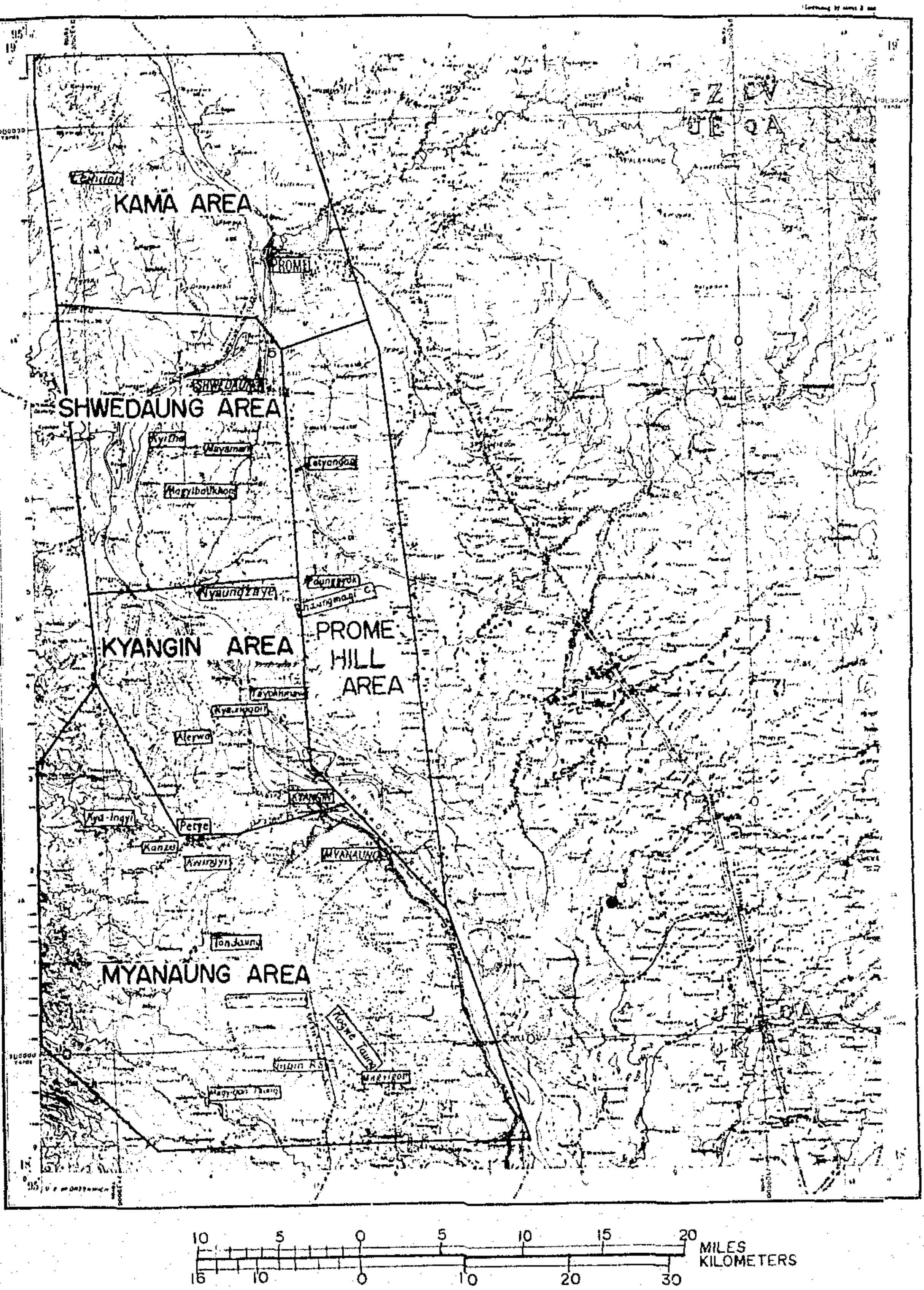


Table PH-2 A PHOTOGEOLOGIC INTERPRETATION CHERTS

Unit	Elements / Area	Topographic Expression: Drainage Pattern: Form	Drainage Pattern: Density	Tonal Texture	Erosional Form: Relief	Erosional Form: Dessection	Valley	Ridge	Boundary Characteristics	Photo Tonality	Vegetation	Interpretation	Map* Check *BOC Data
A	MYANAUNG	Dendritic	Dense	Coarse	Strong	Moderate			A～B Good	Grey	Heavy～ Moderate	Shale (Hard Sedimentary rock	Negrais?
B	KAMA	Dendritic	Sparce Medium	Granular	Strong Low	Severe			B～C Poor	Grey	Mottled	Massive Sandstone Massive Mudstone	Shwezetaw or Yaw Stage (Eocene?)
	MYANAUNG	Dendritic	Medium	Medium	Moderate	Moderate			B～C Good	Dark	Heavy	Sandstone	
C	KAMA	Dendritic	Medium	Granular ～ Mottled	Rather Low	Severe			C～D Poor	Dark grey	Mottled	Massive Mudstone	Padaung Clays
	KYANGIN	Dendritic	Medium	Fine	Low	Severe			C～D Good	Grey	Heavy ～ Coarse	Mudstone	
	MYANAUNG	Dendritic	Medium	Fine	Low	Moderate			C～D Good	Grey	Moderate	Mudstone	
D	KAMA	Trellis	Medium	Granular	Moderate	Moderate			D～E Fair	Grey	Billowy	Sandstone Mudstone Alternation	Okhmintaung Sandstone
	SCHWEDUNG	Trellis	Dense	Granular	Moderate	Moderate			D～E Fair	Dark Grey	Heavy ～ Billowy	Sandstone	
	KYANGIN	Trellis ～ Dendritic	Medium ～ Coarse	Banded ～ Coarse	Moderate	Moderate ～ Severe			D～E Good	Dark	Heavy ～ Billowy	Sandstone with mudstone	
	MYANAUNG	Trellis ～ Dendritic	Medium	Medium	Low	Moderate			D～E Good	Dark	Heavy	Alternation	
E	KAMA	Dendritic	Medium	Granular ～ Mottled	Low	Severe			E～F Fair	(Dark) Grey	Mottled	Mudstone	Pyawbwe Clays
	SCHWEDUNG	Dendritic	Medium	Granular	Moderate	Moderate			E F Fair	Light Grey	Moderate	Mudstone	
	KYANGIN	Dendritic	Medium ～ Dense	Granular	Low	Moderate ～ Severe			E F Good	Dark	Moderate	Mudstone	
	MYANAUNG	Dendritic	Dense	Medium	Low	Moderate			E F Fair	Grey	Heavy	Mudstone	

Table PH-2 B PHOTOGEOLOGIC INTERPRETATION CHERTS

Unit		Elements / Area	Topographic Expression: Drainage Pattern: Form	Drainage Pattern: Density	Tonal Texture	Erosional: Relief	Erosional: Dessection	Form: Valley	Form: Ridge	Boundary Characteristics	Photo Tonality	Vegetation	Interpretation	Map* Check *BOC Data
F		KAMA	Dendritic Trellis	Medium	Fine	Strong	Moderate			F~G Poor	Grey	Moderate	Sandstone	Kyoukkok Sandstone
F		SCHWEDUNG	Dendritic Trellis	Medium	Fine Granular	Low Moderate	Severe Weak			F~G Poor	Grey	Sparse Heavy	Sandstone with Mudstone	
F	f_4	KYANGIN	Dendritic	Dense	Brains	Low	Low			f_4~G Gradually	Grey	Moderate	Siltstone	
F	f_3	KYANGIN	Trellis	Medium	Banded	Low	Weak			f_3~f_4 Gradually	Dark	Billowy	Alternation	
F	f_2	KYANGIN	Trellis	Rare	Banded	Moderate~ Strong	Severe~ Low			f_2~f_3 Poor	Grey	Billowy	Sandstone with Mudstone	
F	f_1	KYANGIN	Trellis	Rare	Banded	Strong	Low			f_1~f_2 Poor	Light	Billowy	Sandstone	
F		MYANAUNG	Trellis	Sparse ~ Medium	Coarse	Moderate	Weak			F~G Obscure	Dark	Moderate · Heavy	Sandstone and Alternation	
F	f'_2	PROME HILL	Trellis	Medium	Granular Fine	Low	Weak			f'_2~G Fair	Light Grey	Mottled	Siltstone	
F	f'_1	PROME HILL	Trellis	Medium	Granular	Strong	Moderate			f'_1 ~ f'_2 Excellent	Dark Grey	Solidly Sparse	Sandstone	
G		KAMA	Dendritic Trellis	Medium	Mottled Banded	Moderate	Moderate			G~H Poor	Grey	Moderate Billowy	Alternation	Obogon Alternations
G		SCHWEDUNG	Dendritic Trellis	Absence	Fine	Moderate	Moderate			G~H Good	Light Grey ~ Grey	Sparse ~ Moderate	Siltstone	
G		KYANGIN	Dendritic	Medium	Brains	Low	Low			G~H Fair	Grey	Moderate	Sandy rock	
G		MYANUNG	Dendritic	Medium	Fine	Low	Severe			G~H Good	Light Grey	Sparse	Mudstone with Sandstone	
G		PROME HILL	Dendritic Trellis	Medium	Granular Banded	Moderate ~ Low	Moderate			G~H Fair~ Poor	Grey	Moderate Billowy	Alternation	

Table PH-2 C PHOTOGEOLOGIC INTERPRETATION CHERTS

Unit		Elements / Area	Topographic Expression: Drainage Pattern: Form	Drainage Pattern: Density	Tonal Texture	Erosional Form: Relief	Erosional Form: Dessection	Erosional Form: Valley	Erosional Form: Ridge	Boundary Characteristics	Photo Tonality	Vegetation	Interpretation	Map* Check *BOC Data
H		KAMA	Parallel Dendritic	Sparse	Granular ~ Fine	Moderate	Moderate			H ~ I Gradually	Light Grey	Moderate ~ Sparse	Massive Sandstone Alternation	Irrawaddy Series
H		SCHWEDUNG	Dendritic	Sparse	Fine	Low ~ Moderate	None ~ Moderate			H ~ I Good	Grey	Moderate ~ Sparse	Sandstone	Irrawaddy Series
H		KYANGIN	Dendritic	Sparse Dense	Banded	Strong	Low Severe			H ~ J Obscure	Dark	Billowy	Sandstone with Siltstone	Irrawaddy Series
H	h_3	PROME HILL	Dendritic	Medium	Granular	Moderate	Moderate			$h_3 \sim I$ Fair	Light Grey	Poor	Sandstone	Irrawaddy Series
H	h_2	PROME HILL	Dendritic	Absence	Fine	Low	Severe			$h_2 \sim h_3$ Excellent	Light Grey	Poor	Sandstone	Irrawaddy Series
H	h_1	PROME HILL	Dendritic	Medium	Banded	Moderate Low	Moderate			$h_1 \sim h_2$ Excellent	Grey	Billowy	Sandstone	Irrawaddy Series
I		KAMA	Dendritic	Sparse	Fine	Low	Weak				Dark Grey	Sparse	Gravel	Plateau Gravel
I		SCHWEDUNG	None Dendritic	Absence ~ very sparse	Fine	Low	None				Light Grey	Solidly	Gravel	Plateau Gravel
I		MYANAUNG	Dendritic	Sparse	Fine	Moderate	Weak				Grey	Heavy	Sand. Gravel	Plateau Gravel
I	i_2	PROME HILL	Dendritic	Sparse	Fine	Moderate	Moderate				Grey	Spotted	Gravel	Plateau Gravel
I	i_1	PROME HILL	Dendritic	Dense	Glanular	Moderate	Moderate			$i_1 \sim i_2$ Good	Grey	Moderate	Gravel	Plateau Gravel
J		KYANGIN	Dendritic	Sparse	Glanular	Low	Low				Light	Sparse	Terrace Deposits	Irrawaddy River Terrace

3) The period and station for survey

1. The operation was begun on Feb. 18, 1963, using air-photograph offered by Burma.

2. Feb. 18 - Feb. 28, 1963 (10 days were required for survey) : The photogeologic interpretation was done at P.M.D.C. Office in Rangoon city.

3. March 1 - March 3, 1963 : The station was moved to Kyangen from Rangood city through Prome.

4. March 4 - March 9, 1963 : At the camp of Kyangin, the result of photogeologic interpretation were checked from air and on land and compiling work was carried out. For this purpose a Bell type helicopter (for 4 days), a ship (complement 40 men; for 2 day) and a few jeeps offered by Burma authorities were used, and a few of laborers on the spot were employed.

5. March 10, 1963 : The work was finished and the party of photogeologic survey dissolved. According to the plan, on March 11, the party chief leaved Kyangin for home, but the other members remained for the field geological survey.

3-3 Photogeologic interpretation

As shown on the index map (Fig. PH-1), the investigated area was divided successively from the north into five parts; Kama, Shwedung, Prome Hill, Kyangin and Mynaung areas. The each member of the party took charge of each part and put in operation the photomosaic observation, stereoscopic observation, compiling from the results of photogeologic interpretation, and check survey in air and on the land, respectively. Specially, the detailed photogeologic survey was applied on the areas of Kyangin and Prome Hill as the anticlinal structures worthy of test boring for natural gas.

In the operation of photogeologic interpretation and mapping, the qualitative methods were adopted instead of quantitative methods which contained the measurements of strike, dip and thickness of the strata, planimetric control and so on, owing to the scheduled time limit, (Mapping of the results of photogeologic interpretation was made by the so-called group tracings, so the planimetric accuracy of each photogeologic map was not high.)

3-3-1 Stratigraphy

As shown in Table I_{A-C} the strata outcropped in this region were divided into 10 rock units by the photogeologic interpretation based on the features on photographs.

The description of the name of stratum corresponding to each unit was made by correlation with a compiling geological map issued by B.O.C., the scale of which being about 1/250,000. In consequence, it was not strict, especially in the west part of Kyangin, the names of the formation corresponding to B - D units were uncertain, as the division of the formation had not yet been decided, but tentative correlation was made mechanically.

The distribution of each unit and photographic character are detailed in the following chapter (see Table I_{A-C} and Fig. PH-2).

The detail of each unit (from the lower to the upper)

1) Unit A: Unit A distributed in the west part of the area of the survey with the topography characterized by the dendritic drainage system developed comparatively well and the steep feautures with strong relief. The photographic tone of this unit was rather light gray in contrast with the other units, showing a definite boundary.

This unit may be correlated to Negris series (Cretaceous stage) by the above-mentioned geological map.

2) Unit B: In the south-west part of the area of the survey, Unit A is developed in the N-S direction along the east side of the Unit A. In this part, comparatively fine dendritic drainage system is developed and the relief of land is low.

The photographic tone is dark and the surface is covered with thick forest. In the west of Leinden village in the north-west of Prome, there are the steep belt with strong relief and scarce drainage system suggesting this unit consisted of sandstone. But in the south-west part, this unit is not recognized. By the geological map this unit may be correlated to the sandstones belonging to Shwezetaw or Yaw stage series (Eocene) lying under Padaung clay.

3) Unit C: This unit is mostly developed in N-S direction on the east side of the unit B. The photography of this part is characterized by the fine dendritic drainage pattern and low relief. The erosion developed fairly well to result a wide valley forming the rice field in the valley, while the rest is covered with thick forest.

The boundary between C and D units is distinct. This pattern implied of mudstone and its stratum can be roughly correlated to Padaung clay, but in the west district of Kangin, there are something doubtful in this respect.

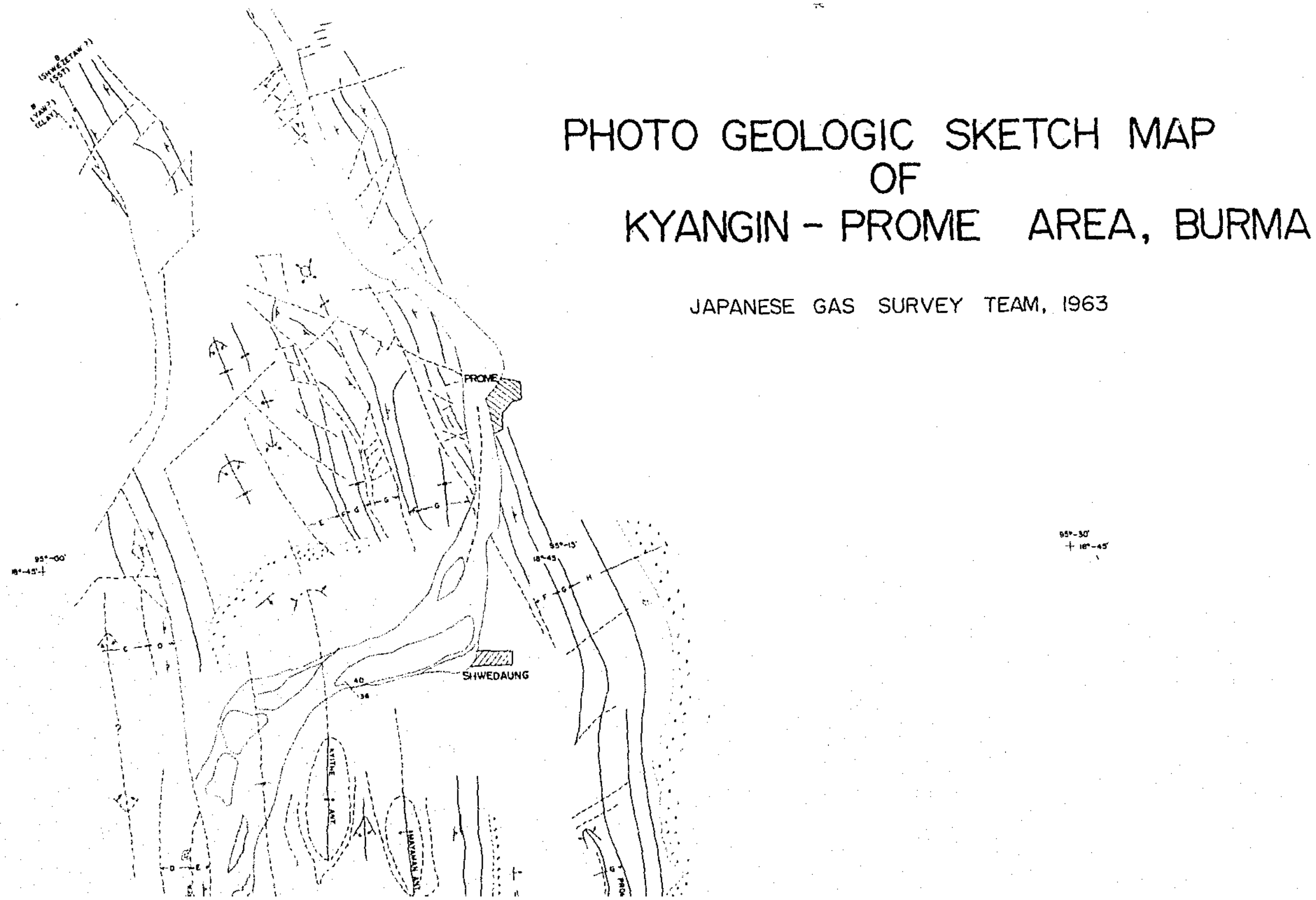
4) Unit D: The drainage system in the area of this unit is mostly checkered but partly of fine dendritic pattern. The boundaries between C and D units and also between D and E units are distinct and the relief in the are of D unit is the strongest than that of C and E units, but in the south-west of Petye, the relief of D unit is decreased to the same order as that or C unit, owing to the difference of kinds of rocks.

Namely, the drainage system in the north part is checkered owing to the alternation of sandstone and mudstone, but in the south part, it is gradually changed into fine dendritic pattern owing to an decrease of sandstone with an increase of generally homogeneous mudstone. On the air-photograph, it is easily discernible that the part of sandstone in this unit disappear towards south in the south-west of Tonbo.

The area with the trellis-like drainage pattern is frequently found, being covered by the billowy vegetation. The unit D may be considered

Fig. PH-2

PHOTOGEOLOGIC MAP




TONBO
TAYOKHMAW
KYANGIN
MYANAUNG
M.V.
QUART
PLISTOCENE
MIOCENE
OLIGOCENE(?)
EOCENE(?)
PLATEAU GRAVELS
H IRRAWADDY SERIES
S OBOGON ALTERNATIONS
F KYAUKKOK SANDSTONES
E PYAWBWE CLAYS
D OKHMINTAUNG SANDSTONE (TONDAUNG LIMESTONE)
C PADAUNG CLAYS
SHWEZETAW SANDSTONE
B YAW SHALE
A NEGRAS BED
M.V. MUD VOLCANO
( ) ROCK UNIT ON PHOTOGRAPHS
STRIKE AND DIP
STRIKE AND DIP ON PHOTOS
DIP SLOPE ON PHOTOS
ROCK UNIT BOUNDARY
(UNCERTAINED)
ANTICLINE (ANT.)
SYNCLINE (Sy.)
FAULT
MILES 5 4 3 2 1 0 5 10 MILES
KILOMETERS 8 6 4 2 5 10 15 KILOMETERS
APPROXIMATE SCALE
CHINA
THAILAND
BAY of BENGAL
X PLANIMETRIC UNCONTROL MAP

to be the alternation of sandstone and shale, and may be correlated to Okhmintaung Sandstones, Clays according to the data of the above-mentioned geological map, but it is a question whether this correlation would be proper or not in the west of Kyangin.

5) Unit E : The drainage system of the area composed of unit E is of dendritic pattern in the same as that of the area of unit C. It is found that, in this area, the physical aspects show the more progressed dissection than that of unit C area, low relief with the saucer shaped valleys and rounded ridges, and existence of the rice field in the valleys. The unit E can be easily discriminated from F unit. This unit in Kyangin contains several thin sheets of sandstone. But this unit may be mostly composed of mudstone and may be correlated to Pyawbwe Clays in the above-mentioned geological map.[1)]

6) Unit F : The area of unit F is characterized by the coarce dendritic drainage pattern. The topography in the lower part of this unit has generally strong relief with steep valleys and hills forming cuestas at places.

The topographic features of the middle and upper parts are characterized by the low relief and progressed dissection. In and around the plain, there are rows of monadnock parallel to the strike of this stratum. The land reveal banded texture with valleys of bowl-shaped cross-section and billowy vegetation arrangements. It is supposed that such a pattern implies alternation of sandstone and mudstone. This unit exists in the syncline in Kyangin and Myanaung districts.

The upper part (d4) of this unit is siltstone and the topographic features of this part are characterized by the dendritic drainage pattern, surface undulation resembling that of brains and low relief with gentle valley slope.

These features show silt facies. The boundary of this unit to G unit is not distinct presumably owing to the gradual change in rock facies. This unit is correlated to Kyaukkok sandstone in the above-mentioned geological map.

7) Unit G : This unit distributed in the broad region extended from the north part of Prome to Prome Hill is assumed as the alternation. The topographic feauture of this region is characterized by the checkered and dendritic pattern of drainage system, stripped surface and valleys with cross section resembling that of bowl, and this area is covered undulately with plants, especially on the synclinal axis of Kyangin and Myanaung.

It seems that this feauture is caused by the gentle dip of the strata in this unit in this part. There are generally distinct difference between the unit G and the unit H. This unit may be correlated to Obogon Alternation series in the above-mentioned geological map.

8) Unit H : The area occupied by this unit distrubuted broadly in Prome Hill is characterized in topography by sparse drainage density

of dendritic pattern, and degrees of dissection and relief are various. The surface is generally smooth, being composed of smooth valleys and Hills.

The sub-unit h_2 in the Prome district appeared light grey in photographic tone and can be easily traced and discriminated from I unit on the air-photograph. It is considered that this unit is sandstone formation with some siltstone and is correlated to Irrawaddy series in the geological map.

9) Unit I : The unit I shows the topographic features characterized by dendritic drainage pattern with few rivers, showing rather smooth topography with inclined terraces. The dissection is not so progressed that the primary and secondary rivers are only recognizable This unit distrubute broadly in Prome Hill and Myanaung areas. This unit is correlated to the Plateau gravel of the above-mentioned geological map.

10) Unit J : The river-terrace sediments along the Irrawaddy River are classified as Unit J. The primary rivers are only recognized, the dissection having been undeveloped and the relief is low.

3-3-2 Structure (See Fig. PH-1,2,3 and 4)

The Kama district in the north is very complex in its structure and the Shwedaung area is a past flood plain of the Irrawaddy River. Though the photogeologic interpretation is very difficult on these districts, the two anticlines of Kyithe and Mayaman are successfully detected.

The air-photograph of the Kyangin district, where the detailed field survey was to be made, was interpreted carefully. By this operation, an anticlinal structure of Tantabin was found as the northern extension of the Kyangin anticline as shown in Figs PH-2 and 3.

In Myanaung district, a nose structure is assumed in the northwest of Tondaung anticline, and in the plain east of it, Kogwe Hill anticline and Myanaung anticlinal structures are also assumed.

In the district of Prome Hill, a closed structure of Prome Hill anticline was found, so that detailed photogeologic interpretation was done in the same way as in the Kyangin district.

In the following descriptions on the structure as well as the results of photogeologic interpretation will be given.

1) Kogwe Hill structure

Situation : The Kogwe Hill is a hill ranging about 10 miles in the S E direction from Okshitkon railway Station which is about 9 miles from Myanaung in SSW-direction. An axis of anticline is assumed lying along the east side of this hill.

The photogeologic interpretation : The hills in the old flood plain along the Irrawaddy River, being covered by the strata of unit I, forms the cuesta topography with the west-ward slope. A comparatively dissected area is observed in the south-east corner of the hill, but the very gradual change of the slope from west dip to east dip is recognized, suggesting the axis of anticline passing through near this area.

In the north part of the hill, the east dip is not observed as the strata are covered by the flood plain of the rivers, but it is assumed that the axis of the anticline is running in the NW-SE direction nearly along the east side of the hill.

The plain area running from Inbin station along the railway in nearly N-S direction is found corresponding to the synclinal structure, considering from the photographic tone and the drainage pattern.

This structure is assumed to plunge towards the south in accord with the shape of the plain. From this consideration, it is assumed that this anticlinal structure of Kogwe Hill plunge towards the south.

2) Myanaung structure

Situation : This anticline is assumed in the Hill along the Irrawaddy river from Myanaung to Tegyaung.

The photogeologic interpretation : In spite of the fact that this region are covered by the uniform river deposits, there find a topographic heigh as a hill. This implies the existence of a buried anticlineinal structure in this district. This is backed by the river system of elliptic annular pattern, the major axis of which running nearly in the NW-SE direction, suggesting the reflection of an anticlinal structure.

3) Tondaung structure

Situation : The Tondaung mountain standing about 8 miles southwest of Kyangin is noted for its limestone. Along the mountain ridge running from this mountain in N-S direction, an anticline exists.

The photogeologic interpretation : The topographic features of this area are strong relief, steep slope and light grey photographic tone. The strata consist of the Okhmintang Sandstones containing limestone belonging to the unit D.

Near the foot of this mountain, unit E (Pyawbwe Clay series) is found in grey photographic tone, showing low relief with dendritic drainage pattern. In the far eastern part, the area of unit F (Kyaukkok Sandstones) is also found showing the topography of steep slope and of rectangular drainage pattern.

The strata of this unit have N-S strike and E dip in the east side of this mountain and the same strike and W dip in the west side, i.e. this mountain land has in itself an anticlinal structure.

This anticline is cut into pieces by the NW-SE and NE-SW faults and covered by Plateau Gravels in the south side, and can be traced to near Magyigon Thoung.

4) Kanze structure

Situation : The extension of this structure is found in the range from Kanze village of about 10 miles west of Kyangin to Kwingyi village with the direction of south-east.

The photogeologic interpretation : In the west of Kwingyi village, comparatively steep hills distribute in V-shape and the arrangement of small hills around this hill are also V - U shape in pattern of outcrops, implying a plunging anticline. The strata of this hill are corresponding to unit F (f1, f_2), and by the strike and dip of these strata read on the photograph, it is very obvious that they forme an anticlinal structure.
This structure opens towards NW, developing towards south, forming a plunging nose structure and disappears in the north of Kanze.

5) Kyangin structure (detailed in Chapter 3-3-3)

Situation : The anticlinal structure of the west mountain land of Kyangin is outstretched from the vicinity of Pedaw village on the banks of the Pashin-Chaung to the Vicinity of Aleywa village on the banks of the Pauktaing Chaung with axis of anticline in the N-S direction. After this photogeologic interpretation the detailed field survey was done in this area.

The photogeologic interpretation : It is so easy to find the direction of strike and dip of the strata and to follow and affirm the strata of this unit and so on by phogeologic interpretation, that an anticlinal structure is recognized. The Kyangin anticline has a culmination part and its axis coincided with the mountain ridge. In the core of this structure, the unit D is found, and around this unit, the unit E and F are also distributed respectively in the elliptical shape of outcrop.

This anticline is cut by a few NE-SW faults, and in the northern sinking part of it is also cut by EW fault. This structure and Tantabin structure make en echelon arrangement.

6) Tantabin structure (detailed in chapter 3-3-3)

Situation : On the anticlinal structure extending to NNW direction from the small hill, about 7 miles east of Shandawggi village, through Kyungon, photogeological-survey was followed by the detailed field survey.

The photogeologic interpretation : This structure is mostly consisted of units E and J of talus sediments. The unit E covered by unit J has the eastward dip. The west wing of the anticline is occupied by unit F of the westward dip. From this observations and the west dip of unit F on the west mountain (the east wing of Akauktaung syncline), the anticline is assumed in this area.

7) Kyithe structure and Mayaman structure:

Situation : These structures are the anticlines in Kyithe on the bank of the Irrawaddy River to the south-west of Shwedaung and in the vicinity of Mayaman, about 4 miles south of Shwedaung.

The photogeologic interpretation : The stream of the Irrawaddy River which goes south from Prome, curves to the west at Shwedaung and turns to the east at Tonbo.
It is difficult to interpret the geology of this region, as it is covered by the floodplains of the Irrawaddy River, but it is well-known that such a drainage deflection of the large river is apt to be caused by the anticlinal structure.

On the hills in the south of Mayaman, the structures of units F and G with east dip are recognized by photogeologic interpretation. A stratum having NE dip (unit F ?) is observed from a helicopter on the banks 4 miles west of Shwedaung, and a synclinal structure is assumed by the anomalous drainage pattern of the Thayet-chaung(river)running in the N S direction from the south of Magyibaukkon to Nyaungzaye. Compiling these results, two anticlinal structures of Kyithe and Mayaman are assumed.

8) Prome Hill structure (detailed in the chapter 3-3-3)

Situation : The anticlinal structure is situated along the west side of Prome Hill.

The photogeologic interpretation : The strata of G, H and I units are chiefly distributed in this hill. By tracing the key bed (h_2) which turned light grey photographic tone belonging to H units (it shows V shaped outcrop with a pointed end towards south) and the direction of the dip of the stratum, an anticlinal structure sinking towards south in the east of Paunggyok and plunging towards north is assumed, as the V-shaped outcrop pointed towards north in the south of Letpandan is observed.

3-3-3 The photogeologic detailed survey

1) Kyangin distruct (See Fig. PH-3)

(i) The area of the survey : The photogeologic interpretation was made over the area about 140 sq. miles, surrounded by the lines connecting Kyangin, Petye, Tonbo, Nyaungzaye, Thityanggon and Tayokhmaw.

(ii) Stratigraphy : As the results by the photogeologic interpretation, the stratigraphic relation of the rock units divided by the correlation to the past geological data is shown in the following table, (see the Table I_{A-C}) :

ROCK UNIT	Formation (B.O.C)
J	Terrace Deposit
H	Irrawaddy Series
G	Obogon Alternation
F f_4 f_3 f_2 f_1	Kyaukkok Sandstone
E	Pyawbwe Clay
D	Okhmintaung Sandstone
C	Padaung Clay

The character of each unit is described in detail as follows:

Unit C : The area composed of unit C is well eloded low relief with rare plants, and have a dendritic drainage pattern, and is gray in photographic tone.

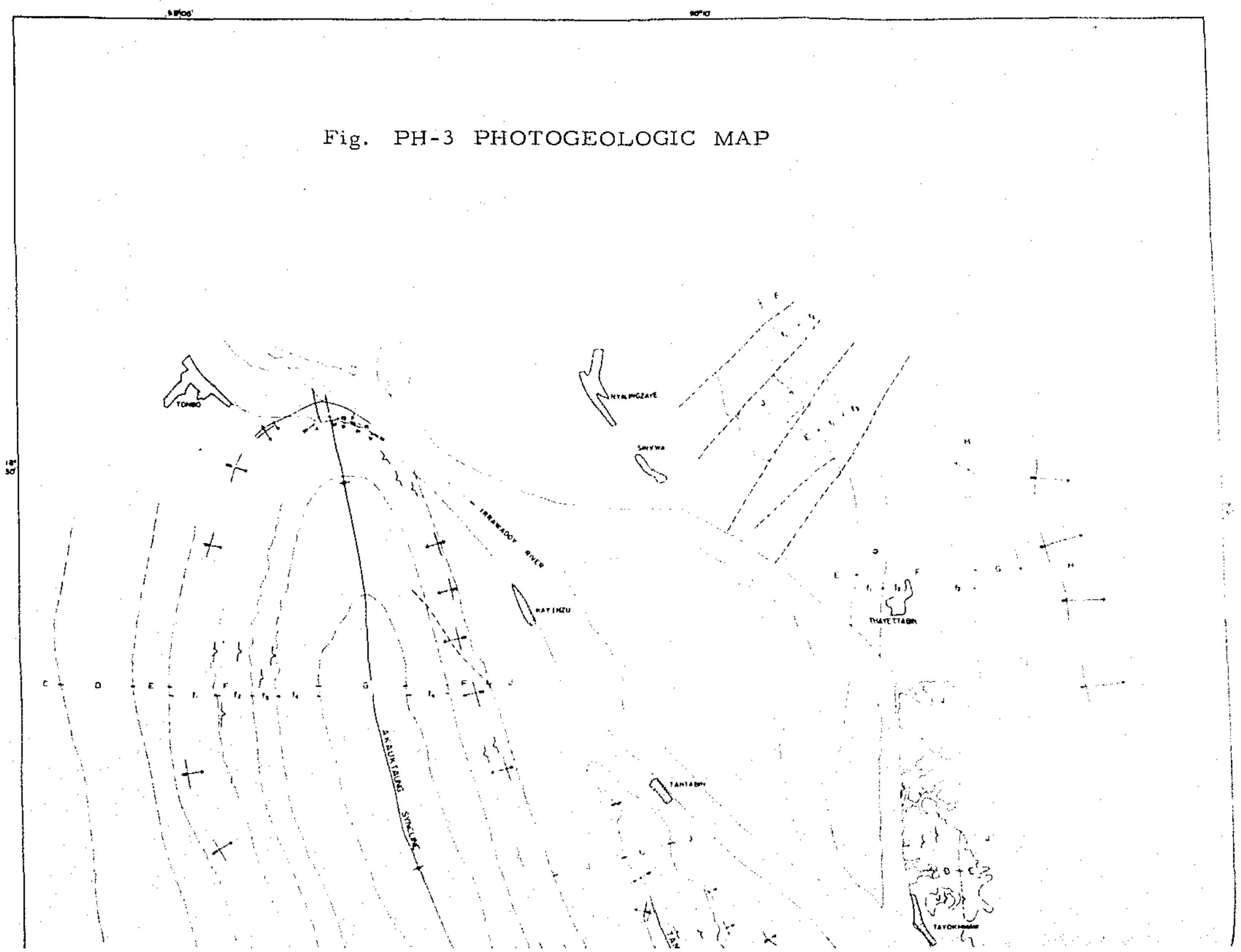
Unit D : There are steep mountain-land with very strong relief in the south of Tonbo. This mountainland is dissected by the coarse trellis drainage pattern and is cuestas with eas gentle slope. This rock pattern is assumed as sandstone. This pattern of sandstone in the vicinity of Tonbo disappeared towards the south, and in the west of Petye syncline, it is observed that the pattern of sandstone in lower and mudstone in upper rock unit with low relief and dendritic drainage pattern.

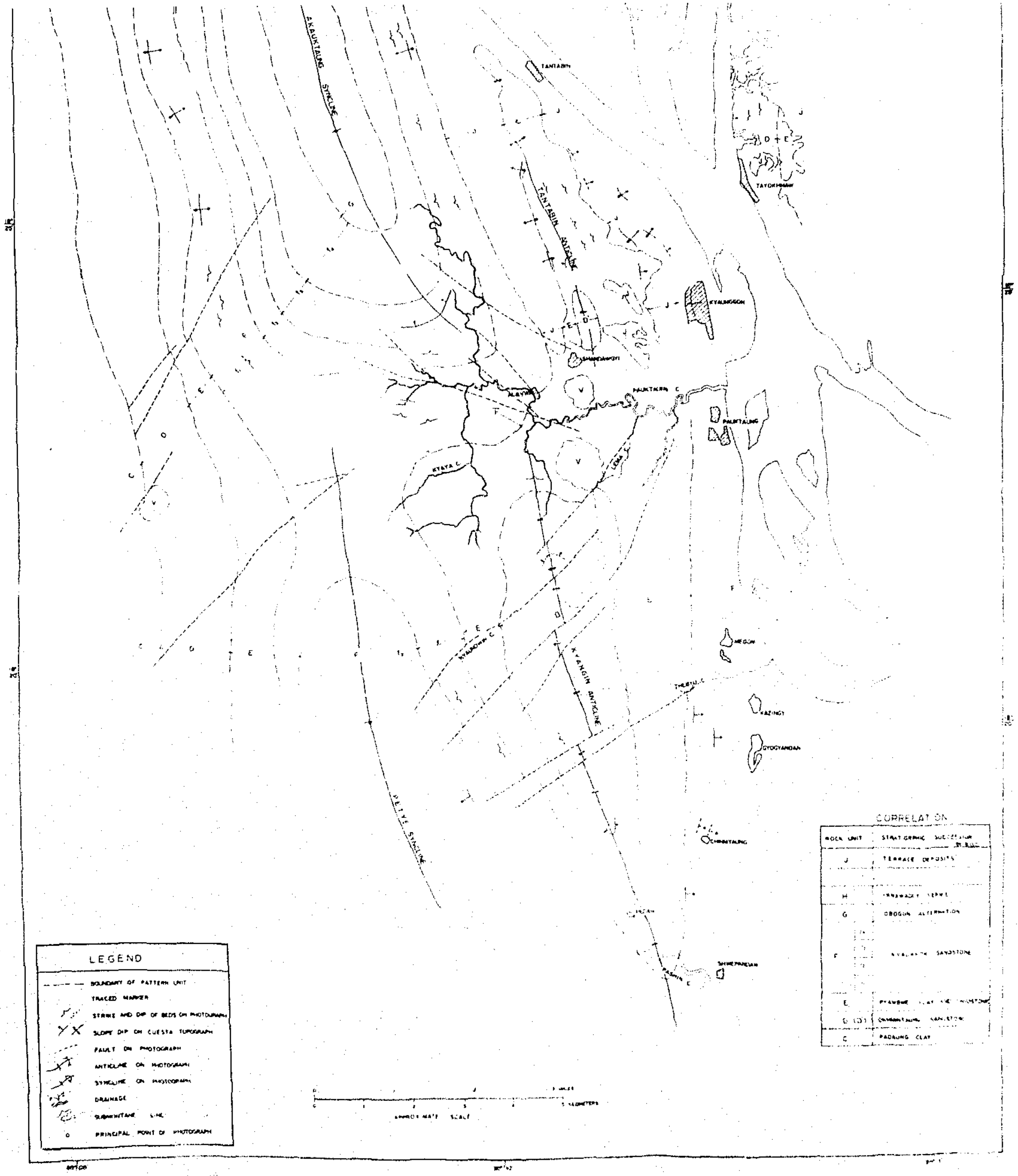
In the east of Kyangin anticline, this unit is interposed by a few thin sandstone beds which is followed as the key bed on the photograph. This sandstone also disappear towards the south. Considering from the fact that the outcrops of this unit in Tantabin anticline has a physical feauture of the trellis drainage pattern, it is possible that this unit is composed of alternation of sandstone and mudstone, being increased in sandstone part.

Unit F : In the area of Akauktaung syncline, this unit can be divided into four subunits, f_1, f_2, f_3 and f_4 from the bottom. The common feauture of f_1, f_2, and f_3 is the trellies drainage pattern, stripes vegitation, banded texture and light gray in tone. The division of these subunits is made by the land form, resistance to the elosion. These subunits seemed mostly consi with sandstone.

The topography of the muddy stratum of f_4 have the drainage of dendritic pattern,

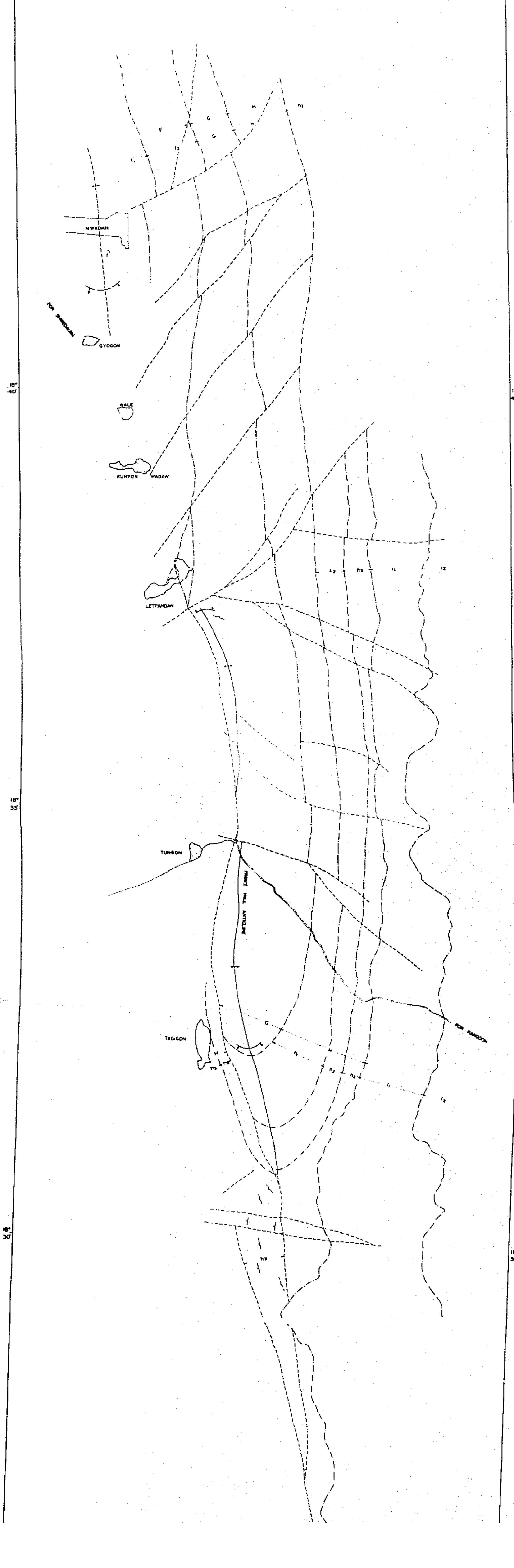
Fig. PH-3 PHOTOGEOLOGIC MAP

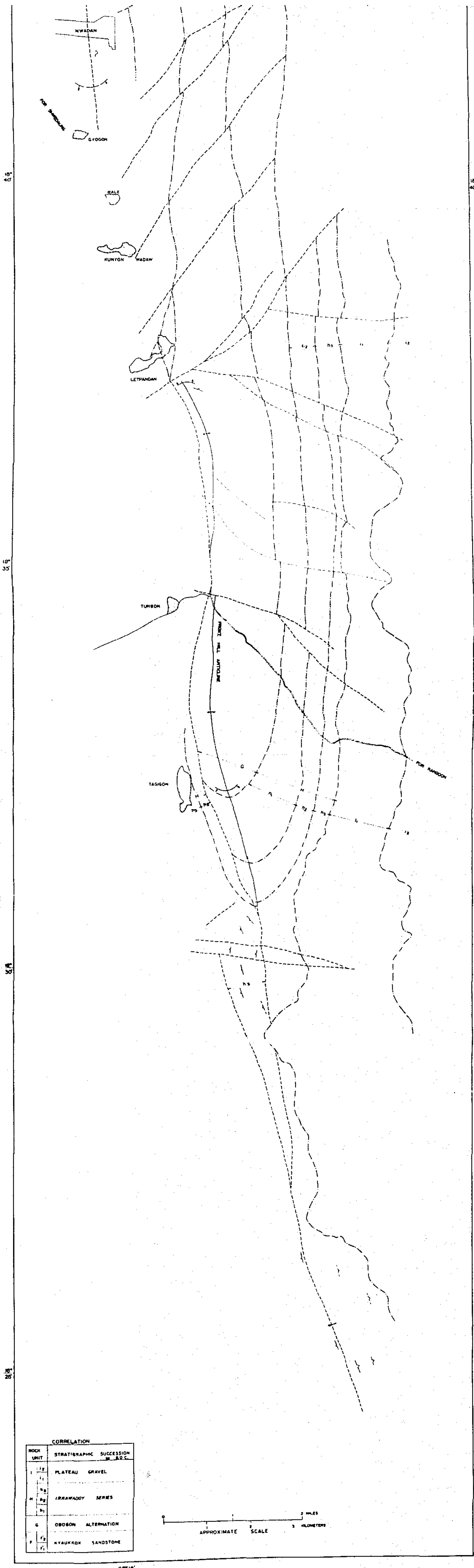




LEGEND
BOUNDARY OF PATTERN UNIT
TRACED MARKER
SLOPE DIP ON CUESTA TOPOGRAPH
FAULT ON PHOTOGRAPH
DRAINAGE
CORRELATION
ROCK UNIT
TERRACE DEPOSITS
PADAUNG CLAY
KYAUKTAING SYNCLINE
TANTABIN ANTICLINE
KYANGIN ANTICLINE
PETYE SYNCLINE
TANTABIN
TAYOKHMAW
KYAUNGGON
PAUKTAING
MEGON
ALAYWA
APPROXIMATE SCALE

Fig. PH-4 PHOTOGEOLOGIC MAP




NWADAN
FOR SHWEDAUNG
GYOGON
WALE
KUNYON
WADAW
LETPANDAN
TUMBON
PROME HILL ANTICLINE
FOR RANGOON
TASIGON
CORRELATION
ROCK UNIT
STRATIGRAPHIC SUCCESSION
PLATEAU GRAVEL
IRRAWADDY SERIES
OBOGON ALTERNATION
KYAUKKOK SANDSTONE
APPROXIMATE SCALE
2 MILES
3 KILOMETERS
95°15'

brain texture and the low relief. In Akauktaung syncline, the above-mentioned f_4 subunit formed the Cuestas, and it is easy to find the synclinal structure on the air-photograph. The region ranged from the Petye syncline to the east wing of Kyangin anticline and Tayokhmaw district, the sandstones of f_1 was found in lower part of this unit forming the Cuestas. The upper part, f_2 subunit was found to be associated with muddy rocks with dendritic drainage pattern.

Unit G : The area of unit G which is observed in the east of Tayokhmow, showed the dendritic drainage pattern with broad ravine, the low relief and the coarse texture. But, around Akauktaung anticline, the features of the dendritic puttern with low relief and of the brains-like texture are seen which was presumably due to the small dip of the stratum near the anticlinal axis. This unit is conceived to be of siltstone.

Unit H : This rock unit distribut over, the area in the east of Tayokhmow showing the strong relief with dendritic drainage pattern and the banded texture which was perhaps owing to the difference of vegetation in according with alternation of thick sandstone and mudstone.

In the small part of this survey, I unit forming the Cuesta covered this unit stratum, but the base of unit I was not so distinct that this part of I unit might be treated including in H unit.

Unit J : This unit consists the river talus sediments of the Irrawaddy and the area of this unit was generally rice-field, as the surface of this area was flat or gentle slope with rare drainage.

Mud-volcanoes : Three mud-volcanoes were situated on the sites of about a mile to the south-east, about 0.5 mile to the east and about a mile to the north east of Aleiwa . (north of Schandawgyi)

The former two were affirmed, by check survey, but the east was not. These mudvolcanoes were easily found by the features of simple cone or simple oval-cone with the radial river system.

(iii) Structure :

There were Akauktaung syncline and Petye Syncline in the west, Tantabin anticline and Kyangin anticline in the central part, and a monoclinal structure in the east.

Akautaung syncline had a axis of N-S trend and a oval shape with about 9 miles in the long radius and about 4 miles in the short radius. The ends of east and west were composed of the mountainridge (consisted with unit f_1), resistive to erosion and forming the Cuestas. The unit G is distributed along the synclinal axis. And the faults with NNW-SSE and E-W trend were also found in the south part of this syncline.

Petye syncline was the open structure towards south and the trend of its axis was in the same trend N-S of Akauktaung syncline. Around this structure, F unit existed forming the Cuesta topography.

Kyangin anticline was found in the east of Petye syncline and was egg-shape swelled in the north with the axis of N-S trend. This anticline had a scale of 4 miles in the major axis and a mile in the minor axis. It was observed on the air-photograph that the south part of this anticline was shinking with a gentle slope, while the north part with a steep slope, and the E-W wings also had a comparatively steep slopes.

The core of this anticline was constructed with unit D and is cut in pieces by the NE-SW faults. By photographic interpretation the top of the culmination observed situated about 2.5 miles south of Aleywa.

Tantabin anticline seemed to be one, of which have a axis in N-S trend and, shinking towards the north. It was assumed that culmination was situated in the vicinity of the mud-volcanoes in the northeast of Aleywa, but this culmination could not defined on the air-photograph.

The east wing of this structure could be recognized on the air photograph, but on the east wing, the dip of sediments of the unit E is not recognized, because they were covered by unit J. This anticline was assumed on the ground that the unit J have the west dip and the following relation with the Akauktaung anticline, The north end of Kyangin anticline continuing to Aleywa and the south end of Tantabin anticline lay in the east of Shandawgyi, so that the distance between them was about 0.5 mile. It is not defined whether these two syncline were laid parallel in each other from the beginning or originally these had been one anticline but is separated afterwards cutting by the E-W fault through Aleywa and disposed in echelon.

In order to confirm the north plunge of the Tantabin anticline presume by the photographic interpretation, the check field survey was carried out, though rather for a short time, on the south bank of the Irrawaddy River. From this results, this anticline was confirmed. According to this survey, near the top of the anticline, the dip of the stratum is very steep (about 60° - 70°) followed by calcite veins, which suggested the disturbance of the structure. Hence sufficient attention should be paid in the evaluation of this structure.

2) Prome Hill district (See Fig. PH-4)

1. The area of survey : The area for which the detailed photograph interpretation was carried out, is about 50 sq. miles of which E-W side was 3 miles from the east part of Shwedaung to the east part of Paunggyok, and the N-S side is 15 miles.

   This area is corresponded to the central part of the Prome Hill which showed a low relief in the trend from Prome to the south.

2. Stratigraphy : The correlation of the photogeological units and the pubirshed geological deta above-mentioned was as follows:

TOCK UNIT		Formation (B.O.C.)
I	$i_{2'}$ $i_{1'}$	Plateau Gravels
H	$h_{3'}$ $h_{2'}$ $h_{1'}$	Irrawaddy Series
G		Obogon Alternations
F	$f_{2'}$ $f_{1'}$	Kyaukkok Sandstone

The character of each unit is as follows (see Tables I_A and I_B) :

1) Unit F : This unit is divided into two subunits, $f_{1'}$ and $f_{2'}$.

The difference between these two subunits is found by the factors such as the drainage pattern, land form, the relief, the photo tonality, and the vegetation. It is found that $f_{1'}$ is mostly consisted of hard sandstone, and the features of this unit were distinct Cuestas with the east dip, the strong relief and the trellis drainage pattern which was formed by strike side large valleys and small dales through which the streams flew into them.

This area is covered by broad-leaved trees. This character is more remarkable towards the north part. In contrast to $f_{1'}$ the f_2 area was low relief with dendritic drainage pattern well eloded and dim questas were observed.

Generally the grasses covered this area and in the south part the rice field was developed. The stratum of f_2 unit is constructed with comparably soft sediments as silt and fine sandstone etc.

2) Unit G : The feauture of this area is low relief with comparatively fine dendritic drainage pattern. The elosional tone is somewhat differ in the north and south parts, less advanced in the former being obstructed by the existence of the resistant rock of F unit in the downstream. As the elosion progressed, the finely strip in topography became more eloded showing the character of the alternations, and this area is covered widely by the broad-leaved trees. The rock unit G is outcroped as the core of Prome Hill structure.

In the sinking part of this anticline, the stripe of photro tonality is not distinct, and the rice-field is found amount the low relief, probably owing to the gentle dip of the stratum.

3) Unit H : This unit is divided into three subunits, h_1, h_2 and h_3.

Among them, h_1 (the lower) and h_2 (the upper) are alike, but h_2 (middle) is very distinct in characters. The subunit h_1 borne so high resemblance to the unit G on the air photograph that the difference was barely found in the finer dendritic drainage pattern and in the more obscure band of potograpic tone in the area of unit h_1 in the north part. In the south part, the difference is not found on the photograph and the relief became low as with the unit G and the rice field developed. The stratum of unit h_1 is assumed to be constructed with the alternation of mainly siltstone, sandstone and conglomerate etc. just the same as in the unit G area.

The feature of the subunit h_2 is low relief with very rare drainage. The stratum of this unit is the most distinct among the other strata and can be easily followed by the light tone and smooth texture. Among this unit, the three slightly dark layers which were a little higher than the rest were also easily traced, this layers being covered by ragged broad-leaved trees is distinguished from the other area of grasses and of barren land.

For the reason that the valleys well developed as fine drainage in the upper stream vanished in the area of this unit, this subunit is considred to be composed of the fine to medium-grained sandstone of the nature, loose, easy weathering and permeable to the surface water. But in the north of east Nwadan, the rice field increas in proportion rather than the grassy waste. This implied that the rock facies gradually chenge into finer towards the north to the impermeable siltstone.

The small hill arranged in zone were supposed to be constructed with hard sandstone or the like hard conglomerate, probably hardned with lime or iron, developed in loose sandstone. On the subunit h_3, stand the rock unit I forming the higher plane with a gentle eastward slope.

The subunit h_3, being steeply sloped by the progressed erosion, situated between the unit I and the subunit h_2, which is highly dissected. Therefore the vegetation of this area were only the sparce broad-leaved trees. In conclusion, the strata of this unit are composed of relatively loose sediments mostly of coarse sandstone interposed with siltstone and conglomerate etc.

4) Unit I : The stratum of this unit distributed covering unconformably the strata of H unit and the subordinate units, and formed a flat or a gentle slope to the east. The streams deeply scooped this surface were developed, but in general the elosion was not progressed. That the terrace plane formed several steps are recognized on the air photograph.

This unit is divided into two subunits, i_1' and i_2', in the area of this survey. The area of subunit i_1' has fine dendritic drainage pattern and covered by heavy broad-leaved trees, but subunit i_2 has sparse dendritic drainage pattern and covered by sparce broad-leaved trees or low shrubs. The rock of these subunits consist quaternary conglomerate and the difference between these subunits is easily found.

3. Structure : In this district, the strike of general trends is generally in N-S direction along the hill. In the north part of the surveyed area the structure is monoclinal with east dip and the strata ranging from F to I units are outcropped. In the central part, the Prome Hill anticline is found. An anticline plunging towards the south is presumed from the drainage anomaly of arch-shape tending towards south in the plain outstreched from Nwadan to Gyoggon. In the vicinity of Letpandan, there is a fault lying in NE-SW trend.

The Prome Hill anticline is in the south of this fault and by west of the axis, that is cut by a fault. This anticline extend about 6 miles in N-S and 1 mile in E-W direction having sloped steeply in the west side and gently in the east side. The axis of anticline curved in to the east in the north part of the E-W fault in the east of Tangon, and curved into the west in south part of it.

This anticline is sinking towards the south and approaching to the fault in the west side. At last losing the normal anticline, and it is no more recognized in the south of Chaungmagi Chaung. It is difficult to read the character of the fault in the west on the air potograph, but from the distribution of each unit is assumed to be a thrust having a samll throw resulted from the block moved to the west.

As there may be assumed other faults of NNW-SSE trend in the more west part. In the decision of the value for exprolation in this structure, the character of these faults must be taken into coside-ration.

3-4 Conclusion

The amount and the accuracy of the informations obtained from the photogeologic interpretation depend on those of the references. From this point of view, the geological references on this area were so scanty that this photogeologic survey is no better than a blind interpretation, but the object to grasp the outlines of the geology, especially of geological structure, is nearly attained. Namely, beside the hitherto-known Tondaung, Kyangin anticlines, Tantabin, Kyithe, Mayaman, Prome Hill, Myanaung and Kogwe Hill anticlines were also presumed.

It would be hasty to evaluate the merit of prospecting using only the results of the photogeologic interpretation, the following conclusion is tentatively deduced from the standpoint of the exploration of the natural gas.

In view of the outline of the structure of the area surveyed, there are a trend of anticlines parallel to the elevated belt of the Alakan Yoma and another trend in the plain in the east of it. Tondaung, Kyangin, Tantabin and Mayaman-Kyithe structures belong to the former trend. Tondaung and Kyangin structures are prettily complex ones followed by faults in which the Tertiary formation is outcropped, and towards the Irrawaddy River in the north the structures are found less disturbed, so that Tantabin and Mayaman-Kyithe structures are though to be worthy of consideration of prospecting. Prome Hill, Myanaung and Kogwe Hill structures belong to the latter trend. These trends are more remote from the upheaval zone of the Alakan Yoma than the former, so that these sturctures are regarded as stable. Hence, it is concluded that these latter structures are quite worthy or prospecting preferentially.

4. Gravimetric survey

4-1 Introduction

This gravimetric survey was made as a part of the program of fundamental prospecting for the exploration of the natural gas resources in Kyangin area. The survey was executed in the area of about 370 sq. miles ranging from Prome in north, to Myanaung in south, in the period between Feb. 14, and April 28, 1963. The gist of the work is shown in the followings:

	Project	Operation	%
Total area surveyed	280 sq.miles	370 sq.miles	132.1
Length of lines of measurement	375 miles	432 miles	115.2
No. of stations	1200	1385	115.4
No. of days required	74	74	100.0
No. of days actually worked	64	64	100.0

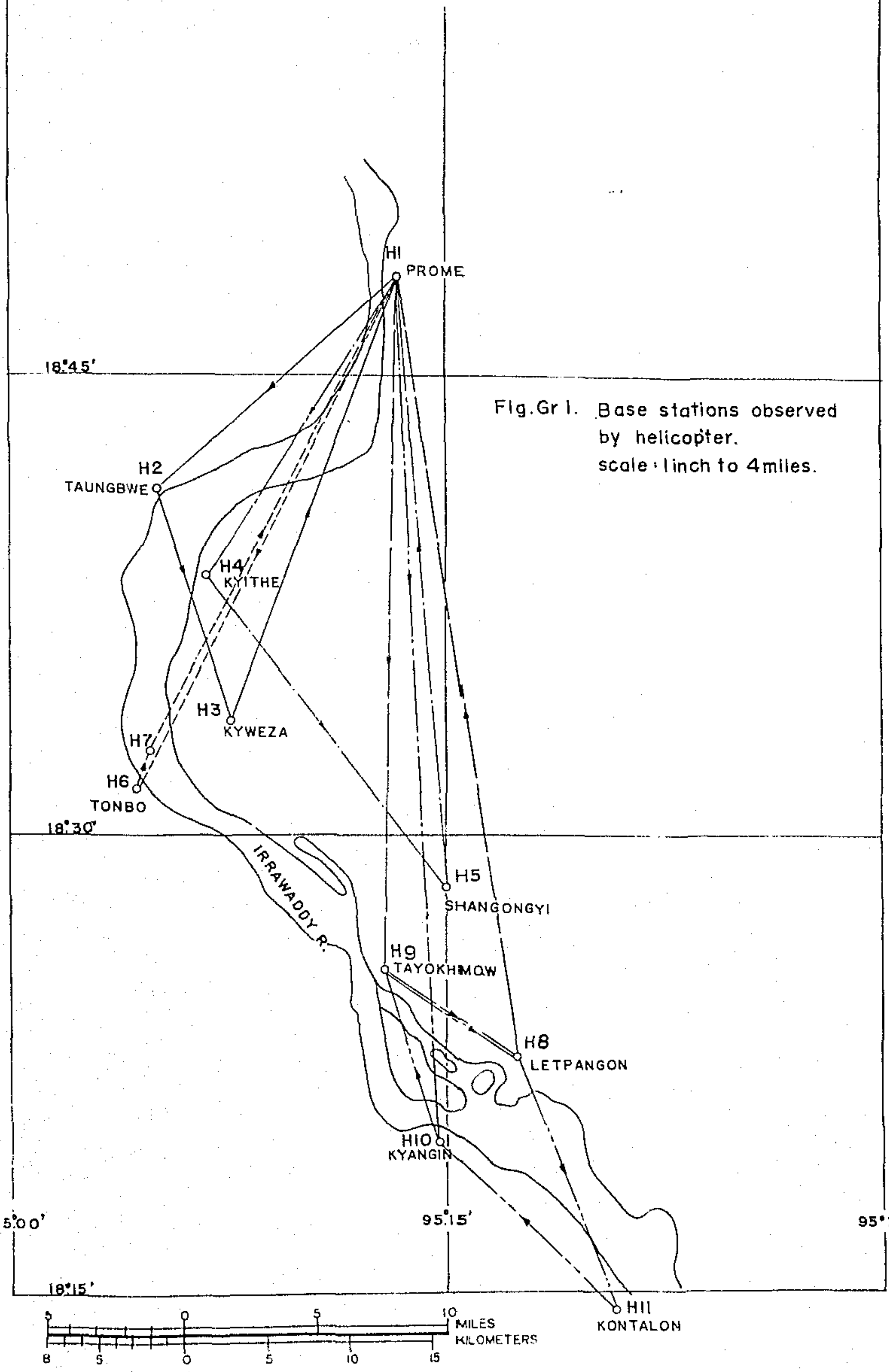
The area initially projected was 280 sq. miles in the north of Kyangin, but as the anticlinal structure was assumed in Myanaung by the photogeological survey in this prospecting, the area to be surveyed was enlarged by about 120 sq. miles in Myanaung. South of Kyangin, in exchange of the projected area of about 30 sq. miles in Akuktoung syncline, and Kyangin and Tuntabin anticlines in the original plan.

Accordingly the operation area amounted to 370 sq. miles, the length of the line of measurement as well as the number of stations in effect having been exceeded.

4-2 Abstruct

The survey was made by use of the Worden Gravimeter of prospector type manufactured by H.T.L. (*Houstone Technical Laboratory*). The

Fig. GR-1 STATIONING MAP OF H BASE STATIONS



area of survey extends to the both sides of the Irrawaddy River more than 42 miles in N-S direction. Except in the north part of this survey area i.e., Prome, Shwedaung, Mayaman and Inma districts, the condition of roads is too bad to set the gravity base stations with a fair accuracy, so that a helicopter was used to attain the high accuracy for the station in the whole survey area. Over the survey area, 11 base stations, named H base stations (surveyed by a helicopter) were arranged in closed loops of measurement of gravity and the survey was done in a short period of time.

The positions of H base stations are shown in Fig. Gr-1. The closing error and closing time of this measurements are shown as follows:

The closing error and the closing times of H base stations

closed loop	measurement	Closing error	Closing times
		mgal	h m
H_1-H_2-H_3-H_1	1	-0.08	1 22
	2	-0.11	1 16
H_1-H_4-H_5-H_1	1	-0.09	2 07
	2	-0.13	1 22
H_1-H_9-H_8-H_1	1	-0.09	1 38
	2	-0.11	1 14
H_1-H_9-H_8-H_1	1	-0.03	1 25
	2	-0.06	1 30
H_{10}-H_9-H_8-H_{11}-H_{10}	1	-0.12	2 14
	2	-0.05	1 05

But a part of the operation area was changed, as stated before, so that the three station H_{3-5} contained in 11 base stations were not used for the following measurements. As the H base stations were arranged in the heli-port for the calculation of $\triangle g$*, these stations generally were not situated on the lines of stations of the survey, therefore, for only two of these stations levelling was made to calculate $\triangle g_0''$ *.

Reffering again to the above table, that the closing error of the measurement always showed negative sign was presumably caused by the difference of temperature during the survey, because the measurements were always done in the morning when the rate of temperature rising was high. As at the second closing measurement, the rate of temperature rising was higher than that at the first, the closing errers in the first closing measurement were usually greater than those of the second. After these procedure, nine supplimentary base stations (named A base stations) were established by the overland route, and gravity anomaly was surveyed around the loops of supplimentary base stations in connection with H base stations. The gravity observation on the common stations of which distance were generally 0.3 miles, was

* $\triangle g$ and $\triangle g_0''$: See the following chapter (4-3) for the method of calculation.

measured under 0.25 mgal of the closing error. If the closing error was over 0.25 mgal, the measurement was repeated. The closing time of a measurement of gravity around one loop was less than 2.5 hours, for over 2.5 hours, the tidal effect became to be taken into consideration.

In the following table was given the total number of stations including the stations added.

No. of H base station	11
No. of A base station	9
No. of common station	1366
Total	1386

The gravity measurement was carried out with the height of 6-16 inches above the ground, using the 20 inches tripod, and the observed value was reduced to the ground. With the aid of the aero-photograph the common stations were set up on the topographical map of the scale 1 : 2500 (magnified from the scale 1 : 63360), but, as to a few lines of stations which were not set up accurately, they were set by means of graphical travers survey.

The true height of each station was decided by direct levelling. First, the base loop was established in connection with the bench-marks at Prome, Myanaung and Kyangin, and then, net works of the levelling within the base loop was set up referring to the fixed points on it.

The closing error of loop was less than 30 $\sqrt{s}$ mm, where s is the course distance in kilometer and is less than 20 kilometer. If this limited error was exceeded, the levelling was made another attempt.

The total levelling distance was amounted to 432 miles, that of double survey was 30.6 miles, that of twice levelling was 14.1 miles and that of graphical travers survey was also 33.4 miles. Beside these, the topographical survey in the vicinity of 20 stations was put into operation.

The technicians engaged in the survey consisted of 7 persons; the party chief, two meter-operators and four surveyors (including two from Burma). The camps were established as follows:

Prome camp	Feb. 18 - March 17
Tayokhmaw camp	March 18 - April 5
Myanaung camp	April 3 - April 21

4-3 Reduction of observations

The base station A_3 in Shwedaung was taken as the original station of this gravity survey and the gravity value at this station was assumed to be 100 mgal.

In order to get the corrected value of gravity anomaly $\Delta g_0''$, the difference between the observed gravity values at the base station and that in each stations was reduced by the following corrections.

4-3-1 Correction for closure difference

The closure difference (<0.25 mgal), which was either the closure difference referred to the same station or that between a certain known and another known gravity stations, was distributed in accord with the observed time for the correction of closure. Thus, gravity values obtained are shown in the column of Δg of the appendix table-1. As the variation of the tide-generating force may be considered linear in a relatively short period less than 2.5 hours, the correction for the tidal effect was omitted as considered that it was approximately made by including it in the drift correction as usually done.

4-3-2 Free air and Bouguer reduction

In the appendix table-1, the height at each stations was shown in the column of elevation and in the column of combined correction, the combined correction value of free-air reduction (F) and Bouguer reduction (B) was also shown.

Combined correction value : $(F-B) = (0.3086-0.0419\ \delta)\ H$, where H is height in meter difference between the each station and the datum plane, δ being the density of the strata over the datum plane.

4-3-3 Normal reduction

The normal corrections ($\Delta\gamma_0$) shown in the appendix table-1 were computed referring to the international gravity formula

$$\gamma_0 = 978.049\ (1+0.0052884\ \sin^2\varphi - 0.0000059\ \sin^2\ 2\varphi)$$

Where γ_0 is the normal gravity value in latitude φ, but in practice, the normal gravity value $\gamma_0 = 978.586$ was used as the standard and $\Delta\gamma_0$ was calculated by the difference from the standard value.

4-3-4 Topographic reduction

Topographic corrections shown in the table were those obtained for the topography within 45 kilometers. In computation, using the chart the average elevation of the land within each compartment was estimated, which was divided by a series of concentric circles of radii R_n and radial eight lines and, taking the difference between this average elevation and the station elevation, the total topographic correction (T) within 45 kilometers were determined.

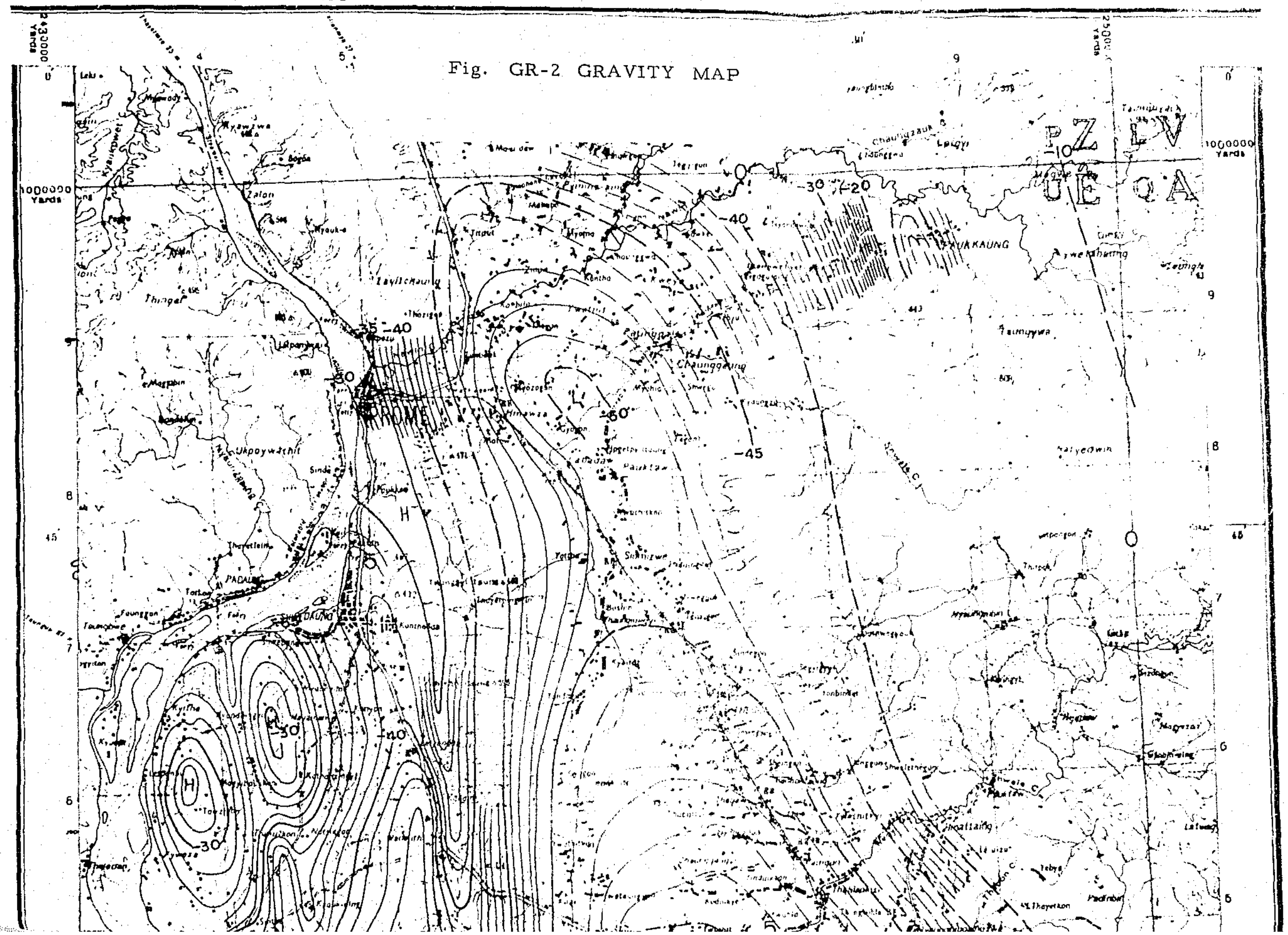
R_n used are as follows;

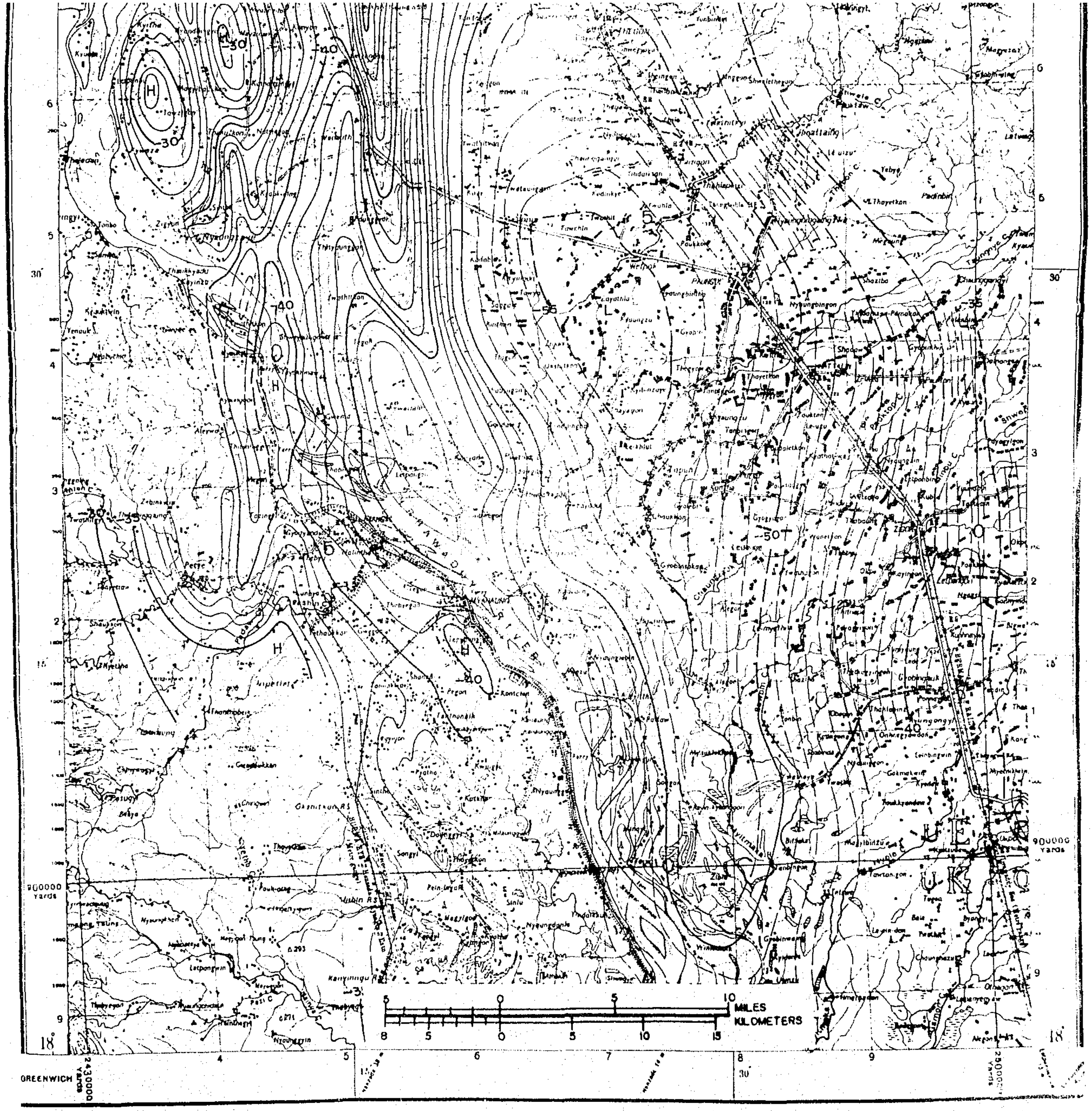
R_n ; 1, 1.5, 2.0, 3.0, 4.5, 7.0, 10, 15, 20, 30, 45, ..., 45000 meter.

The topographic maps used for correction were

0 - 100 meter	:	1 : 5000 actual survey map
100 - 1000 meter	:	1 : 25000 enlarged map

Fig. GR-2 GRAVITY MAP




MILES
KILOMETERS
900000 Yards
GREENWICH

1 - 10 kilo-meter	:	1 : 63360 map
10 - 45 kilo-meter	:	1 : 253,440 map

thus, the obtained value $\triangle g_0''$ was calculated by the formula

$$\triangle g + F - B + \triangle r_0 + T = \triangle g_0''$$

and was shown in the appendix table-1.

4-4 Interpretation

4-4-1 Gravity anomaly

In the west side of the survey area, a high gravity anomaly zone is shown, in Arakan Yoma and Pegu Yoma in the east side also shows high gravity anomaly zone.

In the middle zone between the both high gravity anomaly zones, the low gravity anomaly belt is streched from Minbu Tertiary Basin to the spot 18°30' N. Lat. and 95°25' E. Long. along the direction NNW to SSE, forming a gravity basin. As the present area of survey is situated between this gravity low and the gravity high of Arakan Yoma the general trend of gravity anomaly is such that it had a strike of nearly N-S direction and an increase of gravity from east to west.

The result of this prospecting is shown in Fig. Gr-2* by isogal lines with 1 milligal intervals. As seen in this figure, from the lower gravity zone, having its center at 18°30' N. Lat. and 95°25' E_0 Long., and its elongation N-S, the gravity generally increase towards west. The higher gravity zone, stretching in N-S direction, is in accord with the topography of the hills, running towards south from Prome, and disappeare keeping pace with the hills.

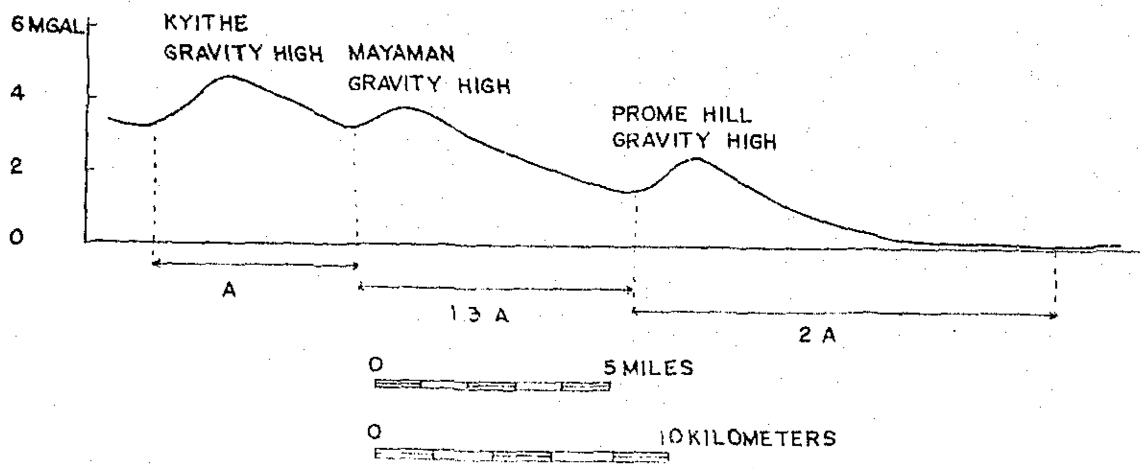
Beyond this south end of hills another small high gravity zone is discovered in Myauaung lying parallel to Prome Hill and these seem to belong to the same group of the high gravity zone ranging from Prome to Myanaung.

On the west part of Prome Hill, there exist a serise of high gravity zone from the west of Shwedaung and Mayaman through Tayckhmaw and another gravity high was found from the east part of Kyithe to Tantabin in the more west part of this region.

These three gravity-high anomalies are quite marked, showing the general tendency that the more western the belt of anomaly is, the higher is the gravity and more complex in distribution.

* I Fig. Gr-2 the gravity anomaly is shown in isogal lines at 0.2 milligal intervals on topographic map of the scale 1:25000.

Fig. GR-3 GRAVITY ANOMALY ON E-W SECTION



The low gravity zones accompaning each of these high gravity zones, lay close to the west side of each high gravity zone, thus as shown in Fig. Gr-3, the shape of gravity-high anomaly is asymmetric and the span of the high gravity belt becomes shorter towards west.

In Fig. Gr-4 showing the residual gravity map, the high and low gravity anomalies are more definite, and the E-W trend was also recognized in addition to the N-S trend in the distribution of gravity. Some of them bent or broke the gravity-high zone of N-S direction. These are schematically shown in the gravity trend map (Fog. Gr-5).

4-4-2 Geological interpretation

From the interpretation of the analysis of gravity profile, along 18°45' N.Lat., in Fig. Gr-6, it is considered that the region from the Bay of Bengal to the west to the Shan Plateau Massives to the east is composed of the large tertiary basin of sediments and also that this large basin is divided into some small sedimentary basins by the raised zones in the Arakan Yoma and the volcanic zone in the Pegu Yoma.

As for the age of formation of the Arakan Yoma opinion is differed. It is, however, assumed that the present uplifted zone was not formed a time, but rising and sinking were worked in turn. It was made up after the middle Miocene, and thus the center of basin gradually moved from west to east that is, initially in the Eocene, the center of basin was situated at the west side of the Arakan Yoma, but at the Oligocene, it was shifted towards east owing to the subsidence of the Arakan Yoma.

During the Miocene epock it was shifted further to the east by the rising of the Arakan Yoma. After then, as the Arakan Yoma was raised higher and higher, the center of the basin kept moving towards east.

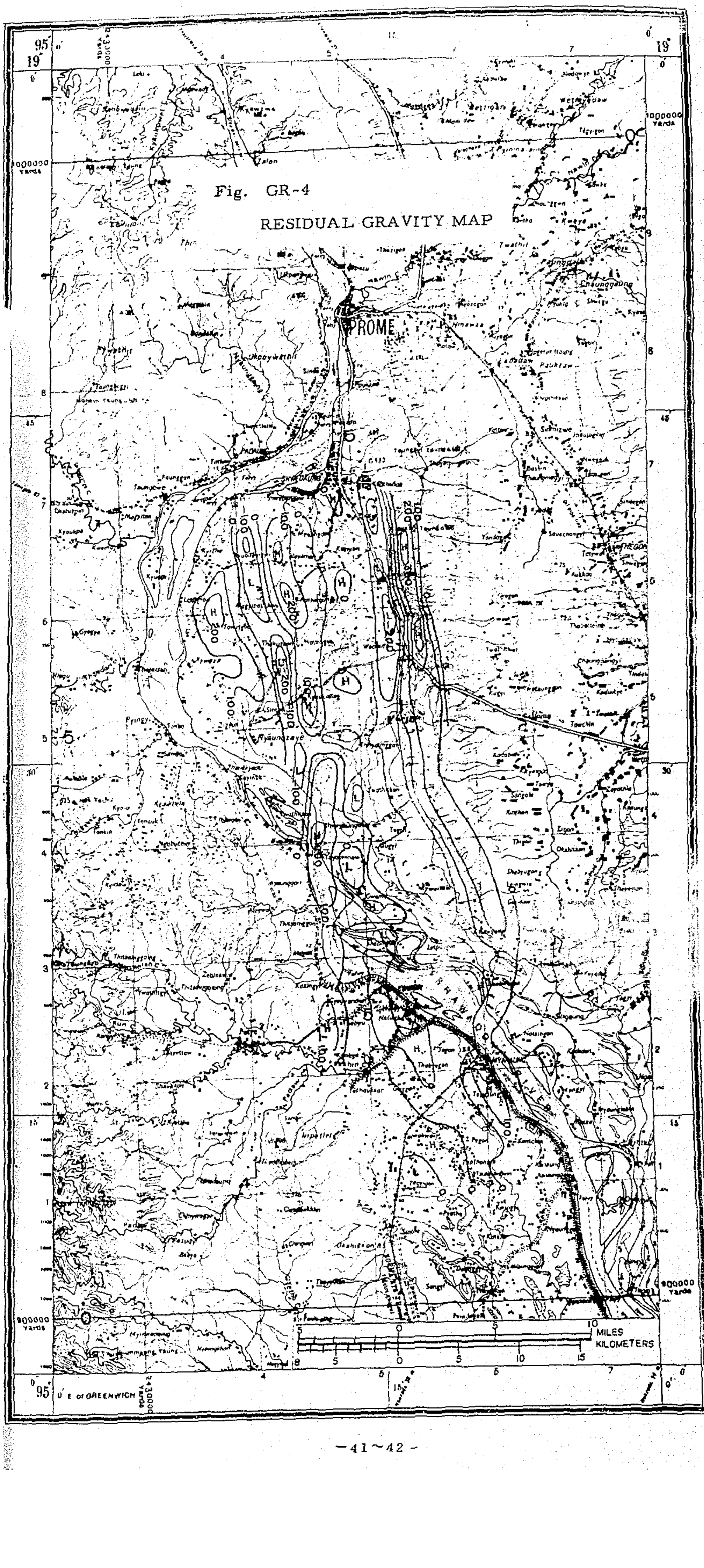


Fig. GR-4
RESIDUAL GRAVITY MAP
PROME
MILES
KILOMETERS

Fig. GR-5

GRAVITY TREND MAP

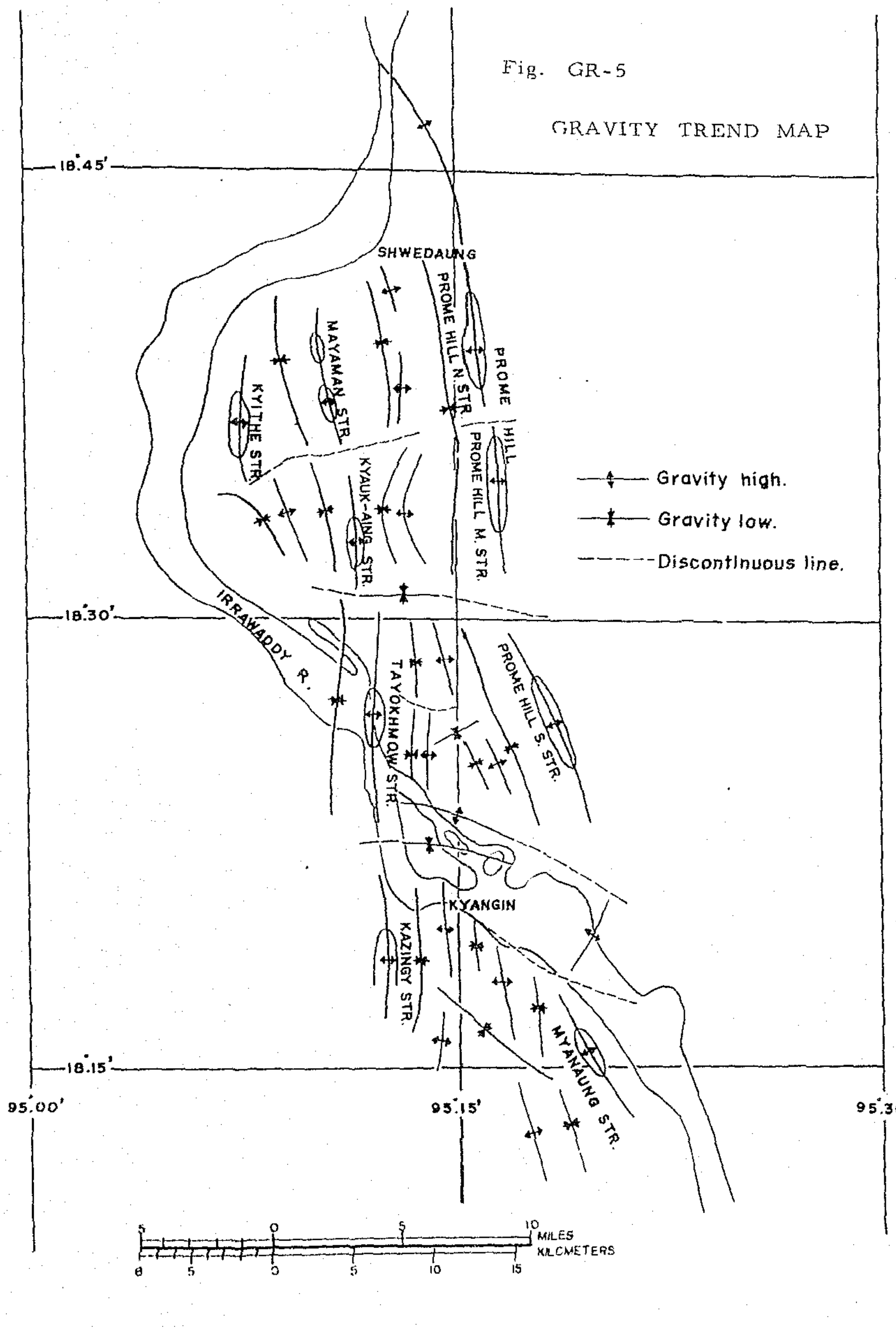


Fig. GR-6 ANALYSIS OF GRAVITY PROFILE ALONG LATITUDE 18°45'
(BY B. O. C. DATA)

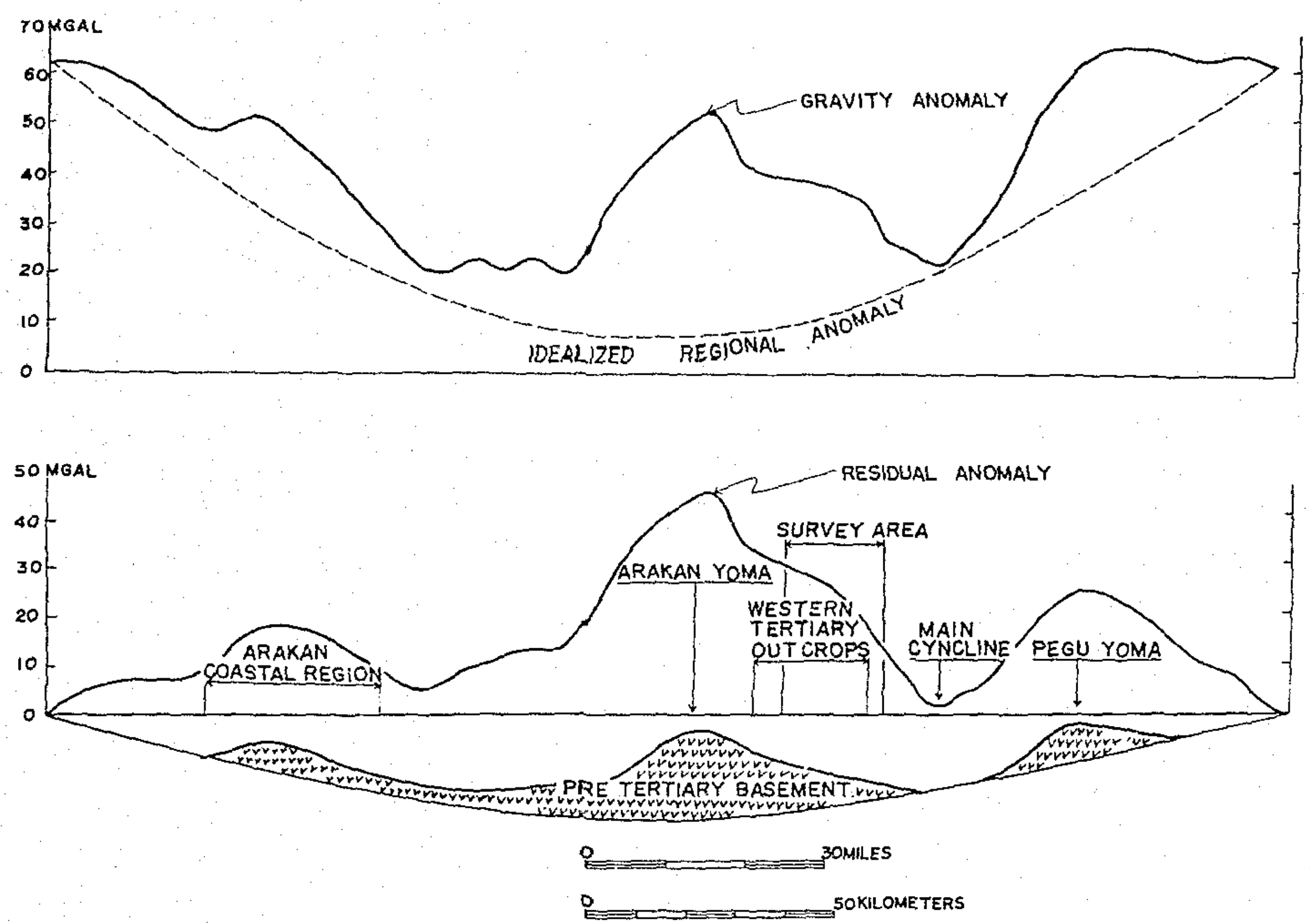


Table GR-1 ROCK DENSITY

Stage / Rock facies / Locality	Eocene		Oligocene				Miocene						Pliocene	
			Padaung clay		Okhmintan sd		Pyawbwe clay		Kyaukkok sd		Obogon		Irrawaddy Series	
	Sd	Md	Sd	Md	Sd	Md	Sd	Md	Sd	Md	Sd	Md		
Kangin Anticline Tantabin Anti-line Akauktaung Syncline Kum Chaung srea Ahlon Chaung area	2.55	2.28	2.51	2.38	2.53	2.12		2.22	2.56	2.13		1.94		
	2.54		2.47	2.26	2.40	2.07		2.00	2.46	2.11		1.92		
	2.14		2.31	2.01	2.25	2.05		1.98	2.31	2.04				
	2.00		2.25	1.93		2.03		1.94	2.28	2.02				
			2.16	1.89		1.99		1.93	2.22	2.00				
				1.82		1.97		1.92		1.98				
				1.80		1.97		1.92		1.94				
						1.96		1.92		1.92				
						1.93		1.90		1.83				
						1.89		1.90						
						1.89		1.89						
						1.88		1.88						
						1.87		1.86						
						1.86		1.86						
						1.85		1.85						
						1.84		1.85						
						1.79		1.84						
						1.75		1.82						
Mean density	2.31	2.28	2.35	2.01	2.39	1.93		1.92	2.37	2.00		1.93		
Tayokhmaw area										2.07		1.82		
										2.06		1.66		
										1.88				
Mean density										2.00		1.74		
Prome hill area											1.72	1.93	2.05	2.10
														1.91
														1.69
Mean density											1.72	1.93	2.05	1.90

Since the begining of the Pliocene, the center of the basin has been moved to the position of the main syncline showing the present low gravity region. As the results, in the main syncline lying in the south of 19° N. Lat., the sediments of Irrawaddy Series grew most thick. From these considerations, the region of the present survey can be considered as one where the Tertiary sediments are well developed in spite of the rather high gravity anomaly as compared with that in the Minbu basin.

(1) Rock density

The natural density of about one hundred of rock samples selected from those collected by the member of geological party, were measured. These results are shown in Table Gr-1. In this table, it was found that fine sediments (shown by Md in table) of Eocene and of Oligocene showed a conspicuous difference in natural density but those of Oligocene and Miocene did not differ each other, the values being about 2.0g/cm^3. As for Pliocene and thereafter, samples available were so few that the natural densities of the fine sediments are difficult to be discussed. From these results, it was assumed that at the begining of Eocene, the sediments of this region were suffered very hard compression by crustal movement, but this phenomenon did not occur in Oligocene.

The medium-grain sediments (shown by Sd in table) showed generally higher values in density than the fine grained sediments, but the densities of medium grain sediments showed no marked difference in rocks of Eocene and Miocene, the values are about 2.35g/cm^3. It suggests that the medium-grained sediments are more resistant to compaction than the fined-grained ones.

Considering from the fact that the medium-grained sediments take the density fairly larger than that of fine-grained sediments (generally the difference being about 0.35), the distribution of gravity anomaly may be influenced by the distribution of sandstone. It is noteworthy that the Kyaukkok Sandstones are mostly consisted of sandstone, while the underlying strata, Pyawbwe Clays, are of mudstone.

The existence of the formation showing such a peculiar density distribution required caution for the analysis of gravity anomalies. As the examples, the gravity profiles to be produced by the several assumed structures are shown in Fig. Gr-7.

(2) Structures

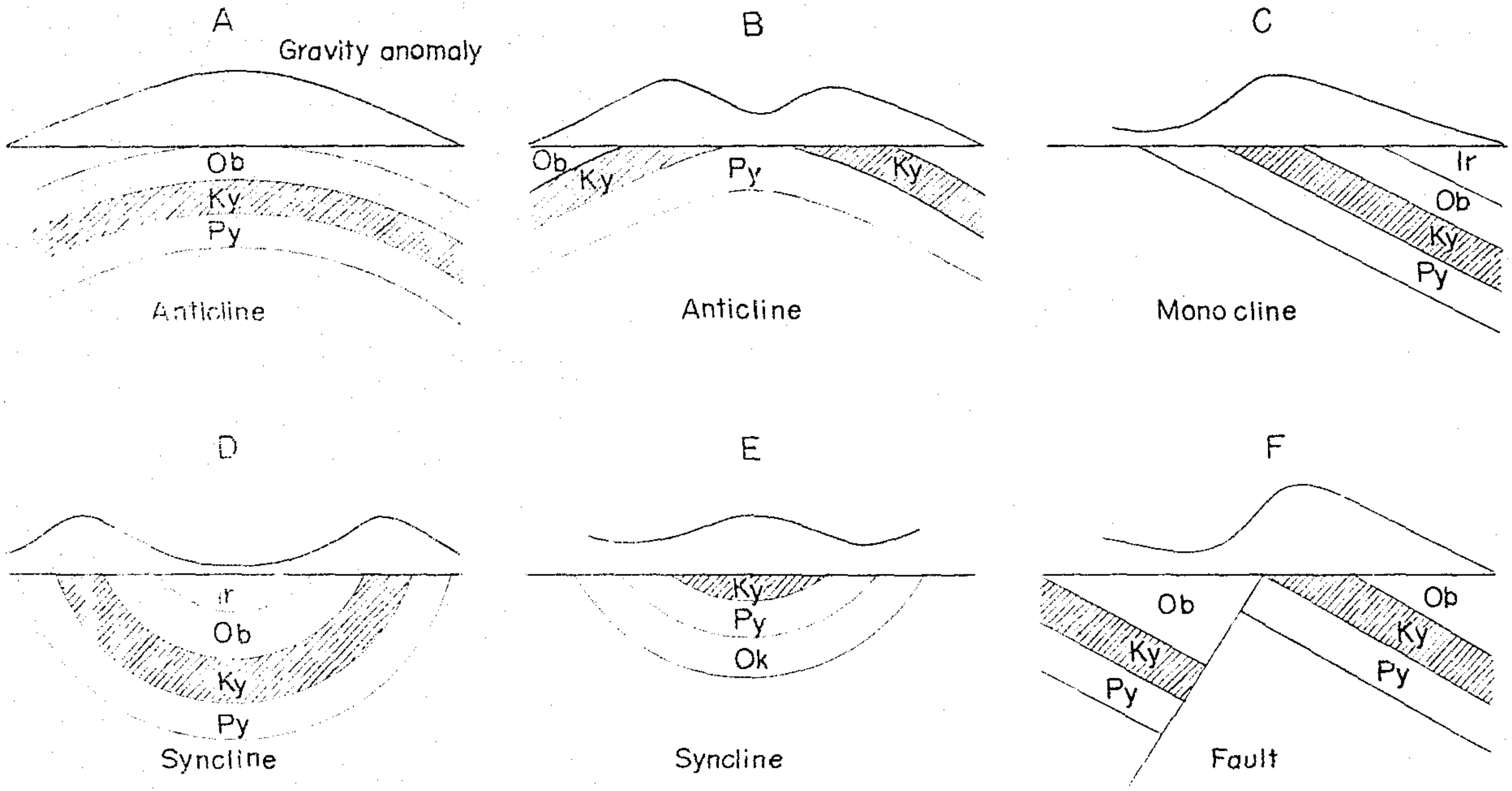
The general tendency of gravity anomalies in the survey region were already mentioned, and the local anomalies as shown in Fig . Gr-4 and Gr-5 were recognized among them. As to a few local gravity anomalies which are considered important some explanations will be given in connection with the geological structure in the followings.

(a) The Prome Hill structural Series.

This structure is expressed as a belt-like zone of high gravity anomaly crossing the Irrawaddy river at the south part

Fig. GR-7

GRAVITY PROFILES PRODUCED BY DIFFERENT STRUCTURE



Ir : IRRAWADDY SERIES. Ob : OBOGON ALTERNATIONS. Ky : KYAUKKOK SANDSTONES. Py : PYAWBWE CLAYS.

of the Prome Hill, extending about 30 miles nearly in N-S direction, and it is in good accordance with the direction of the hills showing the topography indicating the structure. The long high gravity belt can be divided into three parts, that is, the north of 18°41'30" N. Lat., the middle part from 18°41'30" N. Lat. to 18°30' N. Lat. and the south of 18°31' N. Lat.

Near each ends of these parts, the high gravity anomalies turn their trends showing their discontinuity. It is assumed in the geological structure too that these three parts constitute the three independent anticlines. As a rule, the amount of upheaval seems to be larger towards the north, so that in the north part the Kyaukkok Sandstones crops out, and in the central part Obogon Alternations does at the crest of the anticlines, but in the south part, they are covered by the Quarternary stratum. As one goes north, the geological structure will be more complex. On the south structure, it is uncertain, but may probably be divided into two parts if the survey on the east of high gravity region is practiced.

In the Myanaung on the west side of the Irrawaddy river, the direction of the high gravity anomaly is NNW-SSE, resembling to that of the high gravity belt in the south part of the Prome Hills. Henc, it is assumed that this direction is the extension of the Prome Hills structure.

From the result of gravity survey, the scale of this structure is small, about 5 - 6 miles in length, but it is assumed that there is a gentle anticlinal structure in the strata lying below those of the Prome Hills structure. As the surface of this district is covered by the Quarternary sediments, the definite structure is not recognized, but is seemed to lie about 3000 - 4500 feet below that of the Prome Hills.

(b) Structure series in Mayaman and Tayokhmaw

This structural series is shown as a belt of the high gravity from the plain west of Mayaman to the west of Kyangin through Tayokhmaw. This structure is called the Mayaman structure. The north part of this structure is situated on the west plain apart from the hills ranging from Mayaman to its south. Hence, the gravity anomaly here is independent of the structure in contrast to the case with the Prome Hills.

Being in contact with the west of Mayaman structure, a sharp low gravity belt running south from Myoma was recognized, which suggests the existence of a fault in the gravity-low area. In the south part of this structure the narrow belts of gravity-high and gravity-low were recognized in the south of the boundary at 18°36' N.Lat. This gravity anomaly is also suggesting the existence of the fault.

Again, in the south end of this structure at 18°31' N.Lat., the high gravity belt curved showing a discontinuity.

Beyond the south end of this belt lay the Tayokhmaw structure mentioned before. From the Tayokhmaw to the west part of Kyangin, the high gravity belt correspond to the area occupied by the Kyaukkok Sandstones observed always dipping to the east on the surface. The Kyaukkok Sandstones in this district consist mostly of sandstone and the natural density of this rock is about 2.37 g/cm^3.

The substratum of this is the Pyawbwe Clays consisting mostly of clay, the density being only 1.92 g/cm^3 in average. In consequence, in the region where Kyaukkok Sandstones and Pyawbwe Clays exist near the surface, the density difference of the two rocks is as large as 0.45 g/cm^3, so that it is possible to cause a high gravity anomaly having no relation to the structure of anticline. Thus, the high gravity anomaly in this region is conceivable to indicate the near-surface distribution of Kyaukkok Sandstones by the monoclinal structure or fault as shown in Fig, Gr-7 f and c.

But, owing to the Quarternary sediments covered the surface of the structure of the north Mayaman, it is not decided whether the high gravity anomaly is independent of an anticline or a indication of asymmetrical anticline similar to the Prome Hill.

(c) Kyithe structure series

This structure is assumed by the high gravity anomaly, situated on the east side of the bent part of the Irrawaddy River to the west, which was suggesting that the meandering is caused by this structure. This high gravity is apparently a indication of a dome structure, but locally the isogal lines are complex in their distribution on the both north and south parts of the gravity-high.

The south extension of this structure in the outside of this survey area continue to the complex anticlinal series in Tantabin and Kyangin. The north extension is also very complex in the structure on the opposite bank of the Irrawaddy River. From these considerations, this structure is not simple, but is seemed to be a complex structure followed by many faults.

(d) E-W structure

As mentioned above, it is recognized that the series of high gravity belt of the Prome Hill is discontinuous and bending at the three points of 18°37', 18°31' and 18°20' N.Lat.

The similar phenomenon was also found at 18°35', 18°31' and 18°22'30" N.Lat, in the series of Mayaman-Tayokhmaw high gravity belt. On the E-W line connecting these points, the low gravity anomaly trending in E-W direction was recognized (see Figs. Gr-4 and Gr-5). These gravity anomalies are conjectured to imply the existence of the cross fault with E-W direction, but it is not defined whether it is a large simple fault or a group of faults.

In structure series of the Prome Hill, the long anticlinal structure was divided into four independent blocks; the north, the middle; the south and the Myanaung parts by these E-W discontinuities.

4-5 Conclusion

From the view of the results, the conclusive remarks are as follows: It is assumed that each structure series surveyed is more complex than more east series, and in one series the structure became more complex to wards the north. From these considerations, the structure of southeast part of the survey area, i.e., the south part of the Prome Hill and Myanaung are the most important region for the supply of natural gas, but from the stand point of drilling, deep well might be required as these two structure is the deepest structure in the present survey region.

The high gravity region of the Mayaman-Tayokhmow series is supposed to be able to reveal high gravity without any anticline, from the results of measurement of the rock densities.

It is presumed that the Kyithe structure series is probably of the anticlinal structure but is very complex. Besides, if the more speculative view is allowed, the Mayaman high gravity series implies the distribution of Kyaukkok Snadstones of the west wing of the anticline and Kyithe high gravity series is due to the existence of Kyaukkok Sandstones in the west wing of the anticline.

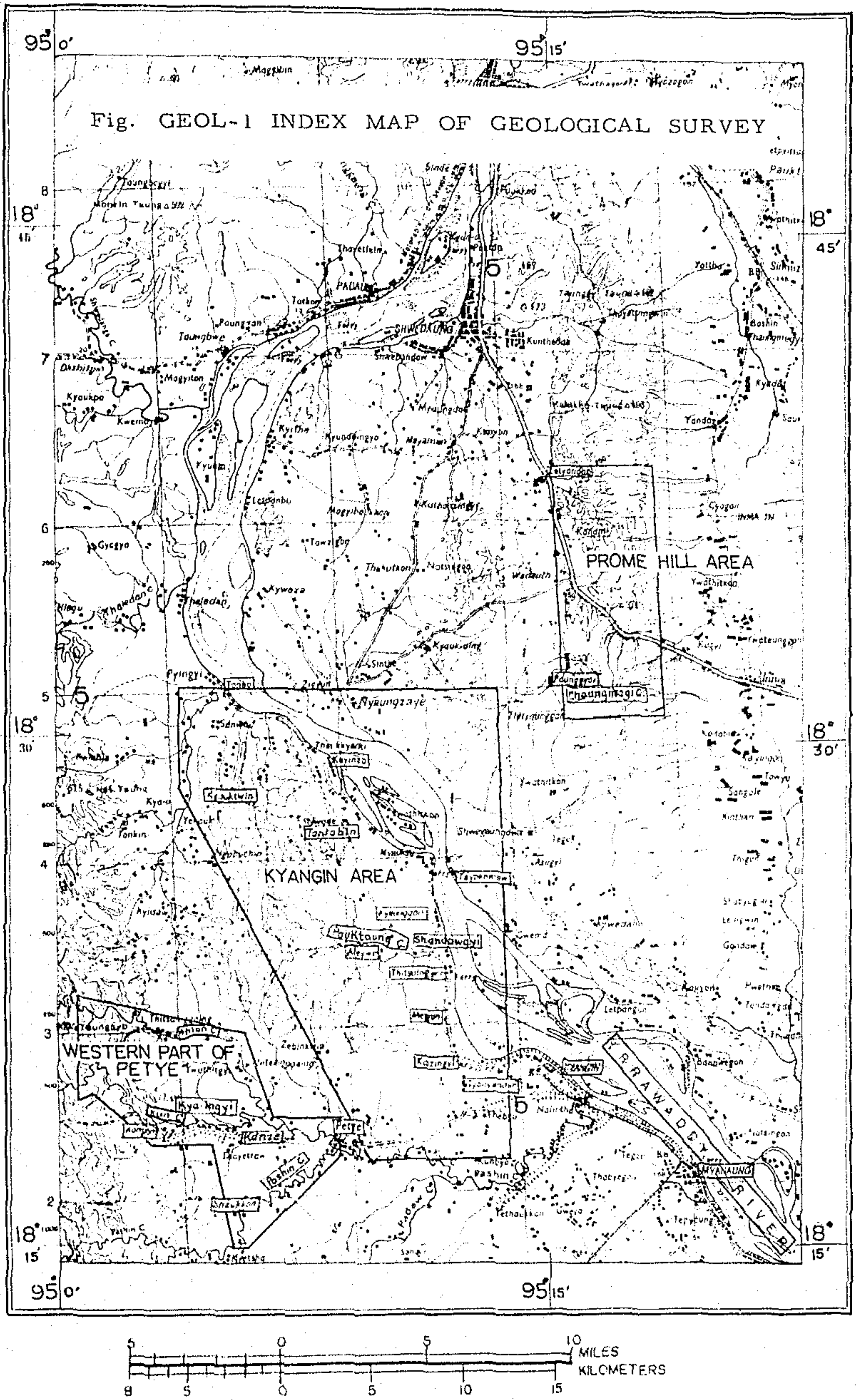
In this case, there may be Pyawbwe Clays,in the low gravity region lying between two gravity-highs from Myoma to the south showing the top of anticline as shown in Fig. Gr-7 B. But also in this case, the top of the anticline is assumed a complex structure combined with the faults. From this reason and the distribution of gravity anomaly in the east of the anticlinal structure of the south Tantabin it will reveal presumably the low gravity anomaly, though the area is outside of the area surveyed.

5. Geological survey

5-1 Introduction

In 48 days from March 5, to April 21, 1963, the surveyed area attained to 57.24 sq. miles and the route length about 34 miles in Kyangin, Tantabin, Tayokhmow and Prome Hill districts. In the period between April 22 and April 27, the indoor work was done in Rangoon (Fig. Geol. -1).

Initially the stratigraphic route-survey and structure areal-survey were planned to be made respectively by two separate parties, but, according to the circumstance on the spot, these two parties took the same activities. By this, the efficient survey was difficult, but the aimed plan was attained finally.


95°0′
95°15′
Fig. GEOL-1 INDEX MAP OF GEOLOGICAL SURVEY
18° 45′
18° 30′
18° 15′
PADAUNG
SHWEDAUNG
PROME HILL AREA
KYANGIN AREA
WESTERN PART OF PETYE
Petye
MYANAUNG
IRRAWADDY RIVER
MILES
KILOMETERS

In the initial project, the stratigraphic survey on the route along the Kawa Chaung on the south west of Tonbo was contained but it was given up owing to the poor public peace. Instead of this plan, the presurvey of the structure of Prome Hill was put into operation, which was revealed by the results of photographic survey.

5-2 Abstract

The scale of the topographic map offered was 1 inch=1 mile (about 1/36000) and 1 inch= 4 miles (about 1/250,000), but these maps were so bad in accuracy that these were considered as improper for practial use, The airphotograph offered by Burma Authorities was useful for geological interpretation, but as the thick woods covered this area it was so difficult to indicate the just point on the airphotograph in the spot, that these photograph was not used for the field geological survey.

Then, at the start, chain survey was brought into operation using a measuring rope and a clinocompass and thus the route map of the scale 1 : 5000 was made up. On the basis of this route map, the geological map (1 : 25000) was drawn up.

On the field geological survey in Prome Hill, the drainage map was used as the topographical map.

The number of the rock samples collected during the survey attained to about 250. These were used for the age determination of the formations by identification of foraminifera which were picked up from the rock samples and some of the mega-fossils were used for the discussion of the age.

The results of the investigation of these fossils were put in order and recorded in the table of the correlation of the formation with the general description of rock facies. The results of the detailed investigation of forminifera will be arranged in another report.

5-3 Geology

The survey of this area had been done by the members of the geological survey of India and of Burma Oil Co., etc, and a part of these data was published by N.L. Chibber (1934), M. Stuart (1912) and H. R. Tainsh (1953), etc.

In this survey, composite geological map with scale 1 inch=4 miles (manufactured by B.O.C.), route map which was assumed to be the fundamental map for above-mentioned geological map and geological report of the Western Outcrops of Lower Burma (1940) by H.A.L. Gevaerts were used as references.

5-3-1 Stratigraphy

The formations in this area can be divided into nine parts as shown in Figs. Geol-6, 11 and 14 of the composite table, among them, few parts can be divided more finely by the character of rock facies. As to the formation of A-C, they are observed only along the route of the stratigraphic survey in the south west of Kyangin, and so the data for discussion of rock facies, etc. are not obtained.

According to the data obtained at Kwinhla in the basin of the Kawa Chaung in the west of Tonbo, it seems that there are no marked changes of rock facies in each formation. The outline of the formation are given from the bottom in the following.

(1) A formation (the base rock)

This base rock is mostly massive hard black mudstone and the part of this rock is slightly thermal-metamorphosed into hornfels by the injection of serpentine.

In the literature of the past, this formation is correlated to Axial Bed or Negrais Group forming the mountain range of Arkan Yoma and this geological age is probably Cretaceous, but any leading fossils of this age are not found in the present survey.

(2) B formation

The boundary between B and A formation is assumed as the fault which is observed in the upper stream of the Kun Chaung. Tracing this boundary on the airphotogeology, a part of this is partly assumed as a fault and the other part is also considered as an unconformity though some parts are left indistinct.

This formation can be divided into two members by the conglomerate (marker-D) in the middle of this formation. The geological age of this formation is not determined on account of no fossil.

a) B_1 member

The rocks are mostly fine to coarse hard sandstone of bluish gray colour containing a great deal of muscovite, and interposing mudstone. Sometimes assumed the alternations of these rocks.

This member contains many fragments of plant and coal, and sometimes these fragments form laminae. No animal fossils including foraminifera are found. The thickness of this formation exceed 1380 feet.

b) B_2 member

The rocks are mostly gray fine-coarse massive sandstone and altered to light brown when weathered.

In the other lithological characters this member is similar to those of B_1 member except that the colour of this member is light bluish gray and the quantity of coal is smaller than B_1 member.

No animal fossils including foraminifera are found. In the lower part of this, the older gravels chiefly of shale and chart etc. increased. This lower conglomerate is easily followed as the key bed, so that it is named marker D, and is assumed to be the base of B_2 member.

In this member either, no foraminifera or other fauna fossils are found. The thickness of this formation is about 1480 feet.

(3) C formation

This formation consists of gray, sometimes greenish-gray massive siltstones and interposes medium - coarse calcareous sandstones containing higher foraminifera such as Nephrolepidina. Though many shell fossils are found, these are usually small and few of them are preserved well enough for determination.

By the determination of the small foraminifera this formation is divided into Globigerina-Haplophragmoides zonule, Plectofrondicularia-Uvigerina zonule, and Ellipsonodosaria-Globigerina zonule from the bottom, and this upper most zonule stepped over to the lower part of E formation. These layers contains a great deal of planktonic foraminifera such as Globigerinoides bisphericus Todd etc..

The direct relation between C and D formations was not observed during the field survey, but the difference of them is very distinct in the features of airphoto-geology and the boundary is assumed to be a fault. It is also backed by the discordance recognized in the boundary between C and B formations on the cross section of the basin of the Kun Chaung. The thickness of this formation attains to 7,020 feet.

Because of the scanty outcrops, this formation is not divided by the field survey, but it is so thick that it can well be divided by the study of the faunal assemblages and characteristic species of the benthonic foraminifera. Besided by the air photogeological survey, it is recognized that formation corresponding to Yaw Stage or Shwezetaw Sandstones on the geological map of B.O.C. extended to the lower part of this formation from the north but the data are so scanty owing to the poor exposure that these facies are treated as one formation.

(4) D formation

The rock facies of this formation is varied. The higher foraminifera including Nephrolepidina and Planorbulinella, etc. are found in this formation which is alternations of fine-grained or coarse-grained calcareous sandstones. The rock facies becomes muddy towards east and south, and also changes into dark grayish mudstone in the districts of Kyangen and Tantabin, and calcareous coarse sandstone or impure limestone are intercalated upper most part of this formation.

It is also found that in the upper layer of this formation, thin sandstone with a thickness of about 0.8 - 1.2 inches is interposed and partialy showes a fine alternation, while in lower layer, there found only dark-grayish mudstone.

In the south west of Kyangin, this formation is formed mostly of grayish mudstone with many massive calcareous nodules often changes into siltstone interposed by thin calcareous fine to medium sandstone of which thickness is about 1 feet - 1 feet 4 inches. This calcareous sandstone thins out at the south of Tonbo, and rock facies are changed between the Tonbo and Kyangin areas.

From the results of the airphotogeological survey, the photo character of this formation and the upper and lower ones can be followed to the south, so these differences in the rock facies are considered as those in the D formation.

Concerning the smaller foraminifera, the Ellipsonodosaria-Globigerina zone continues from the top of the C formation,to the lower half of this formation and the upper half can be divided into Bulimina- Uvigerina zone. As the planktonic foraminifera, Globorotalia fohsi barisanenses Le Roy, Globorotalia mayeri Cushman & Ellisor, etc. are found. Molluscan fossils are also mostly of small kinds in this formation.

The relation between C and D formation can not be recognized in the field, but in the airphotos, the photo-character between C and D formation especially the difference in the drainage pattern is so distinct that this lower mudstone is assumed as the base of D formation and is named marker C.

The thickness of this formation is 1840 - 1940 feet and attains 4040 feet in the axial area of the Kyangin anticline. In this area, it is suspected that D formation may contain a part of C formation in the lower part, or simply increasing the thickness towards westside.

(5) E formation

This formation is mostly composed of mudstone which is assumed as the open sea sediments. In the area of Kyangin and Tantabin, the upper part of this formation is generally light green sandy siltstone interposed by two sheets of calcareous medium - coarse greywacke.

The middle and lower parts of this formation are greenish gray silty mudstone with calcareous dyke of 0.8 - 1.2 inches thickness and sheets of well sorted sandstone of 1 feet - 1 feet 8 inches thickness.

This formation is outcropped distinctly between Kyongon and Tantabin on the banks of the Irrawaddy river, and in the vicinity of Kyongon many vein of calcite are also found. The strike of these vein changes from NE 20° - 30° to EW, generally crossing that of the formation. This structure may be related to the formation of Tantabin Anticline.

In the south west of Kyangin, the rock is light greenish-gray silty mudstone and sometimes changes into siltstone or sandy siltstone with thin layers of very fine - medium sandstone. In this formation, many nodules of marl of various shape and size are found, and in the lower part of this formation, the bamboo-sprout-like nodules of limestone resembling D formation are also found.

Although the difference of rock faciss is not clear, owing to the scanty outcrops, it is assumed that this difference is not so distinct. The thickness of this formation increases towards east and is less in the south-west of Kyangin than in the north-east of Kyangin.

Many mega fossils and micro fossils are found, and the former are as follows: Nucula sp., Cucullaea sp., Barbatia sp., Anadara sp., Pinna sp., Amissiopecten sp., Ostrea sp., Lucina sp., Dinocardium sp., Trachycardium sp., Dosina sp., Chione sp., Thayasira sp., Lucina sp., Paphia sp., Mactra sp., Solen sp., Siliqua sp., Thracia sp., etc. and also contained the higher foraminifera and planktonic foraminifera including Nephrolepidina, Planorbulinella and Globigerinoids bisphericus Todd, etc.

This formation is divided into two zonule of which the lower is Bolivina-Rotalia zonule and the upper Globigerina-Uvigerina zonule. On the lower Ahlon Chaung, calcareous medium coarse sandstone and impure limestone of about 16 feet 8 inches in thickness are found, containing many higher foraminifera such as Nephrolepidina, many littral molluscan fossils as Dentalina and Arca etc. as well as many Briozoa.

In the vicinity of Kyaingyi village along the Kun Chaung, the conglomerate of which thickness is over 8 feet 4 inches(the lower limit being unknown) is found, which contains the older subangular gravels of chart, quartzite and sandstone, etc. This conglomerate as a whole is defined as the base of E formation and is named marker B. This formation is found to be correlatable to the limestone in Sitsayan Clays defined by Stuart and the zoning by micro fossils is also found changed by this formation.

It had been doubtful whether this base implies an unconformity or not. In this survey, however, the decision on the unconformity from the view point of rock facies is very difficult, and no positive data are obtained to define it as unconformity.

In order to solve this difficulty, the more detailed survey and paleontological study will be required.

The thickness of this formation is greatly varied, ranging from 870 to 3960 feet.

(6) F formation

This formation is composed of mostly calcareous fine-coarse sandstone with intervening siltstone and sandy siltstone. In the vicinity of Tonbo, this formation is almost of hard calcareous sandstone, but in the south, the intervening siltstone increases and further on the banks of the Pashin Chaung on the south west of Kyangin, and mudstone interposed in part by sandstone is observed. This implied that the grain size decreases towards south.

In the part of calcareous sandstone, the higher foraminifera including Nephrolapidina and Planorbulinella are found and in the siltstone many molluscan fossils are also found.

Besides these, as to the smaller foraminifera, only Rotalia and Elphidium are rarely found.

The part are the coarse sandstone of the lower part of this formation passes rather sharply into the mudstone of E formation is assumed as the base of this F formation.

This formation is 1290 - 2510 feet in thickness.

(7) G formation

This formation is distributed over the axis of Akauktaung Syncline, the north part of Tayokhmow and the axis of Prome Hill Anticline. This formation is fine alternation of fine to medium, well sorted snadstone and mudstone. The colour of them is gray (changing to light brown by weathering).

The change of both rock facies is not made clear, because the route of this survey is very limited. The boundary between F and G formation is gradual but it is decided tentatively at the part of the upper limit of calcareous hard sandstone.

The fossil molluscs are nearly the same as those in F formation, but the frequency of them seems rather smaller.

(8) H formation

In the area of the detailed survey limited area of this formation is only found in the northern part of Tayokhmow, but is distributed broadly in the east-side of the Prome Hill.

This formation is divided into two member of H_1 and H_2, by the cycle of sedimentation, and this division agrees with the result of the geological interpretatinof the aerial photogeological survey. H_1 member corresponds to h_1 subunit of photogeological results and showes four cycles of sedimentation beginning with conglomerates and finisheing in siltstones.

The gravels of conglomerate are veried in size and mostly of subangular ones of chart. The sandstone of this member is the same as the matrix of this conglomerate, having cross bedding and grain size of fine - coarse with light gray colour (changing to light brown with weathering). In this sandstone are involved thin layer of the same lenticular siltstone.

The base of this H_2 member is conglomerate resembling that of H_1 member. The main part of this member is sandstone, the same as that of H_1 member, having interposed lenticular conglomerate and scattered gravels. In parts it is hardened with iron and is found carrying the fragments of silicified wood.

Though no fossil is found during the present survey, according to the references, fossil mammal are to be found in this formation.

An the base of H formation, conglomerate, presumably of the basal one, developes, forming the boundary with G formation. The constituents of H formation such as sandstone, etc. are similar to those of G formation but this formation lacks the calcarecus parts and the marine fossils.

Thus, the mode of sedimentation of this formation is so different from that of the lower formation that it is desired to assume this boundary to be an unconformity or disconformity. The boundary between H_1 and H_2 member is suspected to be disconformable in the part of the surveyed area, but on the air photograph, the opposite boundaries of the two formation running parallel are easily traceable in wide range, the difference of mode of sedimentation between H_1 and H_2 member may be a trifle one, if any.

As this survey is preparatory and limited, the obtained data are not sufficient for the discussion of the problem of disconformity and changes of rock facies. The thickness of H_1 member is 2050 feet and that of H_2 member over 1000 feet and presumably attains to 2000 feet in the plunging part of the anticline.

(9) I formation

This formation is very rough, composed of massive and loose gravels, whose gravels are fine to coarse in size. The gravels are mostly the fist-sized chart whose colour is reddish brown, stained with iron by weathering. The basal plane of this formation is not recognized distinctly, but the amount of gravels increases towards the base of this formation.

From the air-photogeological survey, it is deduced that the upper part of H formation is eroded irregularly, over which I formation is formed. The dip of I formation is smaller than that of H formation tending towards the east. From these facts, it is assumed that the I formation covers H formation unconformably.

This formation forms a flat plane, showing its broad distribution with a gentle dip on the east side of Prome Hill and making a highest terrace.

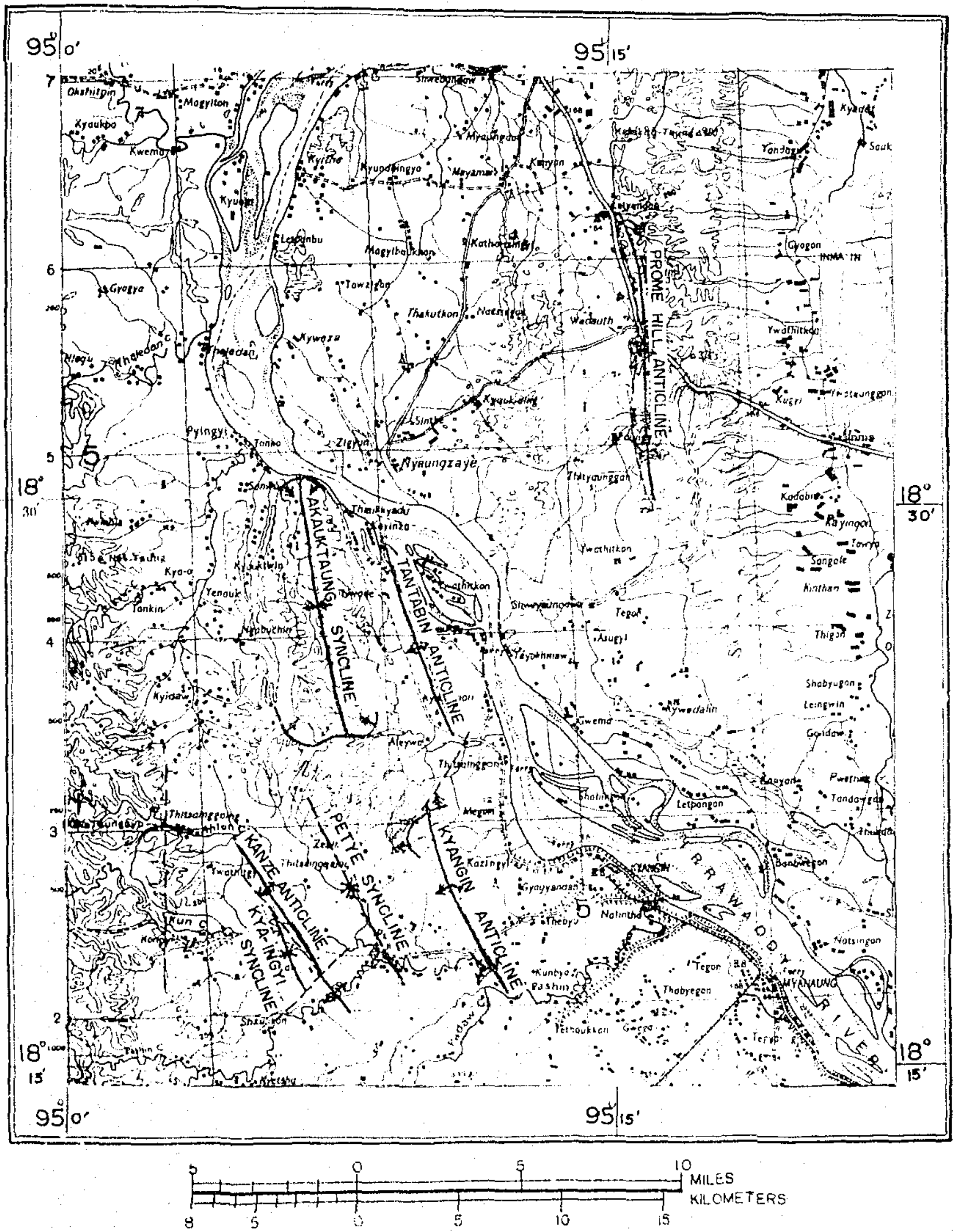
5-3-2 Structure

In the area of this survey, the following structure, shown in Fig. Geol-2, is recognized.

(1) Kanze nose structure

(2) Kyangin anticline

Fig. GEOL-2 STRUCTURE INDEX MAP



(3) *Tantabin anticline*

(4) Prome Hill anticline

(5) Petye syncline

(6) *Akauktaung syncline*

Besides, in the west margin of the area of this survey, the faults which divids base and the Eocene formation and also the formations of Eocene and Oligocene exists, running parallel to the rows of these anticlines and synclines.

(1) The west area of Petye

A syncline is found in the area of B formation and according to the results of geological field survey and photogeological survey, this area is divided into several blocks by faults, showing an aspect very differed from that of the upper formation. On the banks of the Kun Chaung, it is recognized that the boundary between A and B formation is divided by fault. The throw of this fault is considered to be not so large, for a part of the boundary seems to be followed by an unconformity in the air-photogeological survey.

The boundary between B and C formation can not be observed owing to the lack of outcrops, but on the air-photograph, the straight lineation is found between these formation and also the structures of these formation are discordant so that a fault is assumed to exist along this boundary. The throw of this fault is uncertain, but is assumed to be over 3300 feet.

Kanze nose structure

This structure is affirmed to exist near the confluence of the Kun Chaung and the Ahlon Chaung, by the pursuit of the marker-B, and it is also supported by the results of the bio-stratigraphy and the air-photogeological survey.

In the west wing of this structure, the dip of formation is 30° - 70° and somewhat irregular and in the west wing it 30° - 60°, i.e., this structure is steep on the westside and gentle on the eastside. On the banks of the Pashin Chaung to the south, these dip changes abruptly to 85° in the west wing and 60° in the east wing, suggesting the existence of the reverse fault with eastern dip along the axial part of the structure.

In the west of this anticline, Kyaingyi syncline is also easily found topographically by the ridge of the sandstone of F formation. From the results of the air-photogeological survey, this structure is supposed to be divided into many parts by cross faults, but it is not yet defined by the field survey. In the south, this structure continues to the Tondaung anticlines and turns into monoclinal structure in its extension towards the north, so this structure may disappear in the deep under ground and turn into a monoclinal structure.

(2) The area of Tantabin and Kyangin

In this area, the anticlinal structure was surveyed by Stuart and this structure was recorded as the series of anticlinal faults. This structure is formed of two antilines whose axes shows a slight discrepancy in east and west; Tantabin anticline in the north and Kyangin anticline in the south. These anticlines are cut by a fault running east and west along the Pauktan Chaung. It is assumed that these two anticlines are formerly a single anticline, but by a structural movement, the southern half of this anticline slipped off towards the west in the vicinity of the Pauktaung Chaung, forming the constricted part.

Hence, the Tantabin anticline sinks near the Pauktaung Chaung and continues to the Kyangin anticline forming a saddle. The Akauktaung syncline in the west of the Tantabin anticline closes also at the Paudtaung Chang and continues to Petye syncline in the west.

Kyangin anticlinal structure

The N-S length of this structure is about 6 miles and the width of the broad northern part is about 1.9 miles. It is found that the formation has steep dip or overturns and the small faults are developed in the area of this anticlinal axis.

This area is composed mostly of mudstone of presumably D formation which contains the lenticular sandstone. The southern part of this anticline is sinking gradually, while the northern part is spreading to assume a structure suggestive of double anticline, and the end is plunging to form a domic structure having a steep northern dip of 70° - 80°. At the top of this anticline and its extention, three mud-volcanoes are found and it is said that the indication of natural gas has been recognized, but this survey is done in dry season, so that, these indications are not recognized.

Tantabin anticlinal structure

This structure is an anticline running along the Pauktaung Chaung in the southern extention area of Kyangin structure deviating slightly to the east. This structure is only found along the Irrawaddy River from Kyainzu to Tantabin by the reason that this structure is covered broadly by the alluvium of the Irrawaddy River. In this outcrop along this line, the area of anticlinal axis is composed of the sediments of E formation with very complex strike and dip, containing many calcareous nodules and irregularly distributed calcite veins.

Stuart assumed a fault between Pyawbwe formation to the east and Okkmintaung Sandstones to the west of this structure, but according to the present survey, both wings of this anticline are of the same E formation and the dips of both wings are increased towards the top of this anticline. In this area, complexity of the strike and dip of this formation implies the disturbed structure.

As this structure are covered broadly by the alluvium, the structure can not be clarified by the field survey, but from the results of photogeological survey, it is recognized that the lineation is opened towards the south and calmination is observed in the south of Tantabin and in the west of Kyaungon. Besides, along the stream in the west of Kyaungon, the outcrops of D formation with eastern dip are found, it suggest that this structure is rising towards the south.

Considering the complex strike and dip of the formation at the axial part, this Tantabin anticine is supposed to be unfavourable for natural gas.

Akauktaung syncline

This syncline is a smooth structure along the Thayetmyaung Chaung in the west of Tantabin anticline. The northern end of this structure closes at the east of Tonbo, and the southern end also close gently in the vicinity of the Pauktaing Chaung forming a composite syncline. This syncline is surrounded by hills of sandstone of F formation, forming hanging cliffs to reveal a characteristic topography. The faults of this area are considered as occurred during the formation of these structures of anticline and syncline.

These faults have the strikes of NE-SW and along the Panktaing Chang, with almost no throw. Besides, the faults with small throw are also found along the anticlinal axis. Between the west bank and the east bank of the Irrawaddy River is found a gap, which is also presumed from the results of gravimetric survey. This fault is a very large thrust from the east, and its throw is estimated to be 2000 - 4000 feet.

(3) The area of Prome Hill

Prome Hill anticlinal structure

Along Prome Hill which extends southwards from Prome, an anticline has been known. From the results of the photogeological survey also, this structure is confirmed. The length of this structure is about 5 miles in N-S and its width is 2 miles in E-W. The north end is cut by the E-W fault passing through the east of Lepandan village, and the south end is gently plunging in the east of Paunggyok village.

For the preliminary survey to see whether it was worth prospecting or not six to seven routes were selected, and the results stowed that this anticlnal structure had the eastern slope of about 30° and western slope of about 60°, and on the west wing, a reverse fault parallel to the anticlinal axis was assumed, whose throw being assumed as small. By the gravimetric survey too, the slender area of high gravity anomaly extending in N-S direction was found in accordance with the anticline.

As the result, a parallel anticline is assumed, but owing to the roughness of the survey and scantiness of outcrops, the character of the west side faults is not made clear. But it is certain that this fault is a thrust towards the west. The dip of this thrust is not defined, so the cross-section of it is constructed with the consideration of the two cases in which the dip is steep and gentle, but it is desired that the conclusion is left for the results of the next detailed field survey and seismic survey.

This structure is thought to be so highly worthy of further prospecting, that it is desired that this structure will be cleared up by means of the detailed field survey, the seismic survey and drilling for the decision of its stratigraphy and structure.

5-3-3 Age and correlation

From the results of re-examination of the composite geological map of B.O.C. offered by P.M.D.C. and other published references, etc., the correlation as shown in Fig. Geol. 7 is considered, but the relation between typical area and this area is not taken into consideration, owing to the scanty references.

In the middle part of C formation and D.E.F. formation Nephrolepidina, Planorbulinella and Miogypsina, etc. are found, and in the D,E and F formation, many planktonic foraminifera including Globorotalia fohsi barisanensis LeRoy, G. mayeri Cushman and Ellisor, Globigerinoides bisphericus Todd and G. glomerosus Blow,etc. are also found but no Orbulina. Besides, in C formation though planktonic foraminifera are found, number of the samples is few and badly preserved.

From these paleontological data, the age of each formation is determined as follows:

a) The formations under F formation are of the age older than that of the so-colled Orbulina surface 1)

b) The middle and upper parts of C formation, and D,E and F formation, are not differed in the higher and planktonic foraminifera and are correlated to the Globigerinatella insueta zone in Central and South America, especially D, E and F formation are correlated to the upper part of this zone, Globigerinoides bisphericus Subzone.

c) Referring to the planktonic zones on Venezuela which are used as the standard stratigraphy from the present knowledge, the situations of our paleontological samples are as shown in the following tables. From the results of the correlation the age of all the formations from the middle part of C formation to F formation is Aquitanian.

* 1) See the references by Finlay H.J. (1947), Le Roy. W. (1948, 1952), Gloessner M.W. (1954) and Bowen R.N. (1955) etc.

Table 1. Standard biostratigraphy in Venezuela
(By Blow W.H., 1959)

AGE	PLANKTONIC ZONES	
Burdigarian	Globorotaria fohsi Zone	Globorotalia fohsi Zone
		Globorotalia fohsi barisanensis Zone (Orbulina Surface)
Aquitanian	Globigerinatella insueta Zone	Globigerinatella insueta - Globigerinoides bispherica Subzone
		Globigerinatella insueta - Globigerinoides triloba Subzone

d) Besides, on the data by Tainsh, 1950 and ECAFE, 1962, the former opinions on the stratigraphy and age of the Tertiary formation were such as shown in the following table, but this is so differed from the results of the stratigraphy and age obtained by the present survey, that there are many problem awaiting the solution in the future.

Table 2. The stratigraphy and ages of the Tertiary formations in Burma (By Tainsh, 1950, ECAFE, 1962)

General	Time Scale	Local Nomenclature	
Pliocene & Upper Miocene		Irrawaddy System	
Upper & Middle Miocene	Vindobonian Burdigarian Aquitanian	Pegu System	Obogon Alternations Kyaukkok Sandstones Pyawbwe Clays & Sandstones
Oligocene	Chattian Ruplian Sannoisian		Okhmintaung Sandstones Radaung Clays Shwezetaw Stage
Eocene	Bartonian Auversian	Upper Eocene	Yaw Stage Pondaung Sandstones
	Lutetian	Middle Eocene	Tabyin Clays
	Cuisian Sparnacian	Lower Eocene	Tilin Sandstones Langshe Sahles with Paunggyi Conglomerate
	Thanetian Montian	Palaeocene	

Namely, if the age of each formation in the standard area is right, the formation correlated to Oligocene as formerly considered, i.e., the most part of Shwezetaw, Padawng and Okhmintaung are lacking in Kyangin distruct.

If the former considerations of the age of these formation are doubtful, what will be the relation of the ages of the formations in Kyangin area and in the standard area ?

We are very emphatic about the necessity of the discussion of these problems. For the plan of prospecting the natural gas, and the precedence of the each area of the survey was to be decided on the grounds of the consideration of historical geology and paleogeography of the Tertiary formations bearing oil and gas after the re-examination of correlation between the formation of the standard area and those of Kyangin area.

5-4 Petroleum geology

5-4-1 The indication of petroleum and natural gas

The detection of the indication of petroleum and natural gas in the areas of Kyangin and Petye was very difficult owing to the dry season.

Knowing that near the junction of the Pashin Chaung and the Irrawaddy River to the south of Kyangin which was outside of the surveyed area, the indication of natural gas had been recognized, the servey was made but in vain. In the vicinity of Kwinhla, about 6.8 miles WSS of Tonbo, some indications of natural gas were recognized. One of these was seepage with stink and slight glittering on the water surface, in the gray silty mudstone of C formation.

The villager told that a few years ago, they got a small quantity of oil with water from the well through the bamboo casing, in the drilling time, but this was filled up in the time of this survey. Besides this, it was said that the oil film arose on the surface of the well water in the village, but it was not defined perhaps owing to its scantiness. In the vicinity of Kwinhla, too, some indications of oil in the same formation were also mentioned, but we had not enough time to survey this area. Mud-volcanos were found in the south west of Shandwgi, in the south east of Aleywa and on the top of hills in the west of Chinmyaun along Kyangin anticline.

The hill composed of the eruptive deposits in the south west of Shandwgi is about 1.5 miles in radius, and has three craters, from which mud have been erupted intermittently, forming mud cones with 9 - 15 feet in radius and 1.5 - 2 feet in height. The eruption of the one in the south east of Aleywa ceased recently, and the crater was not found, the top being flattened out. The radius of this hill attained to 2 miles.

The other one on the hill in the west of the Chimyaung village in the south of the other two is smaller, but it has two or three craters on the flat of the hill ridge from which small quantity of water and combustible gas issues.

Besides these, H. Stuart had pointed out that mud-volcanos were found in the north of Shandaygyi. By photogeologic survey also, probably a crater was perceptible, but the field survey was not done. These mud-volcanos are arranged in a row along the complex part of the crest of Kyangin anticline and also along the faults crossing the axes of it. From these facts, it is assumed that these mud-volcanos erupt through the cracks of these faults.

In the area of the Prome Hill, the indication of petroleum and gas was not found in this survey and no knowledge was obtained, either. As the failure in finding the indication of petroleum and gas was probably due to the dry season, the survey in the wet season would be desired.

5-4-2 Source rock and reservoir

For the appraisal of source rock, the samples of source rock collected in this survey were subjected to liquid chromatographic analysis for Naphtha-bitumen, but, for the limitation in days of survey, Kera-bitumen carbon analyses of these samples were given up.

(1) Method of analysis

By the heated circulating extraction with the mixed, solvent of benzen-alkohl-aceton from the dry purverized samples, the amount of Naphtha-bitumen (T-O-E o/oo) were gotten. These samples were also subjected to the liquid chromatographic analysis in which activated alumina was a carrier and then the ratios of compositions of the saturated hydro-carbon (Ar), the asphalt (As) and the porarizing (Re) material were obtained.

The liquid chromatographic analyses were made by means of the extraction method in which n-hexane, benzen, pyridine, aceton and methanole were adopted as the extraction solvents. For finding the quantity, the weight of the resulting sample was measured after removal of all the solvents by evaporation.

(2) The results of analyses

The results of these analyses are shown in Table 3 and the summary of them are also shown as follows:

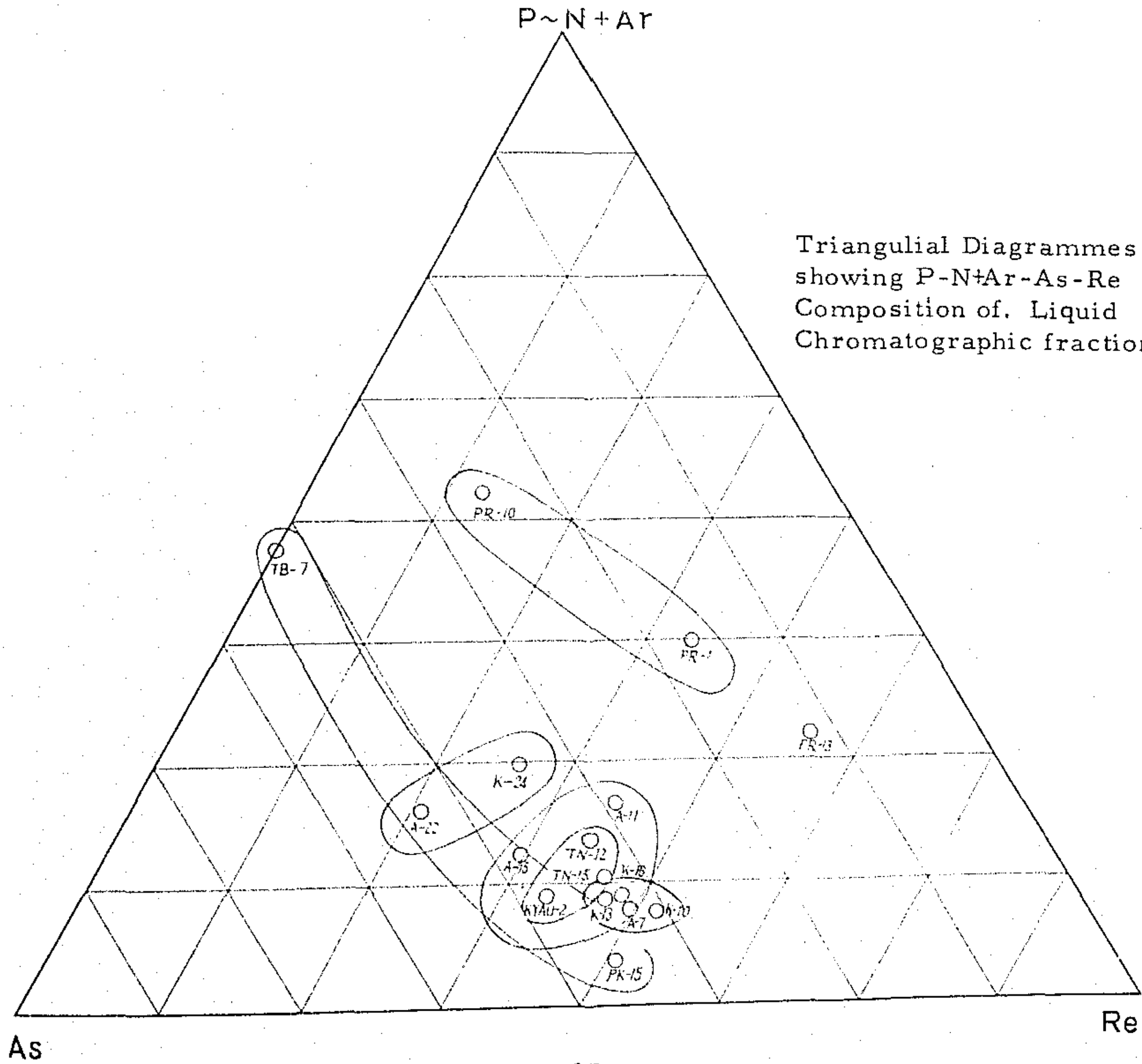
i) The quantities of naphtna-bitumen (T-O-E o/oo) of the samples ranges from 0.11 to 0.55 o/oo. The samples of B,C,D and a part of E formation has relatively high quantities of it, 0.5 ± o/oo, while the other part of E formation, F,G and H formation show the values as low as 0.1 ± o/oo.

ii) The composition ratios of these samples are shown in the triangle diagram in Fig. II. In the diagram, the samples collected from B,C,D and E formation are distributed in the lower central part showing the scantiness of the hydro-carbon components and these formation will be classified as the source rock type, and a part of F formation, and G and H

Table GEOL-3 RESALTS OF LIQUID CHROMATOGRAPY

Sample No	Route	Formation	Description of Rocks	T-O-E (‰)	Chromatographic comosition (%) P - N	Ar	As	Re	Ar / P-N	As / Re	Type of Mother Rock
PR - 13	Prome Hill	H	g. Siltst	0.12	25.5	2.1	14.9	57.5	0.08	0.25	E_1'
PR - 10	〃	G	〃	0.08	34.3	18.6	31.3	15.8	0.55	2.00	E_2'
PR - 1	〃	G	〃	0.12	18.8	18.8	20.8	41.6	1.00	0.50	E_2'
PK - 15	Kyauk San	F	〃	0.12	2.1	2.1	44.7	51.1	1.00	0.88	E_1'
TB - 7	Maungle	F	〃	0.11	37.8	8.9	53.3	0.0	0.24	0.00	E_2'
KYAU-2	Kyaukdwinc	E	〃	0.13	9.4	2.1	47.2	41.3	2.20	2.08	E_1
TN - 15	Tantabin	E	g. Mdst	0.39	6.4	7.0	41.4	45.2	1.10	0.92	D_1'
TN - 12	〃	E	〃	0.50	9.0	8.0	40.2	42.8	0.89	0.94	C_1'
K - 10	Kun C	D	〃	0.55	5.0	4.6	37.9	52.5	0.90	0.72	C_1'
K - 13	〃	D	〃	0.19	10.6	0.0	42.7	46.7	0.00	0.80	D_1'
K - 16	〃	D	〃	0.40	4.4	6.9	40.6	48.1	1.57	0.78	D_1'
A - 7	Ahlon.C	C	〃	0.47	6.4	4.3	40.1	49.2	0.67	0.82	D_1'
A - 11	〃	C	〃	0.36	6.9	13.9	36.1	43.1	2.00	0.84	D_1'
A - 15	〃	C	〃	0.21	11.9	3.6	47.6	36.9	3.00	1.29	D_1
K - 24	Kun. C	B	dk. g. Mdst	0.46	16.2	8.6	42.7	32.5	0.53	1.12	D_1
A - 22	Ahlon.C	B_1	〃	0.19	16.1	4.3	53.8	25.8	0.17	2.08	D_1

Fig. GEOL. -15 Liquid Chromatographic Tri-Composition Diagram.



Triangulial Diagrammes showing P-N+Ar-As-Re Composition of. Liquid Chromatographic fractions.

formation are distributed in the central part of this diagram, which implies the abundance of the components of hydro-carbon showing the reservoir type.

The conclusive remarks connecting the results of the analyses of organic chemistry with the observations in the field survey are as follows:

1) Source rock

As the source rock of oil and gas, the mudstones of C, D and E formation are considerable, but in the B, F, G and H formation no good source rock is found. As for B formation, if the rock facies changes into mudstone in the plain of this region, just as the mudstone facies is found in the west of the Arakan Yoma, this formation may also be classified as the source rock type, but it is not made clear by the results of this survey.

The light greenish gray mudstone of E formation is similar to the core samples of Pyawbwe formation in Chauk oil field in possesion of Rangoon university; hence this mudstone is considered as a good source rock of oil and gas. The mudstones of C and D formation are more black than those of E formation and the former is considered better as source rock of oil and gas than the latter.

From these considerations, the mudstone of this region does not much differ from the source rock of Burma oil field. This means that in this region, the acquisition of oil and natural gas can be well expected. As the oil reservoir, calcareous hard sandstone and limestone of C, D E and F formations seems to be fovourable rocks.

For the F formation, both the calcareous sandstone and intervening loose sandstone are expected as the reservoir. But, the porosity of this calcareous sandstone is less than that of the sandstone, and so the value of the former as oil and gas reservoir is lower than the latter. As for the types of limestone oil or gas reservoir are variable, the estimation of the value of limestone reservoir only from the field observations is very difficult. From the knowledge of the reference, the rock facies of Oligocene and Miocene of this region are more fine than that in the north oil field.

The direction of these development is not clarified in this survey, but the calcareous sandstones interposing in C - E formation are assumed as the seashore sediments considering from the production of higher forminifera, hence it can be expected that these sediments are well developed also in this region.

5-5 Consideration

As above-mentioned, it is defined that the age of the formation of D, E, F extending at least to the middle part of C formation which we have surveyed, is below the so-called Orbulina surface and correlated to Aguitanian. The ages of the formations according to the results of this survey are different from those in the references, the re-examination of the age and the correlation with the formation in the standard district are necessary.

Besides, judging from the investigations of paleogeography and historical geology, the oil-geological estimation of this region must be made to decide the order of survey area, and then the prospecting should be made.

Stuart pointed out that in this region there was very little possibility of the existence of oil and natural gas, because the upper part of Sitsayan Shale was wanting owing to the unconformity at the base of Miocene.

Apart from the problems concerning the age, if the correlation by the B.O.C. is right, in the east of Petye and the west of Kyangin, there is no possibility of the unconformity existing between C, D formation corresponding to Sitsayan Shale and the overlain formation E.

From the results of photogeological survey, it is assumed that the sandstone of D formation is developed in the hills to the south of Tonbo and is gradually changing into mudstone towards the south and west. It is considered that this boundary is not an unconformity and is attributed to the phase transition. Considering these conditions, the inference of unconformity is based on the change of the rock facies.

In this region, calcareous hard sandstone and loose fine sandstone of F formation are developed; especially the latter appeared to be a good reservoir rock to the naked eye.

As for the source rock, the mudstone of C, D and E formation is also developed. The mudstone of E formation in this district is quite similar to the core samples of Pyawbwe formation in Chauk Oil Field in possession of Rangoon university. Besides, from the results of the observation with the naked eye and the chemical analyses of the organic materials, the rocks are not be non-petroliferous as mentioned by Stuart. The mudstones of C and D formation are more black than those of E sormation and the rocks are fit to the source rock from the results of the organic analysis.

Summarizing the above-mentioned results, there are enough possibility of the development of oil and natural gas in the structure with C, D and E formation as the source rock and the sandstone of D formation and F formation as the reservoirs. As promissing structures, Kyangin, Tantabin and Prome Hill anticlines were found.

The both wings of the Kyangin anticline are steep and in the top of this structure, there are some faults and fissures. The mud-volcanos with the spouting of combustible gas along these fissures and faults are found. These volcanos are found in the northern part and southern part of the calmination of Kyangin structure, at least parts of the structures preserving oil and gas in this anticline are destroyed in high possibility. Besides, in the axial part of this anticline, the formation near the lower part of D formation is outcropped, hence there are little possibility of the existence of oil under the ground.

In the Tantabin anticline, for the scanty outcrops of rocks the structure is difficult to define. Judging from the results of photogeological survey the culmination of it is situated in the south of Tantabin, and in the northern sinking part of it, at the outcrops on the banks of the Irrawaddy river, a very complex structure is observed, sugesting the structure originated in the folding. From these considerations, it is assumed that this culmination is not stable.

The Prome Hill anticline, in which the E formation outcrops along the Irrawaddy river and D formation on the top of the calmination is thought to be nearly a stable anticline with the western steep wing and eastern wing of the gentle slope, notwithstanding the western wing of it being cut by a fault.

And as the result of the photogeologic interpretation, the fault is considered to have a small throw and the structure is such as shown as case 1, in the sectional Figure. But as the general tendency seen in the oil field in the middle Burma, faults in such structure may have a gentle slope and increasing throw in the depths, and in that case, this structure is also assumed as the Case II in the Section.

As the outcrops on the axial part of the anticline are G formation, it is considered that F, D and C formation may be the possible oil bearing formations. More detailed field survey, seismic survey, and drilling for the investigation of stratigraphy and structure are also necessary to decide these problems.

Judging from the results of the gravimetric survey, in the east Prome Hill, there is the area of large low-gravity anomaly ranging from the west of the oil field in the north to the delta region of the estuary of the Irrawaddy river. This low-gravity anomaly area is probably the main part of the basin of the Tertiary deposits.

The former oil fields developed in the east of this basin. The surveyed area is situated in the middle part between this gravity anomaly area and the Arakan Yoma to the west and this area suffered apretty hard structural movement. The magnitude of this movement gradually diminishes towards the east followed by the more stable structure. Judging from these facts, the Prome hill structure is the most promissing for the production of oil and natural gas.

In Tondaung anticline, the indication of oil is known from the past, and in the village of Kwinla in the west of Tombo, and also on the Kyangin anticline mud-volcanos the indication of oil is found in this survey. If the structure is favourable, there would be sufficient possibility of producing petroleum and natural gas.

5-6 Conclusion

The Kyangin and Tantabin anticlines aimed in this survey diminished in the merit of survey for petroleum and gas owing to the structure and the vacancy of the formation.

From the results of the primary survey of the structure and the stratigraphy it is assumed that the area of Prome Hill anticline is worth while exprolation for petroleum and gas in this region. But as the fault is found running parallel to the axis of the anticline in the western wing and another doubtful points existed, the decision must be done after clarifying these points.

For the solution of these problems, the detailed survey and seismic survey should be quickly done as well as drilling for the investigation of stratigraphy and structure.

From the results of this survey, it is considered that D, E and F formation and at least middle and upper part of C formation are to be correlated to Aguitanian by Below W. H (1959), being different from the former knowledge so that more detailed investigation would be needed.

The paleontological study is also desired for the same purpose. It would finally be the most economic process to proceed to prospect in consideration of the order of preference of the structures or areas to be surveyed in Burma, based on the results of the historical-geological and paleogeographical investigations.


95° 05'
95° 10'
95° 15'
18° 30'
18° 25'
85 N/2
85 N/3
Tonba
Nyaungzaye
Sinywa
Myoungle
Thayetmyaung c.
Kayinzu
IRRAWADDY RIVER
Kyaukton c.
Thayettabin
Twinbye c.
Twinbye
Aungbangon
Tantabin
Akauktaung Syncline
Tantabin Anticline
Yewingyi
Tayokhmaw
Kyaunggon
A
D
C
D
E
F
G
H

Fig. GEOL-3

GEOLOGICAL MAP (KYANGIN AREA)

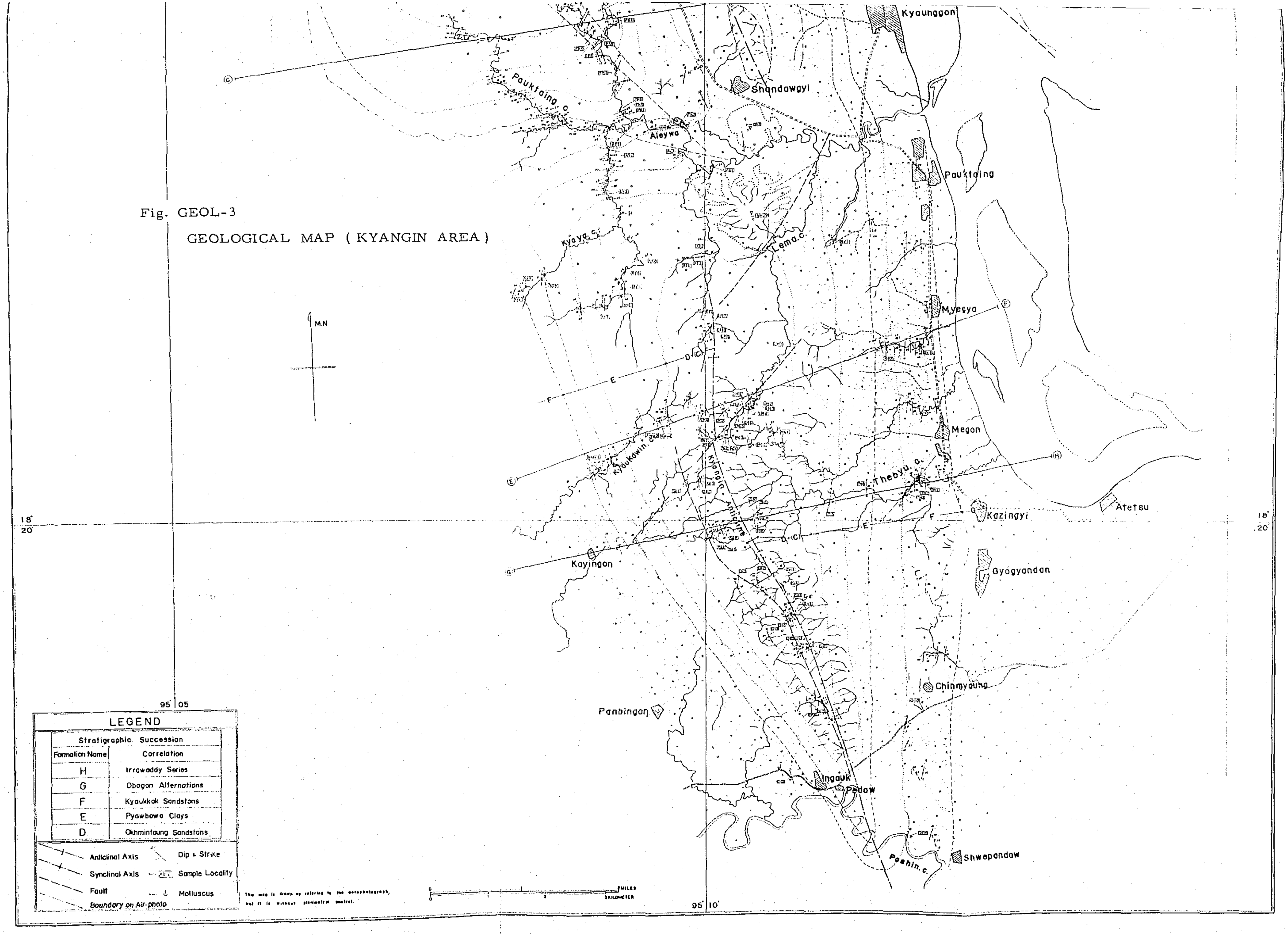


Fig. GEOL-4 GEOLOGIC SECTION (1) (KYANGIN AREA)

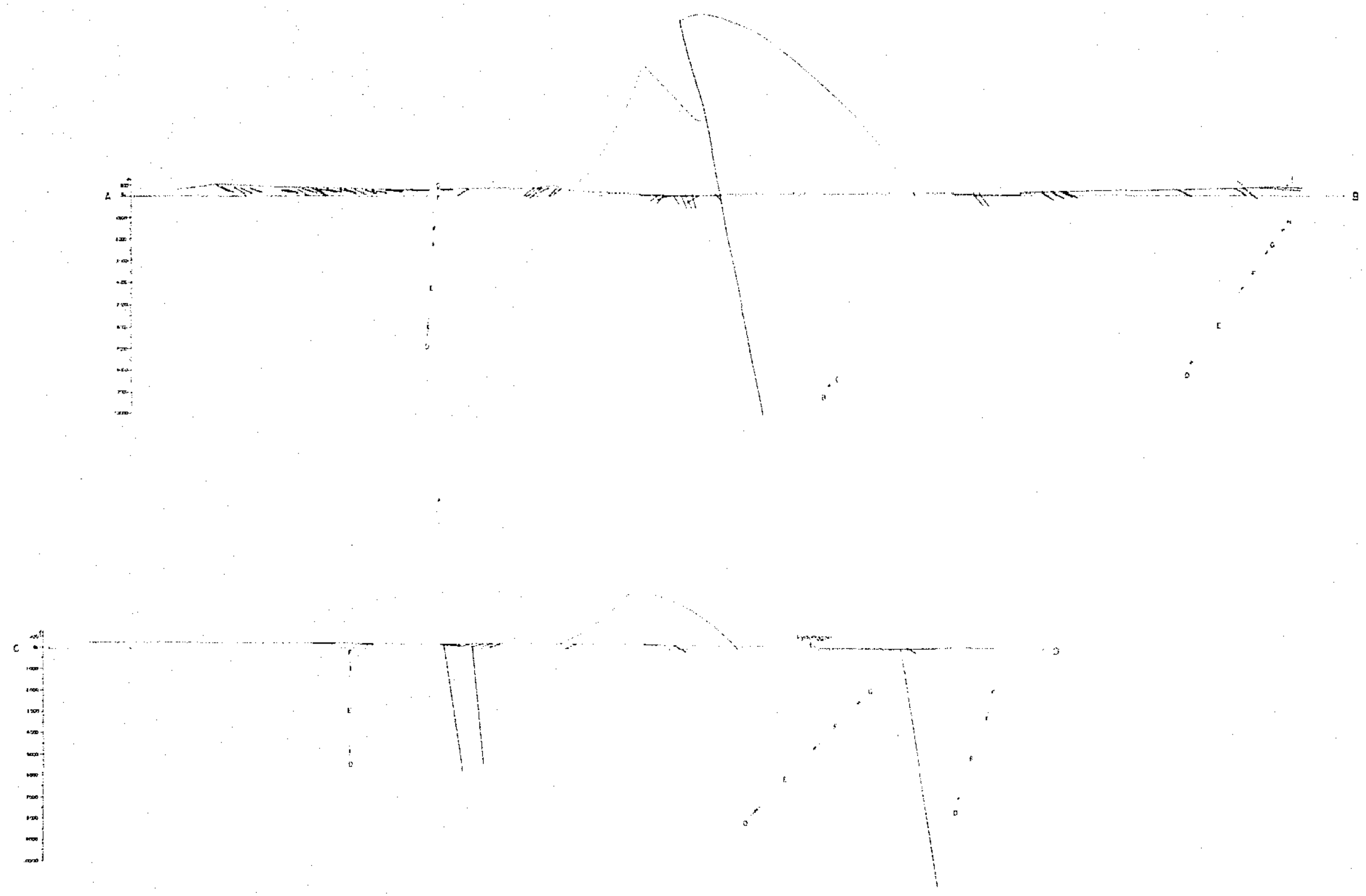


Fig. GEOL-5 GEOLOGIC SECTION (II) (KYANGIN AREA)

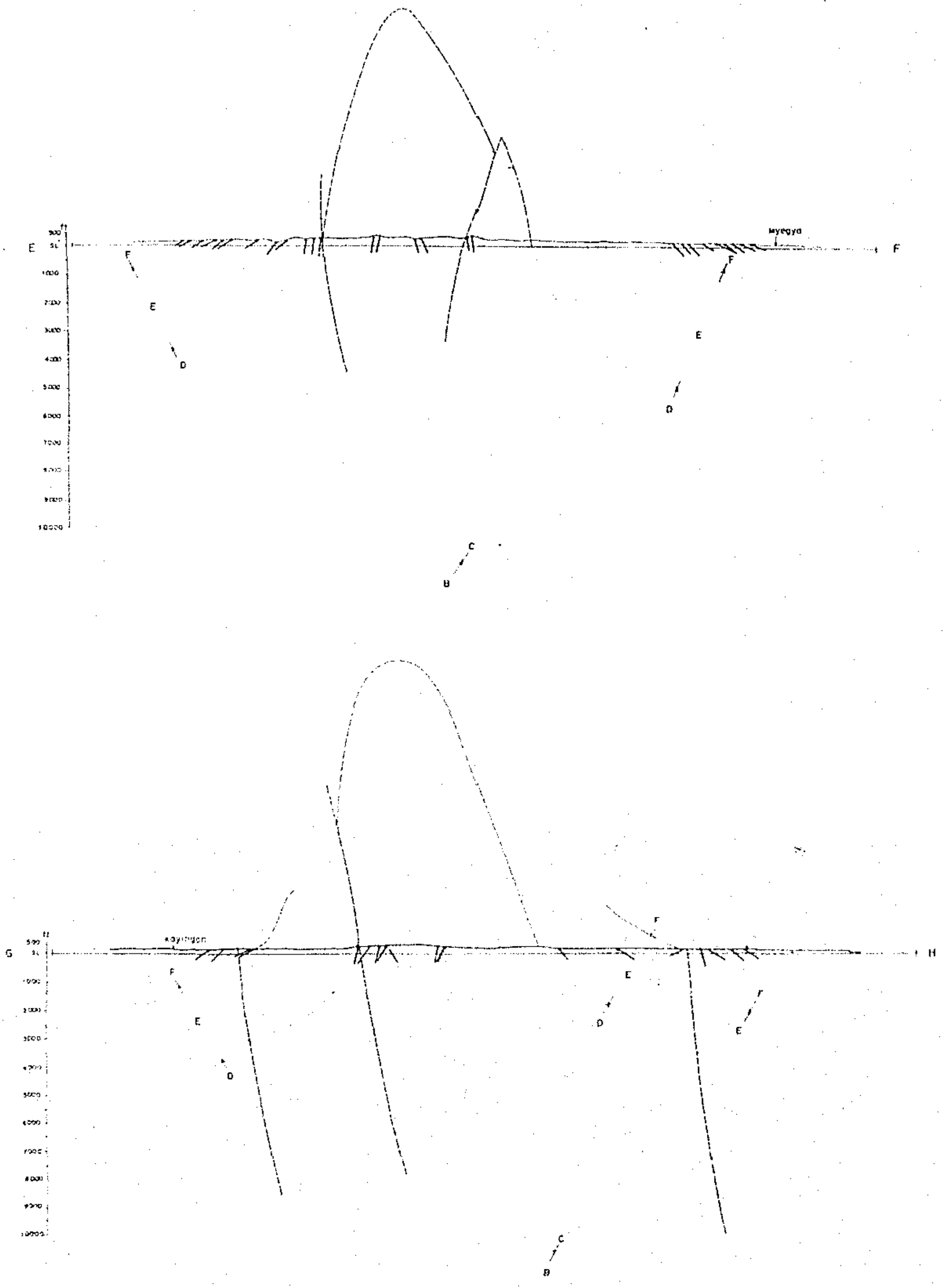
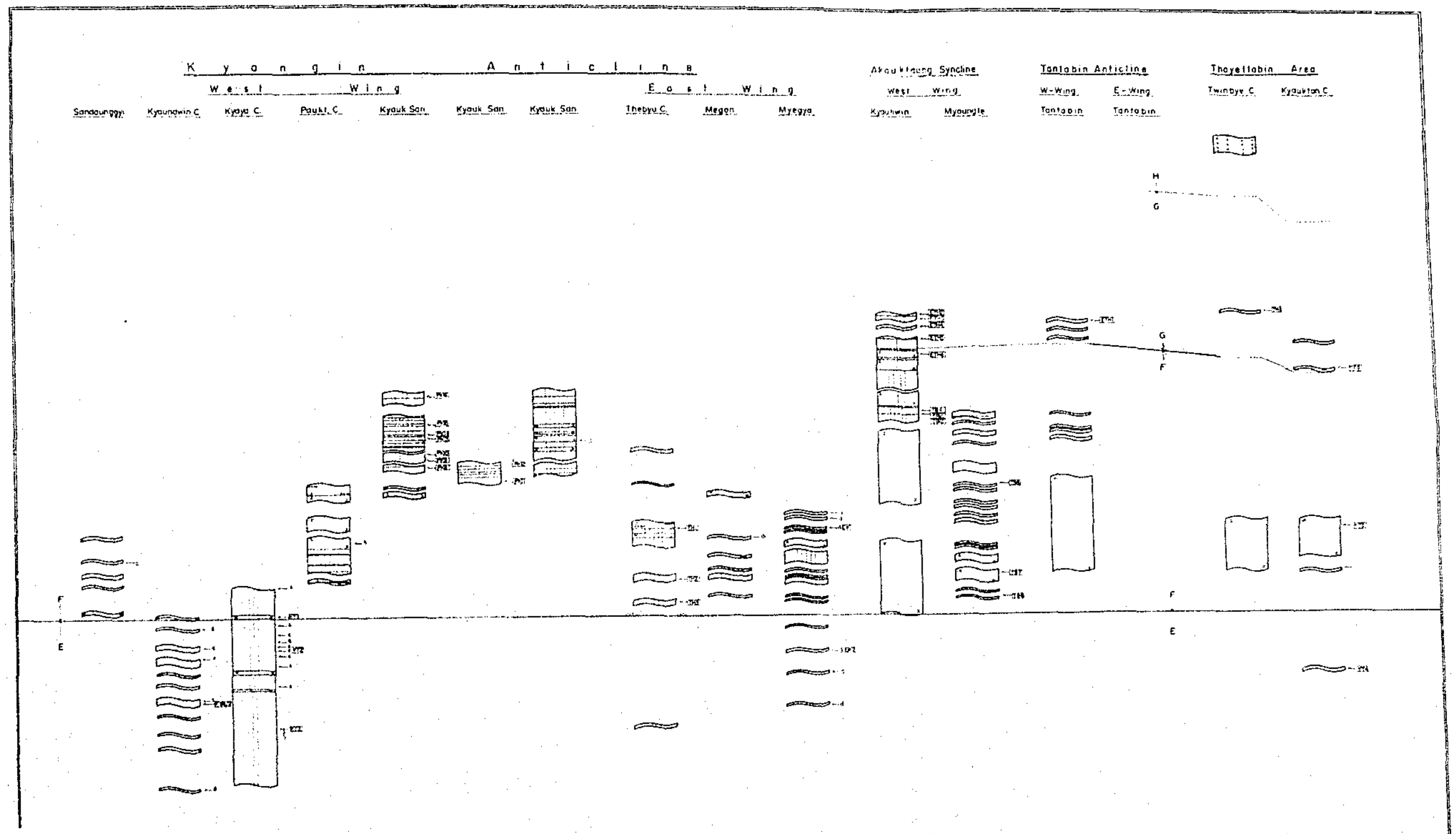


Fig. GEOL-6 COLUMNER SECTION (KYANGIN AREA)



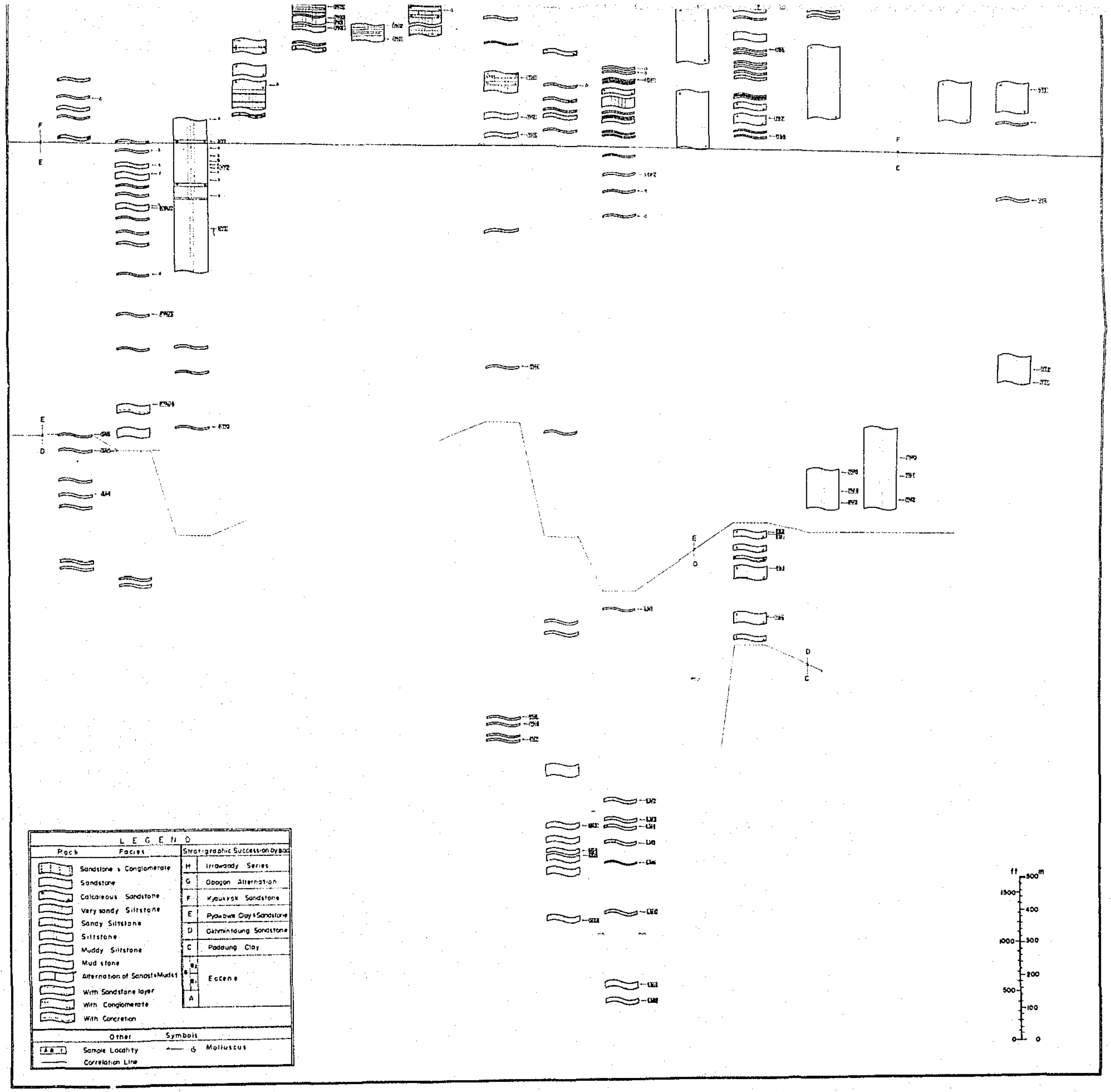
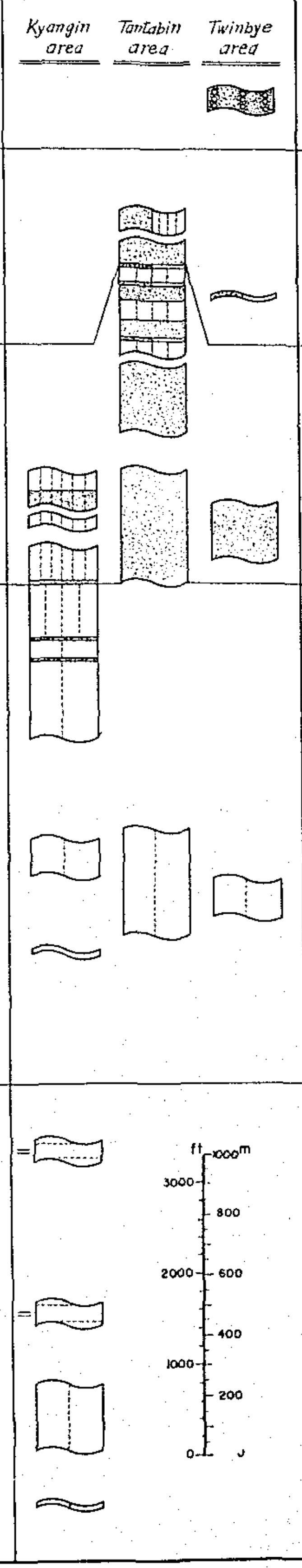

LEGEND
Rock Facies
Sandstone & Conglomerate
Sandstone
Calcareous Sandstone
Very sandy Siltstone
Sandy Siltstone
Siltstone
Muddy Siltstone
Mud stone
Alternation of Sandst & Mudst
With Sandstone layer
With Conglomerate
With Concretion
Stratigraphic Succession by
H Irrawaddy Series
G Obogon Alternation
F Kyaukkok Sandstone
E Pyawbwe Clay & Sandstone
D Okhmintaung Sandstone
C Padaung Clay
B A Eocene
Other Symbols
Sample Locality
Correlation Line
Molluscus
ft m
1500
1000
500
0
500
400
300
200
100
0
F E
E D
D C

Fig. GEOL-7 DESCRIPTION TABLE (KYANGIN AREA)



Formation Name	Standard Columnar Section	Thickness in feet	Thickness in meter	Lithologic Character: main Lithofacies	Lithologic Character: Lithology	Lithologic Character: Lithofacies	Lithologic Character: Character of Formation Boundary	Lithologic Character: Reservoir Rock and Source Rock	Main Fossils: Macro Fossils	Main Fossils: Micro Fossils: Biostratigraphy	Main Fossils: Micro Fossils: Faunal Assemblages	M. Stuart (1911)	B. O. C.
H		462+	140+	Sandstone Siltstone Conglomerte	H formation consists of white, massive, medium graded sandstone, light grey siltstone and pebbly conglomerete. These sandstone beds have large thickness. Sometimes they amount to 30m in thickness. Conglomerate is oftenly ferruginous and hard, and it has about 30cm ~ 5m in thickness.	For the distribution on this formation is very small in this area, so can not be distinguished the variation of rock facies.	Conformity			N F		Irrawaddy Series	Irrawaddy Series
G		660 ~ 1,320	200 ~ 400	Alternation of sandstone & siltstone	Alternation of grading, brownish yellow sandstone and grey sandy siltston is common facies of this formation. Sometimes they make thin alternation, cycle is about 2 ~ 3 cm.	This formation developes in two area such as Tayokhmaw monoclinal area and Akauktaung synclinal area. Comparing these two areas the former strata is thin alternation of sandy siltstone & fine sandstone while the latter strata is very variable like as thin alternation to sandy siltstone.	Conformity			NF - RF		Pegu System; Akauktaung Series	Obogon Alternations
F		1,290 ~ 2,510	390 ~ 760	Calcareous sand stone with siltstone and sandy siltstone	This formation has thick calcareous hard sandstone, yellow, medium ~ coarse soft sandstone and interbedded grey sandy siltstone beds. In siltstone, molluscan fossils with bivalve shells occur but in sandstone, they occur as bed with thickness of 1m ~ 50cm. They are commonly bivalve. Topographically, F formation makes steeper and higher hills, then it can be easily found on air-Photographs	In the northern part of this area this formation consists almost of so-called calcareous sandstone, while in the southern part lithofacies is much changeable. But generally the latter strata is increasing siltstone content to compare with former one.	Conformity	Reservoir rock:— Calcareous sandstone has less porosity than soft sandstone. Soft one is good reservoir rock in this formation. Source rock:— No suitable rock for source rock.	Nucula sp, Chione sp, Cuculaea sp, Paphia sp, Barbatia sp, Mactra sp, Anadara sp, Solen sp, Pinna sp, Siliqua sp, Amissiopecten, Thracia sp, Ostrea sp, Lucina sp, Pinocarclium sp, Trachycardium sp, Dosinia sp	Rotalia-Elphidium Zonule	Elphidium, Rotalia, Globigerinidae Globorotalia foisibarisanensis LeRoy Globorotalia mayeri Cushman & Ellisor Globigerinoides bisphericus Todd Nephrolepidina Planorbalinella larvata		Kyaukkok Sandstones
E		2,640 ~ 3,960	800 ~ 1,200	Upper Part:— Sandy siltstone Middle ~ Lower Part:— Mudstone sometimes interbedded coarse sandstone	Upper part of this formation is represented by pale green sandy siltstone facies intercalating two sandstone beds. These sandstone beds are hard, medium ~ coarse dirty sandstones. Lower part under these sandstones consists of greenish grey silty mudstone. Sometimes this silty mudstone includes calcareous layers (2 ~ 3cm) and graded sandstone beds (50 ~ 30 cm) Along the Irrawaddy river, from Kyongon to Tantabin, there are good outcropes of this formation. Near the village of Kyongon, some calcareous rock dykes are observed. They have two directions, NE 20 ~ 30 and EW. These directions are oblique to general strike of the formation. They probably due to fault and fissures with Tantabin anticline.		Conformity	Reservoir rock:— This formation includes two kinds of sandstone layers. One type is hard, coarse ~ medium sandstone, Sometimes it appears silicious. Another type is soft and graded one and suitable for reservoir rock. The contuityty of this sandstone is not so good. Source rock:— In Japan, the best source rock is so-called "black shale" or "dark grey mudstone". E formation consists of pale greenish mudstone. Some types of source rocks of Japanese gas and oil fields are very similar to these source rocks.	Thayasira sp Lusina sp	Bolivina-Uvigerina Zonule	Bolivina, Uvigerina, Globigerina Buliminella, Haplophragmoides Miogypsina Planorbulinella larvata Globorotalia fohsi barisanensis LeRoy Globorotalia birnagea Blow Globorotalia mayeri Cushman & Ellisor Globorotalia scitula praescitua Blow Globigerinoides spherials Todd Globigerinoides trilobus (Reuss)		Pyawbwe Clays
D		4040+	1225+	Mudstone with sandstone layer and limestone	This formation mainly consists of dark grey mudstone. At the top of this formation, there are calcareous coarse sandstone and dirty limestone beds. In the upper part, mudstone intercalates thin sandstone layers (2 ~ 3 cm), and it looks as rhythmic alternation. Lower part of this formation consists almost of dark grey mudstone.			Reservoir rock:— At the top of this formation, there are some sandstones and limestones. Sandstones are not calcareous as those of the Kyaukkok Sandstone and some of the Pyawbwe Clays. Distribution of limestones is very local. They contain some porous parts. Source rock:— Dark grey mudstone is main rock facies of this formation. This facies is suitable for source rock.		Buliminella-Globigerina Zonule	Globigerina, Buliminella Uvigevina, Cyclammina, Haplophragmoides Globorotalia fohsi barisanensis Le Roy Globoratalia mayeri Cushman & Ellisor Globigerinoides trilobus (Reuss) Nephrolepidina Planarbulinella larvata	Pegu System; Sitsayan Shales	Okhmintaung (Sand stones)

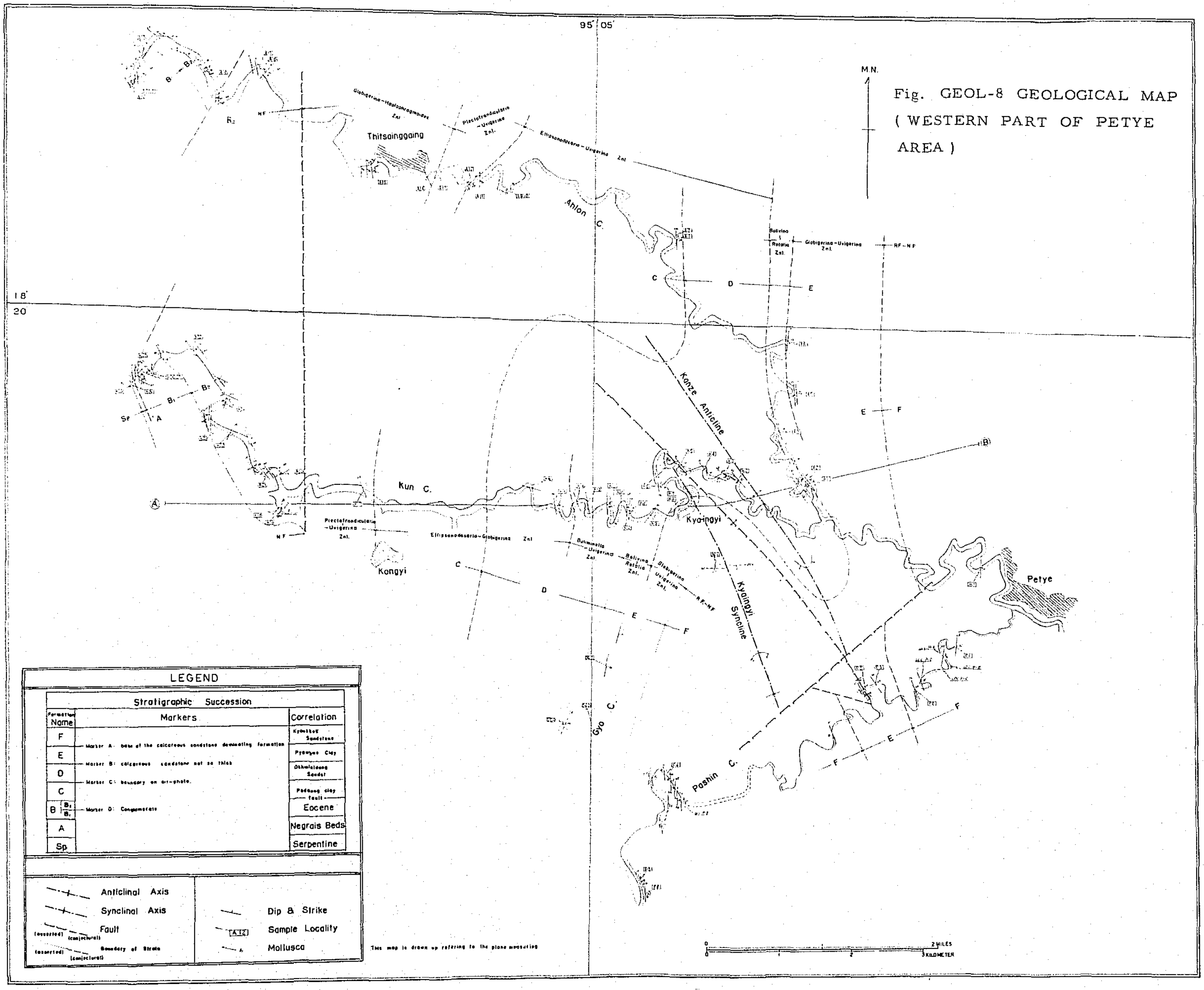


Fig. GEOL-8 GEOLOGICAL MAP
(WESTERN PART OF PETYE
AREA)
M.N.
95° 05'
18°
20
Thitsainggaing
Ahlon C.
Kun C.
Kongyi
Kyaingyi
Kanze Anticline
Kyaingyi Syncline
Gyo C.
Pashin C.
Petye
LEGEND
Stratigraphic Succession
Formation Name
Markers
Correlation
F
E
D
C
B
A
Sp
Eocene
Negrais Beds
Serpentine
Anticlinal Axis
Synclinal Axis
Fault
Dip & Strike
Sample Locality
Mollusca
2 MILES
KILOMETER

Fig. GEOL-9 GEOLOGIC SECTION (WESTERN PART OF PETYE AREA)

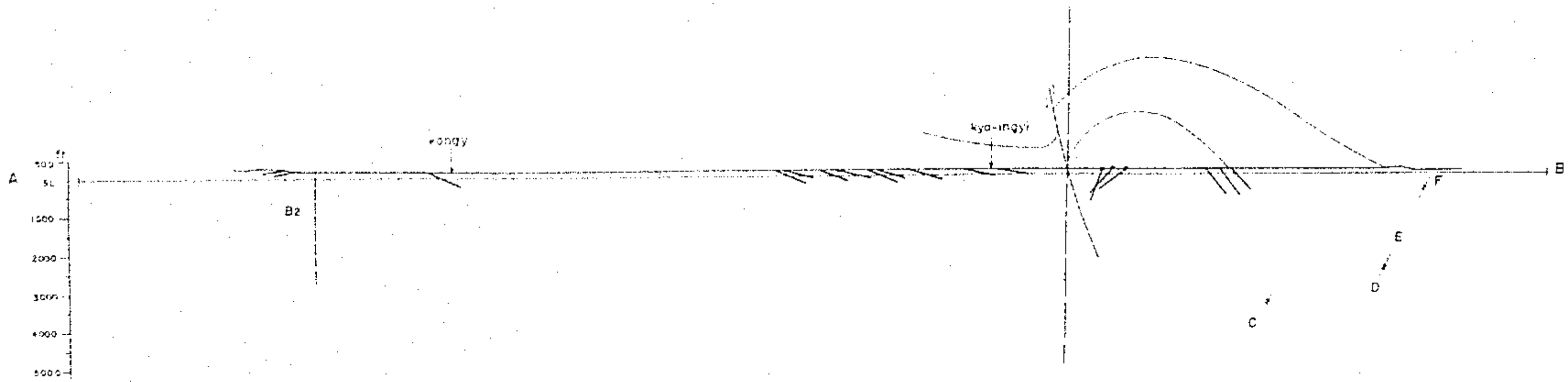
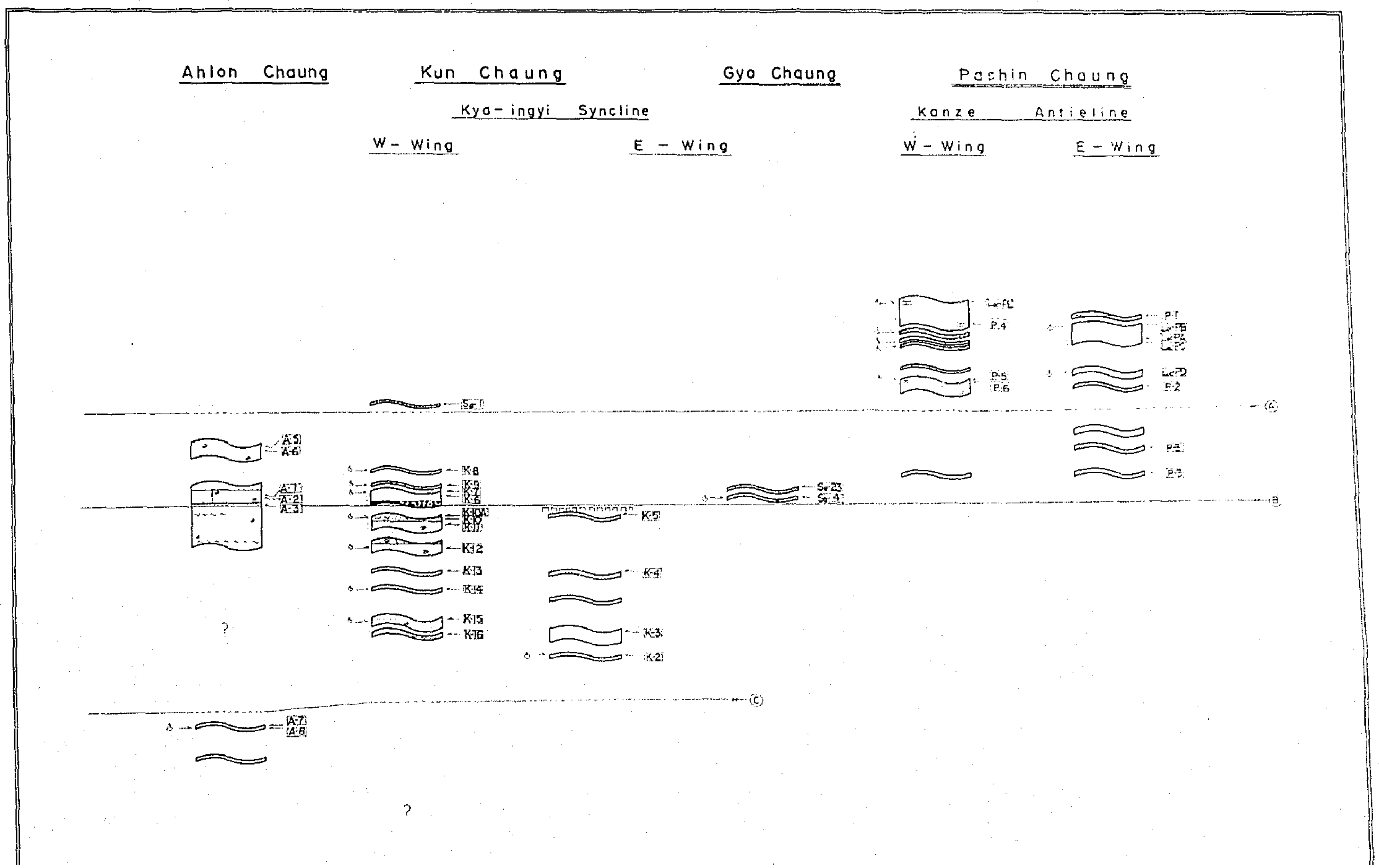
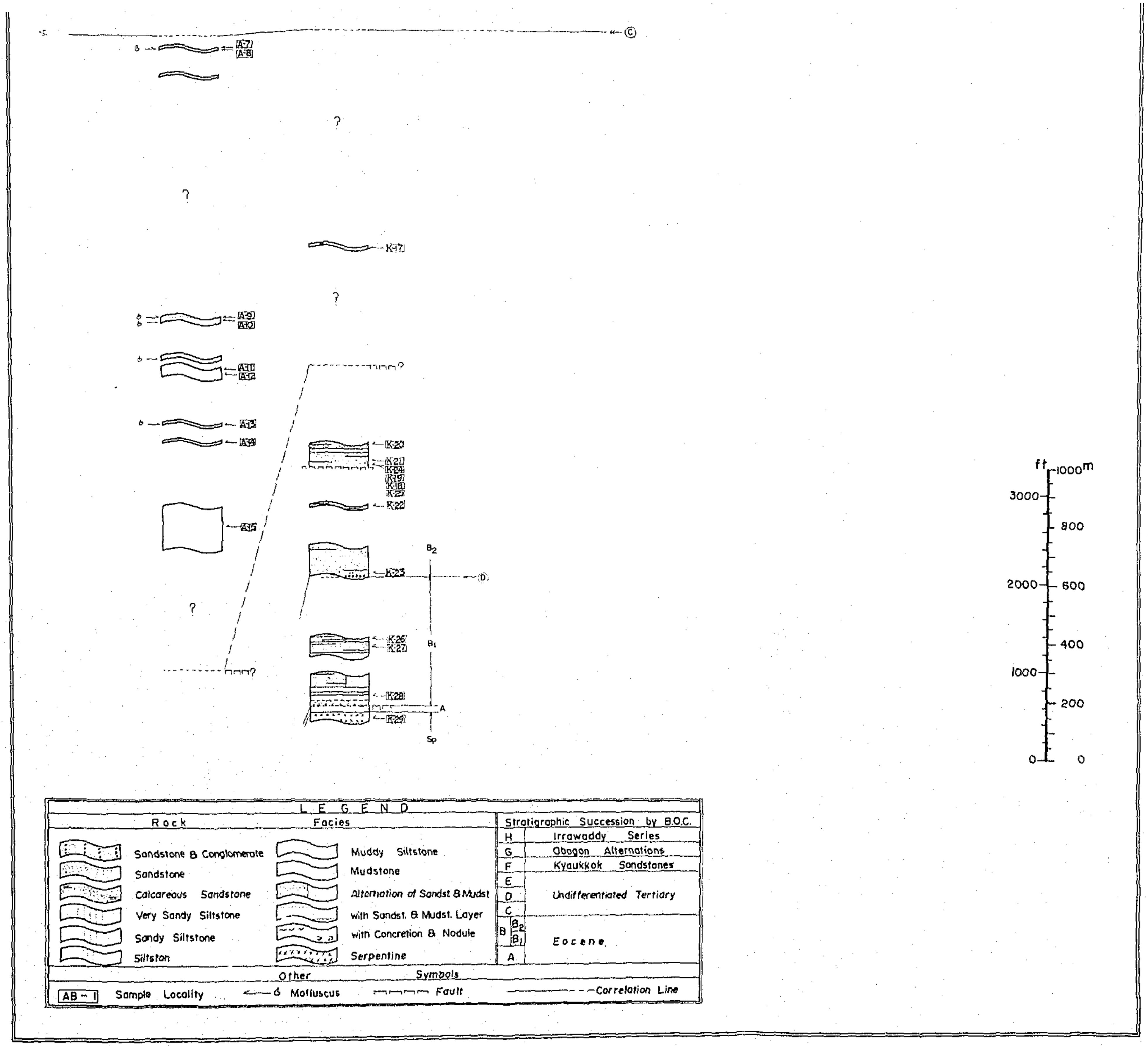


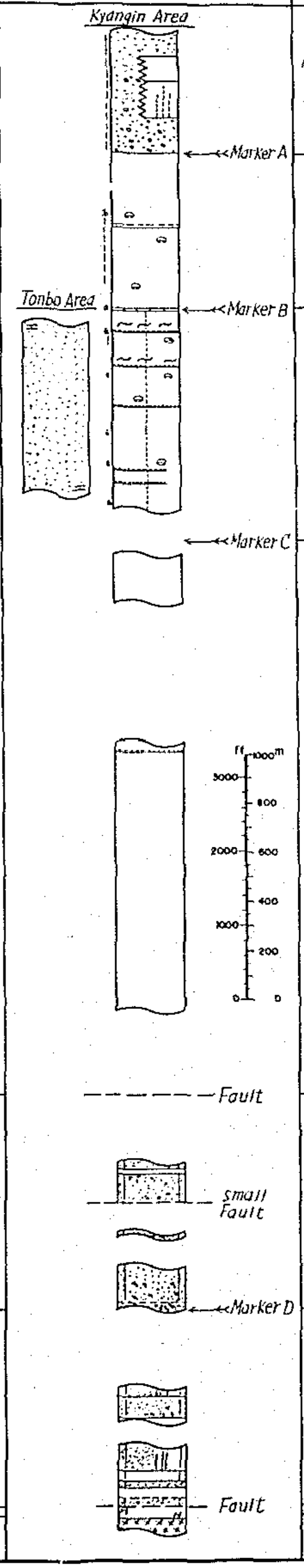
Fig. GEOL-10 COLUMNER SECTION (WESTERN PART OF PETYE AREA)





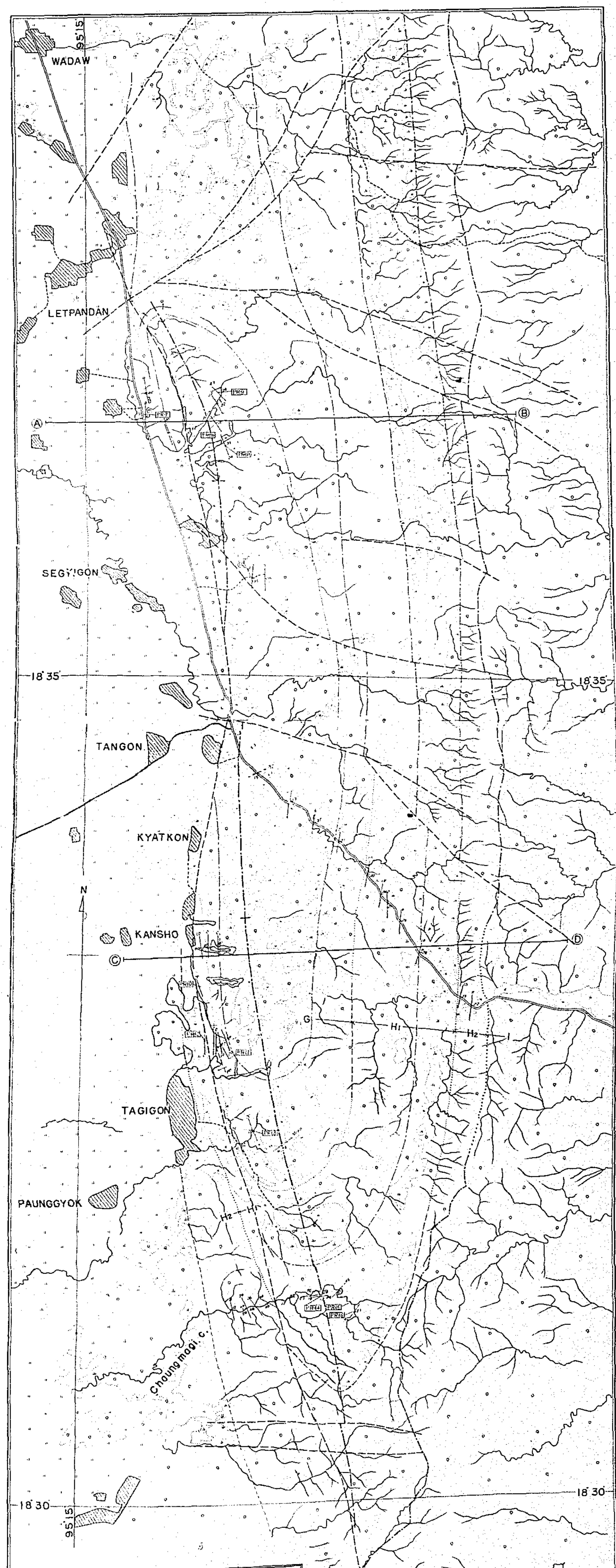
K-17
K-20
K-21
K-24
K-19
K-18
K-25
K-22
K-23
K-26
K-27
K-28
K-29
B2
B1
A
Sp
ft
m
3000
2000
1000
0
1000
800
600
400
200
0
LEGEND
Rock Facies
Sandstone & Conglomerate
Sandstone
Calcareous Sandstone
Very Sandy Siltstone
Sandy Siltstone
Siltston
Muddy Siltstone
Mudstone
Alternation of Sandst & Mudst
with Sandst. & Mudst. Layer
with Concretion & Nodule
Serpentine
Stratigraphic Succession by B.O.C.
H Irrawaddy Series
G Obogon Alternations
F Kyaukkok Sandstones
E
D Undifferentiated Tertiary
C
B B2 B1 Eocene
A
Other Symbols
AB-1 Sample Locality
Molluscus
Fault
Correlation Line

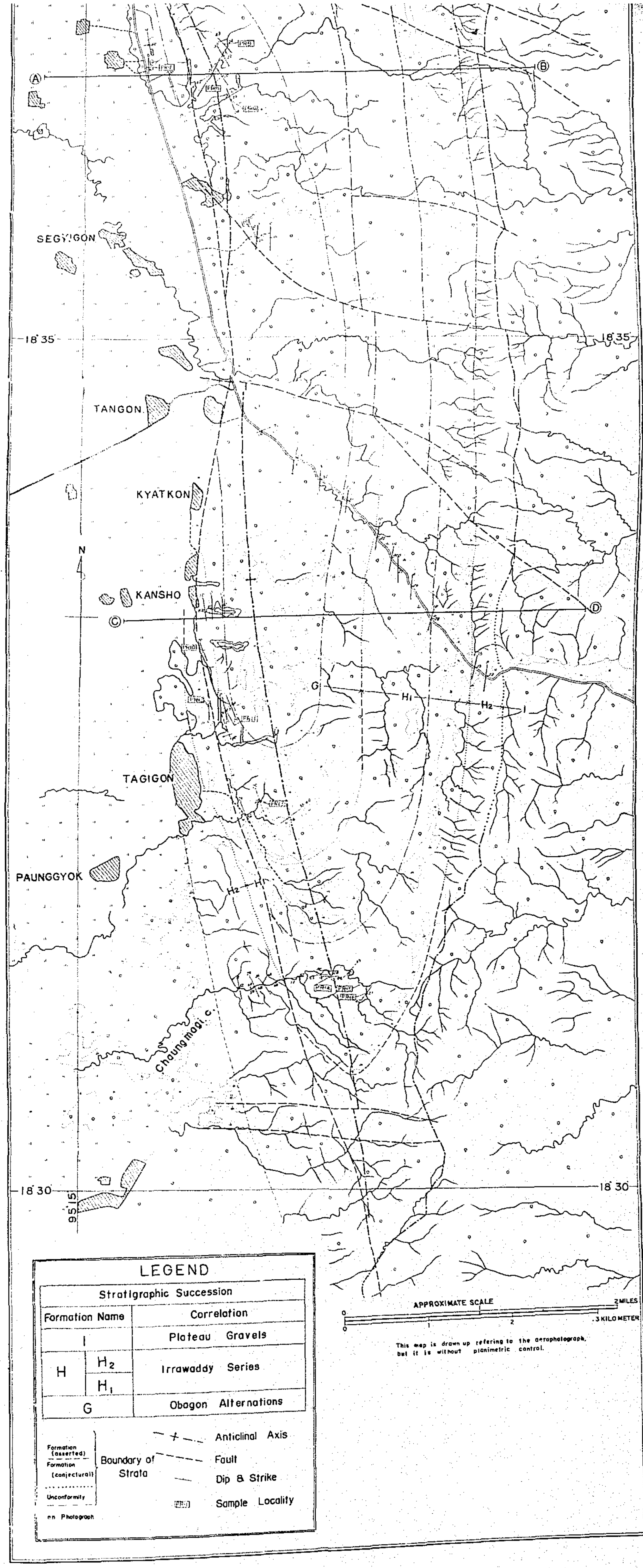
Fig. GEOL-11 DESCRIPTION TABLE (WESTERN PART OF PETYE AREA)



Formation Name	Standard Columnar Section	Thickness in feet	Thickness in meter	Lithology	Lithofacies	Fossils: Macro Fossils	Micro Fossils: Biostratigraphy	Micro Fossils: Faunal Assemblages	Correlation: M Stuart (1911)	Correlation: Central Burma General
F		1,050+	320+	Calcareous fine ~ coarse sandstone. Partly contains granule grains of chert. Commonly yields molluscan fossils and higher foraminiferal fossils. Along the Pashin Chaung it becomes more muddy and mudstone with some medium ~ coarse sandstone layers occupies the main part.	Lateral variation is large. Generally calcareous sandstone changes into siltstone ~ mudstone facies southwards. Marker A is not perfectly certained but may be somewhat coarse sandstone.	Yoldia sp. Paphia sp. Dentalium sp.	Rare - Non RF ~ NF Foraminifela Zonule	Elphidiudium, Rotalia, Nonion	Akauktaung Stage	Kyaukkok Sandstone
E		870±	265±	Grey mudstone. Sometimes it becomes more coarse (siltstone ~ sandy siltstone) and intercalates thin layers of very fine ~ medium sandstone. Molluscan fossils are common. Marly modules of various sizes in the shape of lense, ball and bamboo-shoot are also common.	Grey mudstone becomes sometimes silty or sandy; neverthless lithofacies is rather stable. Marker B is a bed of calcareous sandstone with many molluscan and larger foraminiferal fossils.	Yoldia ? sp. Nucula sp. Lucina sp. Venerupis ? sp. Solen sp. Natica sp. Chela of a Crustacea (Crab?)	Globigerina - Uvigerina Znl Bolivina - Rotalia Zonule	Globigerina, Uvigerina, Eponides Globigerina, Orbulina, Bolivina, Rotalia, Bulimina, Lagenonodosaria	Pegu Series: Sitsayan Clays	Pyawbwe Clays
D		1,840± ~ 1,940±	560± ~ 590±	Tonbo area: Calcareous fine ~ coarse sandstone. Hard parts and not so hard parts are interbedding. Higher foraminiferal tests are commonly found. Kyangin area: Grey mudstone, occasionally silty mudstone. Thin layers of calcareous very fine ~ medium sandstone are contained. Marly nodules of various sizes are common, especially these of bambooshoot shape is peculiar. Some of marly layers (30 ~ 40cm in thickness) are seen. Shell remains are frequently found.	In the Kyangin area, this formation is muddy and does not show remarkable lateral variation. In comparison with the sandstone facies in the Tonbo area, it is proved that the northern sandy facies changes into the muddy facies towards south. Marker C is a line separating two air-photographic tones or drainage patterns, and cannot be see in the field.		Buliminella - Uvigerina Znl.	Globigerina, Buliminella, Bulimina, Uvigerina, Cassidulina, Robulus	Limestone	Okhmintaung (Sandstone)
C		3,770+ ~ 7,020+	1,150+ ~ 2,140+	Grey, sometimes greenish grey, massive mudstone with higher foraminiferal tests bearing medium ~ coarse sandstone bands and marly nodules. Shell remains are not so numerous or frequent as the overlyers.	To estimate lithofacies changes, numbers of the surveyed route are wanted. In contact with the underlyers by a fault, but the fault is not certained in the field. (air-fhotogeologically it is clear)		Ellipsonodosaria —— Globigerina Zonule Plectofrondicularia — Uvigevina Zonule Globigerina — Haplophragmoides Znl.	Globigerina, Ellipsonodosaria, Robulus, Epistominella Globigerina, Plectofrondicularia, Uvigerina, Robulus Globigerina, Haplophragmoides, Cyclammina, Spirosigmoilinella, Uvigerina, Lagenonodosavia, Ellipsonodosaria, Eponides		Undifferenciate Tertiary
B: B_2		1,480+	450+	Grey (weathered brownish), fine ~ coarse non-calcareous sandstone consists main part of this member. Sandstone is generally massive and varely intercalates the mudstone beds. Carbonaceous matter (fragments of plants) and muscovite are common but no molluscan remains are seen. At the lower part, granule grains of slate and chert increase in numbers.	Marker D is a conglomerate bed more than 10m in thickness. It consists of subrounded ~ angular pebbles ~ boulders of older rocks (chert, limestone, slate, porphyrite, schalstein? etc). Base cannot be seen.	no shell remains Plant impressions are common	Non Foraminifela Zonule	no Foraminifera	Sandstone Series (Eocene)	(Eocene)
B: B_1		1,380+	420+	Bluish grey, fine ~ coarse, non-calcareous sandstone with mudstone beds. Sometimes shows alternation facies. Composition and feature of rocks resemble to those of overlying bed. But color of the sandstone is move bluish and carbonaceous matter is more abundant.	Separated from underlying hard mudstone by fault dipping to cast (normal fault).					
				Hard black mudstone, somewhat got thermal influence (of serpentine ?).	Boundary with serpentine cannot be seen.				Negrais Beds	Negrais or Axial Group
S_p				Serpentine					Serpentine	Serpentine

Fig. GEOL-12 GEOLOGICAL MAP (PROME HILL AREA)





SEGYIGON
18°35
TANGON
KYATKON
N
KANSHO
TAGIGON
PAUNGGYOK
Chaungmagi c.
18°30
95°15
A
B
C
D
G
H1
H2
I
LEGEND
Stratigraphic Succession
Formation Name
Correlation
I
Plateau Gravels
H
H2
H1
Irrawaddy Series
G
Obogon Alternations
Anticlinal Axis
Fault
Dip & Strike
Sample Locality
Formation (asserted)
Formation (conjectural)
Boundary of Strata
Unconformity
on Photograph
APPROXIMATE SCALE
2 MILES
3 KILOMETER
This map is drawn up refering to the aerophotograph, but it is without planimetric control.

Fig. GEOL-13 GEOLOGIC SECTION
(PROME HILL AREA)

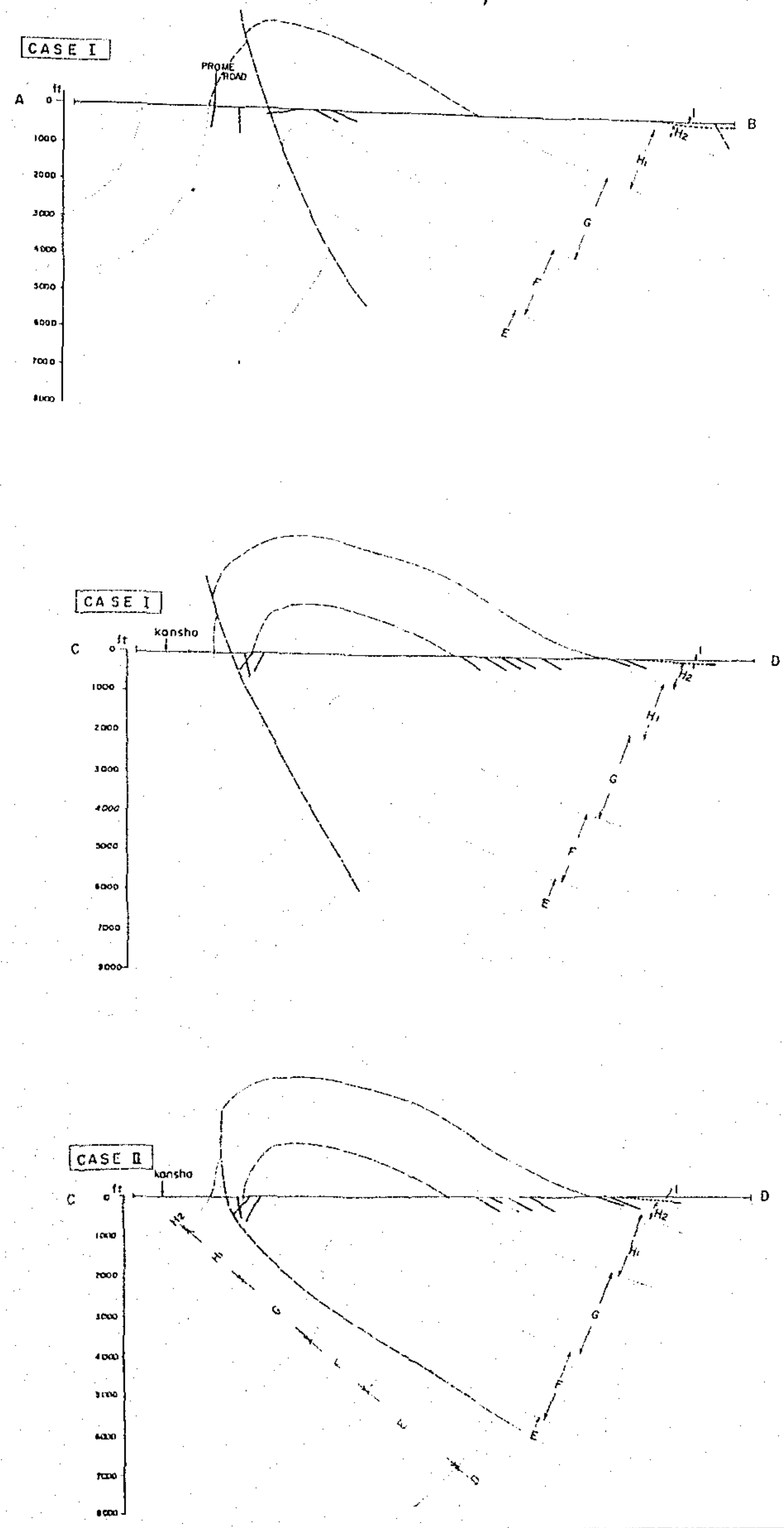
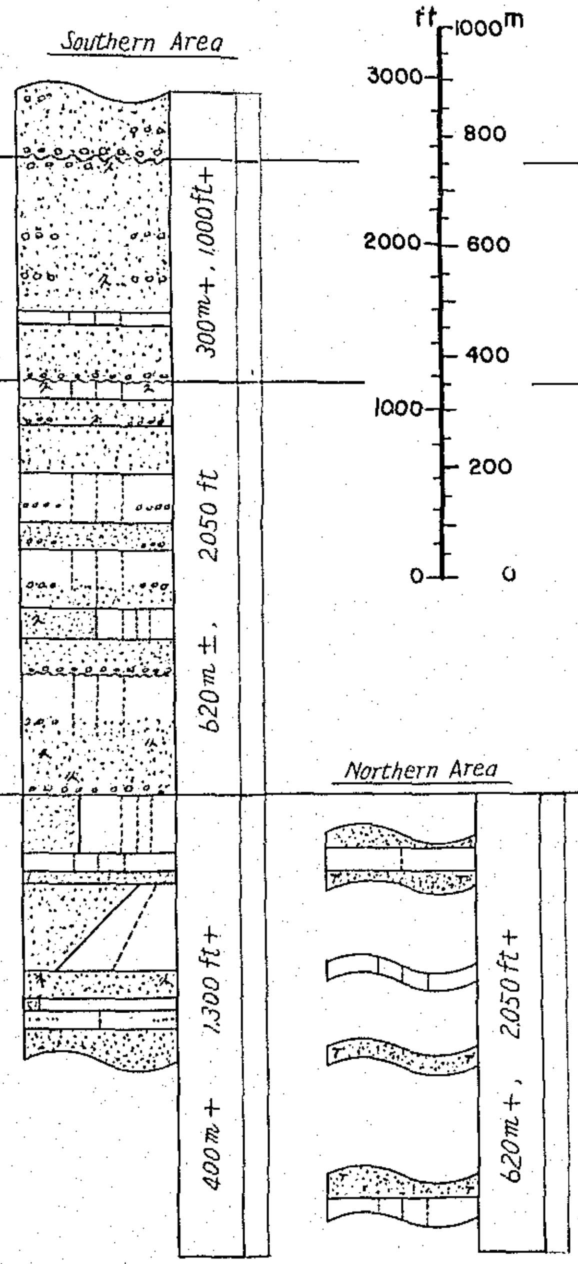


Fig. GEOL-14 DESCRIPTION TABLE (PROME HILL AREA)

Formation Name: Geological Survey	Formation Name: Photogeologic Interpretation	Standard Columnar Section	Lithology	Correlation (B.O.C.)		
I	I		Massive, loose, Cobble ~ granule gravel which mainly consists of chert. In some where limonitization can be seen. In somewhere it is sifferred by limonitization.	Plateau Gravels		Pleistocene
H_2	H, h_3		Cobble ~ granule conglomerate consisting almost of chert. Cross laminated light grey coarse ~ fine sandstone.	Irrawaddy Series		Upper Miocene ~ Pliocene
H_1	H, h_2, h_1		Cobble ~ granule conglomerate consisting of almost chert. Cross laminated light grey coarse ~ fine sandstone with subordinate clay. There are four sedimentary cycles beginning in gravel and ending in siltstone.			
G	G		Upper: Thin alternation of grey silt-stone and grey medium ~ fine sandstone. Massive grey siltstone. Grey medium ~ fine sandstone containing mica. Lower: Hard calcareous coarse ~ fine sandstone with molluscan fossils. Massive grey siltstone.	Pegu Series	Obogon Alternations	Miocene

5. Opinion

This survey was made as a part of the fundamental prospecting for the exploration of the natural gas resources in South Burma Basin. For the judgement of the merits for oil and gas exploration over the whole area, the geological investigation and field survey are important and hence, it is desired that the various kinds of survey will further be continued.

In this area, it is assumed that a part of B formation, C formation, a part of D formation and E formation are considered as the good source rocks for oil and gas, and parts of B and D formation, F and G formation also as the good reservoir, therefore, these are assumed to be in favour of the existance of oil and natural gas pool.

Taking into consideration the fact that indications of oil and gas are recognized in this area, it is quite possible that the reservoir of the natural gas is formed in the favourable structures such as anticlines and so forth, hence the area is regarded as worthy of further prospecting.

From the results of this survey the anticlinal structures or the structures impressed regarded as possible anticline were recognized in ten districts of this surveyed area. Each structure of these anticlines is detailed in the following.

(1) The structure in the middle part of Prome Hill

a)	Situation :	18°30' N. Lat., 95°16' E. Long.
b)	Referred survey :	Photogeologic survey, gravimetric survey and field geological survey.
c)	Structure :	This structure is the anticline with steep slope associated by the thrust from the east on the west wing and gentle slope on the east wing. The throw of this faults is small on the surface, but the dip of this fault in the depth is unknown.
d)	Stratigraphy :	For the G formation is outcropped in the culmination of the anticline, the concievable formation as gas reservoir are F, D and C formation.
e)	Consideration :	This structure is meritorious for prospecting of oil and gas, being stable in some extent. The seismic and the ditailed geologic surveys or drilling for stratigraphy and structure are necessary in future. Especially, to clarify the character, the dip and the trend of the fault will be needed.

(2) Structure in the southery Prome Hill

a)	Situation :	18°34' N. Lat. ; 95°18' E. Long.
b)	Referred surveys :	Photogeologic survey and gravimetric survey.

c) Structure : From the high gravity anomaly, the anticlinal structure is assumed. In the photogeologic survey a fault approximating an anticlinal structure was observed, which might stable according as the orientation of the fault.

d) Stratigraphy : The surface is covered by the rocks of the Irrawaddy series and Platean Gravels belonging to the levels considerably upper than those in the middle part of Prome Hill structure. Therefore, the formation of this structure are assumed to be those of the level about 1000 feet deeper than those of the middle part. The possible formation containing the natural gas are supposed to be G, F, D and C formation.

e) Consideration : This structure is worth prospecting, for it seemed to be a stable structure with a culmination.
The detailed seismic survey is desired in future in order to clarify the true form of the structure.

(3) Myanaung structure

a) Situation : $18^{\circ}16'$ N. Lat., $95^{\circ}20'$ E. Long.

b) Referred surveys : Photogeologic survey and gravimetric survey.

c) Structure : The anticlinal structure resulted from the photogeologic survey reveal a good correspondence to the high gravity anomaly, which suggest the existence of a quite stable anticline, though small in scale.

d) Stratigraphy : From the results of gravimetric survey, this structure is deeper than the structure in southern Prome Hill, however, it is not defined directly, for this is covered by the quaternary sediments. G, F, D and C formation is assumed as the possible gas reservoir in the depth.

e) Consideration : If the closed structure are defined by the seismic survey, this structure will be well worthy of test-drilling.

(4) Mayaman structure

a) Situation : $18^{\circ}37'$ N. Lat., $95^{\circ}40'$ E. Long.

b) Referred surveys : Photogeologic survey and gravimetric survey.

c) Structure : The area occupied this structure assumed by photogeologic survey showed the near correspondence to the high gravity anomaly area. Besides, from the results of gravimetric survey, this anomaly is indicated by the distribution of F formation, showing monoclinal structure, and in the west side of low gravity anomaly, a fault is assumed.

d) Stratigraphy : This area is covered by the Quaternary sediments, but it is largely elevated part. The F and G formation are partly eroded away and only D and C formation are assumed as the possible gas reservior beds.

e) Consideration : This structure was assumed as an anticline or monocline associated with a fault, and therefore, it is necessary to clarify the structure by the seismic survey. If this structure are presumed, as an anticline, it will be worthy of prospecting for the natural gas.

(5) Kyithe structure

a) Situation : 18°37' N. Lat., 95°07' E. Long.

b) Referred surveys: Photogeologic survey and gravimetric survey.

c) Structure : The gravity high anomaly area agreed with the area of the anticline assumed by the photogeological survey. This structual series continue to the Tantabin, Kyangin and Tondaung anticlines. It is assumed that this structure is very complex in the same way as Tondaung and Kyangin structures in which Tertiary sediments cropped out on the surface. Besides, if the gravity high anomaly is a indication of F formation as in Mayaman, the gravity low anomaly area between this and the east Mayaman structure may be assumed to be corresponding to the anticline associated with a fault.

d) Stratigraphy : In the case that the Kyithe structure itself is an anticline, the formation below F become possible to be the object of prospecting, but in the case that east low gravity anomaly area is an anticline, the only D and C formation are expected as the gas reservoir bed.

e) Consideration : In either case mentioned the structure is considered very complex and besides, the ladding of formation was also found. Hence the merit of prospecting for gas is diminished.

(6) Tantabin structure

a) Situation : $18^{o}22'$ N. Lat., $95^{o}11'$ E. Long

b) Referred survey : Photogeologic survey and field geological survey.

c) Structure : The existence of anticline is certain, but because of the scanty outcrops, the detail of the structure is not defined.
By the results of photogeologic survey, the culmination is situated in the vicinity of the mud-volcanos in the north-east of Aleywa.
Near the axial part of the anticline a fault was assumed, and this made the structure highly complex.

d) Stratigraphy : In the culmination area of this structure, D formation crop out and then only C formation is expected as gas reservoir bed.

e) Consideration : Owing to the complex structure and lacking of formations, the merit of prospecting for gas is diminished.

(7) Kyangin structure

a) Situation : $18^{o}21'$ N. Lat., $95^{o}11'$ E. Long.

b) Referred survey : Photogeologic survey and field geological survey.

c) Structure : This structure is the anticline with steep slope of 70^{o} - 80^{o} and partly the formations are overturned.
This structure is cut off at places by the NE-SW faults and, in the area of the axis, the small faults were also found.
In the extension of this structure, mud-volcanos were recognized.

d) Stratigraphy : The outcrops in the culmination is the D formation. Only C formation is expected as the gas and oil reservoir bed.

e) Consideration : Because of the complex structure and lack of the formations, the merit of prospecting is diminished.

(8) Tondaung structure

a) Situation : $18^{\circ}13'$ N. Lat., $95^{\circ}10'$ E. Long.

b) Referred survey : Photogeologic survey

c) Structure : The direction of this anticline is nearly N-S, and this structure is made complex by being crossed at places by the faults running in NW-SW directions.

d) Stratigraphy The top of this anticline is composed of the D formation with limestone and the foot of this structure is covered with the E formation.

e) Consideration : Owing to the complex anticlinal structure cut by many faults into pieces and the scanty promissing beds except the E formation, the merit of prospecting is low.

(9) Kogwe Hill structure

a) Situation : $18^{\circ}05'$ N. Lat., $95^{\circ}19'$ E. Long.

b) Referred survey : Photogeologic survey.

c) Structure : The structure having an anticlinal axis in the NW-SE direction was recognized along the east side of the Kogwe Hill.
The anticline upheaving to the north and sinking to the south part was assumed.

d) Stratigraphy : The hills are covered with the I formation and the east side of the anticline is covered by the flood plain, so that the sequence of the Tertiary formation is not certain.
It is, however, assumed that the sequence will be nearly the same as those of the Myanaung structure.

e) Consideration : The stable anticline is expected. For the structure is rising to the north and sinking to the south, the position of the culminaton is not deffined. It is desired to excute firstly the gravimetric survey to grasp the outline of this structure.

(10) Kanze structure

a) Situation : $18^{\circ}17'$ N. Lat., $95^{\circ}08'$ E. Long.

b) Referred survey : Photogeologic survey and field geological survey.

c) Structure : In this area, the structure was found to be a nose structure, of which west wing is somewhat disturbed having a dip of 30° - 70° and east wing is 30° - 60° in dip.
Hence, this structure is an anticline generally steep in the west and gently sloping in the east.
In the south part of this structure, the dip of west wing is 85° and that of east wing is 60° and, in the axis of this structure, the reverse fault having its hanging wall on the east side is recognized.
In the north part, this structure is converted into a monocline.
Judging from the results of the photogeologic survey, it is supposed that this structure is at places cut by the cross faults.

d) Stratigraphy : The F formation is streched out to the south in the nosy shape.

e) Consideration : The structure is complex and no culmination was found. From these facts, this structure is worthless for prospecting.

APPENDIX 1 COMPUTATION TABLE OF GRAVIMETRIC SURVEY

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_o''$
H — 1					116.05	
H — 2					109.13	
H — 3					103.28	
H — 4					106.35	
H — 5					79.66	
H — 6					99.94	
H — 7					95.61	
H — 8	21.22	4.77	25.83	0	76.15	106.75
H — 9	22.20	4.[illegible]9	22.00	0	88.37	115.37
H — 10					79.73	
H — 11					76.71	
A — 1	47.00	10.57	10.22	0	9[illegible].33	114.12
A — 2	37.42	8.41	0.95	0.01	114.30	123.67
A — 3	32.77	7.37	7.89	0	100.00	115.26
A — 4	38.67	8.70	10.83	0.01	99.62	119.16
A — 5	64.48	14.50	14.06	0	85.27	113.83
A — 6	26.24	5.90	17.08	0.04	94.50	117.52
A — 7	26.68	6.00	10.50	0.03	105.56	122.09
A — 8	22.14	4.98	27.13	0.02	80.01	112.14
A — 9	27.32	6.14	30.54	0	75.32	112.00

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_o''$
1	30.00	6.74	0.95	0	115.48	123.17
2	29.39	6.61	1.21	0	115.65	123.47
3	32.98	7.41	1.41	0	115.18	124.00
4	41.11	9.24	1.69	0	113.24	124.17
5	37.43	8.41	1.91	0	114.32	124.64
6	33.18	7.46	2.13	0	115.27	124.86
7	34.28	7.71	2.33	0	114.98	125.02
8	33.00	7.42	2.58	0	114.95	124.95
9	35.10	7.89	2.81	0	114.26	124.96
10	34.00	7.64	3.03	0	113.91	124.58
11	32.31	7.26	3.25	0	113.54	124.05
12	30.67	6.89	3.48	0	113.07	123.44
13	30.89	6.94	3.72	0	111.94	122.60
14	40.70	9.14	3.90	0	108.83	121.87
15	29.97	6.74	4.03	0	108.75	119.52
16	31.83	7.16	4.23	0	105.88	118.27
17	31.77	7.14	4.48	0	106.30	117.92
18	37.38	8.40	4.73	0	104.49	117.62
19	35.98	8.09	4.95	0	103.95	116.99
20	31.89	7.17	5.21	0	103.96	116.34
21	32.36	7.27	5.44	0	103.04	115.75
22	32.58	7.32	5.68	0	102.47	115.47
23	30.90	6.94	5.92	0	102.47	115.33
24	30.42	6.84	6.17	0	102.44	115.45
25	31.58	7.10	6.40	0	102.00	115.50
26	32.49	7.30	6.64	0	101.50	115.44
27	33.19	7.46	6.86	0	101.02	115.34
28	32.50	7.31	7.08	0	100.91	115.30
29	32.55	7.32	7.31	0	100.62	115.25
30	32.46	7.30	7.56	0	100.45	115.31

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
31	32.35	7.27	7.64	0	100.42	115.33	61	57.01	12.82	11.93	0	88.63	113.38
32	31.10	6.99	8.27	0	100.40	115.66	62	57.47	12.92	12.17	0	87.86	112.95
33	30.52	6.86	8.40	0	100.74	116.00	63	53.83	12.10	12.39	0	87.77	112.26
34	30.41	6.84	8.59	0	100.70	116.13	64	54.17	12.18	12.62	0	87.15	111.95
35	30.90	6.95	8.82	0	100.60	116.37	65	57.56	12.94	12.83	0	86.11	111.88
36	31.31	7.04	9.03	0	100.39	116.46	66	57.96	13.03	13.07	0	86.08	112.18
37	31.15	7.00	9.36	0	100.35	116.71	67	57.79	12.99	13.28	0	86.05	112.32
38	32.34	7.27	9.50	0	100.15	116.92	68	58.83	13.23	13.52	0	85.82	112.57
39	32.94	7.40	9.73	0	100.00	117.13	69	60.57	13.62	13.75	0	85.35	112.72
40	35.56	7.99	9.98	0	99.43	117.40	70	58.70	13.20	14.06	0	84.64	111.90
41	35.08	7.89	10.20	0	99.66	117.75	71	57.19	12.86	14.17	0	84.24	111.27
42	35.61	8.01	10.38	0.01	100.02	118.42	72	55.02	12.38	14.30	0	84.28	110.95
43	36.08	8.11	10.59	0.01	100.21	118.92	73	55.45	12.47	14.43	0	83.95	110.85
44	31.95	7.18	8.07	0	99.83	115.08	74	54.78	12.31	14.55	0	84.01	110.87
45	33.02	7.42	8.39	0	99.35	115.16	75	52.81	11.87	14.65	0	84.65	111.17
46	34.70	7.80	8.47	0	98.58	114.85	76	55.72	12.53	14.72	0	84.39	111.64
47	37.52	8.43	8.67	0	97.38	114.48	77	61.50	13.83	14.73	0	83.52	112.08
48	39.26	8.83	8.91	0	96.72	114.46	78	67.81	15.24	14.78	0	82.50	112.52
49	38.66	8.69	9.12	0	96.50	114.31	79	42.06	9.46	11.00	0.01	99.47	119.94
50	38.66	8.69	9.33	0	96.06	114.08	80	43.83	9.85	11.16	0.01	99.84	120.86
51	40.98	9.21	9.55	0	95.49	114.25	81	39.87	8.96	11.32	0.01	101.18	121.47
52	42.72	9.60	9.78	0	94.77	114.15	82	41.48	9.32	11.53	0.01	101.03	121.89
53	44.84	10.08	10.01	0	94.09	114.18	83	43.56	9.79	11.74	0.01	100.52	122.06
54	45.66	10.26	10.45	0	93.20	113.91	84	44.64	10.04	11.97	0.01	100.10	122.12
55	46.78	10.52	10.67	0	92.58	113.77	85	48.66	10.94	12.19	0.01	99.00	122.14
56	50.20	11.28	10.88	0	91.44	113.60	86	42.04	9.45	12.43	0.01	100.11	122.00
57	51.14	11.50	11.09	0	91.12	113.71	87	43.57	9.79	12.64	0.01	99.34	121.78
58	52.46	11.79	11.24	0	90.81	113.84	88	47.51	10.68	12.88	0.01	97.76	121.33
59	52.94	11.90	11.47	0	90.45	113.82	89	44.59	10.02	13.11	0.01	97.61	120.75
60	54.37	12.22	11.70	0	89.75	113.67	90	44.35	9.97	13.36	0.01	96.73	120.07

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
91	43.92	9.87	13.62	0.01	95.96	119.46	121	36.30	8.16	16.29	0.03	92.04	116.52
92	45.29	10.18	13.84	0.01	94.87	118.90	122	41.83	9.41	16.45	0.03	91.64	117.53
93	42.31	9.51	14.04	0.02	94.77	118.34	123	43.91	9.87	16.65	0.03	91.32	117.87
94	42.50	9.55	14.24	0.02	93.82	117.63	124	33.23	7.47	16.77	0.04	93.93	118.21
95	43.34	9.74	14.42	0.02	91.98	116.16	125	30.96	6.96	16.86	0.04	94.45	118.31
96	43.11	9.69	14.60	0.02	91.49	115.80	126	28.04	6.30	16.96	0.04	94.72	118.02
97	48.43	8.64	14.76	0.02	92.88	116.30	127	30.55	6.87	17.28	0.04	93.35	117.54
98	35.81	8.05	14.95	0.02	94.11	117.13	128	25.06	5.63	17.46	0.04	93.82	116.35
99	31.89	7.17	15.15	0.02	95.66	118.00	129	24.91	5.60	17.67	0.04	92.43	115.74
100	30.56	6.87	15.36	0.03	96.24	118.50	130	24.01	5.40	17.88	0.04	92.16	115.48
101	32.81	7.38	15.58	0.03	95.91	118.90	131	27.53	6.19	18.06	0.04	91.20	115.49
102	30.50	6.86	15.80	0.03	96.51	119.20	132	24.63	5.54	18.23	0.04	91.50	115.31
103	30.39	6.83	16.02	0.03	96.45	119.33	133	23.69	5.33	18.38	0.04	91.02	114.77
104	28.45	6.40	16.22	0.04	96.63	119.29	134	40.26	9.05	10.31	0	98.10	117.46
105	27.04	6.08	16.43	0.04	96.63	119.18	135	43.13	9.70	10.34	0	96.86	116.90
106	28.30	6.36	16.65	0.04	95.53	118.58	136	46.97	10.56	10.55	0	95.44	116.55
107	28.75	6.46	16.74	0.04	94.66	117.90	137	43.60	9.80	10.77	0	95.74	116.31
108	74.28	16.70	14.83	0.01	81.66	113.20	138	41.84	9.41	10.98	0	95.65	116.04
109	76.40	17.17	14.89	0.01	81.52	113.59	139	39.54	8.89	11.26	0	96.01	116.16
110	64.85	14.58	15.00	0.01	84.43	114.02	140	39.48	8.88	11.49	0	95.89	116.26
111	73.75	16.58	15.13	0.01	82.81	114.53	141	41.82	9.40	11.74	0	94.98	116.12
112	65.81	14.79	15.30	0.01	84.70	114.80	142	47.32	10.64	12.00	0	93.56	116.20
113	74.98	16.86	15.56	0.02	82.47	114.91	143	48.33	10.87	11.99	0	92.47	115.33
114	70.64	15.88	15.51	0.02	83.87	115.28	144	42.63	9.59	11.98	0	92.88	114.45
115	53.11	11.94	15.56	0.02	88.51	116.03	145	42.37	9.53	11.90	0	92.58	114.01
116	47.87	10.76	15.69	0.02	90.28	116.75	146	44.50	10.01	11.91	0	91.47	113.39
117	43.95	9.88	15.88	0.02	91.42	117.20	147	46.00	10.34	11.82	0	90.92	113.08
118	46.44	10.44	16.00	0.02	90.81	117.27	148	47.54	10.69	11.61	0	90.85	113.15
119	40.19	9.03	16.09	0.03	91.52	116.67	149	50.05	11.25	11.46	0	90.54	113.25
120	36.97	8.31	16.18	0.03	90.89	115.41	150	37.95	8.53	11.76	0.01	100.68	119.98

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
151	39.72	8.93	10.80	0.01	101.18	120.92	181	27.76	6.24	8.53	0.06	105.41	120.24
152	39.63	8.91	10.79	0.01	102.08	121.79	182	27.86	6.27	8.38	0.05	105.40	120.10
153	35.71	8.03	10.79	0.01	103.79	122.62	183	28.58	6.43	8.22	0.05	105.51	120.21
154	33.25	7.48	10.81	0.01	104.92	123.22	184	28.08	6.31	8.07	0.03	105.54	119.95
155	31.10	6.99	10.76	0.01	105.96	123.72	185	29.54	6.64	8.03	0.02	105.10	119.79
156	30.90	6.95	10.66	0.01	106.49	124.11	186	26.63	5.99	8.03	0.08	106.28	120.38
157	32.61	7.33	10.57	0.01	106.23	124.14	187	26.85	6.04	8.02	0.03	106.81	120.90
158	33.69	7.58	10.61	0.01	105.72	123.92	188	26.60	5.98	7.99	0.02	106.92	120.91
159	32.45	7.30	10.63	0.02	104.70	122.65	189	27.41	6.16	7.96	0.01	106.70	120.83
160	33.97	7.64	10.70	0.02	103.00	121.36	190	26.75	6.02	7.97	0.01	106.76	120.76
161	33.89	7.62	10.73	0.02	102.49	120.86	191	27.08	6.09	7.95	0.01	106.58	120.63
162	31.20	7.02	10.70	0.02	104.34	12,2.08	192	27.31	6.14	7.89	0.01	106.15	120.19
163	30.84	6.94	10.69	0.02	104.95	122.60	193	27.40	6.16	7.82	0.01	105.52	119.51
164	26.88	6.04	10.76	0.02	106.34	123.16	194	27.27	6.13	7.81	0.01	104.94	118.89
165	26.98	6.07	10.82	0.02	106.65	123.56	195	27.98	6.29	7.91	0.01	104.28	118.49
166	26.79	6.02	10.78	0.02	106.75	123.57	196	27.86	6.27	7.95	0.01	103.58	117.81
167	30.52	6.86	10.69	0.02	105.81	123.38	197	27.90	6.27	7.94	0.01	102.91	117.13
168	27.41	6.16	10.64	0.03	106.20	123.03	198	28.28	6.36	7.87	0.01	(位置不明)	
169	24.48	5.51	10.60	0.03	107.22	123.36	199	27.89	6.27	7.73	0	102.17	116.17
170	25.14	5.65	10.55	0.03	106.50	122.73	200	28.42	6.39	7.51	0	102.10	116.00
171	26.79	6.02	10.37	0.04	105.60	122.03	201	29.14	6.55	7.51	0	101.73	115.79
172	26.63	5.99	10.15	0.04	105.95	122.13	202	30.17	6.78	7.52	0	101.19	115.49
173	26.90	6.05	9.95	0.04	105.88	121.92	203	26.32	5.92	8.34	0.02	105.96	120.24
174	26.91	6.05	9.80	0.03	105.68	121.56	204	30.61	6.88	8.57	0.02	104.76	120.23
175	27.37	6.16	9.61	0.09	105.49	121.35	205	29.01	6.52	8.82	0.02	105.29	120.65
176	27.42	6.17	9.44	0.06	105.48	121.15	206	29.67	6.67	8.99	0.02	105.36	121.04
177	27.62	6.21	9.25	0.03	105.47	120.96	207	25.37	5.71	9.25	0.02	105.89	120.87
178	27.43	6.17	9.08	0.06	105.41	120.72	208	26.48	5.95	9.48	0.02	105.44	120.89
179	27.35	6.15	8.89	0.03	105.25	120.32	209	24.02	5.40	9.73	0.02	106.07	121.22
180	27.92	6.28	8.70	0.05	105.32	120.35	210	28.95	6.51	9.97	0.02	104.89	121.39

Station No.	Elevation (meter)	Normal correction	Combined correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
211	27.98	6.29	10.22	0.02	105.48	122.01	241	33.57	7.55	9.82	0.02	102.92	120.31
212	25.53	5.74	10.45	0.02	106.43	122.64	242	29.75	6.69	9.89	0.02	104.66	121.26
213	27.94	6.28	10.66	0.02	106.20	123.16	243	27.56	6.20	9.08	0	107.20	122.48
214	39.63	8.91	10.97	0.02	100.82	120.72	244	27.33	6.15	8.82	0	106.94	121.91
215	39.99	8.99	11.21	0.02	100.62	120.84	245	26.88	6.04	8.61	0	106.60	121.25
216	40.51	9.11	11.44	0.02	100.42	120.99	246	25.95	5.84	8.39	0	106.75	120.98
217	40.32	9.07	11.66	0.02	100.40	121.15	247	25.17	5.66	8.46	0	107.16	121.28
218	42.54	9.57	11.88	0.02	99.54	121.01	248	29.47	6.63	8.52	0	106.51	121.66
219	42.27	9.50	12.08	0.02	99.32	120.92	249	29.24	6.58	8.52	0	106.39	121.49
220	42.23	9.50	12.34	0.02	98.94	120.80	250	24.95	5.61	8.33	0	107.46	121.40
221	40.10	9.02	12.56	0.02	99.28	120.88	251	25.36	5.70	8.10	0	107.29	121.09
222	39.47	8.88	12.75	0.02	99.05	120.70	252	26.83	6.03	8.22	0.01	103.36	117.62
223	38.80	8.72	12.94	0.02	99.10	120.78	253	26.99	6.07	8.42	0.01	103.29	117.79
224	39.19	8.81	13.15	0.02	98.53	120.51	254	26.91	6.05	8.67	0.01	103.48	118.21
225	38.50	8.66	13.08	0.02	98.86	120.62	255	27.60	6.21	8.80	0.01	104.01	119.03
226	40.80	9.17	13.30	0.02	96.98	119.47	256	27.50	6.18	8.89	0.01	104.58	119.66
227	41.43	9.32	13.45	0.01	96.43	119.21	257	27.36	6.15	9.08	0.01	105.03	120.27
228	43.02	9.67	13.62	0.01	95.75	119.05	258	28.40	6.39	9.24	0.01	105.23	120.87
229	32.72	7.36	10.37	0.01	106.29	124.03	259	28.47	6.40	9.33	0.01	105.90	121.64
230	31.81	7.15	10.16	0.01	106.61	123.93	260	27.43	6.17	9.41	0.01	106.68	122.27
231	28.00	6.30	9.95	0.01	107.53	123.79	261	27.38	6.16	9.55	0.01	107.24	122.96
232	30.08	6.76	9.74	0.01	107.10	123.61	262	29.09	6.54	9.51	0.01	105.15	121.21
233	28.16	6.33	9.53	0.01	107.51	123.38	263	30.05	6.75	9.56	0.01	104.32	120.64
234	27.68	6.22	9.30	0.01	107.40	122.93	264	30.15	6.78	9.47	0.01	103.59	119.85
235	27.51	6.19	9.52	0.01	107.79	123.51	265	27.25	6.13	9.45	0.01	103.37	118.96
236	30.76	6.92	9.42	0.01	106.68	123.03	266	30.65	6.89	9.43	0.01	101.83	118.16
237	31.25	7.03	9.44	0.02	106.19	122.68	267	30.70	6.90	9.50	0	101.14	117.54
238	29.50	6.63	9.63	0.02	106.14	122.42	268	32.18	7.24	9.36	0	99.79	116.39
239	32.20	7.24	9.74	0.02	104.42	121.42	269	32.97	7.41	9.39	0	99.01	115.81
240	33.14	7.45	9.82	0.02	102.72	120.01	270	34.07	7.66	9.43	0	98.28	115.37

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ''	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ''
271	34.54	7.77	9.26	0	97.91	114.94	301	54.27	12.20	14.16	0	86.04	112.40
272	36.59	8.23	9.22	0	97.19	114.64	302	56.96	12.81	14.38	0	84.19	111.38
273	41.27	9.28	10.67	0	95.75	115.70	303	58.77	13.21	14.64	0	83.92	111.77
274	40.51	9.11	10.57	0	95.55	115.23	304	75.78	17.04	14.65	0.01	81.89	113.59
275	40.29	9.06	10.43	0	95.34	114.83	305	63.34	14.24	14.49	0.01	85.14	113.38
276	41.80	9.40	10.28	0	94.82	114.50	306	55.85	12.56	14.31	0.01	87.51	114.39
277	43.47	9.77	10.23	0	94.20	114.20	307	53.28	11.98	14.21	0.01	88.74	114.94
278	51.32	11.54	11.08	0.01	96.38	119.01	308	53.26	11.98	14.18	0.01	89.37	115.54
279	53.66	12.07	11.34	0.01	95.46	118.88	309	50.36	11.32	14.05	0.01	90.98	116.36
280	57.70	12.97	11.59	0.01	94.12	118.69	310	49.27	11.08	13.97	0.01	92.11	117.17
281	56.31	12.66	11.81	0.01	93.97	118.45	311	46.40	10.43	13.97	0.01	93.52	117.93
282	83.02	18.67	12.03	0.01	87.27	117.98	312	47.81	10.75	13.89	0.01	93.66	118.31
283	65.65	14.76	12.17	0.01	91.75	118.69	313	39.26	8.83	12.10	0.02	100.36	121.31
284	53.01	11.92	12.31	0.01	95.07	119.31	314	34.28	7.71	12.08	0.02	102.14	121.95
285	49.66	11.17	12.46	0.01	96.31	119.95	315	32.92	7.40	12.00	0.02	103.26	122.68
286	47.81	10.75	12.39	0.01	97.91	121.06	316	29.90	6.72	11.94	0.02	104.59	123.27
287	35.90	8.07	7.49	0	99.59	115.15	317	31.64	7.11	11.85	0.02	105.01	123.99
288	36.97	8.31	7.51	0	99.02	114.84	318	29.66	6.67	11.71	0.02	105.71	124.11
289	39.57	8.90	7.54	0	98.25	114.69	319	31.52	7.09	11.59	0.02	105.92	124.62
290	40.81	9.18	7.56	0	97.90	114.64	320	27.87	6.27	11.45	0.02	106.91	124.65
291	42.40	9.53	7.58	0	97.81	114.92	321	31.09	6.99	11.29	0.03	106.05	124.36
292	43.84	9.86	12.23	0	91.95	114.04	322	30.24	6.80	11.18	0.03	106.01	124.02
293	47.13	10.60	12.44	0	90.71	113.75	323	31.04	6.98	11.12	0.03	105.89	124.02
294	46.21	10.39	12.63	0	90.50	113.52	324	26.39	5.93	10.98	0.03	106.28	123.22
295	46.62	10.48	12.73	0	89.90	113.11	325	25.82	5.81	10.88	0.03	106.32	123.04
296	47.70	10.73	12.96	0	88.95	112.64	326	26.92	6.05	10.76	0.03	105.49	123.33
297	47.11	10.59	13.22	0	88.59	112.40	327	36.25	8.15	15.02	0.02	93.20	116.39
298	49.67	11.17	13.45	0	87.62	112.24	328	40.26	9.05	15.18	0.02	91.91	116.16
299	50.48	11.35	13.68	0	86.81	111.84	329	50.50	11.35	15.28	0.02	89.16	115.81
300	51.67	11.62	13.92	0	86.12	111.66	330	43.39	9.76	15.44	0.02	91.65	116.87

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
331	41.98	9.44	15.60	0.02	92.24	117.30	361	25.41	5.71	11.18	0.03	105.98	122.90
332	43.55	9.79	15.70	0.02	91.78	117.29	362	25.74	5.79	10.97	0.03	106.11	122.90
333	29.83	6.71	15.12	0.03	96.83	118.69	363	33.97	7.64	14.69	0.04	100.94	123.31
334	30.88	6.94	15.08	0.03	97.98	120.03	364	39.20	8.81	12.57	0.02	99.39	120.79
335	32.36	7.28	15.02	0.03	98.80	121.13	365	38.01	8.55	12.78	0.02	99.59	120.94
336	32.68	7.35	14.95	0.03	100.10	122.43	366	34.71	7.81	12.93	0.02	100.70	121.46
337	32.88	7.39	14.90	0.03	100.52	122.84	367	34.89	7.85	13.13	0.02	100.81	121.81
338	29.23	6.57	14.78	0.03	101.87	123.25	368	33.38	7.51	13.31	0.02	101.36	122.20
339	35.71	8.03	14.72	0.04	100.55	123.34	369	32.91	7.40	13.50	0.02	101.47	122.39
340	37.92	8.53	14.67	0.04	100.31	123.55	370	33.09	7.44	13.65	0.02	101.63	122.74
341	38.33	8.62	14.50	0.04	100.34	123.50	371	33.30	7.49	13.64	0.02	102.55	123.70
342	36.38	8.18	14.47	0.04	100.88	123.57	372	33.57	7.55	13.56	0.03	103.26	124.40
343	30.72	6.91	14.62	0.05	102.20	123.78	373	34.36	7.73	13.63	0.03	103.51	124.90
344	23.67	5.32	14.42	0.05	103.74	123.53	374	34.16	7.68	13.82	0.03	103.29	124.82
345	22.02	4.95	14.15	0.05	103.89	123.04	375	34.83	7.83	14.05	0.03	102.50	124.41
346	22.87	5.14	14.05	0.05	103.45	122.69	376	35.36	7.95	14.28	0.03	101.59	123.85
347	24.89	5.60	13.91	0.05	102.61	122.17	377	35.55	7.99	14.45	0.04	101.14	123.62
348	24.52	5.51	13.71	0.05	102.78	122.05	378	22.41	5.04	14.85	0.05	103.52	123.46
349	25.08	5.64	13.62	0.06	102.24	121.56	379	21.94	4.93	15.05	0.05	102.80	122.83
350	25.46	5.73	13.46	0.06	102.01	121.26	380	23.32	5.24	15.25	0.06	101.15	121.70
351	25.70	5.78	13.29	0.06	102.08	121.21	381	25.20	5.67	15.42	0.06	99.84	120.99
352	26.03	5.85	13.08	0.06	101.92	120.91	382	24.62	5.54	15.60	0.06	99.77	120.97
353	25.97	5.84	12.87	0.06	101.96	120.73	383	21.67	4.87	15.72	0.06	100.81	121.46
354	26.24	5.90	12.61	0.05	102.07	120.63	384	23.96	5.39	15.70	0.05	100.98	122.12
355	26.33	5.92	12.40	0.05	102.31	120.68	385	24.23	5.45	15.82	0.05	100.72	122.04
356	26.28	5.91	12.20	0.05	102.52	120.68	386	22.59	5.08	15.97	0.05	100.94	122.04
357	25.87	5.82	11.95	0.04	103.11	120.92	387	24.30	5.46	16.14	0.05	100.10	121.75
358	26.11	5.87	11.76	0.04	103.68	121.35	388	23.53	5.29	16.33	0.05	99.73	121.40
359	26.16	5.88	11.55	0.04	104.60	122.07	389	24.46	5.50	16.56	0.05	98.83	120.94
360	26.34	5.92	11.33	0.03	104.11	121.39	390	23.78	5.35	16.77	0.05	98.27	120.44

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
391	23.64	5.32	16.96	0.05	97.57	119.90	421	60.34	13.56	14.28	0	84.86	112.70
392	23.34	5.25	17.18	0.05	96.68	119.16	422	64.46	14.49	14.47	0	83.35	112.31
393	21.68	4.88	17.36	0.05	96.18	118.47	423	69.37	15.59	14.72	0	82.00	112.31
394	23.98	5.39	17.35	0.05	95.01	117.80	424	66.37	14.92	14.90	0	82.31	112.13
395	33.21	7.47	14.62	0.02	95.02	117.13	425	68.54	15.41	15.10	0	81.79	112.30
396	35.80	8.08	14.44	0.02	95.13	117.67	426	69.33	15.59	15.31	0	81.68	112.58
397	35.29	7.93	14.26	0.02	96.50	118.71	427	71.79	16.14	15.54	0	80.71	112.39
398	34.09	7.66	14.08	0.02	97.75	119.51	428	81.32	18.28	15.75	0	78.55	112.58
399	32.90	7.40	13.97	0.02	99.28	120.67	429	77.67	17.46	15.95	0	78.56	111.97
400	33.08	7.44	13.87	0.02	100.20	121.53	430	75.21	16.91	16.15	0	78.88	111.94
401	31.52	7.09	13.66	0.02	101.33	122.10	431	75.20	16.90	16.38	0	78.78	112.06
402	34.60	7.78	13.48	0.03	103.86	125.15	432	71.95	16.17	16.44	0	78.77	111.38
403	35.36	7.95	13.36	0.03	104.00	125.34	433	70.71	15.90	16.59	0	78.37	110.86
404	36.70	8.25	13.25	0.03	104.01	125.54	434	68.04	15.30	16.77	0	78.54	110.61
405	29.63	6.66	13.32	0.04	105.43	125.45	435	62.58	14.07	14.25	0	86.55	114.87
406	30.45	6.85	13.45	0.04	104.34	124.68	436	63.09	14.18	14.41	0	87.02	115.61
407	23.36	6.38	13.58	0.04	105.20	125.20	437	65.45	14.71	14.57	0	86.23	115.51
408	23.50	5.28	13.55	0.05	104.18	123.06	438	65.41	14.70	14.72	0	85.54	114.96
409	23.99	5.39	13.59	0.05	103.13	122.16	439	68.74	15.45	14.88	0	83.85	114.18
410	34.62	7.78	13.04	0.03	104.93	125.78	440	77.02	17.31	15.05	0	80.99	113.35
411	35.32	7.94	13.05	0.03	105.00	126.02	441	75.39	16.95	15.23	0	80.94	113.12
412	36.11	8.12	12.78	0.03	105.05	125.98	442	66.74	15.00	15.40	0	82.40	112.80
413	35.00	7.87	12.71	0.03	105.78	126.39	443	65.61	14.75	15.58	0	81.48	111.81
414	35.40	7.96	12.50	0.03	106.04	126.53	444	63.46	14.27	15.52	0	80.89	110.68
415	34.05	7.65	12.32	0.03	106.55	126.55	445	60.99	13.71	15.55	0	80.28	109.54
416	31.60	7.10	12.10	0.03	107.18	126.41	446	59.35	13.34	15.58	0	79.26	108.18
417	33.37	7.50	11.88	0.03	106.34	125.75	447	57.56	12.94	15.70	0	78.51	107.15
418	33.32	7.49	11.65	0.03	105.94	125.11	448	53.68	12.07	15.83	0	78.46	106.36
419	31.61	7.11	11.47	0.03	105.86	124.47	449	56.85	12.78	15.94	0	76.95	105.67
420	32.76	7.36	11.25	0.03	105.17	123.81	450	52.10	11.71	16.03	0	77.11	104.85

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
451	47.68	10.72	16.13	0	77.16	104.01	481	60.67	13.64	14.35	0	77.64	105.63
452	41.70	9.37	16.26	0	77.90	103.53	482	66.75	15.01	14.26	0	76.89	106.16
453	37.88	8.52	16.39	0	78.62	103.53	483	72.94	16.40	14.29	0	76.39	107.08
454	31.53	7.09	16.45	0	78.29	101.83	484	91.12	20.48	14.20	0	73.54	108.22
455	30.80	6.92	16.57	0	78.07	101.56	485	100.82	22.66	14.17	0	72.54	109.37
456	29.11	6.54	16.67	0	77.96	101.17	486	112.07	25.19	14.21	0	70.96	110.36
457	27.05	6.08	16.76	0	77.78	100.62	487	100.68	22.63	14.43	0	73.93	110.99
458	26.08	5.86	16.81	0	78.06	100.73	488	77.31	17.38	14.41	0	80.94	112.73
459	23.39	5.26	16.89	0	77.43	99.58	489	72.65	16.33	14.34	0	82.11	112.78
460	23.24	5.22	16.96	0	77.88	100.06	490	70.37	15.82	14.23	0	84.18	114.23
461	53.91	12.12	11.25	0	93.07	116.44	491	65.10	14.63	14.13	0	86.50	115.26
462	54.40	12.23	11.30	0	94.44	117.97	492	68.76	15.46	14.19	0.01	86.32	115.98
463	59.48	13.37	11.22	0	93.32	117.91	493	66.79	15.01	14.17	0.01	86.47	115.66
464	61.37	13.80	11.20	0	91.86	116.86	494	64.97	14.61	16.67	0	79.21	110.49
465	60.23	13.54	11.22	0	90.42	115.18	495	63.14	14.19	16.67	0	79.89	110.75
466	65.07	14.63	11.18	0	88.23	114.04	496	63.29	14.23	16.48	0	80.15	110.86
467	73.30	16.48	11.16	0	85.67	113.31	497	65.74	14.78	16.29	0	79.91	110.98
468	85.16	19.14	11.28	0	80.49	110.91	498	65.98	14.83	16.05	0	80.13	111.01
469	110.49	24.84	11.29	0	73.65	109.78	499	65.53	14.73	15.83	0	80.47	111.03
470	103.98	23.37	11.20	0	73.71	108.28	500	63.99	14.38	15.68	0	80.69	110.75
471	68.07	15.30	15.51	0	75.75	106.56	501	63.85	14.35	15.53	0	80.85	110.73
472	63.66	14.31	15.38	0	76.60	106.29	502	64.36	14.47	15.34	0	80.86	110.67
473	57.57	12.94	15.30	0	77.34	105.58	503	64.40	14.48	15.20	0	81.07	110.75
474	52.99	11.91	15.15	0	77.93	104.99	504	64.48	14.50	15.18	0	81.65	111.33
475	48.93	11.00	14.95	0	78.74	104.69	505	54.17	12.18	16.01	0.02	88.7[illegible]	116.95
476	48.00	10.79	14.73	0	78.91	104.43	506	54.08	12.16	16.07	0.02	88.30	116.55
477	42.60	9.58	14.56	0	79.67	103.81	507	57.52	12.93	16.18	0.02	86.89	116.02
478	38.07	8.56	14.41	0	80.03	103.00	508	66.52	14.95	16.31	0.02	83.95	115.23
479	42.14	9.47	14.35	0	79.92	103.74	509	81.28	18.27	16.30	0.02	80.00	114.95
480	52.59	11.82	14.33	0	78.68	104.83	510	72.83	16.37	16.24	0.02	81.52	114.15

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
511	87.23	19.61	16.28	0.02	77.54	113.45	541	117.27	26.36	16.53	0	68.57	111.46
512	84.05	18.89	16.32	0.01	77.67	112.89	542	108.21	24.33	16.71	0	71.48	112.52
513	76.04	17.09	16.40	0.01	78.80	112.30	543	105.32	2368	16.91	0	72.44	113.03
514	70.91	15.94	16.44	0.01	79.46	111.85	644	110.96	24.94	17.12	0	70.99	113.05
515	66.51	14.95	16.45	0.01	79.96	111.37	545	117.26	26.36	17.33	0	69.11	112.80
516	65.30	14.68	16.46	0.01	79.90	111.05	546	133.07	29.91	17.47	0	64.39	111.77
517	61.91	13.92	16.40	0,01	80.51	110.84	547	129.32	29.07	17.67	0	65.24	111.98
518	41.19	9.26	9.56	0	95.33	114.15	548	147.92	33.25	17.88	0	60.35	111.48
519	42.74	9.61	9.32	0	95.11	114.04	549	151.32	34.02	18.08	0	59.45	111.55
520	44.50	10.00	9.18	0	95.18	114.36	550	145.85	32.79	18.28	0	60.75	111.82
521	47.30	10.63	9.12	0	95.46	115.21	551	136.74	30.74	18.42	0	63.12	112.28
522	47.81	10.75	8.98	0	98.30	118.03	552	137.42	30.89	18.54	0	62.67	112.10
523	53.00	11,91	8.93	0	98.36	119.20	553	117.71	26.46	18.76	0	66.76	111.98
524	51.62	11.60	8.89	0	98.76	119.25	554	92.80	20.86	18.88	0	7201	111.75
525	5216	11.73	8.78	0	98.44	118.95	555	87.43	19.65	19.02	0	73.43	112.10
526	54.22	12.19	8.77	0	97.01	117.97	556	82.20	18.48	19.18	0	73.41	111.07
527	58.52	13.16	8.79	0	94.61	116.56	557	74.74	16.80	19.35	0.01	7399	110.15
528	28.82	6.48	10.41	0.03	106.04	122.96	558	66.72	15.00	19.50	0.01	74.90	109.41
529	2948	6.63	10.33	0.03	105.61	122.60	559	60.92	13.69	19.63	0.01	75.56	108.89
530	24.84	5.58	10.16	0.02	106.67	122.43	560	62.75	14.11	8.75	0	92.14	115.00
531	24.13	5.42	9.95	0.02	106.95	122.34	561	68.47	15.39	8.76	0	90.23	114.38
532	24.23	5.45	9.71	0.02	106.85	122.03	562	23.37	5.25	18.49	0.04	9044	114.22
533	26.13	5.87	9.47	0.02	106.52	121.88	563	22.75	5.11	18.61	0.04	89.90	11366
534	28.06	6.31	10.15	0.02	106.19	122.67	564	23.88	5.37	18.73	0.04	88.95	113.09
535	26.81	6.03	10.16	0.02	106.45	122.66	565	24.90	5.60	18.74	0.03	87.93	112.30
536	28.00	6.29	10.08	0.02	105.78	122.17	566	25.57	5.75	18.80	0.03	87.51	112.09
537	83,25	18.71	15.77	0	75.67	110.15	567	25.55	5.74	18.90	0.03	88.35	112.02
538	95.65	21.50	16.00	0	72.59	110.09	568	26.87	6.04	18.97	0.03	88.77	113.81
539	102.47	23.04	16.23	0	71.00	110.27	569	27.27	6.13	19.17	0.03	88.71	114.04
540	110.12	24.75	16.48	0	69.24	110.47	570	28.02	6.30	19.30	0.03	88.45	114.08

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "
571	28.42	6.39	19.47	0.03	88.39	114.28	601	51.10	11.49	19.97	0.01	76.93	108.40
572	23.82	5.35	19.65	0.03	89.37	114.40	602	55.14	12.40	19.82	0.01	76.44	108.67
573	24.18	5.44	19.80	0.03	89.38	114.65	603	55.39	12.45	19.69	0.01	76.70	108.85
574	29.74	6.69	20.01	0.03	88.14	114.87	604	52.03	11.70	19.63	0.01	77.62	108.96
575	26.90	6.05	20.20	0.03	88.86	115.14	605	51.13	11.49	19.43	0.01	78.17	109.10
576	27.65	6.22	20.43	0.03	88.56	115.24	606	51.06	11.48	19.30	0.01	78.55	109.34
577	28.73	6.46	20.65	0.03	88.35	115.49	607	51.30	11.53	19.10	0.01	78.94	109.58
578	25.16	5.66	20.87	0.03	89.09	115.65	608	51.18	11.51	18.88	0.01	79.33	109.73
579	34.43	7.74	21.09	0.03	88.63	117.49	609	52.55	11.81	18.68	0.01	79.26	109.76
580	27.22	6.12	21.31	0.03	86.10	113.56	610	53.96	12.13	18.48	0.01	79.14	109.76
581	25.04	5.63	21.51	0.03	88.95	116.12	611	57.99	13.04	18.36	0.01	78.43	109.84
582	23.97	5.39	21.73	0.03	89.06	116.21	612	63.17	14.20	18.18	0.01	77.52	109.91
583	22.76	5.12	22.18	0.03	87.56	114.89	613	63.82	14.35	17.92	0	77.61	109.88
584	23.75	5.34	22.28	0.03	86.44	114.09	614	66.08	14.85	17.72	0	77.55	110.12
585	25.22	5.67	22.37	0.03	85.10	113.17	615	66.35	14.92	17.56	0	77.75	110.23
586	30.29	6.81	22.28	0.02	83.54	112.65	616	67.05	15.07	17.39	0	77.78	110.24
587	37.31	8.39	22.07	0.02	82.12	112.60	617	65.13	14.64	17.18	0	78.45	110.27
588	33.27	7.48	21.96	0.02	82.91	112.37	618	65.17	14.65	16.94	0	78.79	110.38
589	26.70	6.00	21.77	0.02	84.56	112.35	619	23.30	5.24	22.43	0.03	86.28	113.98
590	28.12	6.32	21.58	0.02	83.87	111.79	620	23.58	5.30	22.53	0.03	85.28	113.14
591	28.09	6.31	21.49	0.02	83.55	111.37	621	23.71	5.33	22.76	0.02	84.52	112.63
592	28.59	6.43	21.39	0.02	82.66	110.50	622	23.12	5.20	22.92	0.02	84.29	112.43
593	28.80	6.47	21.27	0.02	82.09	109.85	623	23.45	5.27	23.07	0.02	83.93	112.29
594	30.74	6.91	21.09	0.02	81.38	109.40	624	23.22	5.22	23.16	0.02	83.89	112.29
595	37.42	8.41	20.94	0.02	79.75	109.12	625	23.06	5.18	23.47	0.02	83.81	112.48
596	39.86	8.29	20.76	0.01	79.87	108.93	626	22.74	5.11	23.69	0.02	83.63	112.45
597	38.19	8.59	20.53	0.01	79.61	108.74	627	23.42	5.26	23.82	0.02	83.15	112.25
598	41.11	9.24	20.44	0.01	78.71	108.40	628	23.45	5.27	24.00	0.02	82.68	111.97
599	44.07	9.91	20.26	0.01	78.05	108.23	629	23.09	5.19	24.11	0.02	82.11	111.43
600	48.20	10.84	20.08	0.01	77.32	108.25	630	21.46	4.82	24.16	0.02	81.66	110.66

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
631	21.84	4.91	24.26	0.02	81.03	110.22	661	39.67	8.92	18.66	0.03	86.69	114.30
632	21.58	4.85	24.37	0.02	80.61	109.85	662	36.13	8.12	18.47	0.02	87.35	113.96
633	21.76	4.89	24.42	0.01	80.01	109.33	663	37.03	8.32	18.30	0.02	86.80	113.44
634	20.34	4.57	24.54	0.01	79.92	109.04	664	41.86	9.41	18.18	0.02	84.99	112.60
635	21.14	4.75	24.57	0.01	79.12	108.45	665	64.33	14.46	18.22	0.02	79.21	111.91
636	20.91	4.70	24.67	0.01	78.73	108.11	666	66.24	14.89	18.06	0.02	78.64	111.61
637	20.81	4.68	24.76	0.01	78.28	107.73	667	54.64	12.28	17.87	0.02	81.04	111.21
638	20.38	4.58	24.86	0.01	77.93	107.38	668	51.82	11.65	17.68	0.02	81.75	111.10
639	21.63	4.86	25.02	0.01	77.29	107.18	669	51.29	11.53	17.68	0.02	81.35	110.58
640	21.75	4.89	25.20	0.01	77.02	107.12	670	57.50	12.93	17.66	0.01	79.67	110.27
641	21.79	4.90	25.40	0.01	76.74	107.05	671	58.67	13.19	17.77	0.01	79.20	110.17
642	21.39	4.81	25.49	0.01	76.57	106.88	672	58.23	13.09	17.88	0.01	79.07	110.05
643	21.26	4.78	25.37	0.01	76.61	106.77	673	56.96	12.80	18.10	0.01	79.15	110.06
644	21.46	4.82	25.40	0.01	76.41	106.64	674	54.30	12.21	18.16	0.01	79.59	109.97
645	18.48	4.15	25.45	0	77.12	106.72	675	57.92	13.02	18.22	0.01	78.74	109.99
646	20.81	4.68	25.65	0	76.35	106.68	676	34.41	7.74	20.89	0.02	81.17	109.82
647	21.48	4.83	26.00	0	75.90	106.73	677	32.30	7.26	20.80	0.02	82.29	110.37
648	20.74	4.66	26.07	0	76.02	106.75	678	35.92	8.07	20.68	0.02	81.92	110.69
649	19.69	4.43	26.13	0	76.26	106.82	679	30.09	6.76	20.53	0.02	83.67	110.98
650	19.50	4.38	25.98	0	76.44	106.80	680	29.96	6.74	20.40	0.02	84.32	111.48
651	22.12	4.98	25.84	0	76.02	106.84	681	29.96	6.74	20.36	0.02	84.90	112.02
652	21.65	4.87	26.00	0	76.05	106.92	682	31.78	7.14	20.30	0.02	84.93	112.39
653	20.73	4.66	26.17	0	76.13	106.96	683	31.20	7.01	20.24	0.02	85.94	113.21
654	20.45	4.60	26.37	0	76.09	107.06	684	35.27	7.93	20.18	0.02	85.96	114.09
655	20.69	4.65	26.50	0	75.85	107.00	685	28.73	6.46	20.13	0.03	88.23	114.85
656	20.33	4.57	26.63	0	75.88	107.08	686	41.66	9.37	20.55	0.01	78.22	108.15
657	21.02	4.73	26.80	0	75.70	107.23	687	41.02	9.22	20.72	0.01	77.98	107.93
658	20.85	4.69	26.80	0	75.70	107.19	688	42.53	9.56	20.80	0.01	77.33	107.70
659	30.86	6.94	19.10	0.03	88.01	114.08	689	43.14	9.70	20.93	0.01	76.82	107.46
660	33.45	7.52	18.87	0.03	87.65	114.07	690	43.93	9.88	21.05	0.01	76.17	107.11

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
691	40.88	9.19	21.26	0.0.1	76.56	107.02	721	26.06	5.86	25.10	0	77.85	108.81
692	40.42	9.09	21.45	0.01	76.52	107.07	722	27.18	6.11	24.96	0	77.40	10847
693	38.84	8.73	21.60	0.01	76.55	106.89	723	28.38	6.38	24.75	0	76.97	108.10
694	34.74	7.81	21.82	0.01	77.16	106.80	724	28.44	6.39	24.57	0	76.80	107.76
695	31.14	7.00	22.03	0.01	77.69	106.93	725	27.07	6.09	24.42	0	76.87	107.38
696	28.04	6.30	22.24	0.01	78.39	106.94	726	27.23	6.12	24.25	0	76.81	107.18
697	27.37	6.15	22.40	0.01	78.38	106.94	727	28.65	6.44	24.02	0	7658	107.04
698	27.18	6.11	22.55	0.01	78.13	106.80	728	28.19	6.34	23.90	0	76.56	106.80
699	26.85	6.04	22.74	0.01	77.89	106.68	729	23.96	5.39	24.00	0	77.25	106.64
700	27.67	6.22	22.78	0.01	77.58	106.59	730	22.05	4.96	24.03	0	77.35	106.34
701	25.71	5.78	22.98	0.01	77.82	106.59	731	25.36	5.70	23.85	0	76.94	106.49
702	25.47	5.73	23.13	0.01	77.60	106.47	732	29.57	6.65	23.68	0	76.24	106.57
703	24.51	5.51	23.35	0.01	77.68	106.55	733	30.69	6.90	23.52	0	76.11	106.53
704	21.62	4.86	23.53	0.01	78.21	106.61	734	32.01	7.20	23.34	0	75.93	106.47
705	19.24	4.33	23.72	0.01	78.60	106.66	735	32.85	7.38	23.22	0	75.79	106.39
706	19.02	4.28	23.93	0.01	78.45	106.67	736	35.15	7.90	23.04	0	75.46	106.40
707	19.52	4.39	24.13	0.01	78.28	106.81	737	35.41	7.96	22.85	0.01	75.43	106.25
708	20.69	4.65	24.31	0.01	78.09	107.06	738	34.59	7.78	22.76	0.01	75.70	106.25
709	21.82	4.91	24.46	0.01	77.62	107.00	739	32.80	7.37	22.76	0.01	76.15	106.29
710	20.95	4.71	24.64	0.01	77.52	106.88	740	30.25	6.80	22.95	0.01	76.74	106.50
711	21.76	4.89	24.83	0.01	77.32	107.05	741	25.46	5.72	22.76	0.01	78.34	106.83
712	21.18	4.76	25.74	0	76.52	107.02	742	24.46	5.50	22.73	0.01	78.72	106.96
713	21.14	4.75	25.75	0	76.65	107.15	743	22.52	5.06	22.71	0.01	79.65	107.43
714	20.02	4.50	25.60	0	77.20	107.30	744	22.59	5.08	22.70	0,01	80.24	108.03
715	19.84	4.46	25.53	0	77.66	107.65	745	22.05	4.96	22.75	0.01	80.94	108.66
716	19.16	4.31	25.60	0	78.09	108.00	746	20.62	4.64	22.90	0.02	81.52	109.08
717	22.48	5.05	25.45	0	77.91	108.41	747	20.85	4.69	23.01	0.02	82.07	109.79
718	24.39	5.48	25.45	0	77.32	108.25	748	20.82	4.68	23.19	0.02	82.46	110.35
719	23.86	5.36	25.30	0	77.77	108.43	749	21.03	4.73	23.29	0.02	82.96	111.00
720	25.05	5.63	25.18	0	77.94	108.75	750	22.00	4.95	23.36	0.02	83.30	111.63

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
751	22.73	5.11	23.24	0.02	83.79	112.16	781	47.09	10.59	23.80	0	73.96	108.35
752	22.53	5.06	23.09	0.02	84.20	112.37	782	34.72	7.81	20.34	0.02	82.96	111.13
753	20.62	4.64	24.80	0.01	79.61	109.06	783	62.33	14.01	20.13	0.02	76.58	110.74
754	22.17	4.98	25.00	0.01	78.79	108.78	784	63.18	14.20	19.94	0.02	76.82	110.98
755	21.93	4.93	25.20	0.01	78.64	108.78	785	71.00	15.96	19.75	0.02	75.47	111.20
756	20.97	4.71	25.41	0.01	79.04	109.17	786	62.41	14.03	19.52	0.02	77.75	111.32
757	21.67	4.87	25.63	0.01	78.66	109.17	787	64.14	14.42	19.31	0.02	77.74	111.49
758	21.21	4.77	25.80	0.01	78.57	109.15	788	65.30	14.68	19.08	0.02	77.68	111.46
759	21.62	4.86	25.97	0.02	78.59	109.44	789	63.43	14.26	18.88	0.02	78.40	111.56
760	21.11	4.75	26.15	0.02	78.90	109.82	790	64.36	14.47	18.68	0.02	78.44	111.61
761	20.75	4.66	26.37	0.02	79.06	110.11	791	66.04	14.85	18.45	0.02	78.46	111.78
762	20.21	4.54	26.54	0.02	78.85	109.95	792	68.02	15.29	18.25	0.02	78.15	111.71
763	12.12	2.72	26.72	0.01	78.68	108.13	793	58.91	13.24	17.83	0.02	80.26	111.35
764	19.00	4.27	26.50	0.01	78.54	109.32	794	62.21	13.98	17.63	0.02	79.85	111.48
765	18.40	4.14	26.28	0.01	78.65	109.08	795	62.64	14.08	17.40	0.02	80.10	111.60
766	20.64	4.64	26.12	0.01	77.94	108.71	796	65.68	14.76	17.23	0.02	79.91	111.92
767	16.16	3.63	25.97	0.01	78.94	108.55	797	67.85	15.25	17.03	0.02	79.71	112.01
768	17.41	3.91	25.76	0.01	78.39	108.07	798	74.84	15.48	16.87	0.02	78.82	111.19
769	21.21	4.77	25.83	0.01	77.13	107.74	799	83.76	18.83	16.69	0.02	77.32	112.86
770	20.94	4.71	26.02	0.01	76.96	107.70	800	86.22	19.38	16.51	0.01	76.95	112.85
771	21.40	4.81	26.15	0.01	76.63	107.60	801	44.29	9.96	20.66	0.01	77.17	107.80
772	20.36	4.58	26.22	0.01	76.49	107.30	802	48.67	10.94	20.60	0.01	76.13	107.63
773	20.80	4.68	26.09	0.01	76.28	107.06	803	54.18	12.18	20.55	0.01	75.10	107.84
774	21.16	4.76	25.89	0.01	76.23	106.89	804	59.35	13.34	20.53	0.01	73.99	107.87
775	21.28	4.78	25.05	0.01	77.00	106.84	805	62.94	14.15	20.59	0	73.46	108.20
776	17.98	4.04	24.83	0.01	77.87	106.75	806	63.91	14.37	20.65	0	73.26	108.28
777	19.64	4.42	24.67	0.01	77.34	106.44	807	58.32	13.11	20.85	0	73.64	107.60
778	19.63	4.41	24.45	0.01	77.47	106.34	808	54.39	12.23	21.09	0.01	74.02	107.35
779	19.12	4.30	24.28	0	77.80	106.38	809	52.05	11.70	21.30	0.01	74.13	107.14
780	35.58	8.00	23.87	0	75.75	107.62	810	52.49	11.80	21.45	0.01	74.05	107.31

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "
811	46.33	10.41	21.70	0.01	74.77	106.89	841	20.51	4.61	27.44	0	73.82	105.87
812	44.22	9.94	21.94	0.01	74.83	106.72	842	20.21	4.54	27.53	0	74.05	106.12
813	41.67	9.37	22.17	0.01	74.97	106.52	843	19.91	4.48	27.62	0	74.44	106.54
814	38.69	8.70	22.43	0.01	75.29	106.43	844	63.02	14.17	17.51	0.02	79.92	111.62
815	42.78	9.62	22.40	0.01	74.52	106.55	845	65.47	14.72	17.56	0.02	79.70	112.00
816	44.93	10.10	22.42	0	74.35	106.87	846	69.48	15.62	17.65	0.02	79.16	112.45
817	49.27	1.1.08	22.45	0	73.90	107.43	847	69.34	15.59	17.66	0.02	79.41	112.68
818	56.57	12.72	22.45	0	72.89	108.06	848	41.25	9.27	17.64	0.03	86.10	113.04
819	63.08	14.18	22.29	0	72.14	108.61	849	41.41	9.31	17.71	0.03	86.61	113.66
820	69.54	15.63	22.15	0	71.22	109.00	850	45.71	10.28	17.66	0.03	85.57	113.54
821	63.58	14.29	23.65	0	70.35	108.29	851	48.60	10.93	17.59	0.03	84.53	113.08
822	79.46	17.86	23.49	0	66.95	108.30	852	45.79	10.29	17.68	0.03	85.20	113.20
823	95.36	21.44	23.40	0	63.08	107.92	853	41.25	9.27	17.76	0.03	87.45	114.51
824	78.79	17.71	23.43	0	66.73	107.87	854	40.47	9.10	17.78	0.03	88.42	115.33
825	57.42	12.91	23.54	0	71.23	107.68	855	42.50	9.55	17.82	0.04	88.85	116.26
826	28.03	6.30	25.20	0	76.25	107.75	856	29.23	6.57	17.84	0.04	91.75	116.20
827	28.43	6.39	25.30	0	75.78	107.47	857	23.69	5.33	17.91	0.04	92.66	115.94
828	27.14	6.10	25.48	0	75.55	107.13	858	20.50	4.61	26.80	0	75.68	107.09
829	24.07	5.41	25.65	0	76.26	107.32	859	20.77	4.67	26.74	0	75.55	106.96
830	19.75	4.44	25.92	0	76.88	107.24	860	21.15	4.75	26.82	0	74.93	106.50
831	19.41	4.36	26.13	0	76.52	107.01	861	20.85	4.69	27.00	0	74.57	106.26
832	19.23	4.32	26.10	0	76.02	106.44	862	20.80	4.68	27.23	0	74.35	106.26
833	18.98	4.27	26.07	0	75.94	106.28	863	20.65	4.64	27.39	0	74.05	106.08
834	20.21	4.54	26.05	0	75.18	105.77	864	20.62	4.64	27.60	0	73.33	105.57
835	18.87	4.24	26.27	0	75.06	105.57	865	20.51	4.61	27.65	0	72.95	105.21
836	19.23	4.32	26.42	0	74.98	105.72	866	20.99	4.72	27.73	0	72.42	104.87
837	20.23	4.55	26.65	0	74.59	105.79	867	20.76	4.67	27.90	0	72.08	104.65
838	19.17	4.31	26.85	0	74.64	105.80	868	20.57	4.62	28.04	0	71.68	104.34
839	20.05	4.51	27.08	0	74.12	105.71	869	20.54	4.62	28.20	0	71.36	104.18
840	18.51	4.16	27.28	0	74.33	105.77	870	18.07	4.06	28.30	0	71.91	104.27

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
871	20.13	4.53	28.47	0	71.63	104.63	901	32.01	7.20	15.03	0.04	100.72	122.99
872	19.07	4.29	28.68	0	71.70	104.67	902	29.28	6.58	15.30	0.04	100.91	122.83
873	19.98	4.49	28.89	0	71.39	104.77	903	30.98	6.96	15.51	0.04	99.93	122.44
874	20.19	4.54	29.06	0	71.06	104.66	904	34.20	7.69	15.71	0.04	99.07	122.51
875	20.21	4.54	29.25	0	70.84	104.63	905	31.84	7.16	15.50	0.04	98.95	121.65
876	20.40	4.59	29.43	0	70.54	104.56	906	28.75	6.46	15.75	0.04	99.97	122.22
877	18.96	4.26	29.60	0	70.74	104.60	907	26.44	5.94	15.78	0.04	100.03	121.49
878	19.81	4.45	29.71	0	70.81	104.97	908	26.70	6.00	15.93	0.04	99.14	121.11
879	20.30	4.56	29.65	0	71.08	105.29	909	28.46	6.40	16.05	0.04	97.78	120.27
880	19.88	4.47	29.65	0	71.55	105.67	910	13.30	2.99	21.96	0.03	90.42	115.40
881	1913	4.30	2955	0	72.03	105.88	911	14.66	3.30	21.85	0.03	90.11	115.29
882	19.13	4.30	29.33	0	72.09	105.72	912	19.76	4.44	21.64	0.03	89.41	115.52
883	19.05	4.28	29.23	0	72.64	106.15	913	21.66	4.87	21.40	0.03	89.11	115.41
884	20.41	4.59	29.15	0	72.47	106.21	914	19.22	4.32	21.32	0.03	88.86	114.53
885	19.82	4.46	29.02	0	72.77	106.25	915	16.07	3.61	21.31	0.04	88.27	113.23
886	20.79	4.67	29.07	0	72.96	106.70	916	21.52	4.84	21.02	0.04	86.66	112.56
887	20.89	4.70	28.98	0	73.08	106.76	917	22.61	5.08	20.89	0.04	86.53	112.54
888	20.07	4.51	28.83	0	73.34	106.68	918	22.42	5.04	20.65	0.04	87.24	112.97
889	19.80	4.45	28.68	0	73.61	106.74	919	22.99	5.17	20.52	0.04	87.44	113.17
890	20.63	4.64	28.55	0	73.68	106.87	920	22.69	5.10	27.27	0.02	80.22	112.61
891	20.50	4.61	28.42	0	73.61	106.64	921	24.85	5.59	27.42	0.03	79.72	112.76
892	20.83	4.68	28.27	0	73.41	106.36	922	23.46	5.27	27.59	0.03	80.05	112.94
893	20.18	4.54	28.17	0	73.93	106.64	923	23.10	5.19	27.79	0.03	80.26	113.27
894	20.73	4.66	27.97	0	73.82	106.45	924	23.25	5.23	27.97	0.04	80.81	114.05
895	21.06	4.73	2788	0	74.10	106.71	925	23.37	5.25	28.13	0.04	81.36	114.78
896	20.89	4.70	27.76	0	74.50	106.96	926	23.45	5.27	28.22	0.04	81.98	115.51
897	20.61	4.63	27.53	0	74.83	106.99	927	24.19	5.44	28.27	0.04	82.21	115.96
898	20.59	4.63	27.37	0	75.21	107.21	928	25.78	5.80	28.29	0.05	82.06	116.20
899	20.58	4.63	27.15	0	75.52	107.30	929	28.45	6.40	28.29	0.05	81.84	116.58
900	20.81	4.68	26.98	0	75.60	107.26	930	28.47	6.40	28.46	0.05	81.73	116.64

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
931	30.71	6.90	28.53	0.06	80.72	116.21	961	23.51	5.29	28.60	0.01	75.70	109.60
932	34.34	7.72	28.63	0.06	79.60	116.01	962	23.33	5.24	28.72	0.01	75.63	109.60
933	32.20	7.24	28.76	0.06	79.20	115.26	963	23.12	5.20	28.76	0	75.59	109.55
934	28.87	6.49	28.93	0.07	79.02	114.51	964	23.09	5.19	28.85	0	75.52	109.56
935	30.36	6.82	29.05	0.07	78.30	114.24	965	23.11	5.20	28.98	0	75.59	109.77
936	29.15	6.55	29.20	0.07	78.19	114.01	966	23.42	5.26	29.14	0	75.46	109.86
937	33.02	7.42	29.10	0.07	78.12	114.71	967	23.40	5.26	29.30	0	75.56	110.12
938	31.41	7.06	29.07	0.08	78.20	114.41	968	23.12	5.20	29.49	0	75.63	110.32
939	30.85	6.94	29.12	0.08	78.25	114.39	969	22.96	5.16	29.69	0	75.83	110.68
940	31.35	7.05	29.12	0.08	77.72	113.97	970	22.72	5.11	29.84	0	75.96	110.91
941	31.19	7.01	29.15	0.09	76.97	113.22	971	22.44	5.04	30.04	0	76.19	111.27
942	32.34	7.27	29.17	0.09	76.15	112.68	972	23.31	5.24	30.27	0	76.30	111.81
943	32.56	7.32	29.17	0.09	75.85	112.43	973	28.83	6.48	30.47	0	74.97	111.92
944	32.94	7.40	29.22	0.09	75.67	112.38	974	26.67	6.00	30.69	0	75.68	112.37
945	32.94	7.40	29.14	0.10	75.59	112.23	975	28.82	6.48	30.88	0	74.70	112.06
946	33.80	7.60	29.11	0.10	75.43	112.24	976	26.79	6.02	31.07	0	75.15	112.24
947	22.16	4.98	26.98	0.02	79.69	111.67	977	28.38	6.38	31.27	0	74.78	112.43
948	22.66	5.09	26.92	0.02	79.21	111.24	978	24.22	5.44	31.45	0	75.38	112.27
949	22.63	5.09	27.02	0.02	78.73	110.86	979	23.85	5.36	31.68	0	75.48	112.52
950	22.47	5.05	27.15	0.02	78.42	110.64	980	22.46	5.05	31.91	0	75.55	112.51
951	24.20	5.44	27.36	0.02	77.86	110.68	981	19.66	4.42	32.05	0	75.62	112.09
952	23.97	5.39	27.52	0.02	77.57	110.50	982	19.73	4.44	32.14	0	75.27	111.85
953	23.90	5.37	27.68	0.01	77.26	110.32	983	20.27	4.56	32.25	0	74.95	111.76
954	21.02	4.73	27.82	0.01	77.73	110.29	984	19.53	4.39	32.34	0	74.21	110.94
955	18.94	4.26	27.97	0.01	77.94	110.18	985	20.22	4.55	32.40	0	72.96	109.91
956	20.75	4.66	28.04	0.01	77.54	110.25	986	20.47	4.60	32.55	0	72.25	109.40
957	20.53	4.62	28.12	0.01	77.31	110.06	987	19.86	4.46	32.70	0	71.97	109.13
958	20.29	4.56	28.23	0.01	77.14	109.94	988	32.94	7.40	30.75	0	73.37	111.52
959	23.67	5.32	28.33	0.01	76.05	109.71	989	34.31	7.71	30.97	0	74.67	113.35
960	23.79	5.35	28.49	0.01	75.79	109.64	990	34.72	7.81	31.19	0	75.22	114.22

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "
991	32.94	7.40	31.39	0	75.73	114.52	1021	20.04	4.50	31.57	0.01	77.68	113.76
992	28.20	6.34	31.55	0	76.44	114.33	1022	20.35	4.57	31.77	0.01	77.80	114.15
993	21.50	4.83	31.70	0	76.98	113.51	1023	20.04	4.50	31.95	0.02	77.99	114.46
994	18.49	4.16	31.90	0	77.53	113.59	1024	20.67	4.65	32.13	0.02	78.02	114.82
995	18.18	4.09	32.08	0	77.25	113.42	1025	22.65	5.09	32.33	0.02	77.62	115.06
996	18.63	4.19	32.25	0	77.15	113.59	1026	20.26	4.55	32.52	0.03	78.28	115.38
997	19.47	4.38	32.43	0	76.85	113.66	1027	20.10	4.52	32.75	0.03	78.18	115.48
998	19.62	4.41	32.67	0	76.80	113.88	1028	20.09	4.52	33.00	0.03	78.17	115.72
999	20.06	4.51	32.90	0.01	76.72	114.14	1029	19.18	4.31	33.25	0.03	78.12	115.71
1000	20.01	4.50	33.09	0.01	76.79	114.39	1030	18.93	4.26	33.52	0.03	77.92	115.73
1001	20.55	4.62	33.29	0.01	76.68	114.60	1031	19.59	4.40	33.74	0.03	77.35	115.52
1002	19.69	4.43	33.42	0.01	76.77	114.63	1032	19.54	4.39	33.94	0.03	77.09	115.45
1003	19.57	4.40	33.40	0.01	76.95	114.76	1033	19.62	4.41	34.18	0.03	76.92	115.54
1004	19.24	4.33	33.40	0.01	77.29	115.03	1034	19.68	4.42	33.38	0.03	77.93	115.76
1005	19.03	4.28	33.41	0.01	77.43	115.13	1035	20.07	4.51	33.18	0.03	78.21	115.93
1006	18.83	4.23	33.45	0.02	77.56	115.26	1036	20.15	4.53	32.95	0.04	78.55	116.07
1007	18.79	4.22	33.56	0.02	77.38	115.18	1037	21.39	4.81	32.72	0.04	78.35	115.92
1008	19.19	4.31	33.77	0.02	77.05	115.15	1038	21.54	4.84	32.55	0.04	78.59	116.02
1009	18.74	4.21	33.94	0.02	77.00	115.17	1039	21.59	4.85	32.37	0.04	79.98	117.24
1010	18.70	4.20	34.09	0.03	76.85	115.17	1040	21.66	4.87	32.16	0.04	79.23	116.30
1011	18.99	4.27	34.30	0.03	76.83	115.43	1041	22.20	4.99	31.98	0.04	79.35	116.36
1012	19.39	4.36	34.38	0.03	76.71	115.48	1042	22.42	5.04	31.78	0.04	79.54	116.40
1013	22.16	4.98	30.12	0	77.67	112.77	1043	22.86	5.14	31.58	0.04	79.63	116.39
1014	20.42	4.59	30.30	0	77.91	112.80	1044	22.95	5.16	31.37	0.04	79.73	116.30
1015	19.04	4.28	30.48	0	78.02	112.78	1045	23.31	5.24	31.13	0.04	79.78	116.19
1016	18.61	4.18	30.70	0.01	78.01	112.90	1046	23.78	5.35	30.92	0.04	79.82	116.13
1017	18.95	4.26	30.90	0.01	77.70	112.87	1047	23.97	5.39	30.68	0.04	79.87	115.98
1018	19.16	4.31	31.07	0.01	77.61	113.00	1048	24.87	5.59	30.48	0.04	79.72	115.83
1019	19.44	4.37	31.25	0.01	77.67	113.30	1049	26.88	6.04	30.50	0.05	80.19	116.78
1020	18.97	4.26	31.41	0.01	77.85	113.53	1050	26.62	5.98	30.40	0.05	79.85	116.28

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_n ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_o ″
1051	26.57	5.97	30.47	0.04	79.69	116.17	1081	17.14	3.85	35.50	0.01	75.60	114.96
1052	26.53	5.96	30.38	0.04	79.66	116.04	1082	16.78	3.77	35.53	0.01	75.76	115.07
1053	25.59	5.75	30.24	0.04	79.56	115.59	1083	17.19	3.86	35.67	0.01	75.62	115.16
1054	25.19	5.66	30.09	0.04	79.25	115.04	1084	16.74	3.76	35.62	0.01	75.64	115.03
1055	24.68	5.55	29.96	0.03	74.10	114.64	1085	17.31	3.89	35.59	0.01	75.57	115.06
1056	24.55	5.52	29.83	0.03	78.99	114.37	1086	17.09	3.84	35.55	0.01	75.80	115.20
1057	24.38	5.48	29.68	0.03	78.64	113.83	1087	17.14	3.85	35.59	0.01	75.63	115.08
1058	24.54	5.52	29.48	0.02	78.37	113.39	1088	16.37	3.68	35.46	0	76.00	115.14
1059	24.43	5.49	29.30	0.02	78.28	113.09	1089	15.38	3.46	35.45	0	76.20	115.11
1060	24.20	5.44	29.12	0.02	78.09	112.67	1090	15.01	3.37	35.47	0	75.96	114.80
1061	23.83	5.36	28.98	0.02	77.91	112.27	1091	17.01	3.82	35.41	0	75.39	114.62
1062	23.92	5.38	28.89	0.02	77.60	111.89	1092	16.98	3.82	35.36	0	75.41	114.59
1063	23.92	5.38	28.82	0.01	77.28	111.49	1093	16.99	3.82	35.28	0	75.26	114.36
1064	23.81	5.35	28.74	0.01	76.98	111.08	1094	17.16	3.86	35.24	0	75.11	114.21
1065	23.81	5.35	28.58	0.01	76.60	110.54	1095	17.43	3.92	35.03	0	75.05	114.00
1066	23.69	5.33	28.45	0.01	76.35	110.14	1096	17.28	3.88	34.90	0	75.06	113.84
1067	19.33	4.35	34.41	0.04	76.82	115.62	1097	17.27	3.88	34.83	0	75.14	113.85
1068	19.46	4.37	34.48	0.04	77.07	115.96	1098	16.00	3.60	34.70	0	75.41	113.71
1069	19.67	4.42	34.66	0.04	76.91	116.03	1099	16.04	3.61	34.60	0	75.29	113.50
1070	19.13	4.30	34.89	0.04	76.70	115.93	1100	16.76	3.77	34.54	0	75.11	113.42
1071	18.62	4.19	35.11	0.04	76.50	115.84	1101	17.05	3.83	34.47	0	74.92	113.22
1072	19.60	4.41	35.35	0.04	75.87	115.67	1102	17.64	3.97	34.31	0	74.89	113.17
1073	20.82	4.68	35.59	0.04	75.32	115.63	1103	18.42	4.14	34.08	0	75.06	113.28
1074	19.62	4.41	35.73	0.04	75.57	115.75	1104	18.55	4.17	33.98	0	74.69	112.84
1075	18.18	4.09	35.56	0.03	75.64	115.32	1105	17.63	3.96	33.82	0	74.73	112.51
1076	18.32	4.12	35.59	0.03	75.28	115.02	1106	17.58	3.95	33.64	0	74.39	111.98
1077	18.25	4.10	35.58	0.03	75.24	114.95	1107	17.33	3.90	33.56	0	73.98	111.44
1078	17.53	3.94	35.63	0.02	75.28	114.87	1108	18.20	4.09	33.45	0	73.23	110.77
1079	17.54	3.94	35.60	0.02	75.29	114.85	1109	18.30	4.11	33.35	0	72.62	110.09
1080	16.95	3.81	35.48	0.02	75.60	114.91	1110	18.57	4.17	33.37	0	71.80	109.34

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "
1111	19.13	4.30	33.32	0	70.89	108.51	1141	17.90	4.02	32.93	0	76.49	113.44
1112	19.68	4.42	33.13	0	70.77	108.32	1142	17.72	3.98	33.13	0	76.31	113.42
1113	19.91	4.48	32.95	0	71.25	108.68	1143	18.05	4.06	33.30	0	75.97	113.33
1114	18.33	4.12	34.50	0.03	76.46	115.11	1144	18.06	4.06	33.50	0	75.93	113.49
1115	18.83	4.23	34.65	0.03	76.01	114.92	1145	17.07	3.84	33.71	0	76.13	113.68
1116	17.38	3.91	34.78	0.02	76.14	114.85	1146	16.92	3.80	33.91	0	75.96	113.67
1117	17.28	3.88	34.75	0.02	76.23	114.88	1147	18.17	4.08	34.11	0	75.69	113.88
1118	17.03	3.83	34.60	0.02	76.41	114.86	1148	18.58	4.18	34.35	0	75.62	114.15
1119	16.69	3.75	34.48	0.02	76.68	114.93	1149	18.43	4.14	34.50	0	75.47	114.11
1120	17.01	3.82	34.34	0.01	76.91	115.08	1150	18.88	4.24	34.55	0	75.27	114.06
1121	17.93	4.03	34.14	0.01	76.84	115.02	1151	18.16	4.08	34.67	0	75.31	114.06
1122	17.64	3.97	34.24	0.01	76.69	114.91	1152	17.56	3.95	34.73	0	75.30	113.98
1123	16.88	3.79	34.22	0.01	76.85	114.87	1153	17.52	3.94	34.88	0	75.12	113.94
1124	17.38	3.91	34.10	0.01	76.89	114.91	1154	16.80	3.78	34.15	0	75.63	113.56
1125	18.00	4.05	33.95	0.01	76.81	114.82	1155	17.14	3.85	34.11	0	75.69	113.65
1126	18.46	4.15	33.96	0.01	76.70	114.82	1156	16.47	3.70	34.10	0	75.89	113.69
1127	19.49	4.38	33.73	0.01	76.62	114.74	1157	16.15	3.63	34.05	0	75.92	113.60
1128	19.53	4.39	33.53	0.01	76.65	114.58	1158	16.38	3.68	33.96	0	76.05	113.69
1129	18.58	4.18	29.02	0	75.15	108.35	1159	16.23	3.65	33.91	0	76.29	113.85
1130	18.14	4.08	34.05	0.01	76.61	114.75	1160	16.41	3.69	33.82	0	76.38	113.89
1131	18.27	4.11	34.23	0.01	76.34	114.69	1161	16.53	3.72	33.72	0	76.32	113.76
1132	18.23	4.10	34.51	0.01	76.24	114.86	1162	17.23	3.87	33.32	0	76.05	113.24
1133	17.90	4.02	34.73	0.01	76.18	114.94	1163	17.04	3.83	33.07	0	76.20	113.10
1134	17.59	3.95	34.93	0.01	76.30	115.19	1164	17.68	3.97	32.83	0	76.07	112.87
1135	16.05	3.61	35.12	0.01	76.55	115.29	1165	17.18	3.86	32.88	0	76.43	113.17
1136	16.77	3.77	35.32	0.01	76.07	115.17	1166	17.12	3.85	32.85	0	76.68	113.38
1137	18.18	3.86	35.37	0.01	75.86	115.10	1167	19.90	4.47	32.66	0	76.46	113.59
1138	17.40	3.91	35.46	0.01	75.76	115.14	1168	22.01	4.95	32.48	0	76.16	113.59
1139	19.67	4.42	32.86	0	76.62	113.90	1169	24.48	5.50	32.28	0	76.26	114.04
1140	19.07	4.29	32.78	0	76.48	113.55	1170	28.85	6.49	32.06	0	75.97	114.52

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 "
1171	32.02	7.21	31.85	0	75.65	114.71	1201	26.70	6.00	30.88	0	76.92	113.80
1172	33.55	7.54	31.69	0	75.15	114.38	1202	25.23	5.67	30.64	0	77.01	113.32
1173	27.58	6.20	31.67	0	75.90	113.77	1203	22.63	5.09	30.42	0	77.45	112.96
1174	18.62	4.19	32.62	0	74.94	111.75	1204	19.84	4.46	31.51	0	77.57	113.54
1175	18.40	4.14	32.85	0	75.26	112.25	1205	20.24	4.55	31.68	0	77.38	113.61
1176	18.23	4.10	32.92	0	75.80	112.82	1206	20.26	4.55	31.83	0	77.26	113.64
1177	18.19	4.09	33.03	0	76.08	113.20	1207	16.48	3.70	35.30	0.02	75.78	114.80
1178	17.73	3.99	33.00	0	76.55	113.54	1208	16.52	3.71	35.05	0.02	75.87	114.65
1179	18.13	4.08	33.17	0	76.53	113.78	1209	17.67	3.97	34.98	0.02	75.63	114.60
1180	18.01	4.05	33.25	0	76.60	113.90	1210	21.01	4.72	29.59	0.02	78.91	113.24
1181	17.09	3.84	33.35	0	76.55	113.74	1211	20.77	4.67	29.66	0.02	78.72	113.07
1182	16.72	3.76	33.56	0	76.32	113.64	1212	21.39	4.81	29.59	0.02	78.36	112.78
1183	16.40	3.69	33.76	0	76.17	113.62	1213	21.25	4.78	29.74	0.02	78.26	112.80
1184	20.52	4.61	33.23	0.01	76.79	114.64	1214	20.96	4.71	29.86	0.02	78.16	112.75
1185	19.80	4.45	33.05	0.01	77.19	114.70	1215	20.99	4.72	30.03	0.01	78.14	112.90
1186	20.37	4.58	32.91	0.01	77.28	114.78	1216	20.91	4.70	30.21	0.01	78.12	113.04
1187	20.33	4.57	32.71	0.01	77.34	114.63	1217	20.71	4.66	30.36	0.02	78.21	113.25
1188	20.49	4.61	32.54	0.01	77.46	114.62	1218	20.83	4.68	30.58	0.02	78.02	113.30
1189	20.43	4.59	32.34	0.01	77.54	114.48	1219	21.43	4.82	30.59	0.02	77.99	113.42
1190	21.09	4.74	32.31	0.01	77.53	114.59	1220	21.15	4.75	30.76	0.02	78.17	113.80
1191	21.71	4.88	32.26	0.02	77.68	114.84	1221	21.62	4.86	30.95	0.02	78.11	113.94
1192	19.63	4.41	32.28	0.01	77.61	114.31	1222	20.87	4.69	31.15	0.02	78.32	114.18
1193	19.94	4.48	32.18	0.01	77.45	114.12	1223	21.30	4.79	31.25	0.02	77.99	114.05
1194	19.25	4.33	32.03	0.01	77.47	113.84	1224	21.20	4.77	31.22	0.02	77.85	113.86
1195	18.39	4.13	31.89	0.01	77.52	113.55	1225	20.81	4.68	31.43	0.02	77.78	113.91
1196	18.35	4.13	31.81	0.01	77.46	113.41	1226	20.57	4.62	31.65	0.01	77.72	114.00
1197	18.15	4.08	31.63	0	77.66	113.37	1227	21.55	4.84	31.02	0.02	78.37	114.25
1198	18.05	4.06	31.52	0	77.85	113.43	1228	21.64	4.86	31.11	0.03	78.63	111.63
1199	20.28	4.56	31.29	0	77.54	113.39	1229	21.60	4.86	31.23	0.03	78.93	115.05
1200	20.76	4.67	31.10	0	77.55	113.32	1230	21.73	4.88	31.30	0.03	79.09	115.30

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	$\Delta g_0''$
1231	21.86	4.91	31.38	0.04	79.37	115.70	1261	21.69	4.88	28.84	0.04	80.63	114.39
1232	22.41	5.04	31.37	0.04	79.52	115.97	1262	22.04	4.95	29.02	0.04	80.97	114.98
1233	19.73	4.44	29.19	0	76.56	110.19	1263	22.45	5.05	29.25	0.04	81.16	115.50
1234	18.83	4.23	29.40	0	76.92	110.55	1264	23.12	5.20	29.38	0.05	81.32	115.95
1235	19.14	4.30	29.31	0	76.88	110.49	1265	23.97	5.39	29.58	0.05	81.34	116.36
1236	19.66	4.42	29.34	0.01	76.89	110.66	1266	24.77	5.57	29.73	0.05	81.63	116.98
1237	19.83	4.46	29.34	0.01	77.06	110.87	1267	25.05	5.63	29.75	0.05	82.16	117.59
1238	20.00	4.50	29.44	0.01	77.23	111.18	1268	25.93	5.83	29.92	0.05	82.17	117.97
1239	20.21	4.54	29.60	0.01	77.36	111.51	1269	26.47	5.95	30.03	0.05	81.56	117.59
1240	19.58	4.40	29.80	0.01	77.67	111.88	1270	17.63	3.96	30.10	0.06	83.86	117.98
1241	19.19	4.31	29.92	0.01	78.03	112.27	1271	26.92	6.05	30.22	0.06	82.02	118.35
1242	19.86	4.46	30.02	0.01	78.00	112.49	1272	26.28	5.91	30.43	0.06	82.29	118.69
1243	18.93	4.26	29.70	0.01	77.40	111.37	1273	25.69	5.78	30.60	0.06	82.23	118.67
1244	18.58	4.18	29.81	0.01	77.49	111.49	1274	25.35	5.70	30.72	0.06	81.74	118.22
1245	18.43	4.14	29.94	0.01	77.63	111.72	1275	31.01	6.97	30.77	0.06	80.00	117.80
1246	18.42	4.14	30.07	0	77.84	112.05	1276	29.73	6.68	30.65	0.05	80.17	117.55
1247	18.65	4.19	30.23	0	77.76	112.18	1277	25.39	5.71	29.56	0.05	82.10	117.42
1248	24.12	5.42	29.98	0	76.75	112.15	1278	24.17	5.43	29.32	0.05	82.51	117.31
1249	22.21	4.99	29.81	0	76.88	111.68	1279	24.51	5.51	29.17	0.05	82.58	117.31
1250	22.95	5.16	29.34	0.02	79.23	113.75	1280	24.23	5.45	29.14	0.05	82.76	117.40
125[illegible]	22.22	5.00	29.15	0.03	79.57	113.75	1281	26.00	5.84	29.06	0.06	82.39	117.35
1252	21.48	4.83	28.95	0.03	79.79	113.60	1282	25.83	5.81	28.86	0.06	82.37	117.10
1253	20.83	4.68	28.75	0.03	79.99	113.45	1283	28.32	6.37	28.62	0.06	81.63	116.68
125[illegible]	20.62	4.64	28.54	0.03	30.32	113.53	1284	22.72	5.11	26.76	0.02	79.94	111.83
1255	20.63	4.64	28.34	0.03	80.31	113.22	1285	23.05	5.18	26.70	0.02	79.86	111.76
1256	20.36	4.58	28.13	0.03	80.35	113.09	1286	23.42	5.26	26.70	0.03	79.78	111.77
1257	24.08	5.41	27.98	0.03	79.42	112.84	1287	25.33	5.69	26.82	0.03	79.78	112.32
1258	20.74	4.66	28.34	0.03	80.34	113.37	1288	27.36	6.15	26.97	0.03	79.41	112.56
1259	21.35	4.80	26.50	0.03	80.25	113.58	1289	22.26	5.00	27.15	0.04	81.06	113.25
1260	21.60	4.86	28.66	0.04	80.43	113.99	1290	22.39	5.03	27.15	0.04	81.56	113.78

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″	Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 ″
1291	22.71	5.11	27.06	0.04	81.93	114.14	1321	47.99	10.79	23.16	0.05	77.61	111.61
1292	22.48	5.05	27.05	0.04	82.44	114.58	1322	41.92	9.42	22.94	0.05	79.70	112.11
1293	26.05	5.86	27.03	0.06	81.65	114.59	1323	40.40	9.08	22.72	0.05	80.64	112.49
1294	27.43	6.17	26.89	0.05	81.26	114.37	1324	38.34	8.62	22.50	0.05	81.64	112.81
1295	30.53	6.86	26.69	0.05	80.36	113.96	1325	19.85	4.46	28.35	0	75.63	108.44
1296	27.33	6.14	26.48	0.05	81.20	113.87	1326	13.88	3.12	28.12	0	77.02	108.26
1297	25.63	5.76	26.23	0.05	81.75	113.79	1327	18.97	4.26	27.92	0	75.75	107.93
1298	27.72	6.23	26.00	0.04	81.54	113.81	1328	14.06	3.16	27.80	0	76.87	107.83
1299	28.90	6.38	25.78	0.04	81.74	113.94	1329	19.98	4.49	27.73	0	75.63	107.85
1300	29.11	5.54	25.55	0.04	82.10	114.23	1330	20.70	4.65	27.66	0	75.48	107.79
1301	28.58	6.42	25.32	0.04	82.53	114.31	1331	20.33	4.57	27.58	0	75.62	107.77
1302	26.03	5.85	25.08	0.04	83.52	114.49	1332	20.30	4.57	27.50	0	75.69	107.76
1303	24.00	5.40	24.86	0.04	84.27	114.57	1333	15.56	3.50	27.63	0.01	77.01	108.15
1304	24.47	5.50	24.63	0.04	84.51	114.68	1334	19.59	4.46	27.72	0.01	76.29	108.48
1305	27.20	6.11	24.38	0.04	84.18	114.71	1335	19.77	4.44	27.66	0.01	76.62	108.73
1306	28.62	6.43	24.18	0.04	84.06	114.71	1336	19.74	4.44	27.57	0.01	76.77	108.79
1307	24.31	5.46	24.11	0.04	84.67	114.28	1337	15.10	3.39	27.43	0.01	78.15	108.98
1308	23.89	5.37	23.97	0.04	84.76	114.14	1338	19.85	4.46	27.81	0.01	76.93	109.21
1309	23.23	5.22	23.73	0.04	85.89	114.88	1339	13.06	2.94	26.53	0.02	81.61	111.10
1310	27.13	6.10	23.45	0.04	84.97	114.56	1340	20.52	4.61	26.36	0.02	80.25	111.24
1311	25.55	5.74	23.25	0.04	85.58	114.61	1341	20.94	4.71	26.24	0.02	80.38	111.35
1312	24.41	5.49	23.04	0.04	86.32	114.89	1342	19.02	4.28	26.12	0.02	81.31	111.73
1313	24.30	5.46	22.85	0.04	86.68	115.03	1343	21.80	4.90	26.00	0.02	80.82	111.74
1314	27.88	6.27	24.07	0.04	83.33	113.71	1344	21.53	4.84	25.84	0.03	80.94	111.65
1315	29.12	6.55	23.98	0.05	82.65	113.23	1345	22.17	4.98	25.73	0.03	80.93	111.67
1316	33.00	7.42	23.91	0.05	81.26	112.64	1346	22.71	5.11	25.53	0.03	81.27	111.94
1317	45.48	10.22	23.82	0.05	77.60	111.69	1347	22.16	4.98	25.31	0.03	81.54	111.86
1318	38.68	8.70	23.70	0.05	78.62	111.07	1348	22.20	4.99	25.11	0.03	81.79	111.92
1319	36.86	8.29	23.54	0.05	79.05	110.93	1349	21.61	4.86	24.93	0.02	82.14	111.95
1320	40.22	9.04	23.38	0.05	78.66	111.13	1350	21.89	4.92	24.70	0.02	82.36	112.00

Station No.	Elevation (meter)	Combined correction	Normal correction	Topographic correction	Δg	Δg_0 〃
1351	21.01	4.72	24.54	0.02	82.32	111.60
1352	23.84	5.36	27.87	0.02	77.33	110.58
1353	24.32	5.47	27.90	0.02	77.63	111.02
1354	23.86	5.36	27.89	0.02	78.22	111.49
1355	23.95	5.38	27.90	0.02	78.72	112.02
1356	24.27	5.46	27.82	0.03	79.61	112.92
1357	22.86	5.14	27.57	0.03	79.98	112.72
1358	32.92	7.40	28.11	0.05	80.76	116.32
1359	26.48	5.95	27.89	0.05	82.05	115.94
1360	26.15	5.88	27.58	0.05	82.00	115.61
1361	25.02	5.62	27.45	0.05	82.17	115.29
1362	22.29	5.01	27.25	0.05	82.55	114.86
1363	14.90	3.35	28.45	0	76.75	108.55
1364	17.22	3.87	28.62	0	76.09	108.58
1365	19.95	4.48	28.76	0	75.22	108.46
1366	19.22	4.32	28.86	0	75.13	108.31

Appendix 2 Statistics of the Gravimetric Survey

Total survey period	14-Feb. ---- 30 April	74 days
Field survey period	18-Feb. ---- 21-April	63 days

No. of H Base stations	11 stations
No. of A Base stations	9 stations
No. of stations	1365 stations
Total	1385 stations
Survey area	370 Sq. miles
Length of the levelling survey	432 miles
Length of the plane table survey	33.4 miles
Interval of stations	0.3 miles
Gravity density	3.74 sta/mi^2
Gravity Coverage	0.27 mi^2/sta
Overall Production	659.5 sta/party-month

Appendix 3. References.

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Geological map of the Southern part of Central Burma
(scale 1 inch : 4 mile)

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