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GEOPHYSICAL REPORT
ON
INDUCED POLARIZATION SURVEY
OF EASTERN PART OF THE PROPERTY OF
SHEBA COPPER MINES LTD. (N.P.L.)
HIGHLAND VALLEY, KAMLOOPS M. D.

BY

TAKEO YOKOYAMA

September 20, 1967

CLAIMS SURVEYED

CU # 1-6 (incl.)
CU #17-20 (incl.)
DO # 1-6 (incl.)

DO # 2 Fr.-8 Fr. (incl.)
ANN #5, 6, 16 & 17 Frs.
JJ # 1 Fr.

and

ANN # 2 Fr.
JJ # 2 Fr.
DO # 1 Fr.

J # 3, 5, 21 & 32
J # 33 Fr. - 38 Fr. (incl.)
JAY # 11-2- (incl.)

LOCATION

HIGHLAND VALLEY - 4MILES SSE OF BETHLEHEM MINE
50° 120° S W

SUPERVISING ENGINEER

Gordon R. Hilchey, P. Eng.

FIELD WORK

MAY 15th - JULY 10th

AUGUST 23-26th. (inclusive)
1967

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INTRODUCTION

An induced polarization survey was carried out from May 14th to July 11, 1967 and on additional lines from August 23rd. to August 27th, on the property of Sheba Copper Mines Ltd., Highland Valley, B. C.

On area of approximately 3 square miles consisting of about 42 line miles was covered.

I.P. measurements were made by means of the variable frequency method using the McPhar Induced Polarization System, Model 654. Frequencies of 5 c/s and 0.3 c/s were used on the survey. Intervals of 200' & 400' were adopted using the pole-dipole array with electrode separation of 200' & 400'. The data are presented as contoured plans and profiles of apparent resistivity, frequency effect, and metal factor for 200' and 400' separation using a scale of 1" = 400'.

For reference, the I.P. survey was made on the Lornex, Highmont, and Gaza ore bodies. The profiles and plans of these are also shown.

The I.P. survey was done by the following crew:

T. Yokoyama	Geophysicist & Operator
J. Byberg	Operator & Draftman
J. Puddicombe	Helper
V. Hogan	Helper
C. Huckvale	Helper

INTERPERTATION

The data obtained from the I.P. survey on Sheba property are expressed as frequency effect (F.E.), apparent resistivity and metal factor (M.F.). The latter being dependant of the other two.

The frequency effect had very little variation. No. F.E. anomaly (3-5 percent) could be detected. More than 2% values were contoured as anomalous areas. However, a two percent F.E. does not necessarily indicate an ore body.

For example:(1) on the Lornex ore body (see fig. 1-17-19) the maximum value was 5.6 percent and the area bounded by the 3-4 percent contour coincides with the ore deposit.

(2) on the Highmont and Gaza ore body (see fig. 1-7-20 & 1-7-21) the frequency effect is from 2-3%. Taking these results into consideration, it is possible that a 2% F.E. anomaly could indicate disseminated sulphide deposits of very low grade.

Most values of apparent resistivity ($\rho/2\pi$ Ω -feet) are between 100 and 1000. As only granitic rocks exist on the property, apparent resistivity should be fairly uniform. The variation in resistivity value is considered to depend mainly upon thickness of overburden. On this property, the overburden varies a great deal. Mineralization and alteration also make resistivity lower. But resistivity of disseminated low grade ore may be almost the same as that of deep overburden. Therefore, it is very difficult to distinguish a promising area from the resistivity results. An area of low resistivity where there is little overburden, is considered to be a promising one, especially if an area of low resistivity coincides with an area of high frequency effect. A vertical resistivity survey is necessary to decide the precise depth of overburden. The metal factor (frequency effect divided by the apparent resistivity) is usually an

(3)

important parameter as the frequency effect increases as resistivity increases. On this property however, the variation of frequency effect is so small that the metal factor changes mainly with apparent resistivity and is less than 20. Accordingly, the metal factor is not worthy of notice on this property.

(7)
CONCLUSION & RECOMMENDATION

This property is not very promising as far as the results of I.P. and resistivity surveys are concerned.

Taking the large number of mineralized exposure on the property into account, it is supposed that many small low grade mineralization could exist in the property, but from the geophysical point of view, it could not be expected to find a workable ore body. On the other hand, it is probable that a high frequency effect would not be observed owing to a small quantity of total sulphide.

Furthermore it is the writer's opinion that all places with any possibilities should be investigated in the early stage of exploration. Therefore, the following drilling is recommended on four F.E. anomalies.

A LIST OF DRILL HOLES RECOMMENDED

	Station	Direction	Dip	Length	Ranking
A	24N 8E	East	-45°	500'	5
	32N 21E	West	-45°	500'	4
B	16N 44E	West	-45°	300'	8
	12N 44E	West	-45°	300'	3
C	32S 15E	North	-60°	500'	6
	44S 15E		-90°	400'	7
D	72S 16W	West	-45°	500'	1
	72S 4W	West	-45°	500'	2
Total				3500'	

October 12, 1967

Vancouver, B. C.

Takeo Yokoyama
T. Yokoyama

Geophysicist

(3)

STATEMENT OF QUALIFICATIONS

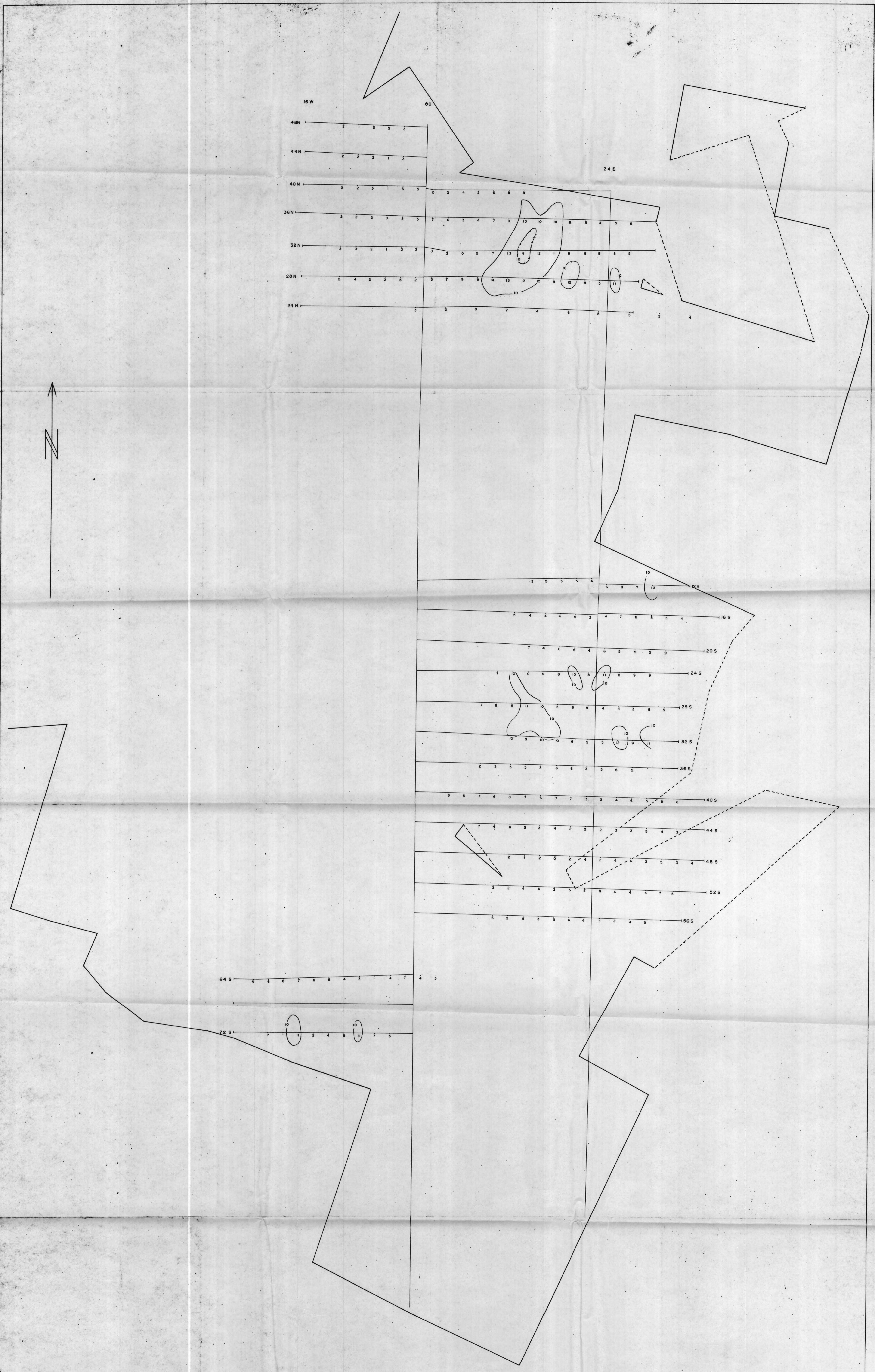
I received a Bachelor of Science degree from Kyoto University in 1960 in geology.


I received a Master of Science degree from Kyoto University in 1962 in geophysical geology.

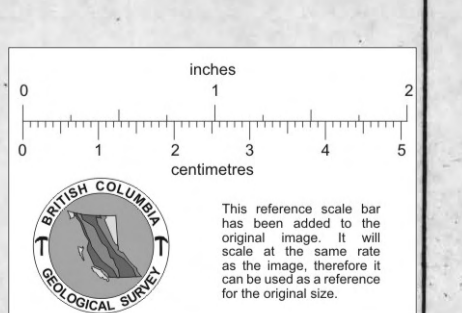
I have been continuously employed on most types of geophysical surveys (and related work) since graduation, for Besshi Mine and Sumitomo Metal Mining Co. Ltd.

I have had three years experience as geophysicist on Induced Polarization surveys.

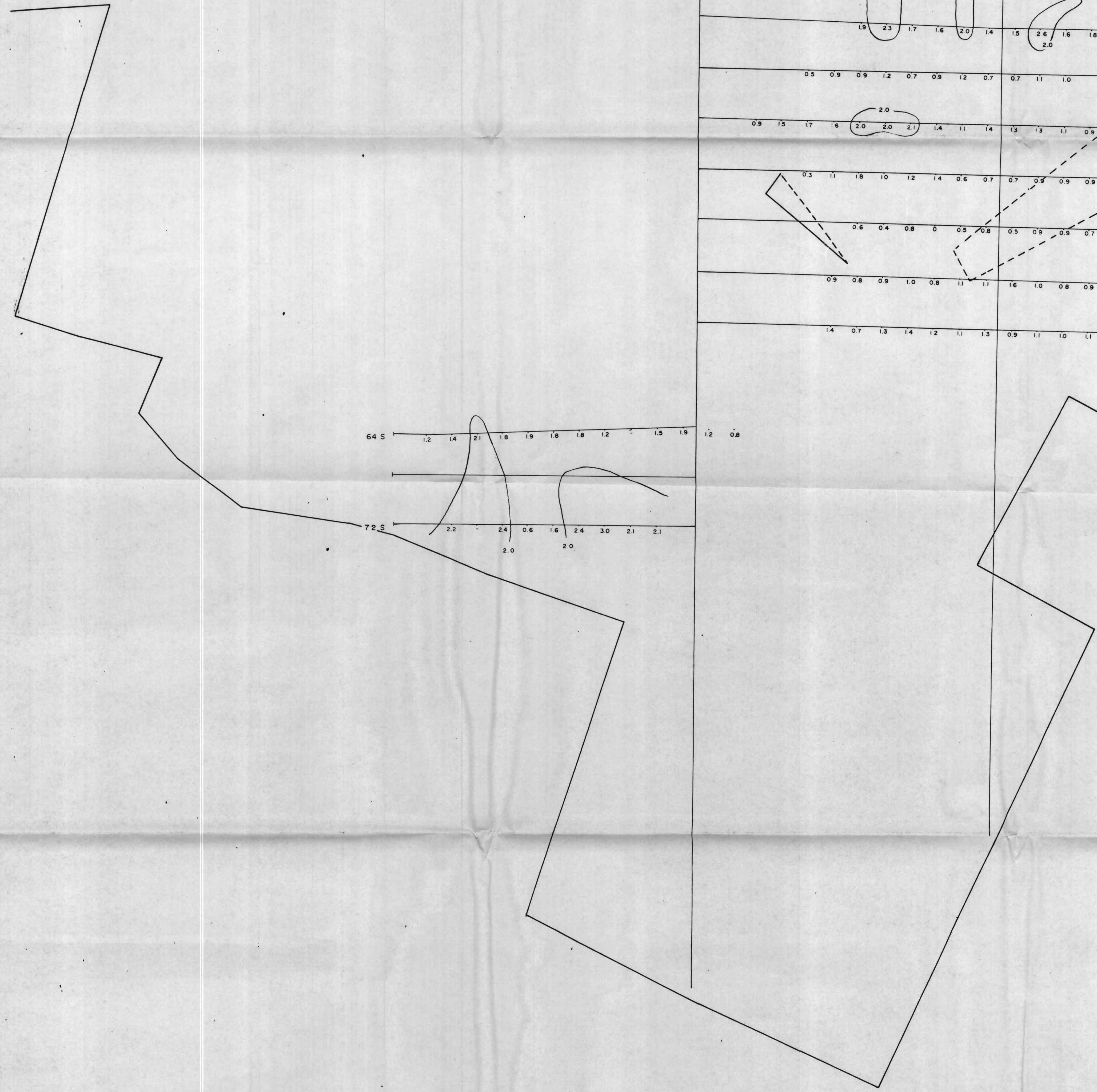
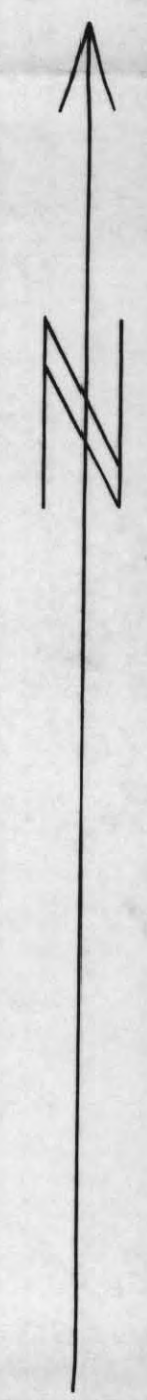
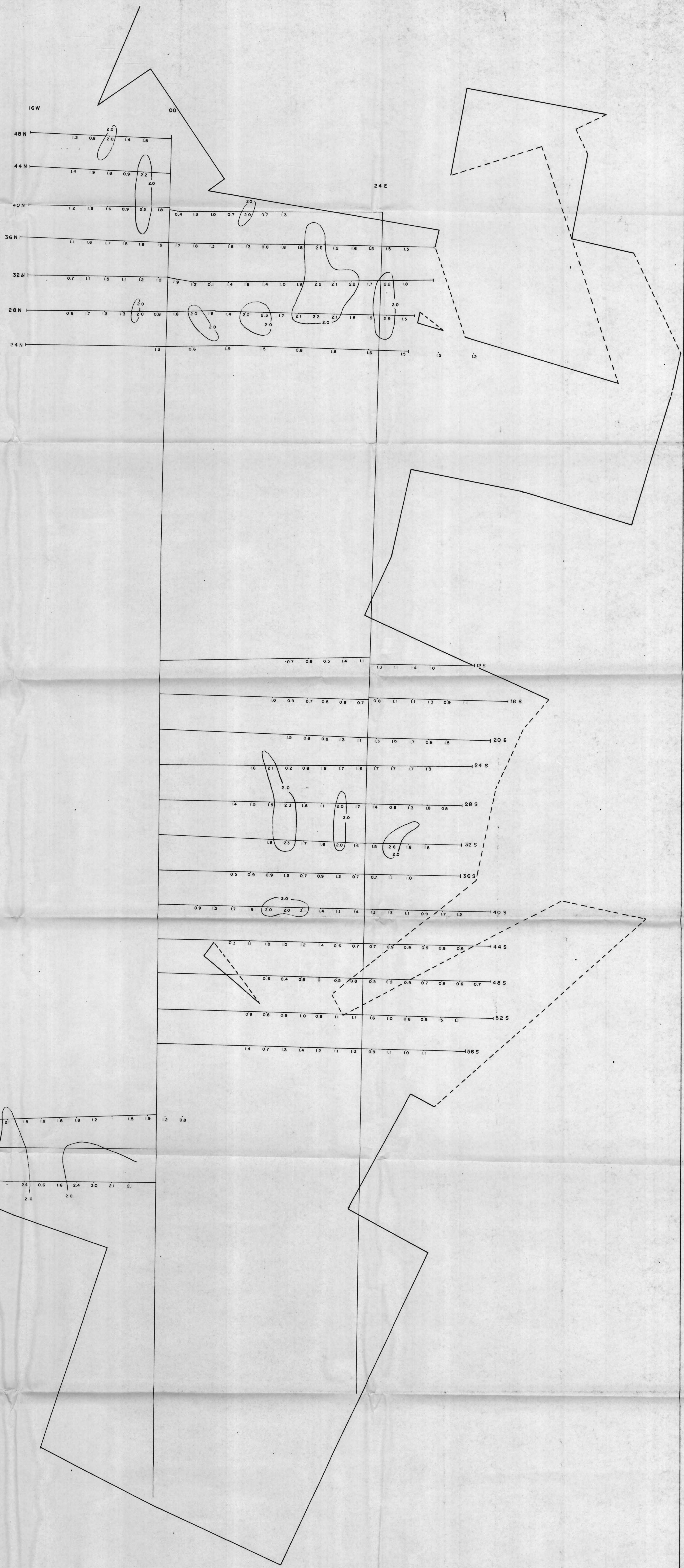
Takeo Yokoyama
Takeo Yokoyama



LEGEND
 POLE DIPOLE CONFIGURATION
 400 ft SEPARATION - 200 ft MOVEMENT

 PLOTTED POINT
 300 ft DEPTH

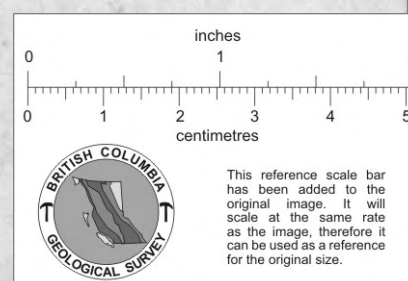
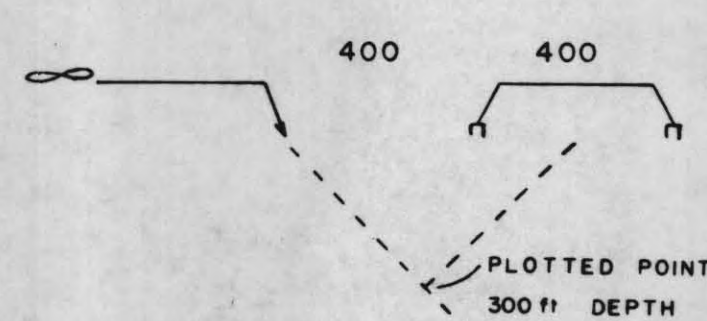


SUMITOMO METAL MINING Co.
 of CANADA Ltd.
 PROJECT SHEBA COPPER MINES
 I.P. SURVEY
 Variable Frequency Method
 METAL FACTOR
 SCALE 1 in = 400 ft
 DRAWN BY J. BYBERG
 DATE SEPT, 1967
 DRAWING NO: 1-6



LEGEND

POLE DIPOLE CONFIGURATION
 400 ft. SEPARATION 200 ft. MOVEMENT



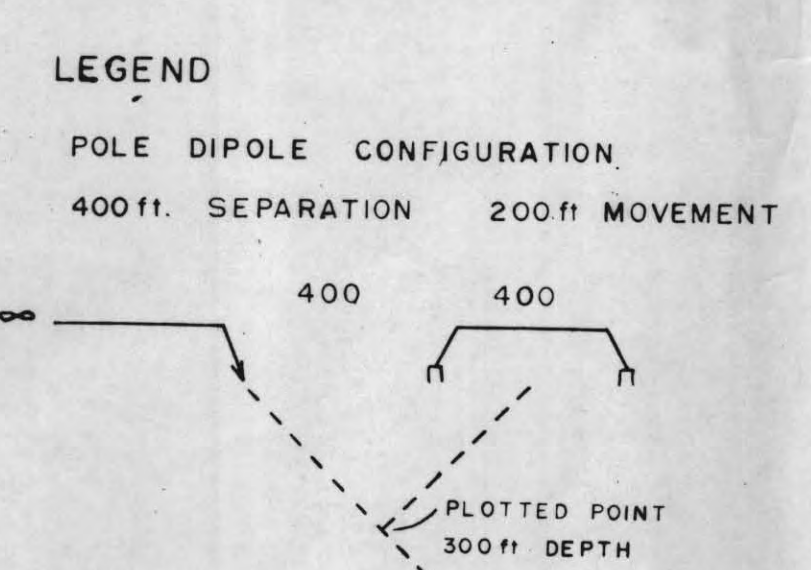
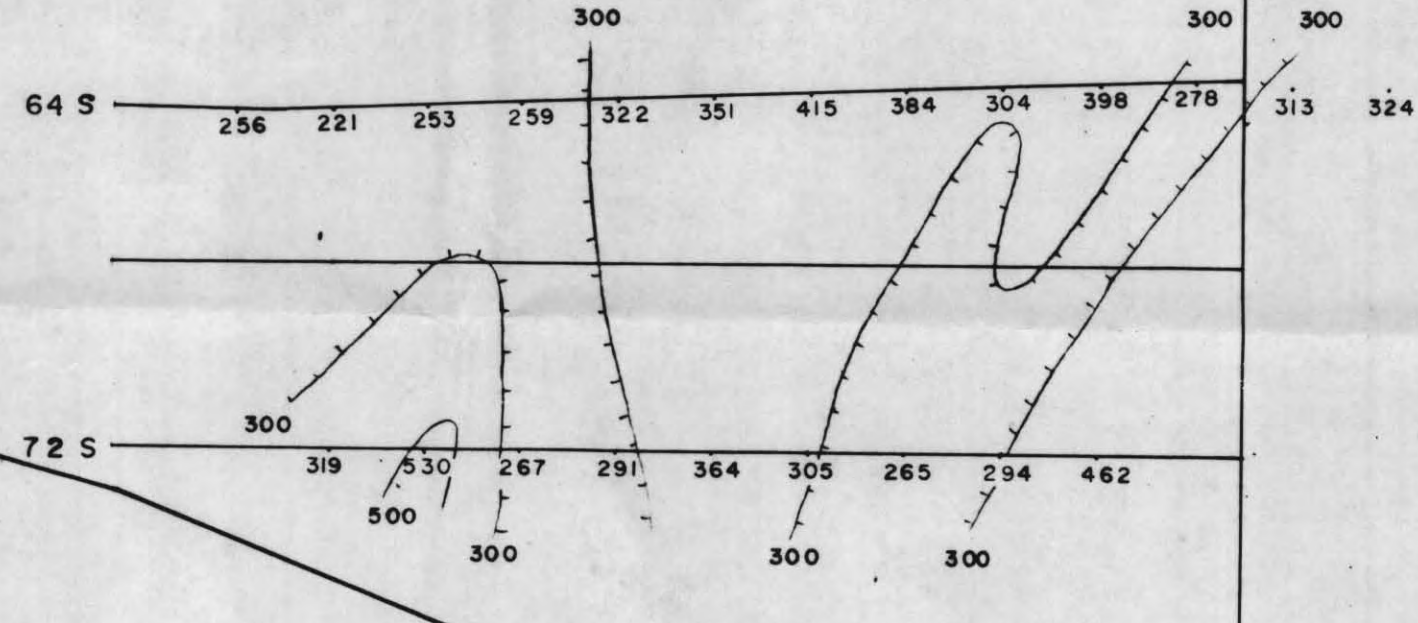
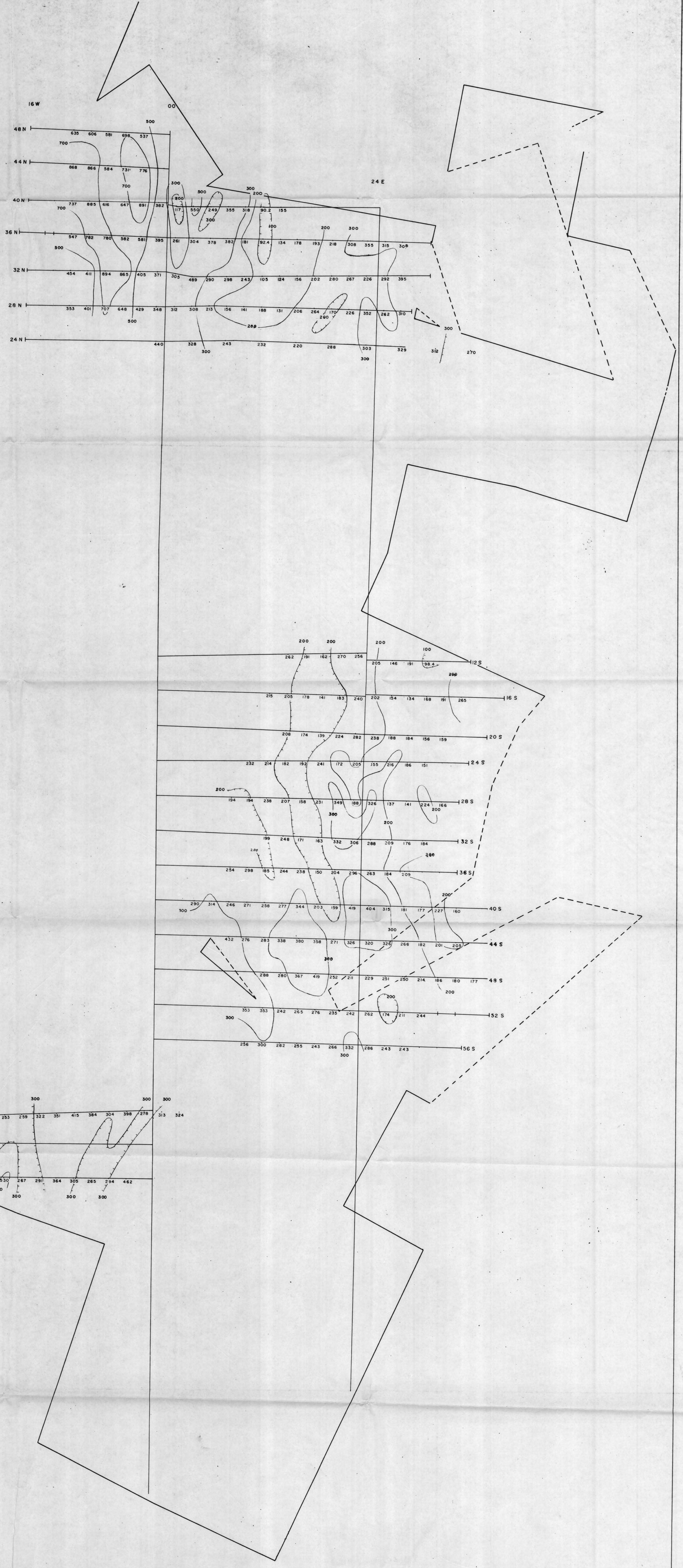
SUMITOMO METAL MINING Co.
Of CANADA Ltd.

PROJECT SHEBA COPPER MINES

I.P. SURVEY
 Variable Frequency Method
 FREQUENCY EFFECT

SCALE 1 in = 400 ft.
 DRAWN BY: J.BYBERG
 DATE: SEPT, 1967

DRAWING NO: 1-4



Sumitomo Metal Mining Co. of Canada Ltd.

PROJECT SHEBA COPPER MINES

I.P. SURVEY
 Variable Frequency Method
 RESISTIVITY

SCALE 1 in = 400 ft
 DRAWN BY J.B. BERG
 DATE SEPT., 1967

DRAWING NO. 1-5

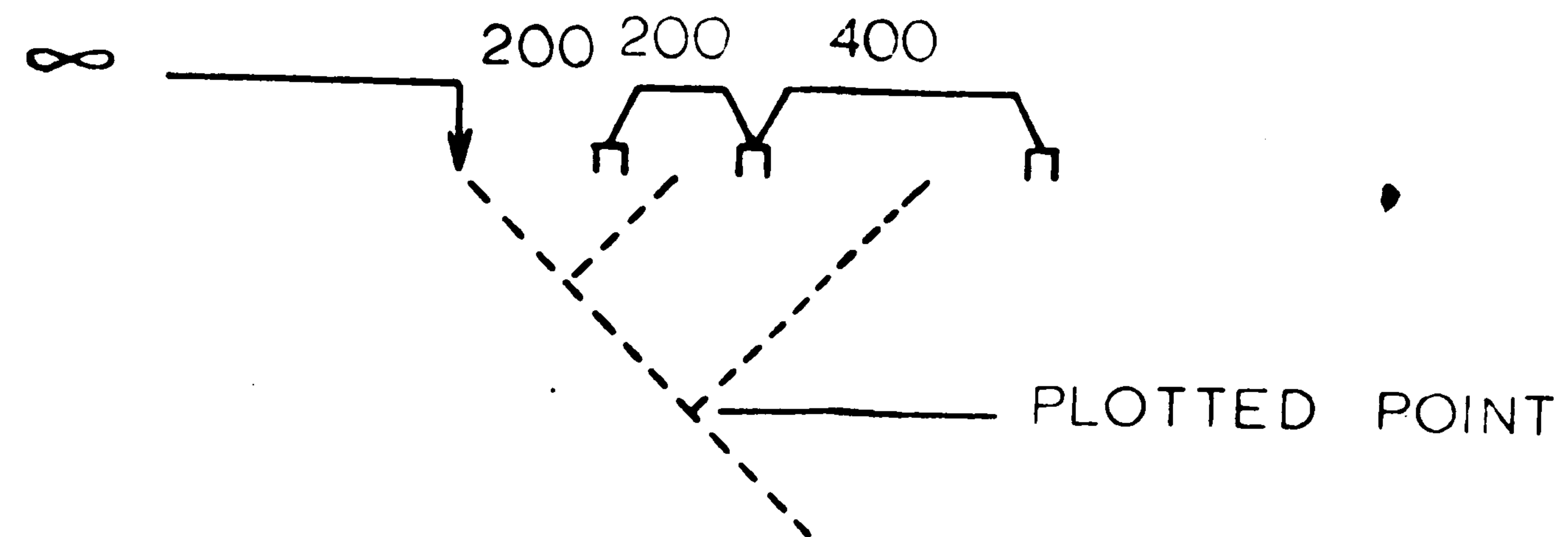
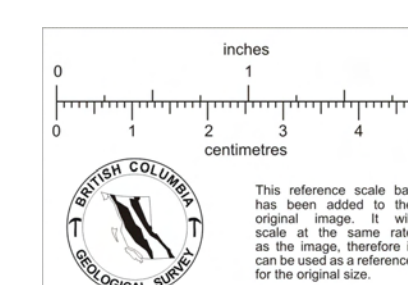
INDUCED POLARIZATION SURVEY

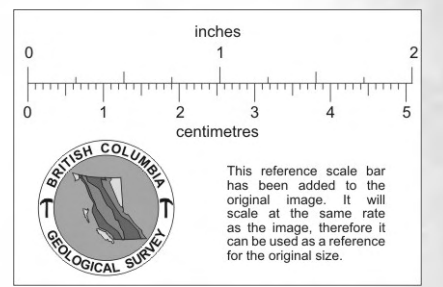
SHEBA PROPERTY

SECTION PROFILES

POLE - DIPOLE CONFIGURATION

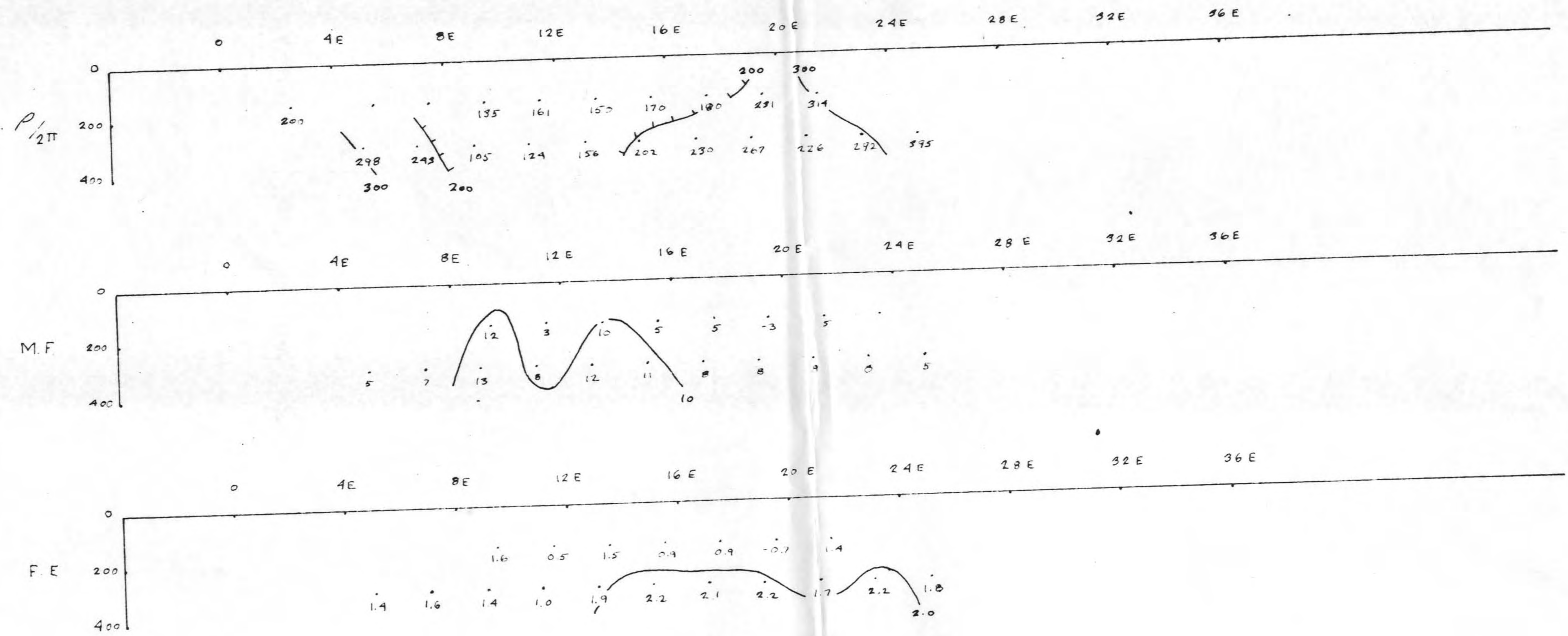
SCALE : 1in = 400ft

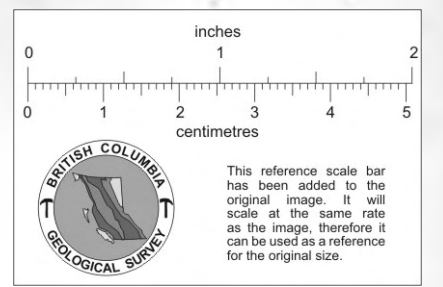




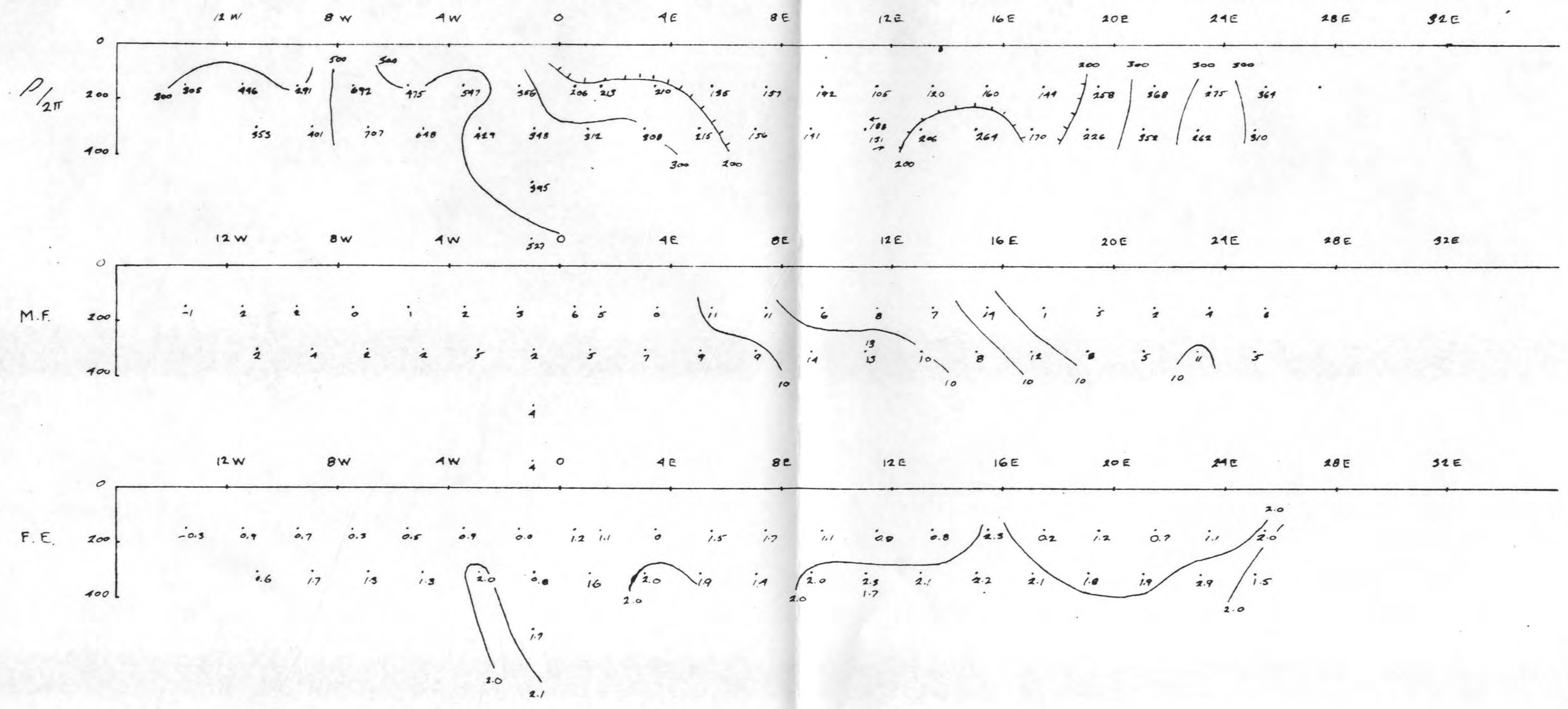
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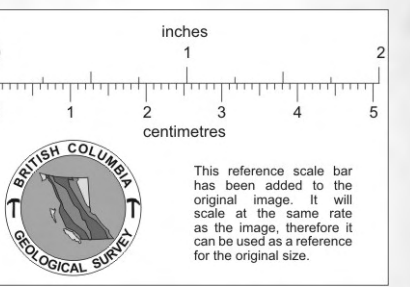
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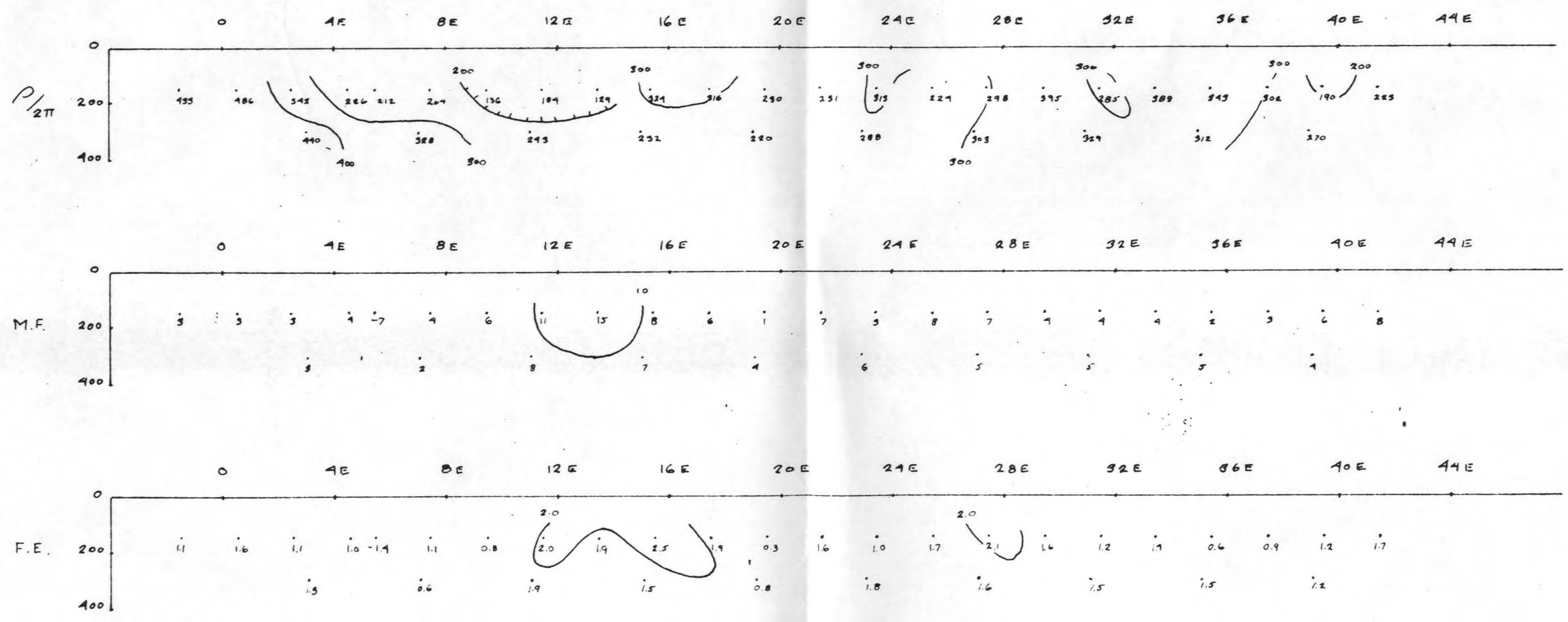
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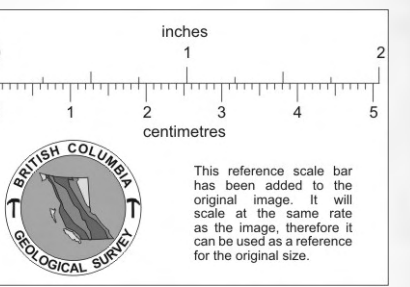




2400 N

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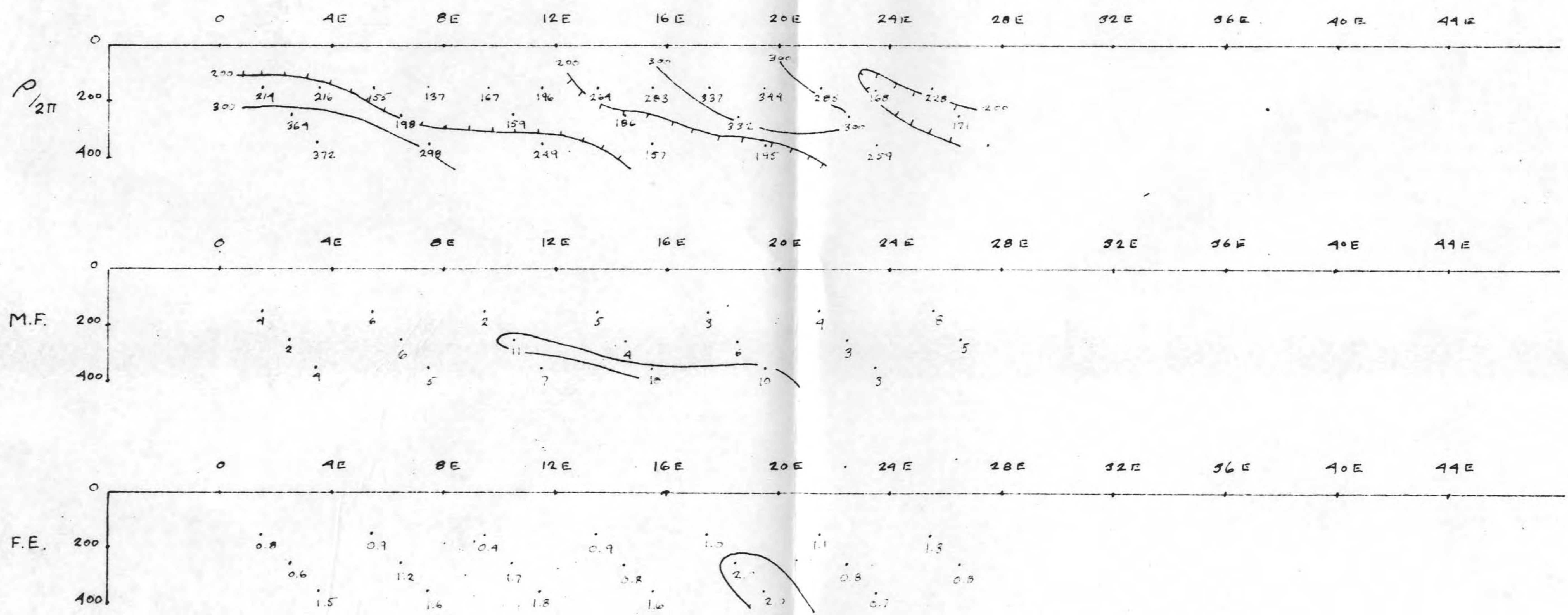
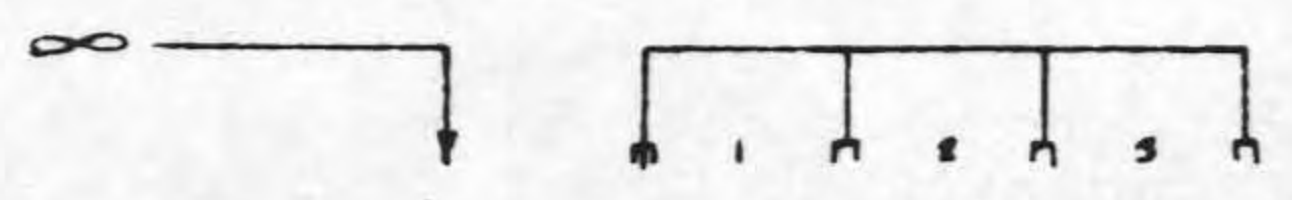


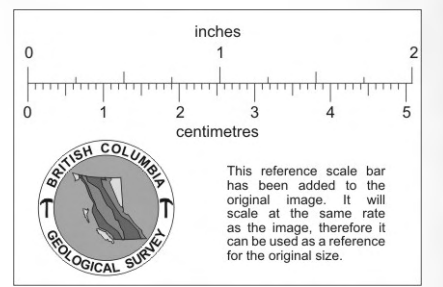


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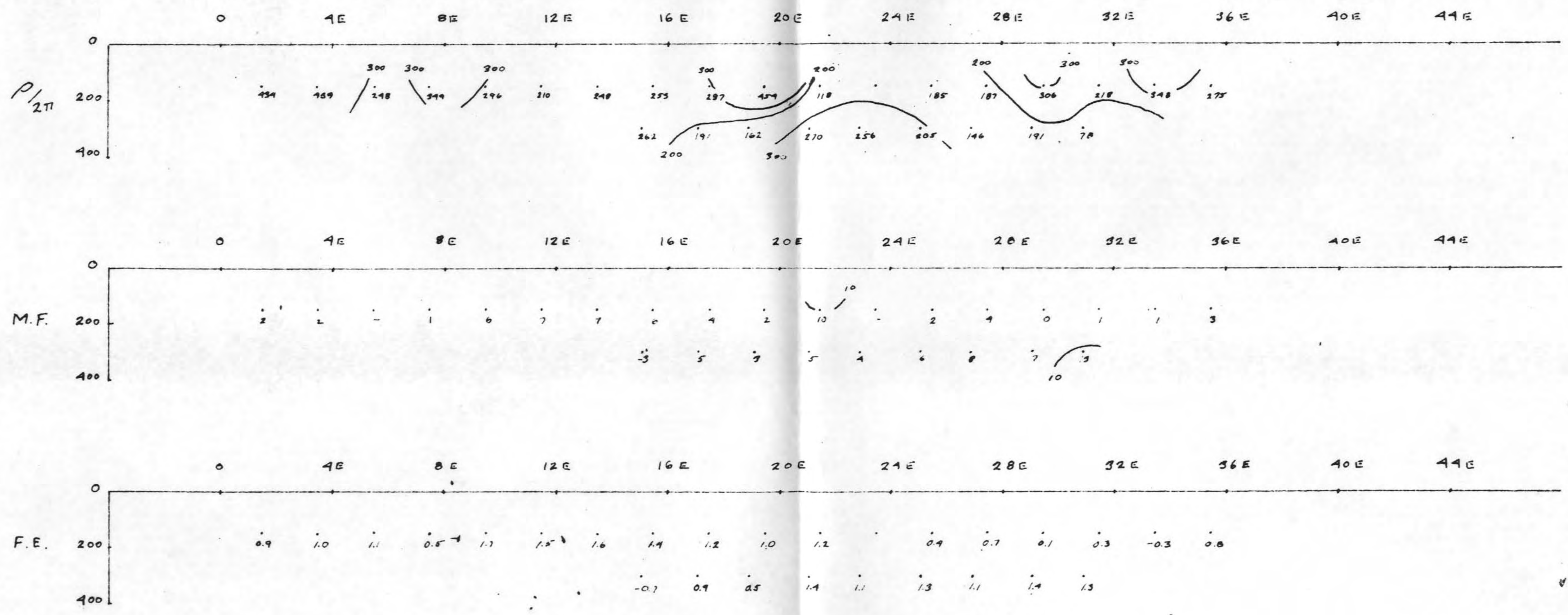
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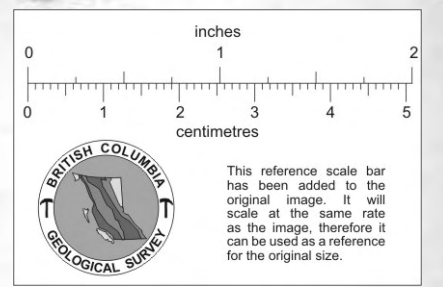
POLE - DIPOLE



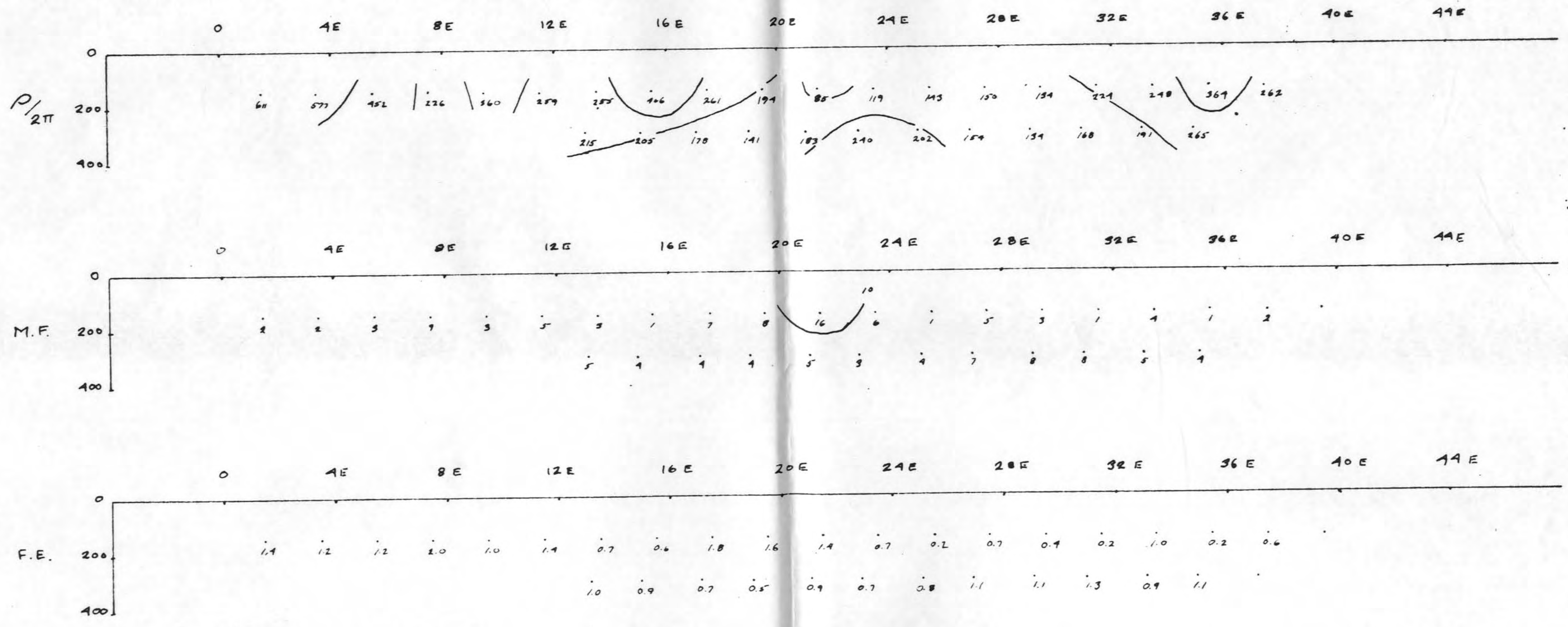


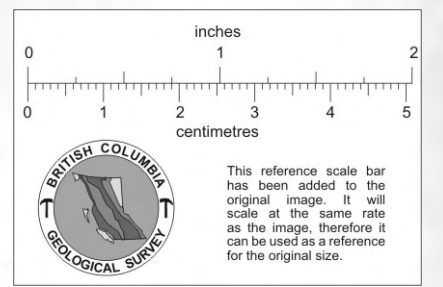
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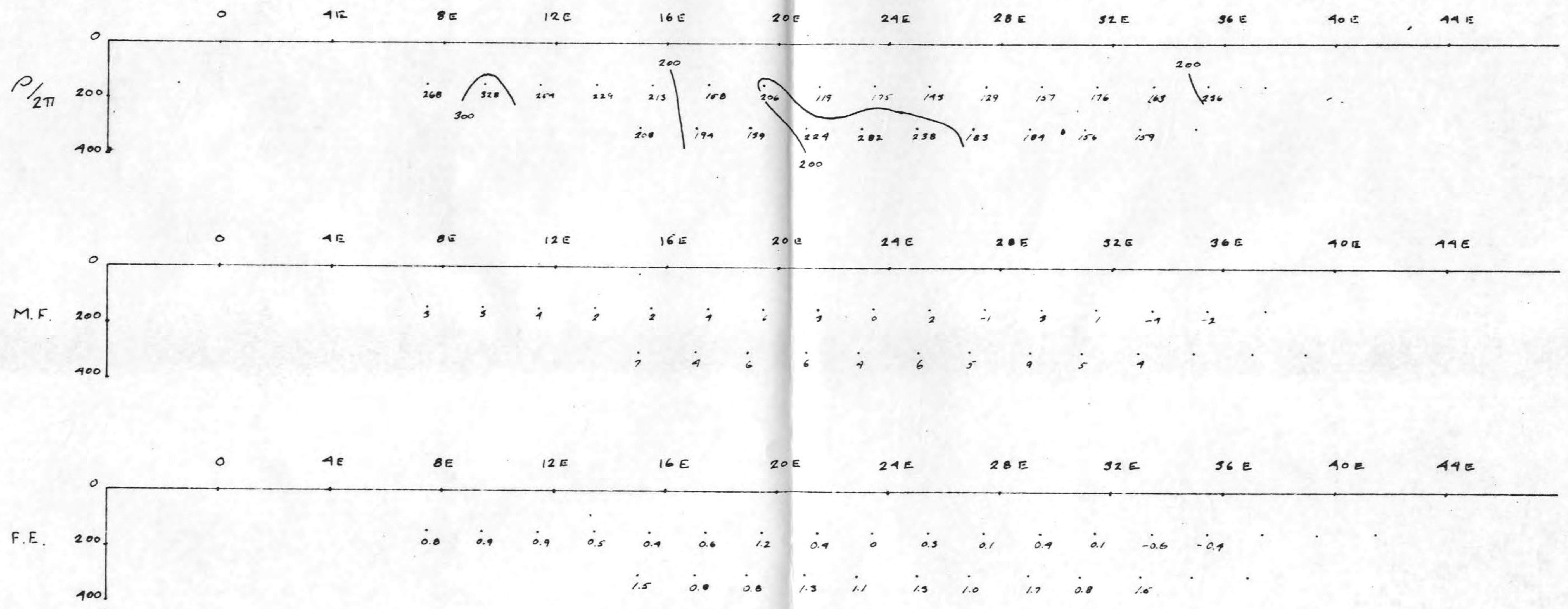
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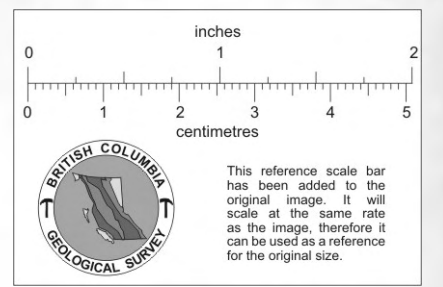




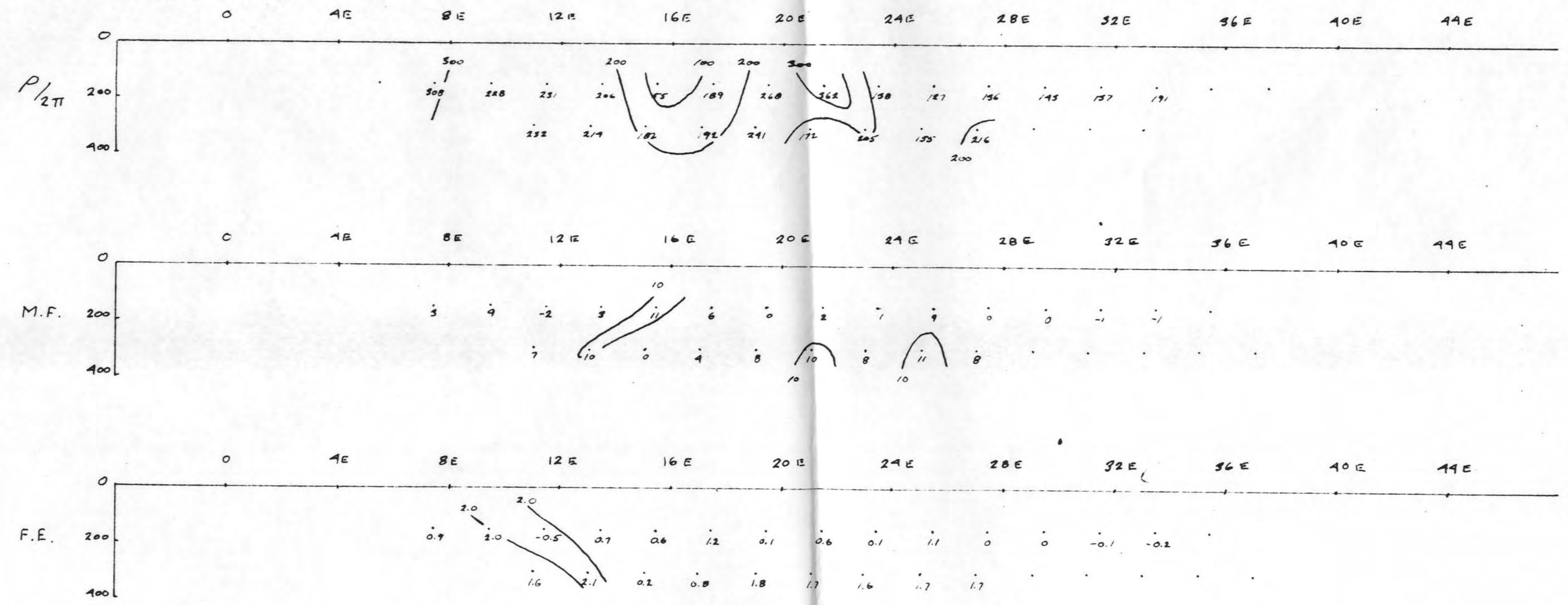
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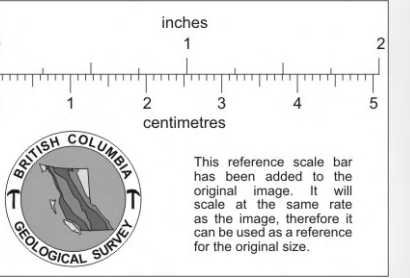
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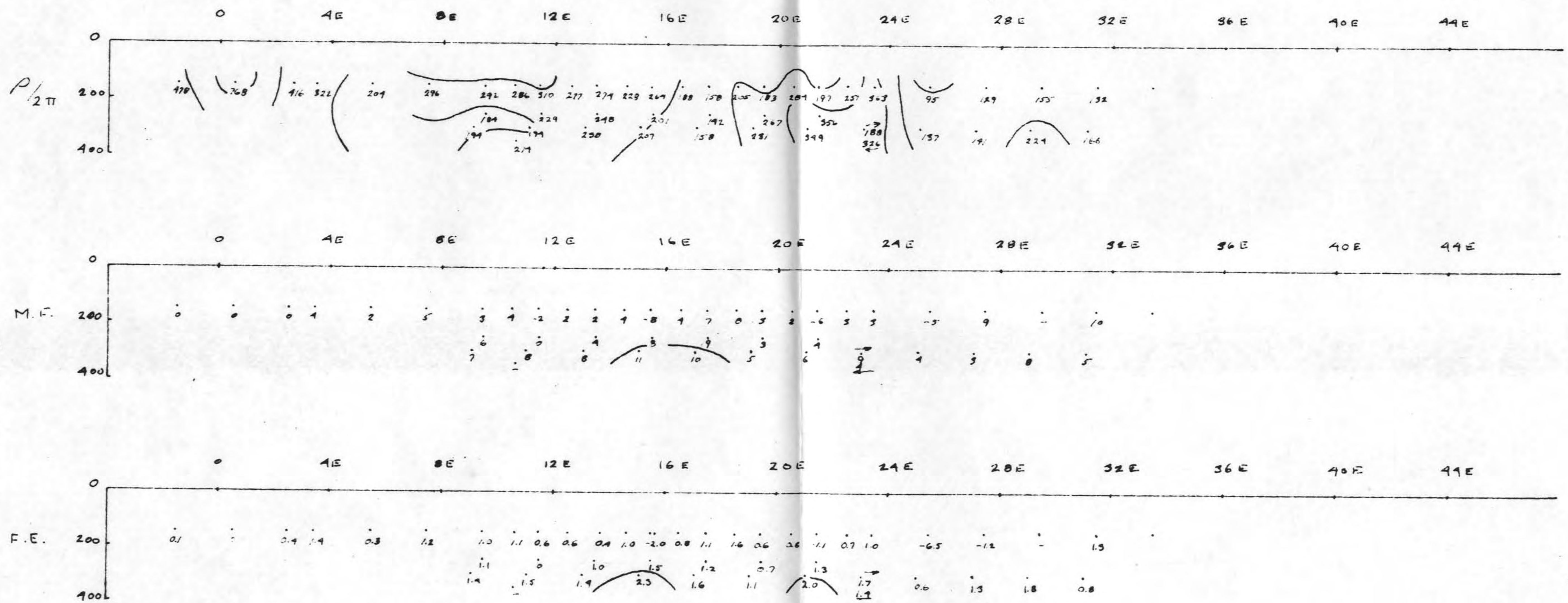


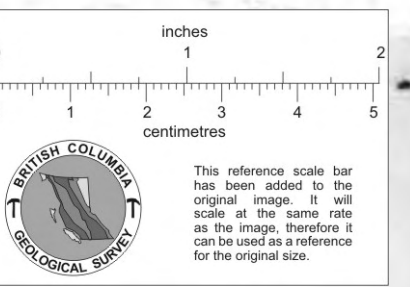
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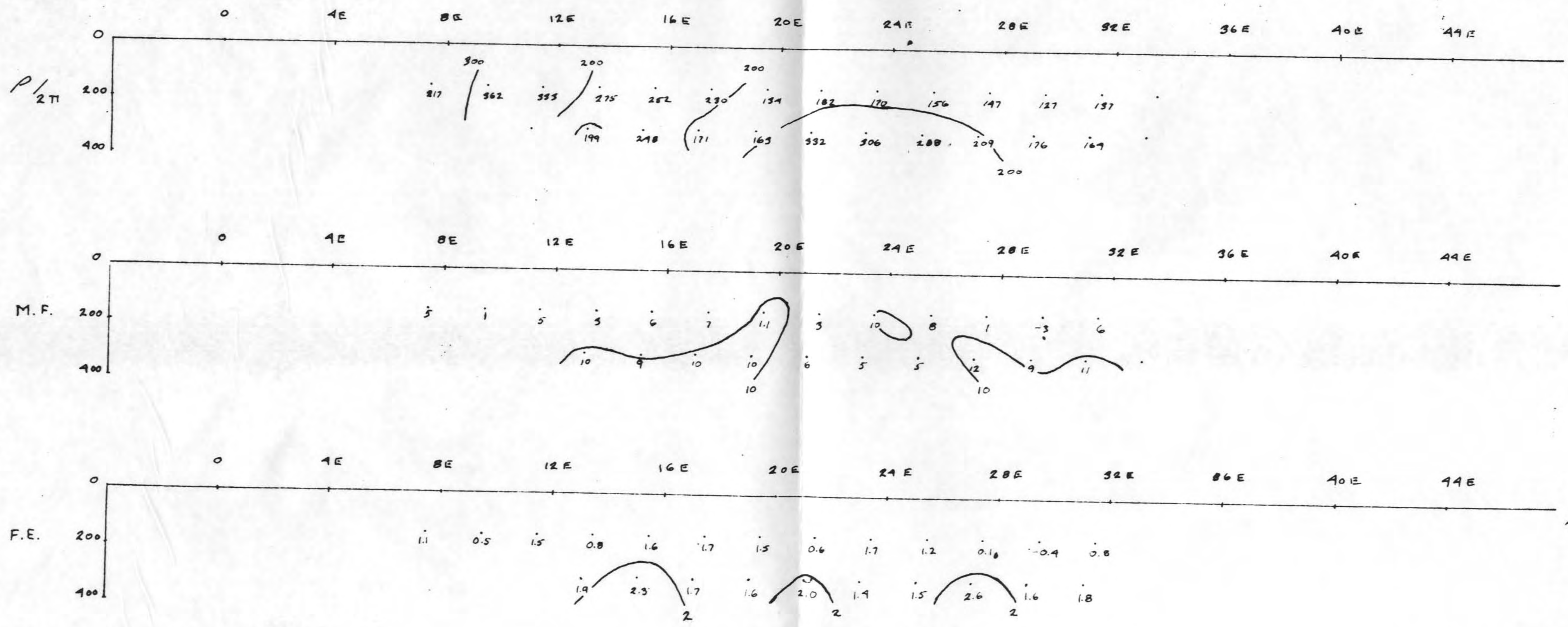


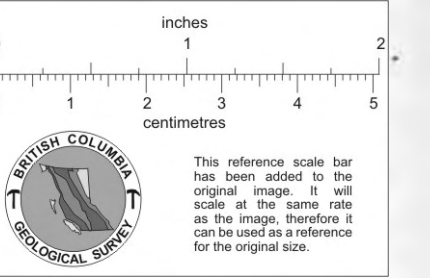
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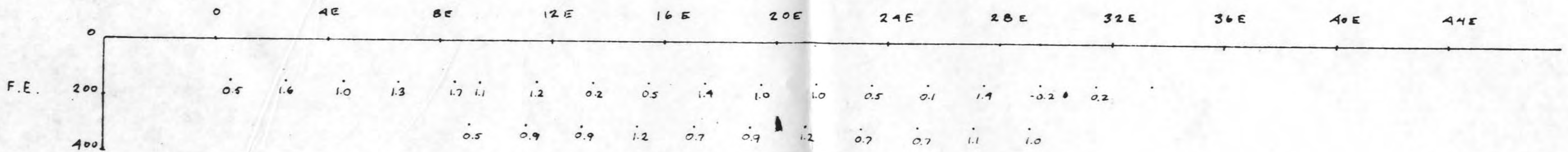
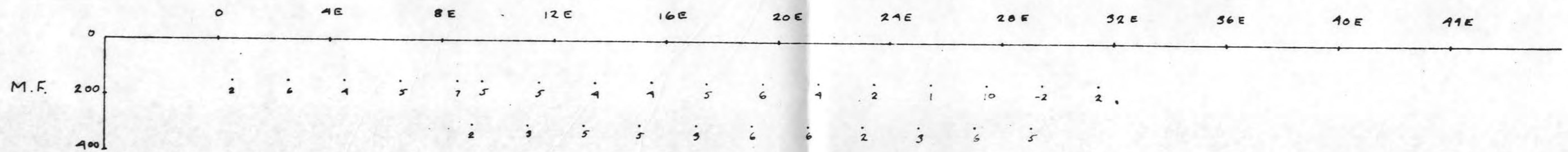
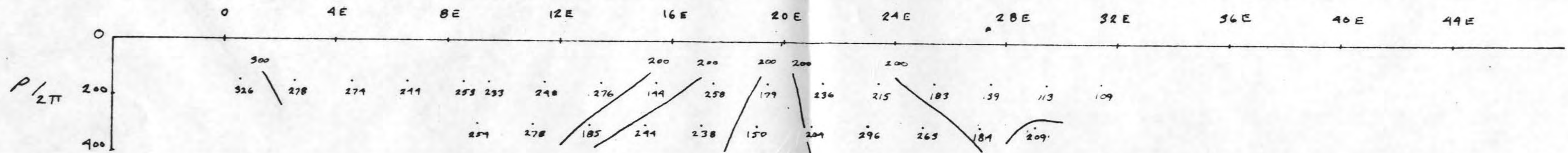


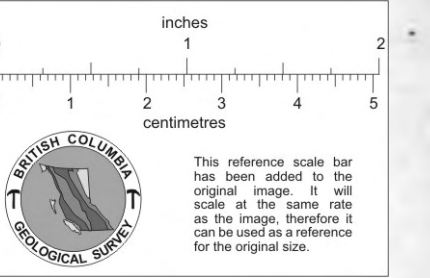
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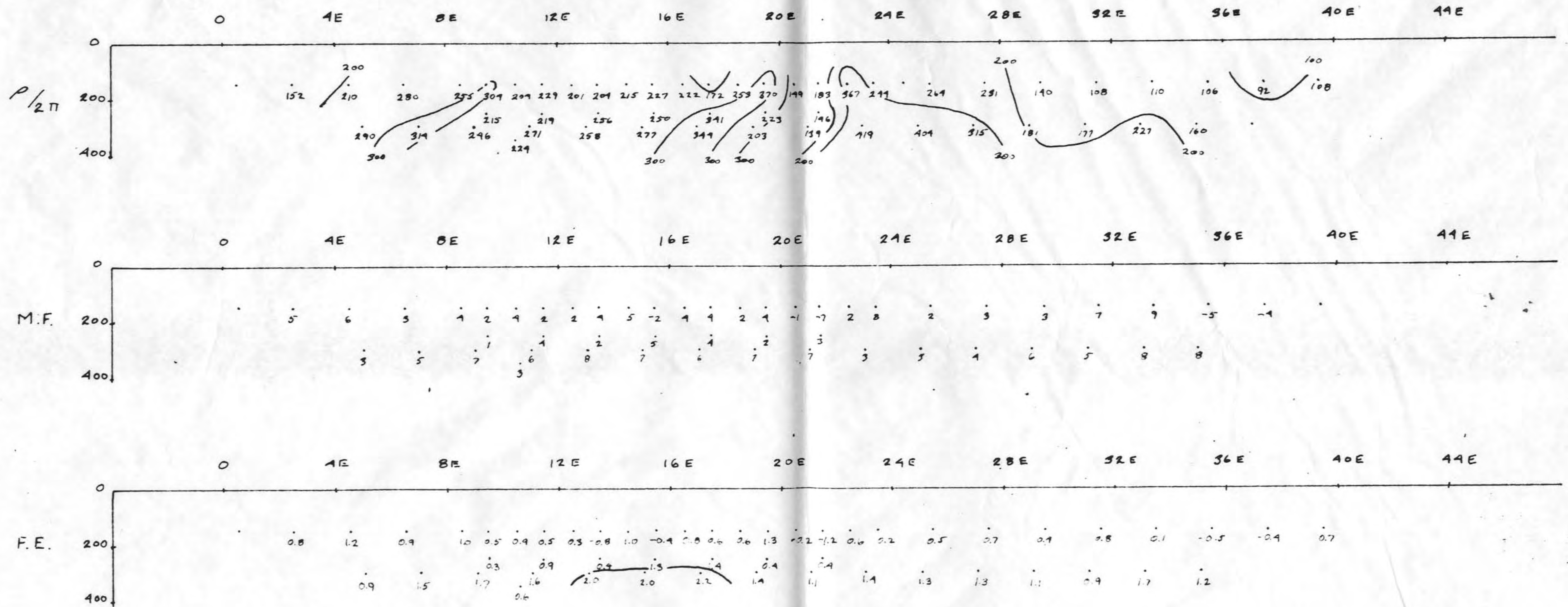
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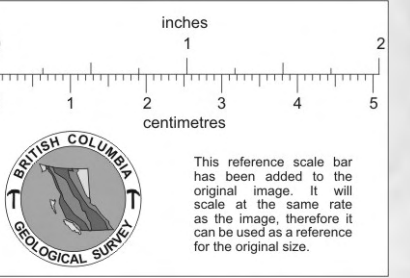




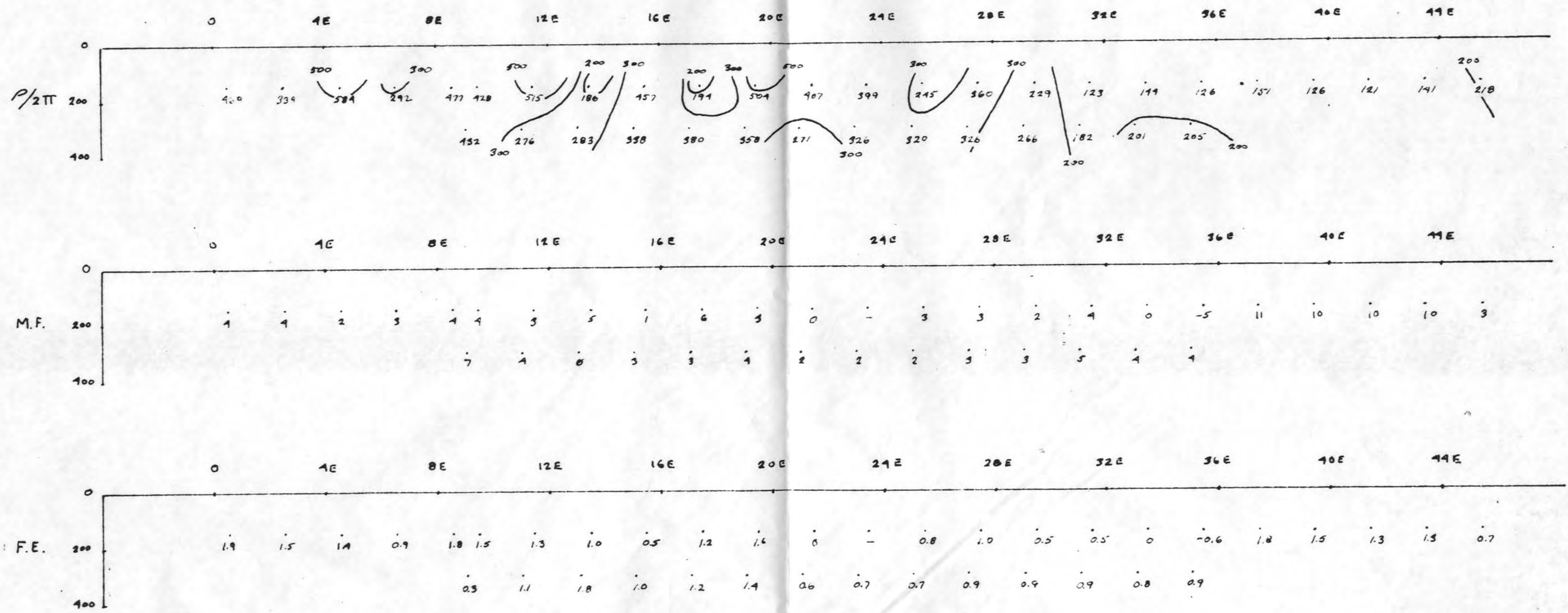
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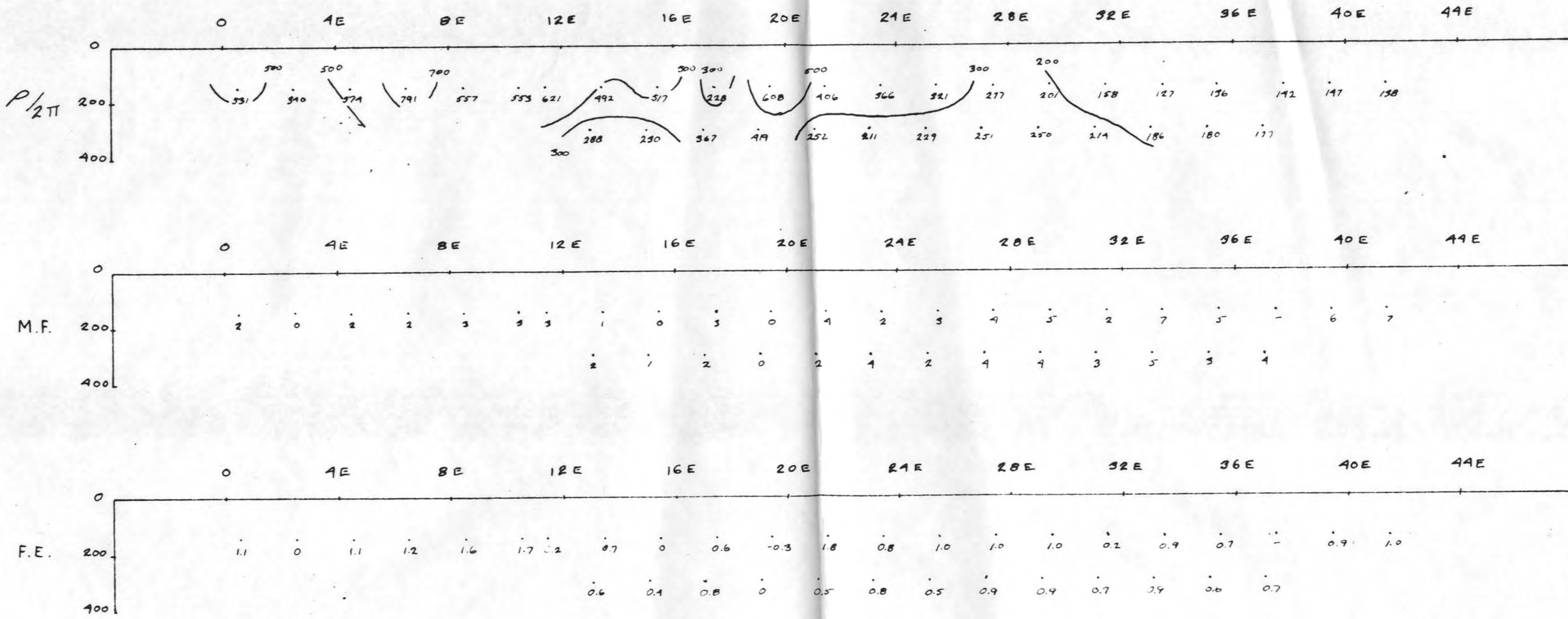
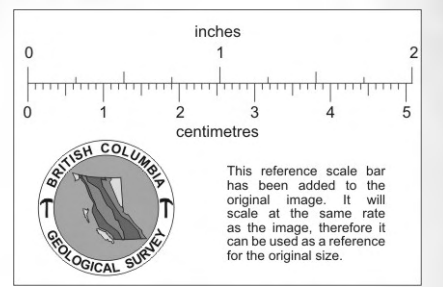
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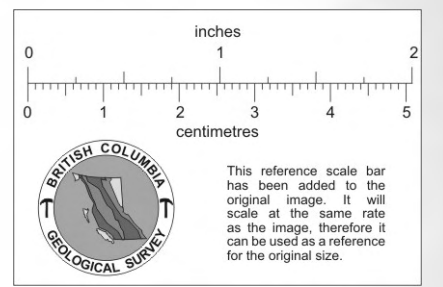




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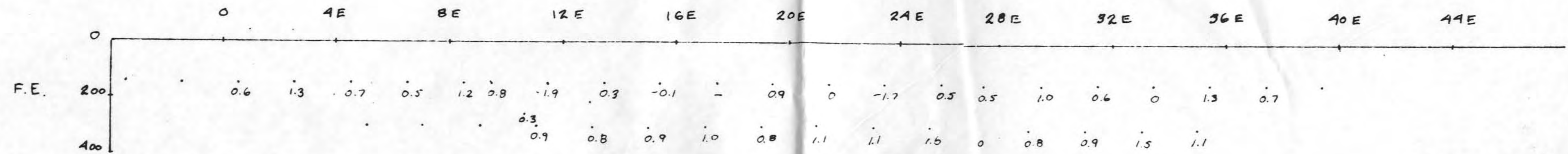
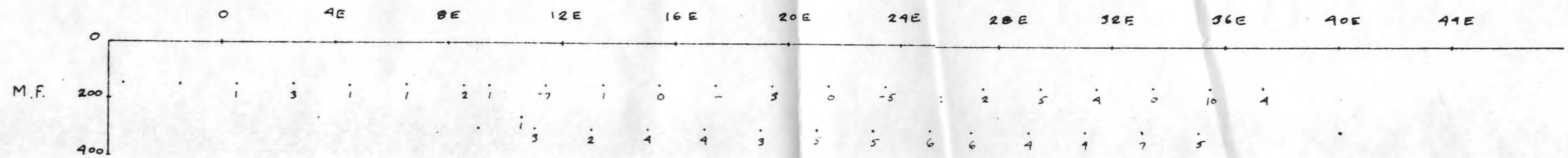
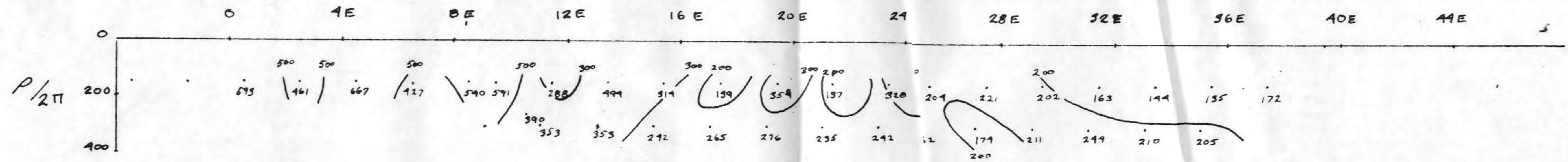


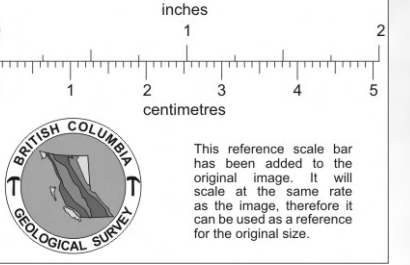




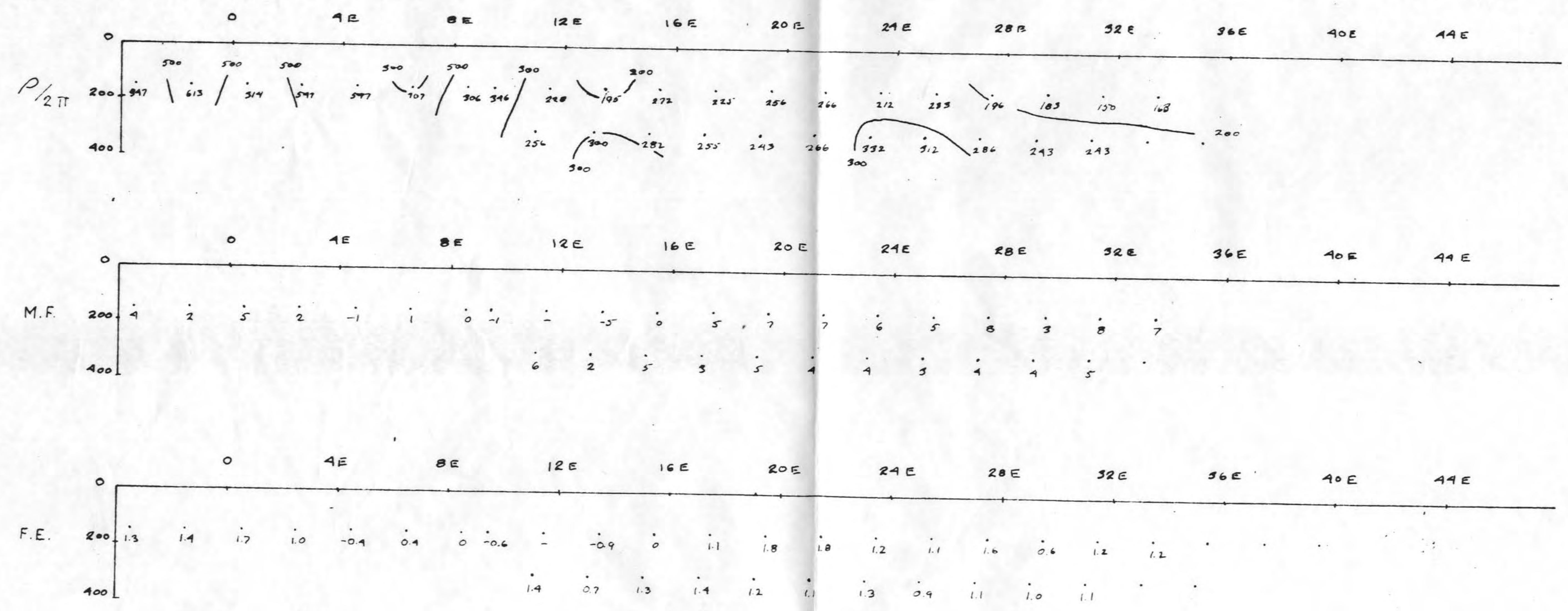
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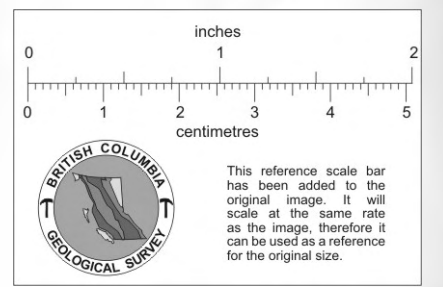
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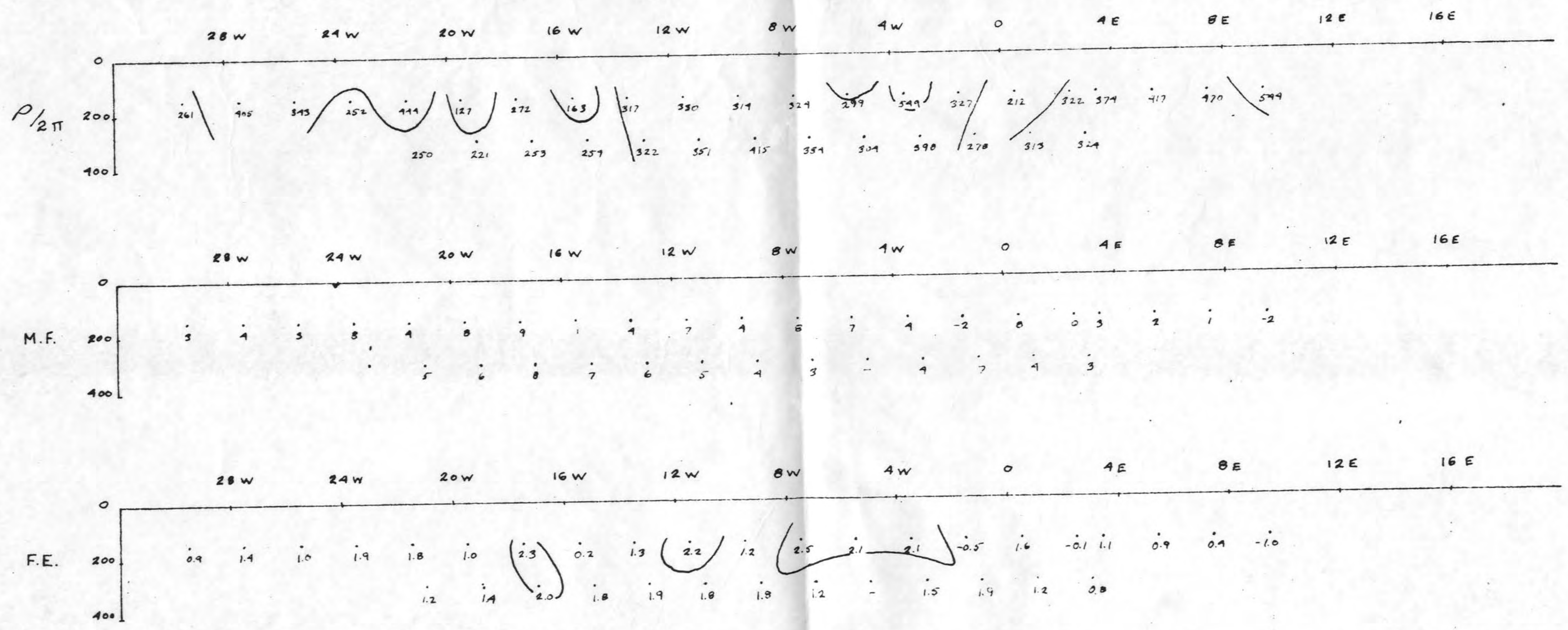


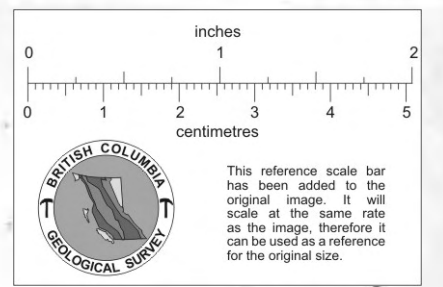
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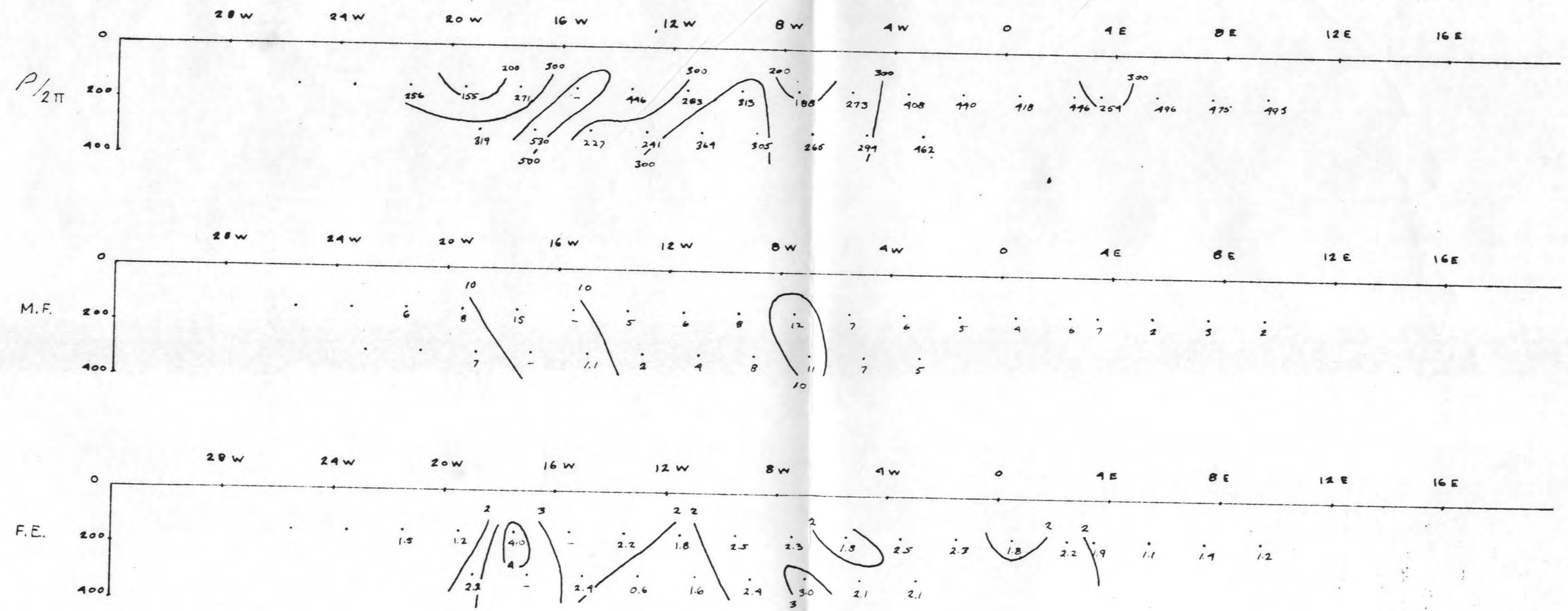
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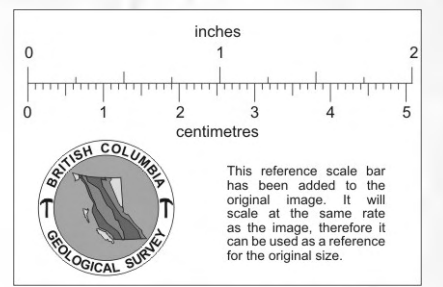




7200 S

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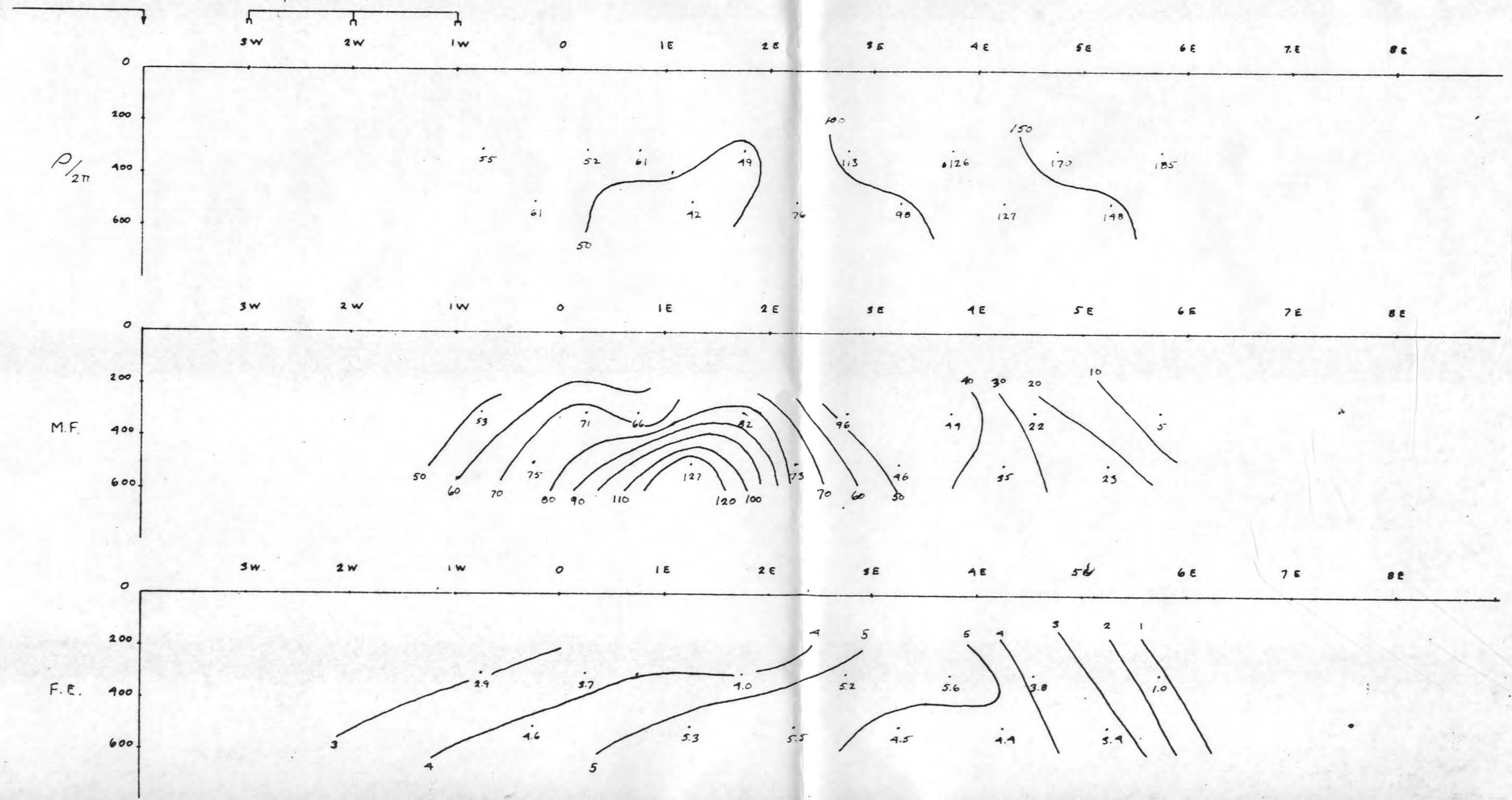


DETAIL SURVEY LORNEX ORE BODY

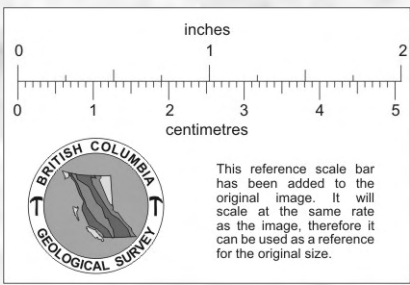
section profile on 15n drill line

POLE - DIPOLE METHOD
n = 1, 2
400ft separation

SCALE : 1in = 400ft

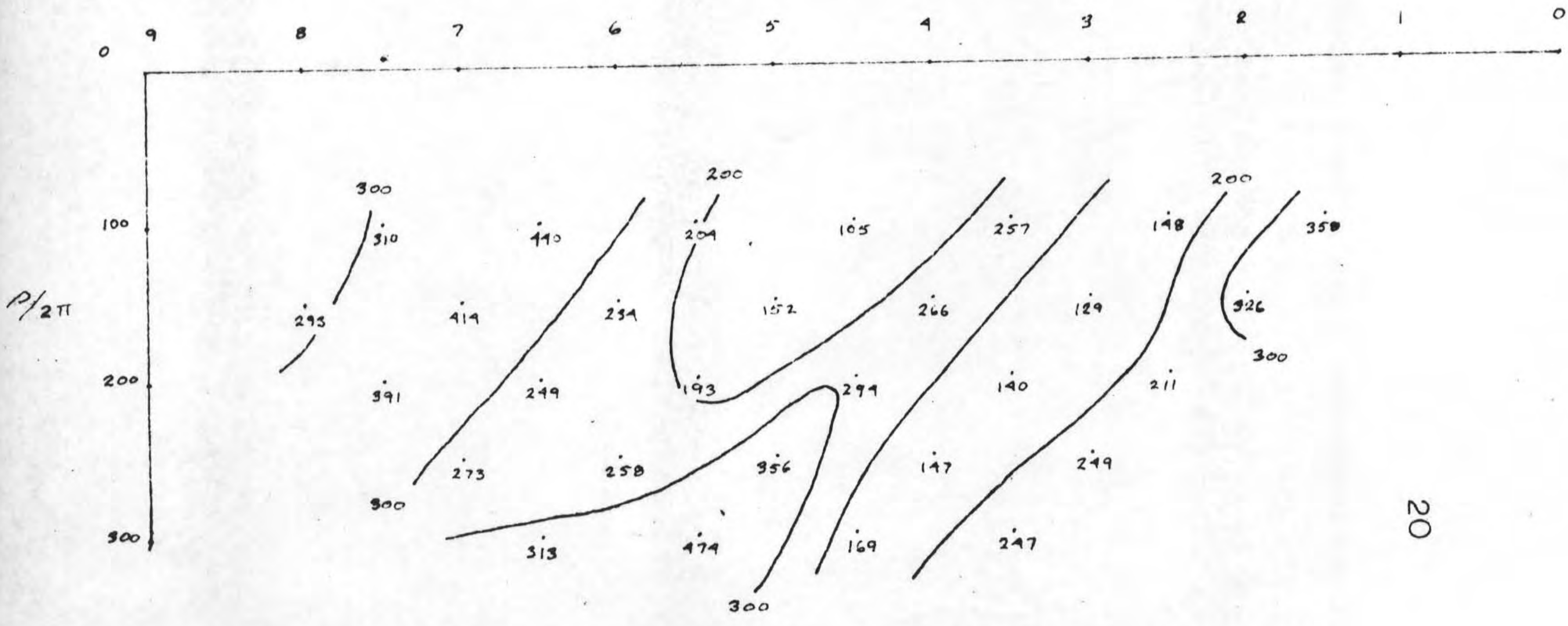
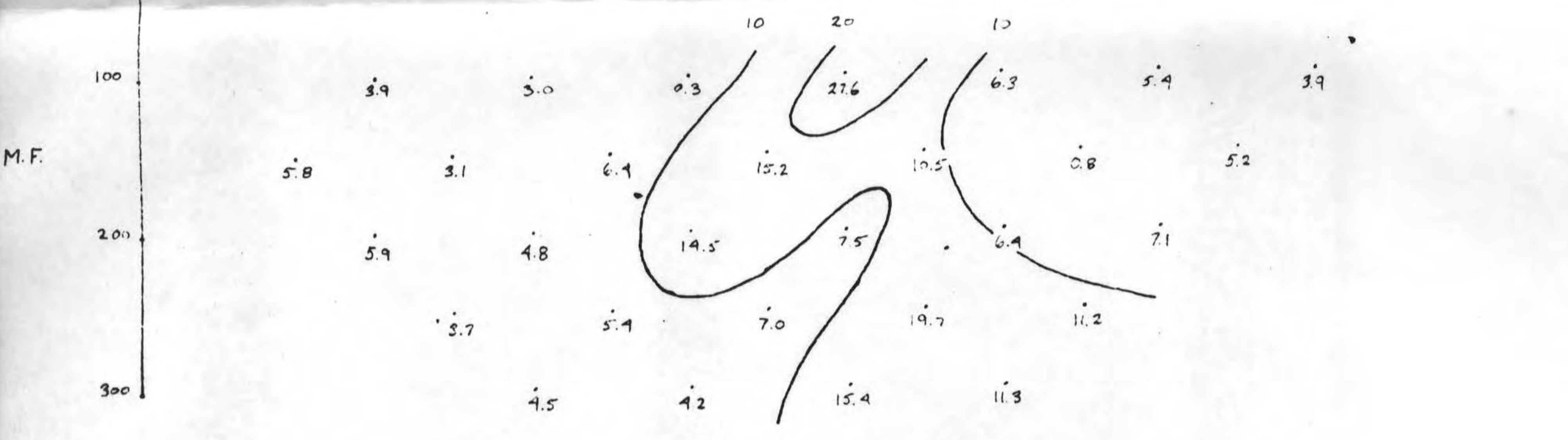
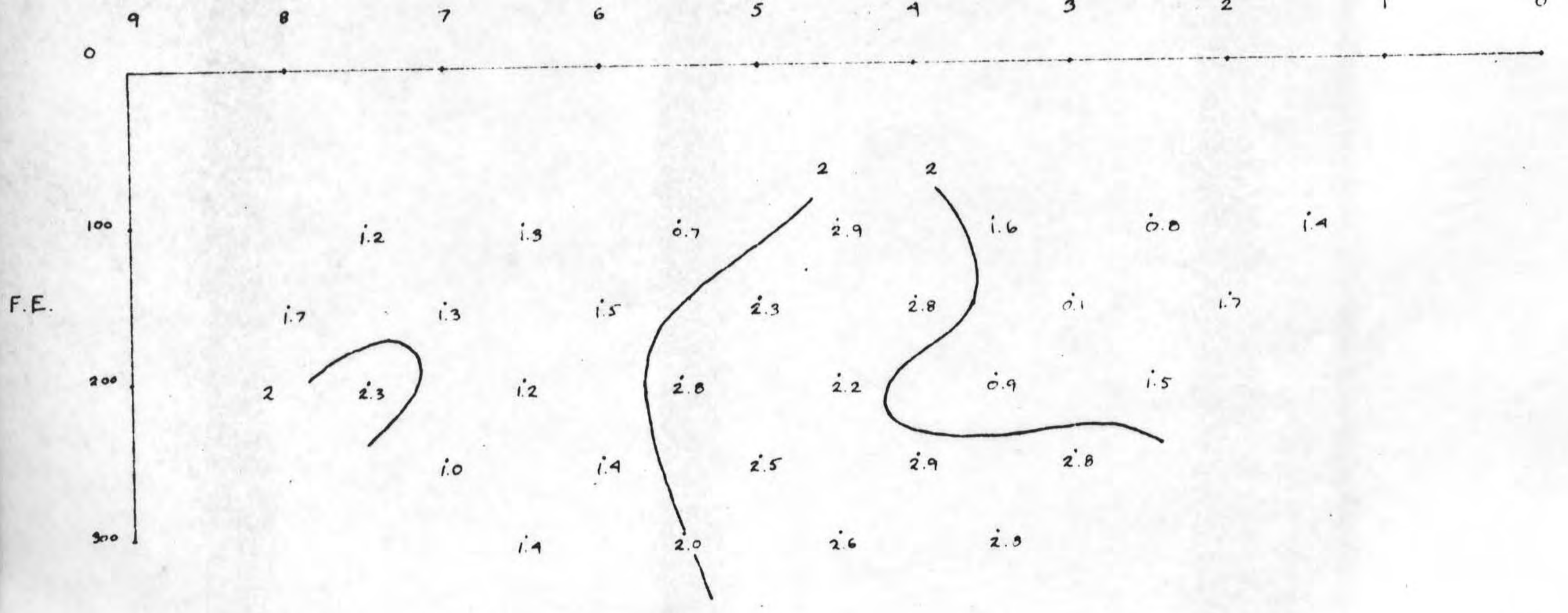


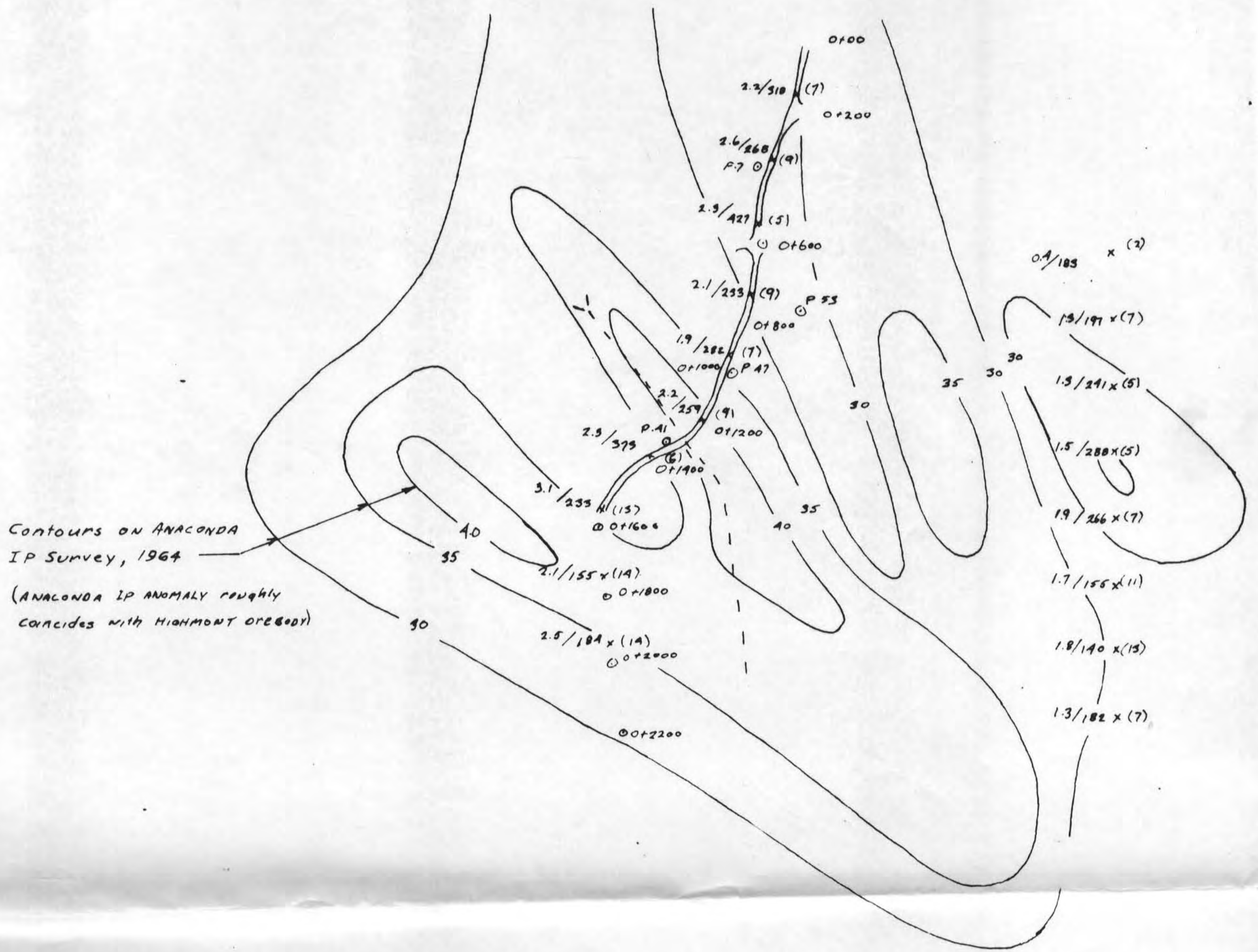
DETAIL SURVEY ON GAZA SHOWING



SCALE : 1 in = 100 ft

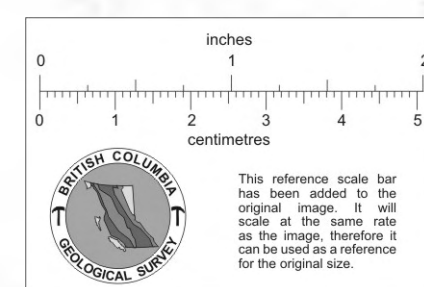
DIPOLE - DIPOLE ARRAY
n=1,2,3,4,5
100 ft separation





Contours on ANACONDA
IP Survey, 1964
(ANACONDA IP ANOMALY roughly
COINCIDES WITH HIGHMONT OREBODY)

I.P. - HIGHMONT PROPERTY
SCALE : 1in=400ft



⊙ P.41 HIGHMONT PERCUSSION
drill hole

- - - - - Approximate location of
HIGHMONT bulk sample adit

2.5/184 FREQUENCY EFFECT (%) APPARENT RESISTIVITY ($P/2\pi \Omega$ FEET)

(14) METAL FACTOR

Pole-Dipole Configuration
200' electrode separation