REPORT ON

GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS

OF THE OWL GROUP

Whitehorse Mining District
Yukon Territory

Latitude : 62° 38° N
Longitude: 133° 20'W

Work done in the period
June 1 to September 30, 1970

By:

JOHN S. BROCK
&
M.E. (Tim) Coates, P. Eng.

ATLAS EXPLORATIONS LIMITED

September 30, 1970

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LIST OF CLAIMS

Claim No.	Grant No.	Recording Date
OWL 1-40	Y39199 - Y39238	Oct. 27, 1969
41-84	Y53528 - Y53625	July 20, 1970

ATLAS EXPLORATIONS LTD.
HESS PROJECT YT
HESS 0EX
N.T.S. 105-K-11
KEY MAP OF OWL CLAIM GROUP
SCALE 1" = 1/2 mi

OWL CLAIM GROUP

1 - 8	H. BRODELL	OCT. 19	1969
9 - 16	R. ETZEL	OCT. 19	
17 - 24	S. McLEOD	OCT. 19	
25 - 32	L. TURNER	OCT. 19	
33 - 40	T. ADAMSON	OCT. 18	

3500
4000
4500
5000
3000
62°39'
133° 23'

SUMMARY

The Owl Group was staked in October, 1969 to cover an area of anomalous geochemical values. Follow-up work done in June, 1970 indicated the presence of Cu-Pb-Zn mineralization and a large area of anomalous geochemical values in soils. Magnetometer, Electromagnetic and Gravity surveys were done in the period July to September and three targets for diamond-drilling selected on a basis of this work.

CONCLUSIONS

1. Anomalous geochemical values are not satisfactorily explained by vein-type mineralization seen to date.

2. Coincident magnetic, electromagnetic and gravity anomalies found to exist in overburden covered areas north of the main geochemical anomaly may be caused by the existence replacement-type Pb-Zn deposit at depth. Three gravity highs shown in Appendix XIV to XVI are thought to be logical drill-targets.

RECOMMENDATIONS

Three vertical diamond-drillholes,with a total footage of 1500 ft., to test the source of the geophysical anomalies detected on the Owl Group are recommended.

The suggested grid-coordinates and specifications for the holes are as follows:

Hole Number	Grid Coordinates	Proposed Depth	Attitude of Hole
Proposed DDH#1	L20E - 7N	500'	Vertical
	L20W - 6+75S	500'	Vertical
	L 4W - 5+25S	500'	Vertical

These holes should if possible be drilled in early October, 1970.

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ATLAS EXPLORATIONS LIMITED

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REPORT ON GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS OF THE OWL GROUP

INTRODUCTION

The initial claims of the OWL GROUP were staked on October 27, 1969 to cover an area of anomalous Cu-Pb-Zn soil-geochemistry detected during the course of the Stokes Lake Program in August and September of that year (Coates, 1969).

To September 30, 1970, the work done on the group consisted of cutting a grid in the area of interest, over which geological mapping, prospecting, soil and silt sampling, magnetic, electro-magnetic and gravity surveys were carried out.

An additional 44 claims were staked in the immediate vicinity during the month of June 1970.

The sections of this report which deal with Geology and Geo-chemistry were written by M. E. Coates. The Geophysical section was written by J. S. Brock.

LOCATION

The OWL GROUP is situated in the southwestern part of N.T.S. area 105-K-11, 20 miles north of the Anvil Mine and 10 miles southeast of Twopete Mountain (See Figure 1). The area lies on the north-facing slope of a mountain range four miles southwest of the Tay River.

ACCESS

Access to the property is by commercial aircraft or road to the Anvil Mine and by helicopter from there. Owl Lake, 6 miles east of the claims and Anvil Lake, 10 miles to the southwest, are accessible using float-equipped aircraft. If a large amount of supplies were required on the property it would possibly be more economical to move freight by float-plane to one of the above lakes and helicopter-ferry from there.

TOPOGRAPHY AND GROUND CONDITIONS

Terrain in the OWL Group area is mountainous with local relief in excess of 3000 ft. The claims are situated on a moderate (generally less than 10^{o}) north-facing slope. The pronounced trellis drainage system reflects in part the moderately dipping rocks of the sub-crop and in part the pronounced glacial fluting of northwest-southeast trend.

Much of the soil in the area is permanently frozen; in the wooded areas a thick layer of spagnum moss provides an insulating blanket.

The "A" horizon, beneath the moss, is thin. A layer of volcanic ash is found immediately below the "A" horizon. The goal for sampling was the top of the "B" horizon beneath the ash layer. Consistency in sampling was difficult to attain because of the variable thickness of the ash layer and the permafrost conditions. At most of the sample sites an axe was used to chop a pit in the permafrost until the "B" horizon was reached.

Timber line is at approximately 4500 ft. Vegetation below 4500 ft. is mainly spruce with a dense undergrowth of dwarf birch and mountain alder.

GENERAL GEOLOGY

The OWL Group area is underlain by a group of sedimentary rocks, largely charty grey-green and black argillites with minor limy sections. Quartzite is less abundant and only occasionally are narrow bands of fossiliferous limestone encountered. These rocks were mapped by J. A. Roddick of the Geological Survey of Canada and are grouped as unit 5 on the geological map of the Tay River Area (105-K, Map 13-1961). The following is a description after Roddick:

> "Unit 5 underlies much of the region between the Anvil and South Fork Ranges. It contains practically no type of rock that does not exist also in the Ordovician-Silurian strata (3), from which it appears to have been derived. Quartzite and limestone are, however, much more abundant in unit 5. The assigned age of the unit is based on Upper Devonian brachiopods from thin beds of silty limestone and chart (5c) between Stokes Lake and Tay River, and on Mississippian brachiopods from a silty sandstone (5c) near the centre of the map-area. The dark cherts of unit 5b are at least 1,500 ft. thick on Twopete Mountain and northwest of the head of Blind Creek.
>
> "Massive chert-pebble conglomerate beds (5a) form conspicuous outcrops in the vicinity of Stokes Lake. At least two beds are presented in the unit. Most of the fragments are of dark grey chert and shale, but significant numbers of fragments in the beds north of Earn River consist of light grey quartzite. The conglomerate beds are not as prominent to the east, and may thin in that direction.
>
> "Mississippian brachiopods were found in a massive grey limestone bed (6) northeast of Twopete Mountain. The limestone is involved in the complex folding and faulting of unit 5."

STRUCTURAL GEOLOGY

Regionally, the rocks between Macmillan and Tintina valleys can be considered as a major fault block with hinge-type displacement about a northwest trending axis, maximum depression being in the southwest.

Locally domed in proximity to the Anvil Range intrusives, Paleozoic rocks in the Stokes Lake Belt describe a synform, troughing in the Tay River Valley, with the northern limb rising toward Macmillan River and the coincident axis of up-lifted Proterozoic rocks.

Low-angle faulting and superficial (?) folding are common in the trough area. Shallow dips and flat lying fold axes of northwest trend are common to the north of the OWL Group though dips at the outcrop areas on the claims are moderate to steep, southwest. Regional strike is northwest-southeast.

ECONOMIC GEOLOGY

The only mineral occurrences found in the OWL Group Area are of fracture filling and disseminated type. Most of the veins examined strike approximately N-30°-E and dip steeply to the west. The following types have been recognized.

(1) Sphalerite-galena-chalcopyrite-arsenopyrite and pyrite. Approximately 15 veins, with a maximum width of 1 ft., have been discovered. Assays of samples from several of the veins gave the following values:

TABLE I
Assays of samples of vein mineralization from OWL Claims

	Au/oz./T.	Ag/oz./T	% Cu	% Pb	% Zn
No. 9713	-	17.52	.32	11.4	.12
No. 9714	-	.92	.25	Tr.	20.2
No. 9715	.01	7.68	-	4.0	-

(2) A quartzite unit in the area of the Type I veins contains minor disseminated arsenopyrite and chalcopyrite. Assay of a sample of this material collected by T. J. Adamson yielded the following:

TABLE II
Assay of sample of disseminated sulphides from OWL Claims

	Au/oz.T.	Ag/oz./T.
No. 9712	Tr.	.06

(3) Small pieces of sulphide bearing float were found in talus in proximity to a granitic plug (Buzz Grid Area). The float samples contain vein-type mineralization, mainly arsenopyrite with lesser amounts of galena and chalcopyrite in quartz gangue. An assay of the specimen of the float gave the following values:

TABLE III

Assays of samples of vein mineralization from OWL Group Area; Buzz Grid

	Au/oz./T.	Ag/oz./T.	% Cu	% Pb	% Zn
No. 4028	.005	1.68	1.7	-	-
No. 4030	Tr.	15.8	0.14	7.5	.40

(4) Quartz-arsenopyrite-stibnite; this type was the first encountered in the OWL Group Area. A piece of vein quartz containing sulphides was found during the earliest staking. Stibnite has not been found "in situ" on the property

GEOCHEMISTRY

Survey Method

Soil samples were collected at 200 ft. stations on all grid lines. The same grid was used for the geophysical surveys. A total of about 1300 soil samples and 72 silt samples were collected.

Silt samples were taken from all major drainages and from minor drainages in areas of interest. An attempt was made to collect active silts from as close to the centre of the drainage as possible.

All samples were analyzed for Cu, Pb and Zn trace element content at a complete testing laboratory at Whitehorse, Y.T.

Each sample was dried in its kraft bag container, then screened to -80 mesh, weighed out to 0.5 grams, and digested in hot nitric acid. Samples were then diluted, clarified for 2 hours, then tested for copper, lead and zinc content by atomic absorption spectrophotometer analysis. The "AA" unit used was a Techtron AA-4. The reproducibility results for copper and zinc was $\pm$ 30%. For lead analyses the reproducibility was $\pm$ 50%.

The geochemical results (expressed in ppm) of each sample were plotted on a single grid plan (1"= 400'). Separate geochemical contour maps were drawn for each of copper, lead and zinc.

Discussion of Geochemical Results

A large area of anomalous soil geochemistry, approximately 5000 ft. by 1200 ft. was found on the southern part of the grid. Coincidence of Cu, Pb and Zn anomalies was near exact. The Zn anomaly does indicate more downslope extension, probably a consequence of groundwater movement.

Several explanations are entertained for the large lateral extension of the geochemical anomalies (Dragen Brabec, Geochemist, October 6, Personal verbal communication). They are as follows:

(1) Left-hand offset of the exposed vein zone, en echelon style, along west-northwest trending faults.

(2) A second, less obvious, zone of veining west of the exposed veins but under talus cover.

(3) Presence of many transported mineralized fragments in the talus covered area.

(4) A replacement-type Cu-Pb-Zn deposit in the vicinity.

Brabec feels that the anomalies might well be expressed further downslope were they not so heavily mantled by overburden.

The sampling procedure in the lower parts of the claim group becomes suspect; permafrost conditions make it difficult to obtain good samples. High volcanic ash content in the stream sediments may also lead to dilution of trace element content in silts collected.

A silt sample from a limonitic seepage on Rat Creek was analyzed to determine if scavenging of base-metals was taking place. The values were surprisingly low (Cu/36, Pb/24, Zn/112). However, a similar seepage over Faro #2 ore body yielded low values as well: (Cu/5, Pb/13, Zn/183). This suggests that the geochemistry of limonitic seepages may depend on other factors than readily availability of base-metal ions (Eh, pH etc.).

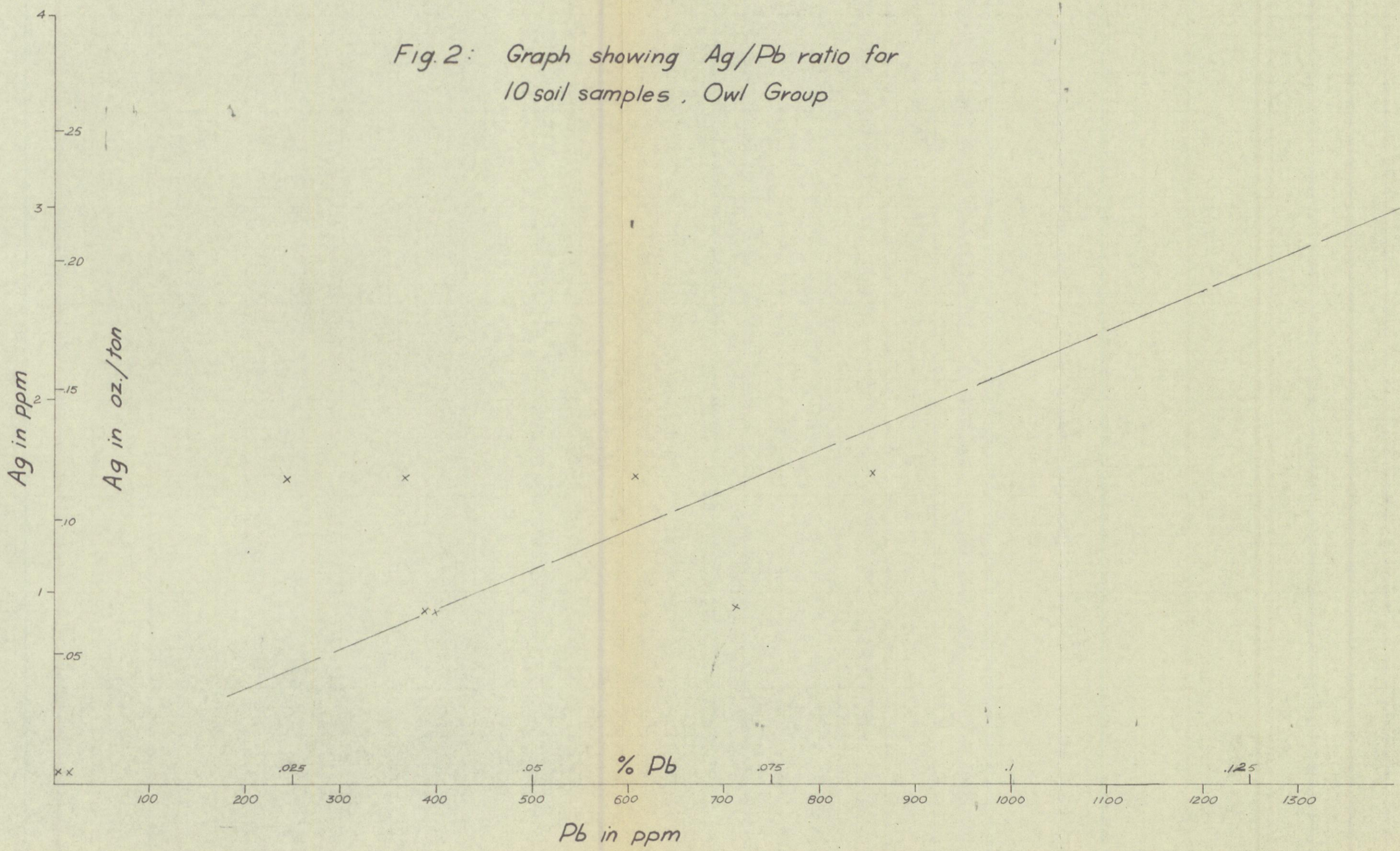
Ten samples with high Pb content were sent to Whitehorse Assay Office for silver determination (See Table IV).

TABLE IV
Silver content in ppm OWL Group Soil Samples

Grid Location	Ag in ppm.
2E, 23N	1.6
25N	1.6
IE, 5N	1.6
7N	.8
IN	1.6
3N	.8
2E, 5	Tr.
7	Tr.
9	.8
IE, 43N	

Any values over 1 ppm could be considered anomalous under normal circumstances. In view of the inexactness of the method (Atomic Absorption) for the range in which the values fall, the results can be regarded as inconclusive (Brabec, Personal verbal communication, Oct. 7, 1970). The silver values obtained were plotted against lead values for the same samples (See Figure 2). There is a good correspondence between high Ag and high lead values for the samples shown in Table IV.

Fig. 2: Graph showing Ag/Pb ratio for 10 soil samples, Owl Group



GEOPHYSICS

GENERAL

Attention was initially drawn to the 'Owl Group area' in part by the presence of apparently regionally controlled northwesterly trending aeromagnetic anomalies. A regional program was carried out by M. E. Coates, during 1969, whereby selected aeromagnetic features in an environment thought to be the extended north flank of the Anvil anticlinorium were prospected by geochemical soil sampling. Those aeromagnetic expressions found to have coincident anomalous geochemical response in either copper, lead or zinc were staked. The Owl Group resulted from this program.

Follow-up work was designed as a typical geophysical-geochemical saturation sequence as had been found successful in exploration of the Faro (Brock 1966), Vangorda (Chisholm 1956) and Swim base metal deposits in the southern flank of the Anvil Range.

SURVEY METHODS AND PROCEDURE

Magnetic Survey

A Sharpe MF-1 fluxgate type vertical component magnetometer was employed for the entire survey, it is hand held and designed for rapid and accurate ground surveys. This instrument was chosen because it gives a direct reading in gamma values and is not subject to large scale drift because of extensive temperature compensation and advanced transistorized circuitry. The maximum sensitivity is 20 gammas per scale division and readability is 5 gammas per scale division on the 1000 gamma range.

Before carrying out the magnetometer survey, the airborne data and previous geochemical results were studied in order to determine the optimum orientation and line spacing of the ground survey grid. Over the main area of interest grids of 800 ft. picket line spacing with 100 ft. station intervals were cut. Sections of geophysical complexity and higher geochemical anomalies were surveyed with a 400 ft. line spacing. Base and tie lines were all cut by local natives hired by the company, the cross line locations were controlled by picket and chain methods.

Prior to the actual survey readings were taken at the intersection points of each cross line with the central base line. These stations were 'looped' and reread every hour as a means of controlling drift and diurnal variation. With base stations of an established value serving as reference points for each cross line portion of the survey, a rapid and precise check was kept on magnetic variations, the whole survey was also kept on a relative value basis during day to day operations.

The magnetic survey was carried out at about 72 degrees, geomagnetic latitude. At times magnetic storms during the summer of 1970 were intense and the validity of some local magnetic readings may be questioned. Magnetic interpretations are of a qualitative nature in order to isolate anomalies that had possible merit for further investigation. Each anomaly has been studied quantitatively and magnetic susceptibilities, theoretical causative structure configurations and depths have been calculated by rule of thumb methods. No magnetic anomaly has been proposed for drilling without further confirmation provided by either supporting geochemical or gravimetric evidence.

Electromagnetic Survey

A Crone JEM dual frequency electromagnetic unit was used during the survey. The Crone unit is of the inductive type and may be used either as a horizontal or vertical loop apparatus. Measurements are made of the resultant dip angle of the field and the width of "null" or out-of-phase component. It is designed to be operated with a maximum coil spread of 300 ft. on frequencies of 480 and 1800 cycles per second, there are no interconnecting cables. The effective depth penetration is 300 ft. for detection of a flat conductor (no skin effect allowance) and 100 ft. for a vertical conductor, using a 300 ft. coil spacing and the horizontal loop method. The method is independent of topographic and elevation effects as the plane of the transmitting loop is orientated on each observation so that extraneous dip angles can be overcome. The effective lateral coverage is a direct function of the spread under ideal conditions.

The equipment and survey methods were chosen in order to give reliable information on the attitude and configuration of a conductor, the physical properties of the host rock, dimensions of the conductor and results free from error due to topographic relief. All surveys were run with horizontal loop configuration in order to obtain the highest response from flat lying sulphide bodies. The coil configuration was not adapted to condtions of conductive overburden and maximum response from such was expected. The surveys were carried out with the coils at a constant 200 ft. separation for maximum signal strength, all traverses were by the 'in line method'.

The interpretive use of high and low frequencies as well as measurement of the null factor permits good discrimination of anomalies. Each anomaly was noted with respect to coincidence with other geophysical data, location, maximum depth below surface, near surface features, attitude and some idea of its conductivity times thickness factor.

Gravity Survey

All gravity surveys were under contract to Overland Explorations of Calgary, Alberta. Gravimetric readings were taken with a Worden Mark II instrument.

The gravity surveys were conducted in selected areas because of previous outlining of magnetic and conductive features partially in coincidence with geochemical anomalies. The same survey grids were used as the other geophysical surveys were conducted over except that they were surveyed by Stadia Methods for line location and station elevations.

The Horizontal and Vertical Survey was conducted with a T-1A Theodolite. Stations were located and elevated along each of the grid lines. The elevation, where possible, was then closed across the extremities of the grid lines, all of the closures thus formed were under 2.5 ft. The gravity readings were taken with a Worden Master meter and stations were metered on a two and one-half hour run from base to base interval. The base station plots were used for graphing the diurnal gravity drift which in turn was applied to all station readings. Each gravity station run had several repeat stations from preceding runs in order to prove the repeatability of the gravity meter. The repeats were all within a 0.00 to 0.08 milligal range. All gravity readings were corrected for diurnal tidal drift, Bouguer Free-Air-Correction, latitude correction, and terrain correction. A density factor of 0.060 for a surface density of 2.65 has been used in the interpretation.

Overland Explorations provided the company with maps of elevation, regional gravity, Bouguer gravity and residual gravity. Such maps were also submitted to R. L. Galeski, Geophysical Consultant for his interpretations.

DATA TABLE I

Bouguer Free-Air-Correction Factor	- 0.06
Latitude Correction	- 4911.15 ft/milligal
Density	- 2.65
Diurnal Drift	- Taken from Base Plots
Terrain Correction	- Taken where necessary
Meter Number	- Worden No. 806
Meter Constant	- 0.08351
Base Value	- Arbitrary Value of 500 milligals

INTERPRETATION

Aeromagnetic Results

Inspection of the Geological Survey 1 inch to 1 mile aeromagnetic maps shows a discontinuous but probably regionally controlled belt of northwesterly trending aeromagnetic highs terminating in the vicinity of Twopete Mountain. These aeromagnetic features are related to the contact areas of Mississippian graphite argillites with cherts. Further to the southeast the higher intensity magnetics are more coincident with Paleozoic tuff, limestone and quartzites. Immediately southeast of the Owl Group, magnetic highs in the vicinity of Northern Empire Mines Caribou Lake property are probably covered by concentrations of pyrrhotite in skarn occurring around the margins of a local intrusive.

Little outcrop occurs in the areas of aeromagnetic anomalies however the presence of anomalies in the Owl Group area is likely due to a higher grade of metamorphism because of proximity to local intrusive stocks related to the Twopete implacements. The aeromagnetic anomalies are all caused by relatively shallow susceptibility changes.

Ground Magnetic Results

Background for ground magnetic results has been selected at 1200 gammas. Magnetic profiles in this range are of constant and flat relief.

Examination of the magnetic contours show east-west oriented, sinuous shaped anomalies enclosing both erratic single-line magnetic highs and lows.

Several main features are immediately obvious from examination of the contour map:

(1) General reproduction of strike direction, location and intensity of aeromagnetic anomalies.

(2) A well defined contact zone found on all survey lines at about station 4N. North of this area black cherty argillites have been found. Susceptibilities are low and obviously uniform.

(3) An area of flat relief between Line 0 and 20E and station 10S and 24S could be either an area of deeper overburden creating a 'masking effect' or a section of low susceptibility cherty argillites similar to the rocks found in the northern part of the grid.

(4) Three areas of higher amplitude magnetics have been selected as having dimensions and intensities similar to massive sulphide models. These are shown within the boundaries of Areas I, II and III on the Compilation Map.

From studies of magnetic profiles, several other features also become apparent:

(1) A strong fault-contact zone or series of en echelon shears, striking east-west between Line 0 and 32W at about station 25S. This area is also coincident with a well defined break in topographic slope.

(2) Erratic magnetic highs are all due to near surface features of not greater source depth than 300 to 400 ft.

The magnetic results alone do not support the presence of a massive sulphide target but when examined in coincidence with gravity, electromagnetic and geochemical results they are of supporting significance.

Electromagnetic Results

The elctromagnetic survey was not completed over lines 4E to 24E because of equipment breakdown.

Study of the Resultant Dip Angle profiles for both frequencies reveals several structural features:

(1) A fault-contour between lines 4E and 28W at stations 8N with a less conductive mass lying to the north.

(2) A conductive mass between lines 4E and 8W and centred at stations 12S. A similar conductive mass between lines 12W and 28W and centred at stations 5N. These two anomalies likely represent beds of more graphitic material that have been displaced by a left lateral north trending fault through line 12W.

(3) Local profile irregularities are representative of variations in conductivity within beds of varying graphitic content in moderate to flat dipping meta-sediments.

(4) No isolated electromagnetic feature on the grid can be readily attributed to massive sulphides.

Gravity Results

The Owl Group data has been interpreted by Overland Explorations, R. B. Galeski a geophysical consultant, and J. S. Brock.

Galeski re-worked the raw data provided by the contractor and came up with a modified interpretation because of an adjustment in regional gradients.

Data were presented to Galeski in the form of Bouguer values and elevations plotted in profile form. Regionals were run on the profiles and tied at the base line. These regional values were plotted on a base map, smoothed and adjusted on the profiles. Residuals were then extracted from the profiles, plotted and contoured. The residual map is the kay map in his interpretation, and has been used in any subsequent interpretations made by Atlas Explorations.

Bouguer Map

The Bouguer Map of the Owl Claim Block as prepared by Overland displays an increase in gravity intensity to the southwest. Breaking up this general gradient are a series of density highs and lows scattered over the map area. Visually, these highs and lows have very little meaning as seen on the Bouguer Map and it is only through residual extraction that these features can be viewed in a meaningful manner.

Regional Map

The regional map as reviewed by Galeski shows regional values decrease from north to south at a rate of 2 milligals per one-half mile in the west and 1 milligal per half-mile in the east. A flexure in the vicinity of line 8E suggests the possible presence there of deep-seated, north-south trending fault (east side downthrown).

Residual Map

Overland Explorations attempted to construct a regional gradient over the Owl Claim area which suppresses the influence of large deep-seated mass effects. The remaining gravity features were

then examined on their own residual merit. There are several anomalies worth investigating as possible sulphide targets. As well, there are a number of positive closures within the claim group indicating the presence of local areas of shallow, heavy rocks. These could be due to the accumulation of sulphide masses, or they could be due to differential overburden effects.

The most important positives, identified as such on the basis of amplitude and flank gradients, are labelled "A" through "F".

A. Peak value - 1¼ milligals, at station 5S on line 20W. A very small, sharp local negative occurs at stations 6S through 8S on line 20 near the apex. This indicates a surficial accumulation of light materials. The small negative does not detract from the importance of the anomaly, but it does mask the true apex position which could be anywhere between 5S and 7S. Two magnetic lineations join near the apex.

Causative mass appears to be slab-shaped, possibly southward dipping. If a sulphide body, it could be of the order of 15 MM tons in size. Computed maximum depth to top is 270 ft. (0.09 density contrast assumed).

According to an interpretation by Chen of Overland Explorations this anomaly is sourced at approximately 750 ft. below surface. There is no surface or topographic expression of the anomaly and he feels that if "A" were entirely caused by glacial drift to native rock contrasts then there would be some surface expression of this event on such a steep topographic slope.

B. Small anomaly with a peak value of 0.8 milligals. Apex value is at 6N on line 20E. Causative mass appears somewhat spherical in shape. Computed maximum

depth to top is 210 ft. Again no surface expression of this anomaly can be seen and thus suggests that the feature is not a gravel to bedrock contrast.

C. Another small anomaly similar to B, but sharper and shallower. Computed maximum depth to top is 145 ft. Apex value is at 4N on line 12E. The northwest flank is distorted by the presence of a high amplitude steep-sided negative of limited areal extent near the north end of line 4E. This negative indicates the presence of a steep-sided depression in the country rock filled with very light materials.

The vicinity of 4N and 5N, line 12E, is strongly positive - a saddle between B and C. It is likely that the causative masses of B and C are separated but closely related.

D. Amplitude of 0.6 milligal, apex between 6S and 7S on line 20E. Calculated maximum depth to top of causative mass is 130 ft. This anomlay has been down-graded because of the lack of regional control at its position near the end of the line and because of the possibility that it represents a sub-till, near surface feature.

E. Extends from 5S on line 4W, past the south end of line 4E to 14S on line 12E. Amplitude is 0.8 milligal on the west to 1.0 milligal on the east. A topographic irregularity is roughly coincident with the axis of the anomaly, and it is thought to be related to near-surface topographic and overburden effects.

F. Amplitude of 0.8 milligal at the north end of line 24W. Downgraded because of a lack of regional control on the north extremity of line 24W.

Calculations

Dc or Z = depth to centre
T = thickness
Dt = depth to top
R = radius
σ = density contrast = .9

Line 20E 6N (anomaly B)

Causative body = sphere

$$Dc = \frac{.65 \times .9}{1/600} = 370'$$

$$R^2 = .$$

$$= \frac{.37 \times .9}{12.77 \times .9} = .0274$$

$$R = 160'$$

$$Dt = 210'$$

Line 20E 6S (anomaly D)

Causative body = slab

$$Z =$$

$$Z = \frac{.65 \times .7}{1/350} = 160'$$

$$T =$$

$$= \frac{.7}{12.77 \times .9} = .06$$

$$= 60'$$

$$D \text{ top} = 130'$$

Line 16E

Horizontal slab

$$\frac{ds}{dx} = \frac{1}{290}$$

$$Z = \frac{g \text{ max} \times .65}{ds/dx \text{ (max)}}$$

$$= \frac{1 \times .65}{1/290}$$

$$= 190'$$

$$T =$$

$$= \frac{1.0}{12.77 \times .9} = .087' - 87'$$

Line 16E (Cont'd)

Horizontal cylinder

$Z = \frac{1}{2}$ g max g max = 320

$= 160'$

$R^2 =$

$= \frac{.16 \times 1.0}{12.77 \times .9} = .0140$

$= .118$

$= 116'$

$DT = 80'$

Line 20W 5S

g (max) = 1.25 mg.

Dc = 400' = .4

DT = 210'

$R^2 = \frac{1.25 \times .4}{12.77 \times .9} = .0433$

R = 210'

D = 190'

Zc = .65 x 1.25 x 400 = 325'

ZT = 270'

$T = \frac{1.25}{12.77 \times .9} = 110'$

CONCLUSIONS AND RECOMMENDATIONS

In a search for massive sulphides, the gravity anomalies appear to be most significant as possible drill targets.

Recommendations offered by Galeski Are"

(1) Test the A anomaly with 2 -300' holes. The first should be drilled at 5S on line 20W, and the second at 8S on line 28W. If either indicates the possibility of an ore body, extend the gravity program southward to 25S on all lines

between 4W and 36W, inclusive. In the process, re-run all of line 8W.

(2) Test the B anomaly with a 300' hole at 6N on line 20E. If mineralization is present, extend lines 8E to 20E, inclusive, northward to 20N and run a transverse line between 3N on line 4E to 7N on line 24E.

From a study of all data, diamond drill holes are proposed for the following locations:

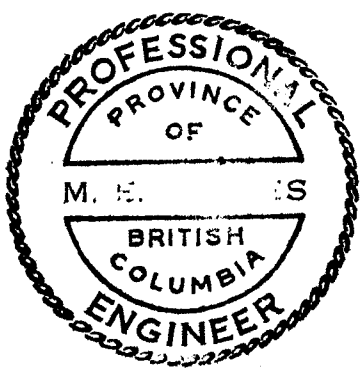
(1) L20E 6N
(2) L4W 5S
(3) L20W 5S

Electromagnetic anomalies do not appear to be related to massive sulphide bodies on the Owl Grid. Magnetic anomalies only where either coincident or in partial coincidence with gravity features are considered to be of interest as possible massive sulphide targets.

Respectfully submitted,

M. E. Coates, P. Eng.

October, 1970



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Chen, David, K.Y., 1970: Yukon Gravity Program on the Lorna, Jean, Owl, Roto, Gran & Sun claims. Overland Explorations Services, Calgary, Alberta.


N
Tay River
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. E. COATES
Symbols
Outcrop limit
Contact
Assumed contact
Bedding attitude
Assumed fault
Mineral occurence
Vein attitude
LEGEND
7 Granite, quartz monzonite & associated dykes
6 Closely interbedded grey chert, quartzite & limestone
5 Grey to black limestone
4 Black graphitic chert
3 Very f.g.-medium grained quartzite; disseminated sulfide (As, cp)
2 Coarse grained light grey quartzite
1 Grey to dark grey chert
Appendix I
ATLAS EXPLORATIONS LIMITED
GEOLOGY OF OWL CLAIMS
HESS PROJECT - YUKON
N. T. S.: 105-K-12
SCALE: 1" = 1000'
DATE OF SURVEY:
PARTY CHIEF:
DATE DRAFTED: October 13, 1970
DRAFTED BY: G.T.
DATE REVISED
REVISED BY:
CHECKED BY:
FIGURE No.:

N

1" = 1000 Ft

BUZZ GRID

KEY MAP

Appendix II

ATLAS EXPLORATIONS LIMITED

HESS PROJECT - OWL GROUP - YUKON REGIONAL

GEOCHEMISTRY

SOIL & SILT SAMPLES

N.T.S.		SCALE:
105 K-12		1" = 1000'

DATE OF SURVEY:	PARTY CHIEF:
DATE DRAFTED:	DRAFTED BY: M.E.C. (M. Coates)

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. E. COATES

LEGEND

SAMPLE ATTACK: All samples digested in hot HNO_3 and analyzed on a Techtron AA-4 atomic absorption unit

Soil samples collected from 'B' horizon

Cu, Pb, Zn, - all values shown in ppm

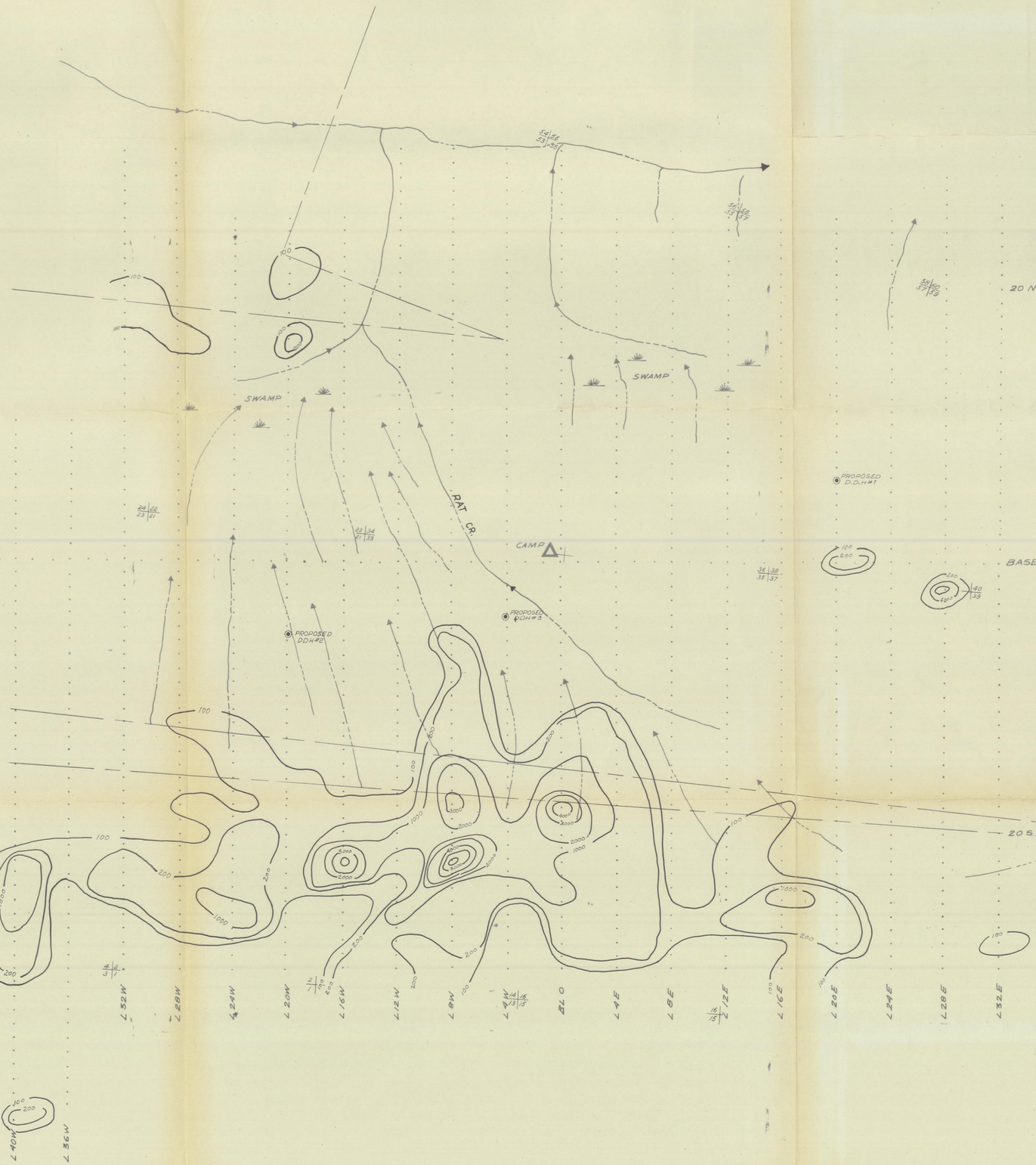
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. E. COATES

Appendix III

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
GEOCHEM SURVEY - VALUES MAP
Cu, Pb, Zn.

N. T. S.: 105-K-12		SCALE: 1" = 400'
DATE OF SURVEY: JULY - AUGUST 1970		PARTY CHIEF: P. Dean
DATE DRAFTED: OCTOBER 1970		DRAFTED BY: P. Dean - J. Dennison
DATE REVISED:		REVISED BY:
CHECKED BY:		FIGURE No.:



PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. E. COATES

INTERPRETIVE MAP DERIVED FROM VALUES MAP APPENDIX III

Appendix V

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
GEOCHEMICAL SURVEY
LEAD CONTOURS

N. T. S.: 105-K-12		SCALE: 1" = 400'
DATE OF SURVEY: JULY - AUGUST 1970		PARTY CHIEF: P. DEAN
DATE DRAFTED: OCTOBER 13, 1970		DRAFTED BY: P. DEAN - J.A.D.
DATE REVISED		REVISED BY:
CHECKED BY:		FIGURE No.

INTERPRETIVE MAP DERIVED FROM VALUES MAP APPENDIX III

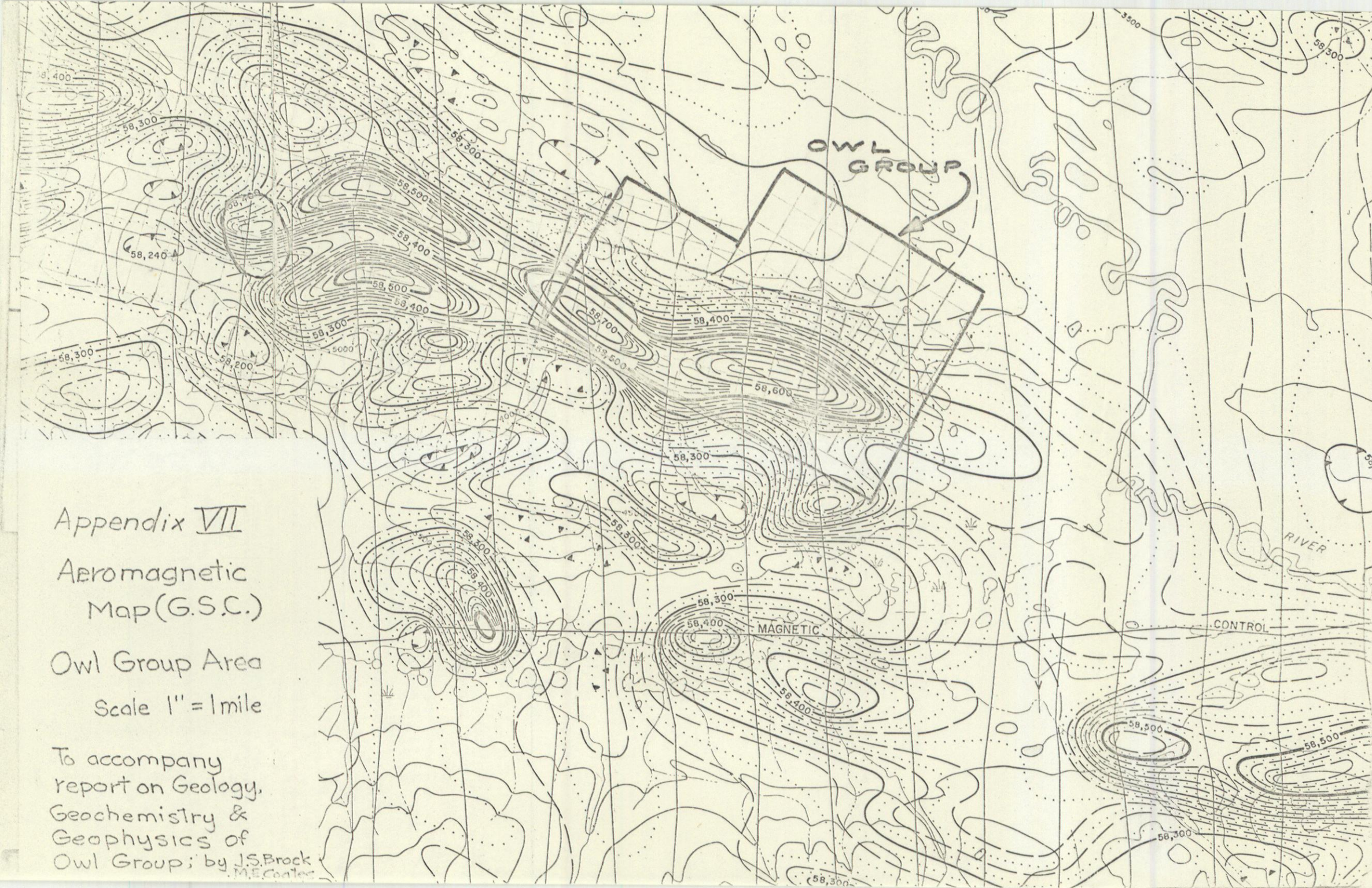
Appendix VI

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
GEOCHEMICAL SURVEY
ZINC CONTOURS

N. T. S.: 105-K-12		SCALE: 1"=400'
DATE OF SURVEY: JULY-AUGUST 1970		PARTY CHIEF: R.DEAN
DATE DRAFTED: OCTOBER 13, 1970		DRAFTED BY: R.DEAN - J.A.D
DATE REVISED:		REVISED BY:
CHECKED BY:		FIGURE No.:

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. E. COATES



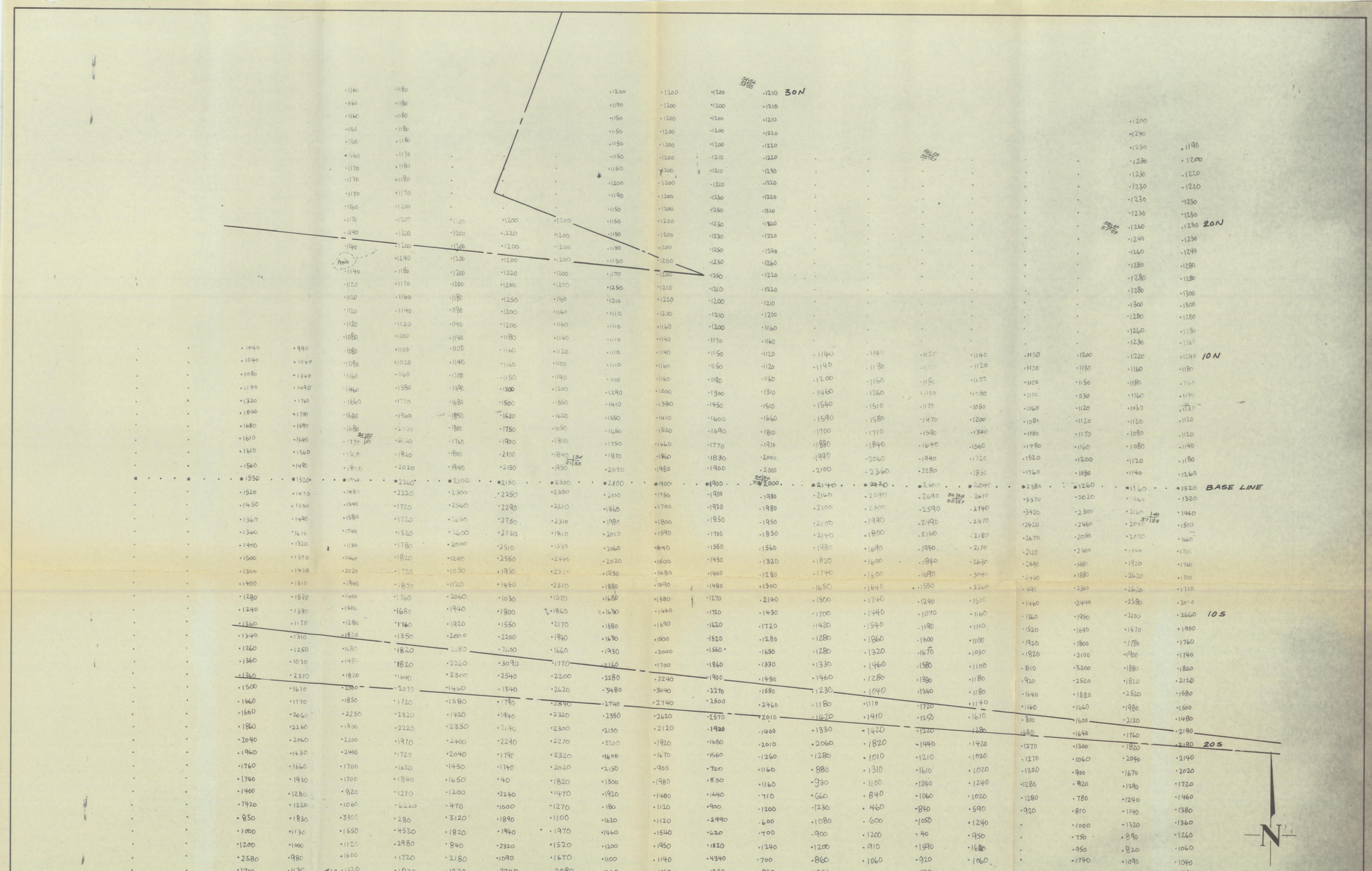
Appendix VII

Aeromagnetic Map (G.S.C.)

Owl Group Area

Scale 1" = 1 mile

To accompany report on Geology, Geochemistry & Geophysics of Owl Group; by J.S. Brock M.E. Coates



Appendix VIII

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
MAGNETOMETER SURVEY - VALUES

N. T. S.: 105 K-12		SCALE: 1" = 400'
DATE OF SURVEY: JULY, AUG., 1970		PARTY CHIEF:
DATE DRAFTED: October 14, 1970		DRAFTED BY: P.Dean ~ J.Dennison
DATE REVISED		REVISED BY:
CHECKED BY:		FIGURE No.:

Appendix IX

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
MAGNETOMETER SURVEY - PROFILE MAP

N. T. S.: 105 K-12		SCALE: 1" = 400' 1" = 2000'
DATE OF SURVEY: JULY-AUG. 1970		PARTY CHIEF: P.DEAN
DATE DRAFTED: OCT. 20, 1970		DRAFTED BY: PD, J.A.D.
DATE REVISED:		REVISED BY:
CHECKED BY:		FIGURE No.:

20 N

10N

BL 0

10S

20S

OWL CLAIM BOUNDARY

OWL CLAIM BOUNDARY

BOUNDARY OF OWL CLAIMS

L 48W
L 44W
L 40W
L 36W
L 32W
L 28W
L 24W
L 20W
L 16W
L 12W
L 8W
L 4W
BL 0
L 4E
L 8E
L 12E
L 16E
L 20E
L 24E
L 28E
L 32E

N

Appendix X

ATLAS EXPLORATIONS LIMITED

OWL CLAIMS
MAGNETOMETER SURVEY - CONTOUR MAP
CONTOUR INTERVAL 100 γ

N. T. S.: 105 K 12		SCALE: 1"=400'
DATE OF SURVEY: JULY-AUG. 1970		PARTY CHIEF:
DATE DRAFTED: OCT. 19, 1970		DRAFTED BY: P.DEAN - J.A.D.
DATE REVISED		REVISED BY:
CHECKED BY:		FIGURE No.:

32W	28W	24W	20W	16W	12W	8W	4W	BL O	4E	8E	12E	16E	20E	24E	28E	32E	
	Good grief!	12.7			.	.	.	54/56 53/55 .								73/75 58/60 .	30N
		15.7														.	
	[65 .10]	12.5			12.6	1.1	9.8	7.2								.	
	28.15	9.3			11.13	6.2	15.15	16.5								.	
	34.18	12.11			4.2	10.7	21.18	8.1								.	
	35.19	14.4	10.1		6.2	8.6	20.13	5.3							6.2	.	
	28.19	12.7	18.5	9.0	2.1	8.3	12.9	9.7			56/58 55/57				4.2	.	
	14.8	6.7	12.6	4.1	3.+2	4.1	11.7	9.6							8.4	19.5	
	8.0	8.5	20.12	6.4	4.3	2.2	7.5	1.+2							10.6	6.4	
	5.6	1.1	9.4	2.1	11.13	3.1	9.8	7.4							14.6	2.+2	
	0.+4	2.1	3.5	0.2	3.0	2.2	12.12	2.1							13.8	5.0	
	4.3	1.+1	2.3	+2.1	+1.+2	4.0	8.5	2.+1							22.7	10.5	
	1.+1	4.+1	1.2	2.+1	1.2	1.1	1.0	4.2							58/57 27.10	14.8	20N
	1.0	0.0	3.0	5.1	1.+1	3.1	0.0	3.0							31.17	11.10	
	3.0	2.0	0.+2	2.2	1.0	3.4	5.3	2.2							30.18	23.14	
	1.0	1.0	1.1	5.4	0.0	4.0	0.0	2.0							23.12	15.13	
	3.5	1.0	1.1	0.1	0.+1	2.0	7.1	3.2							15.7	.10	
	5.1	2.0	5.6	0.+2	0.+1	4.2	1.3	5.0							10.6	16.7	
	6.0	4.2	0.1	+2.0	2.2	2.0	3.+1	6.1							9.5	14.7	
	0.5	5.2	5.0	3.2	2.0	1.+1	10.4	3.0							7.4	13.12	
	12.6	2.0	5.3	2.1	4.1	17.8	16.9	5.1							11.8	17.10	
	16.9	5.2	4.7	3.1	7.4	17.11	25.14	14.8							10.8	17.7	
	22.18	14.6	10.4	1.1	9.2	21.15	21.14	27.10							15.13	5.3	10N
	25.21	21.14	11.6	9.5	10.6	23.15	16.7	23.9							9.5	7.2	
	29.22	25.20	19.9	13.6	13.6	16.9	12.5	17.12							14.9	9.7	
	34.25	26.14	27.16	16.10	11.6	12.6	11.6	14.10							21.13	15.12	
	34.21	26.11	25.13	18.10	13.10	10.4	10.2	15.6							24.15	.	
	30.20	23.10	26.10	20.9	17.7	10.6	4.5	11.7							23.17	.	
	28.12	22.10	25.9	17.6	14.7	6.4	8.6	12.8							24.12	.	
	24/22 23/21 31.15	32.10	27.10	20.11	15.6	10.4	17.13	9.3							24.11	.	
	28.14	27.13	29.16	23.12	13.6	11.4	5.6	9.4							21.7	.	
	26.14	25.11	25.18	22.11 22/34 21/33	9.5	11.7	14.9	16.4							20.10	.	
BL-O	23.10	26.8.11	32.20	25.9	17.13	14.9	8.5	8.6							18.5	16.4	BL.O
	21.6	23.8	28.13	25.17	14.4	10.4	14.8	10.7				36/38 35/37			20.7	15.4	
	14.4	12.0	19.5	21.11	15.10	12.4	11.7	10.4							20.6 38/40 37/39	13.3	
	7.3	6.2	5.3	29.10	17.7	11.2	8.4	13.8							18.5	21.9	
	4.0	2.1	6.4	20.6	17.2	11.6	13.7	8.8							19.3	14.2	
	4.0	0.1	5.2	21.7	15.5	19.6	17.7	12.5							28.9	21.11	
	0.1	2.2	1.+1	14.3	18.5	16.5	20.4	11.6							27.7	13.7	
	4.1	2.+1	4.2	10.1	14.5	27.4	29.13	25.15							21.5	21.8	
	2.+1	2.0	4.0	11.2	20.13	26.12	32.12	24.13							22.8	22.5	
	3.1	+2.0	2.3	6.2	20.15	25.10	26.16	21.22							25.5	23.9	
	2.0	7.+1	3.2	8.3	22.16	21.11	36.24	24.23							27.8	34.13	10S
	1.1.	4.0	13.4	8.3	21.11	26.14	36.20	37.29							23.8	20.9	
	0.+1	10.1	11.1	14.6	26.14	27.14	26.18	37.17							25.14	30.28	
	2.2	6.1	14.4	14.8	27.14	28.16	30.16	26.13							21.24	28.11	
	7.3	10.2	20.5	14.13	28.16	29.16	31.18	33.14							25.26	17.17	
	8.3	20.6	28.10	20.10	26.15	29.18	28.15	31.21							30.32	20.21	
	9.2	15.8	21.11	22.10	18.15	32.15	29.16	31.23							30.33	31.29	
	2.1	10.4	17.13	23.16	20.11	26.11	26.11	27.16							34.32	38.35	
	---	9.4	27.17	25.13	22.16	23.15	18.12	22.11							29.33	36.32	
	---	7.5	27.9	21.19	9.4	20.9	8.4	11.4							27.29	34.20	
	10.6	--.-	19.10	16.8	7.4	10.4	2	8.2							33.31	29.22	20S
	0.1	--.-	23.13	18.1	8.2	.....	.....	2.3							40.35	31.12	
	---	--.-	11.0	17.4	.....	.....	.....	1.2							28.26	28.15	
	-.-	--.-	....-	3.4	.....	.....	.....	.....							18.15	21.13	
	-.-	-.-	.....	7.7	4.3	.....	10.4	.....							29.20	23.12	
	---	-...	.....	0.+1	0.+2	0.0	0.+2	.....							21.11	24.10	
	0.0	-.--	.....	3.1	4.4	0.0	+3.0	.....							15.7	14.12	
	1.+1	-.-.	1.+2	0.0	1.0	3.1	10.7	0.0							20.6	20.12	
	1.0	1.2	0.7	0.1	1.0	1.1	1.2	0.1							6.3	10.9	
	1.0	0.0	2.4	0.0	1.+1	2.2	1.2	+1.1							3.0	9.3	
	0.0	0.0	+1.+1	+2.0	1.1	0.+1	5.0	.....									
4/2 3/1 .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	Appendix XI	.	30S

2/14 1/13

14/16 13/15

16/18 15/17

INSTRUMENT — CRONE J.E.M.

29.13

1800 CPS 480 CPS

All readings plotted are negative resultant dip angles except where shown positive (+)

SURVEY — coil spacing 200'
PROCEDURE - horizontal loop configuration

LEGEND

High Frequency → 29.13

Low Frequency →

ATLAS EXPLORATIONS LIMITED

J.E.M. ELECTROMAGNETIC SURVEY - OWL CLAIMS

HESS PROJECT - YUKON

N. T. S.: 105-K-12		SCALE: 1" = 400'
DATE OF SURVEY: July, August, 1970	PARTY CHIEF: P. Dean.	
DATE DRAFTED: " " "	DRAFTED BY: P. Dean, G.T.	
DATE REVISED	REVISED BY:	
CHECKED BY:	FIGURE No.:	

LEGEND

Instrument Crone J.E.M.
Survey procedure: Coil spacing 200' using horizontal loop configuration

High Frequency
Low Frequency

1" = 20°

Appendix XII

ATLAS EXPLORATIONS LIMITED

ELECTROMAGNETIC PROFILES - OWL CLAIMS
HESS PROJECT - YUKON

N. T. S.: 105-K-12		SCALE: 1" = 400'
DATE OF SURVEY: July, August, 1970	PARTY CHIEF: P. Dean	
DATE DRAFTED: " " "	DRAFTED BY: P. Dean G.T., JAD	
DATE REVISED	REVISED BY:	
CHECKED BY:	FIGURE No.:	

L 32 W
L 28W
L 24W
L 20W
L 16W
L 12W
L 8W
L 4W
BL 0
L 4E
L 8E
L 12E
L 16E
L 20E
L 24E
L 28E
L 32E
30N
20N
10N
BASE LINE
10S
20S
30S
N
Appendix XIII

CONTOUR INTERVAL: - 5 degrees resultant dip
(all values -ve scale)
From high frequency
1800 cps scale
INSTRUMENT Crone J.E.M.
Survey done with horizontal
loop configuration.

ATLAS EXPLORATIONS LIMITED

J.E.M. ELECTROMAGNETIC SURVEY - CONTOUR MAP
OWL CLAIM BLOCK
HESS PROJECT - YUKON

N. T. S.: 105-K-12		SCALE: 1"=400'
DATE OF SURVEY: July, August 1970	PARTY CHIEF: P. Dean	
DATE DRAFTED: October 1970	DRAFTED BY: J. Dennison	
DATE REVISED	REVISED BY:	
CHECKED BY:	FIGURE No.:	

OES

OVERLAND

EXPLORATION SERVICES (1969) LTD.

FOR

ATLAS EXPLORATIONS LIMITED

OWL CLAIM BLOCK

RESIDUAL GRAVITY

R.B. GALESKI CONSULTING — SEPTEMBER, 1970

Scale: 1" = 400 ft. — C.I. 0.1 mgal.

Appendix XIV

N

20N

AREA II

2000
2200
2400
2600

BASE LINE

2000
3000

AREA II

2000

20 S

AREA I

Cu
Pb
2000
3000

BASE OF TALUS

BASE OF TALUS

32W 28W 24W 20W 16W 12W 8W 4W 0 4E 8E 12E 16E 20E 24E 28E 32E

48W 44W 40W 36W

GRAVITY ANOMALY > .5 mg
.1 mg CONTOUR INTERVAL

Cu > 80 ppm in soils

Pb > 100 ppm in soils

Magnetic anomaly
100 γ contour intervals
> 2000 γ

Camp

Survey stations

EM conductors not shown

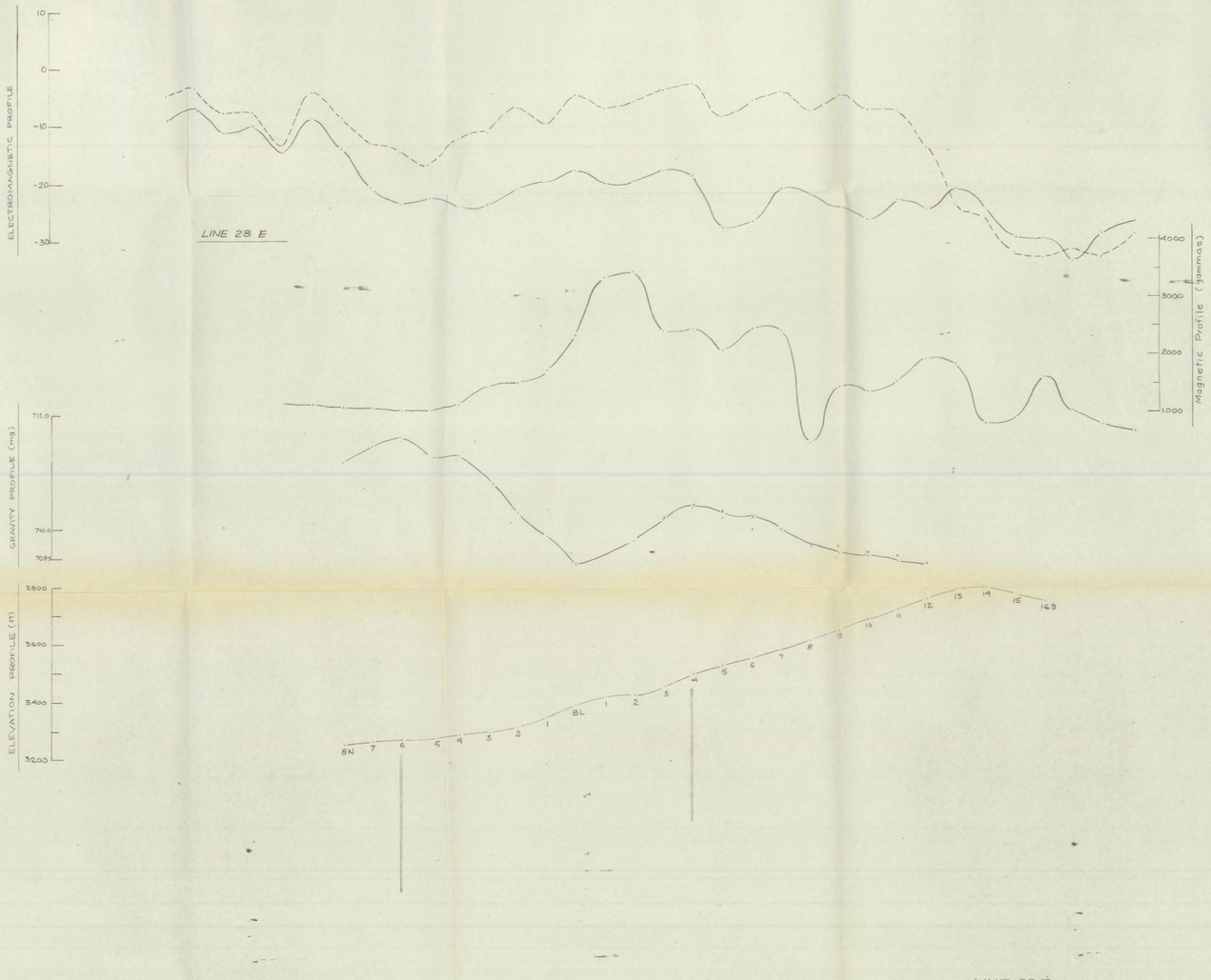
Appendix XV

ATLAS EXPLORATIONS LTD.
HESS PROJECT - OWL GROUP

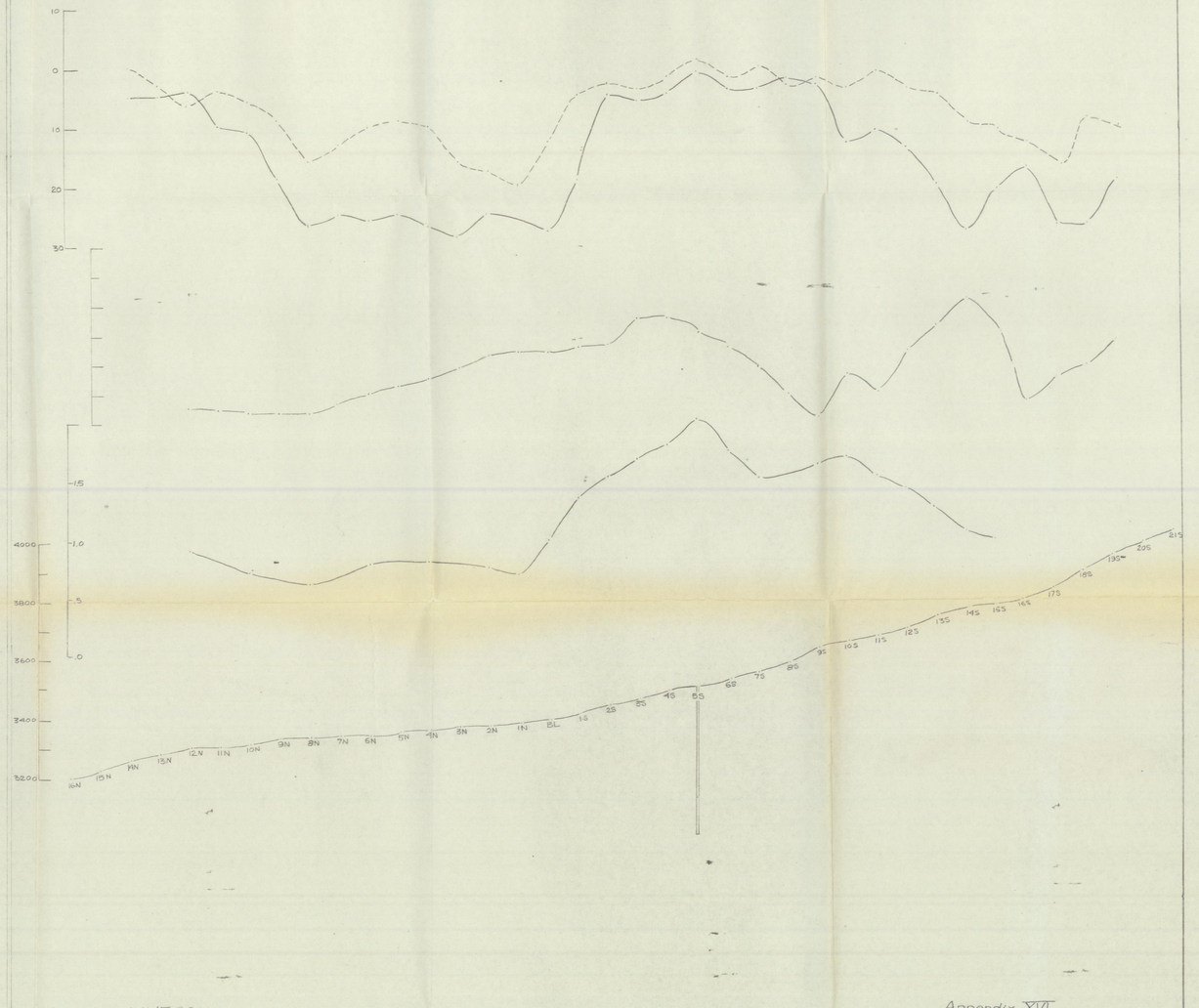
COMPILATION MAP
GRAVITY - SOIL SAMPLING - MAGNETICS

400 200 0 400 800

I.S.B. AUG '70



LINE 20E



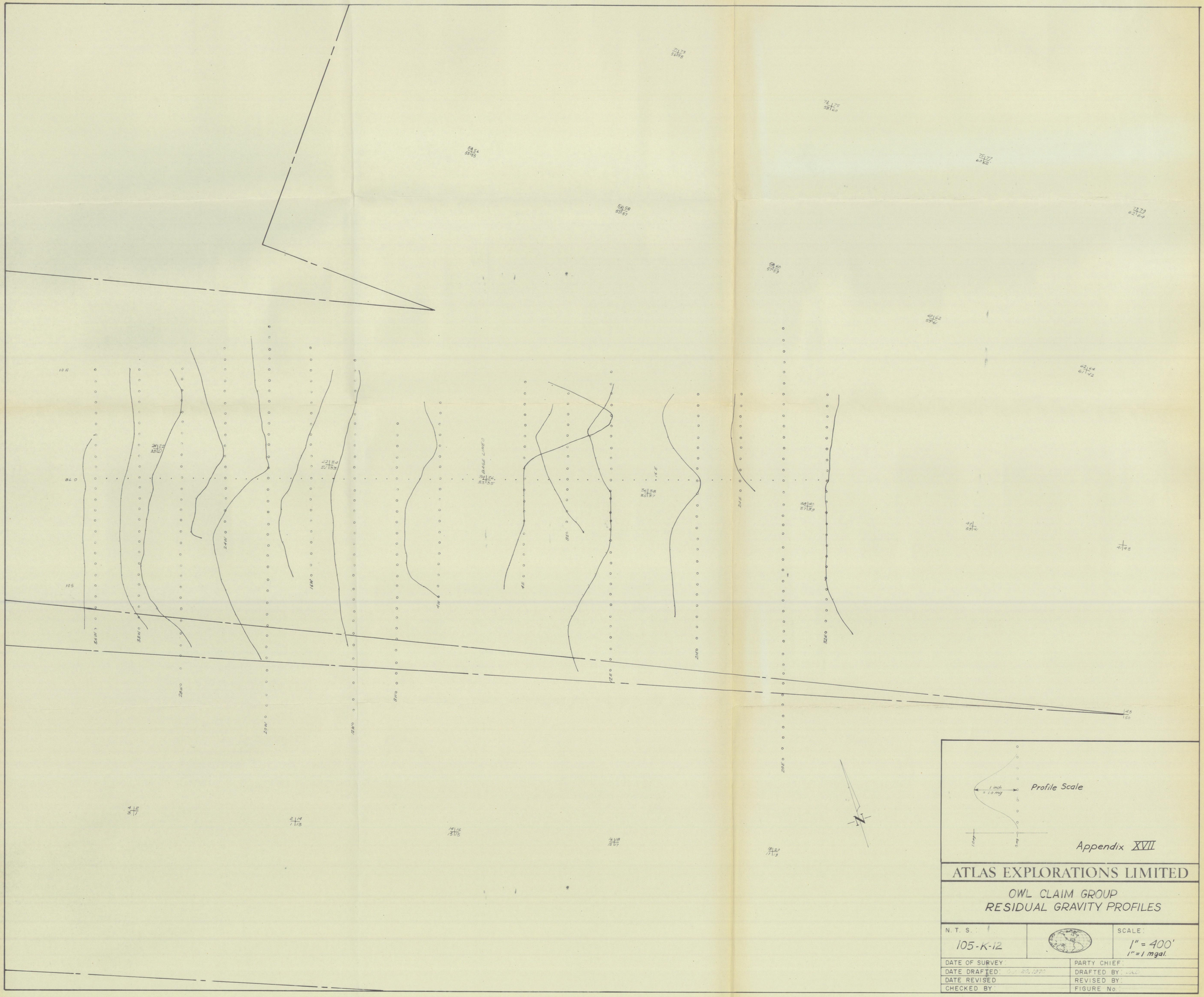
LINE 20W

Appendix XVI

ATLAS EXPLORATIONS LIMITED

OWL CLAIMS - HESS PROJECT
COMPILATION MAP
Topography, Gravity, Magnetic, Elecromagnetic Profiles

N. T. S.: 105-K-12		SCALE:
DATE OF SURVEY:		PARTY CHIEF:
DATE DRAFTED: OCT. 30/70		DRAFTED BY: J.A.D.
DATE REVISED:		REVISED BY:
CHECKED BY:		FIGURE No.:



Profile Scale

1 inch = 1.0 mgl

Appendix XVII

ATLAS EXPLORATIONS LIMITED

OWL CLAIM GROUP
RESIDUAL GRAVITY PROFILES

N. T. S.: 105-K-12		SCALE: 1" = 400' 1" = 1 mgal.
DATE OF SURVEY:		PARTY CHIEF:
DATE DRAFTED: Oct. 23, 1970		DRAFTED BY: A.L.
DATE REVISED		REVISED BY:
CHECKED BY:		FIGURE No.:

BASE LINE

36 W. 32 W. 28 W. 24 W. 20 W. 16 W. 12 W. 8 W. 4 W. 4 E. 8 E. 12 E. 16 E. 20 E. 24 E. 28 E. 32 E.

712.00

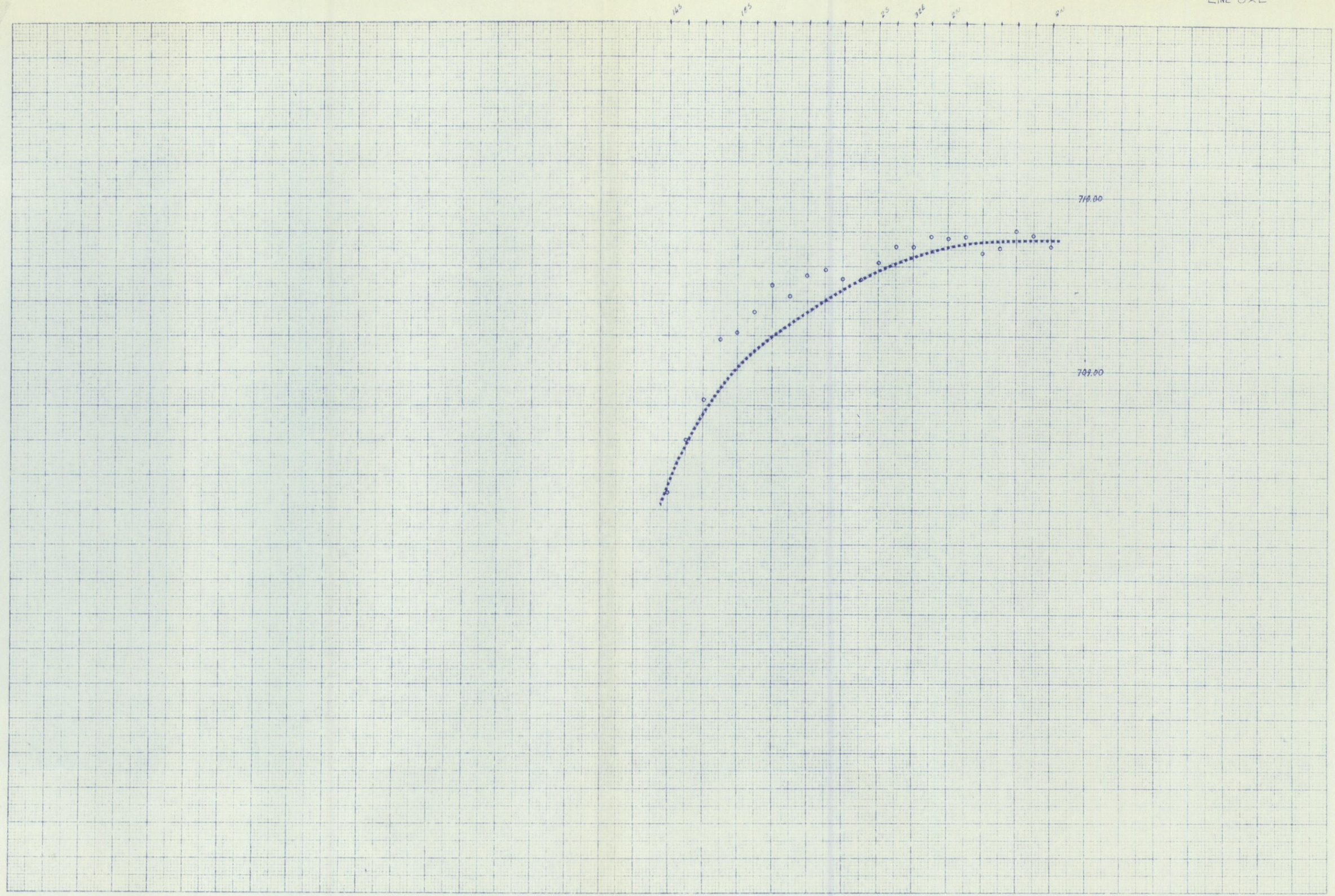
711.00

710.00

709.00

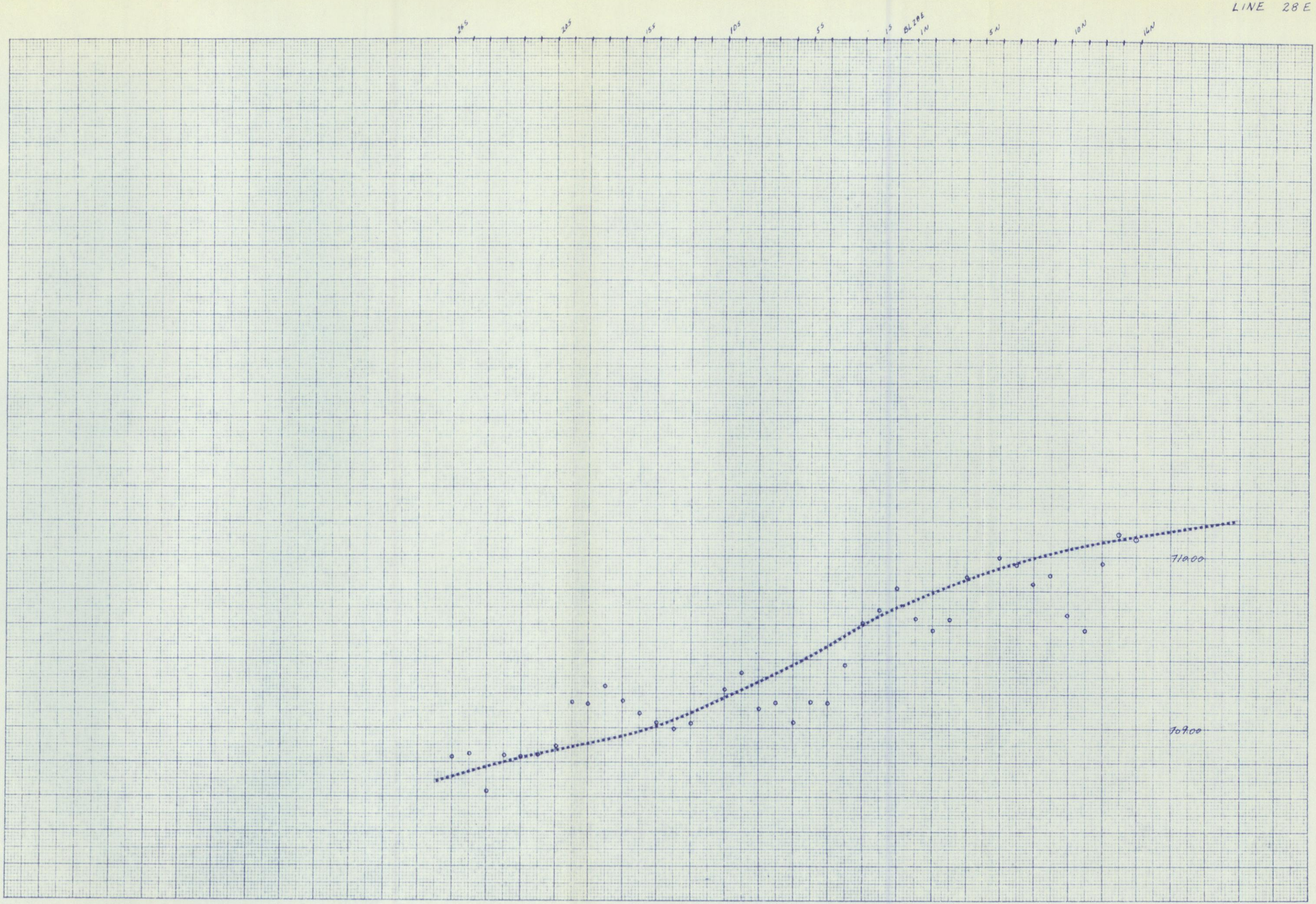
70-164 ATLAS
OWL GROUP

LINE 32E



70-169
ATLAS-OWL GROUP

LINE 28E

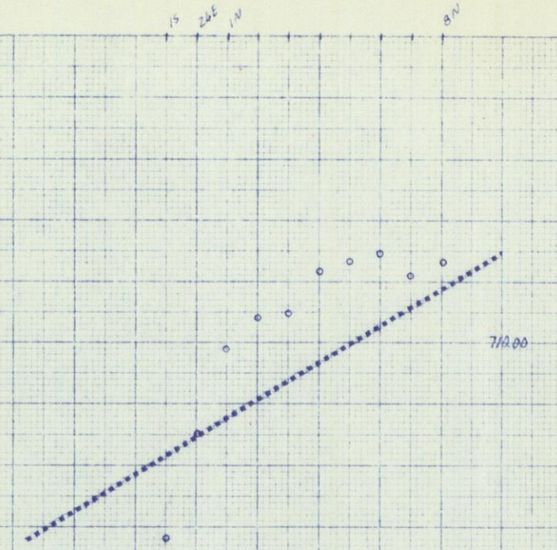


KE 10 X 10 TO THE CENTIMETER 47 1512
25 X 25 CM
KEUFFEL & ESSER CO.

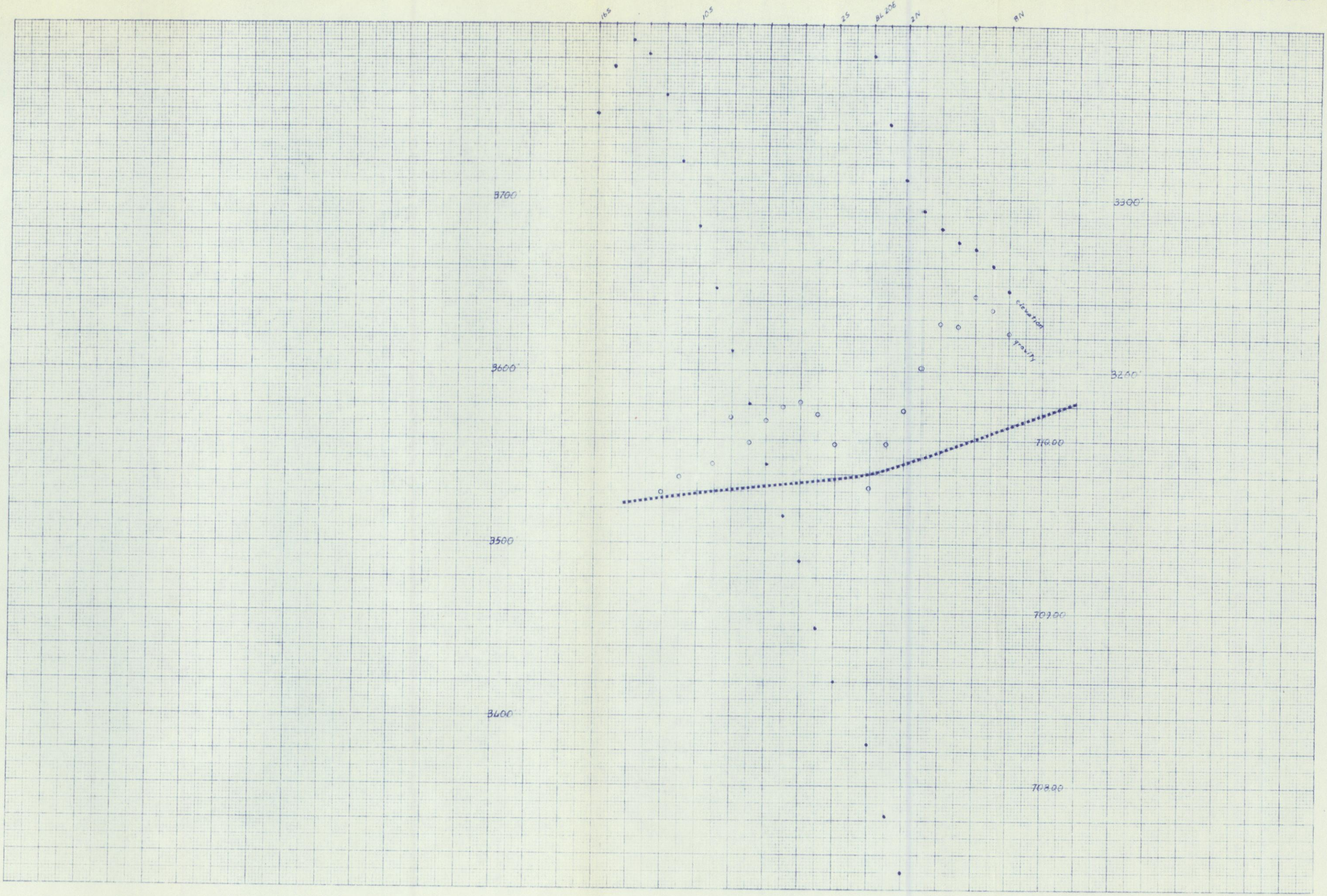
70-164

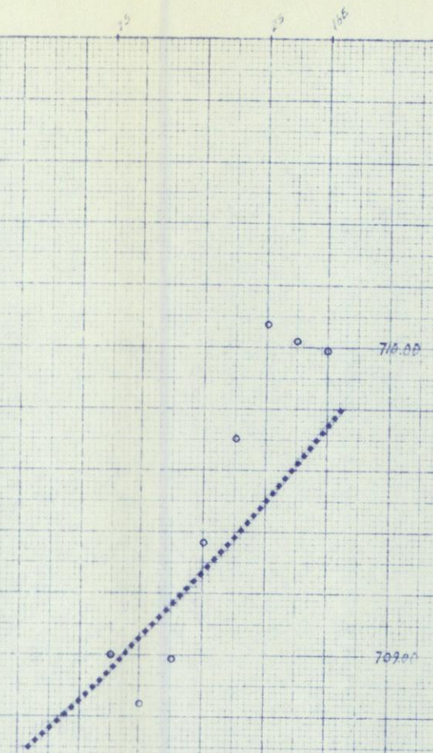
ATLAS-YUKON

LINE 24E

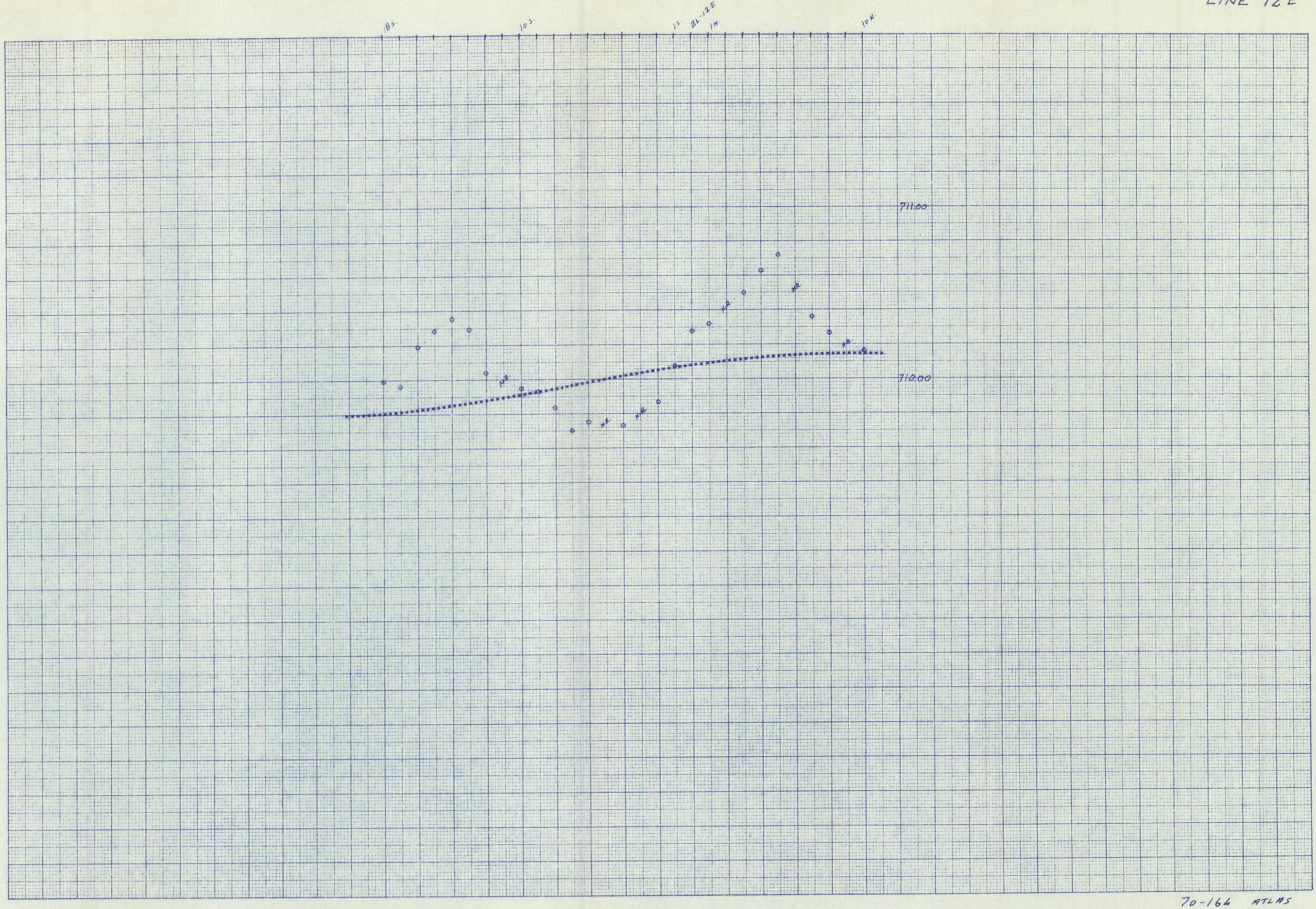


70-164
ATLAS - OWL GROUP



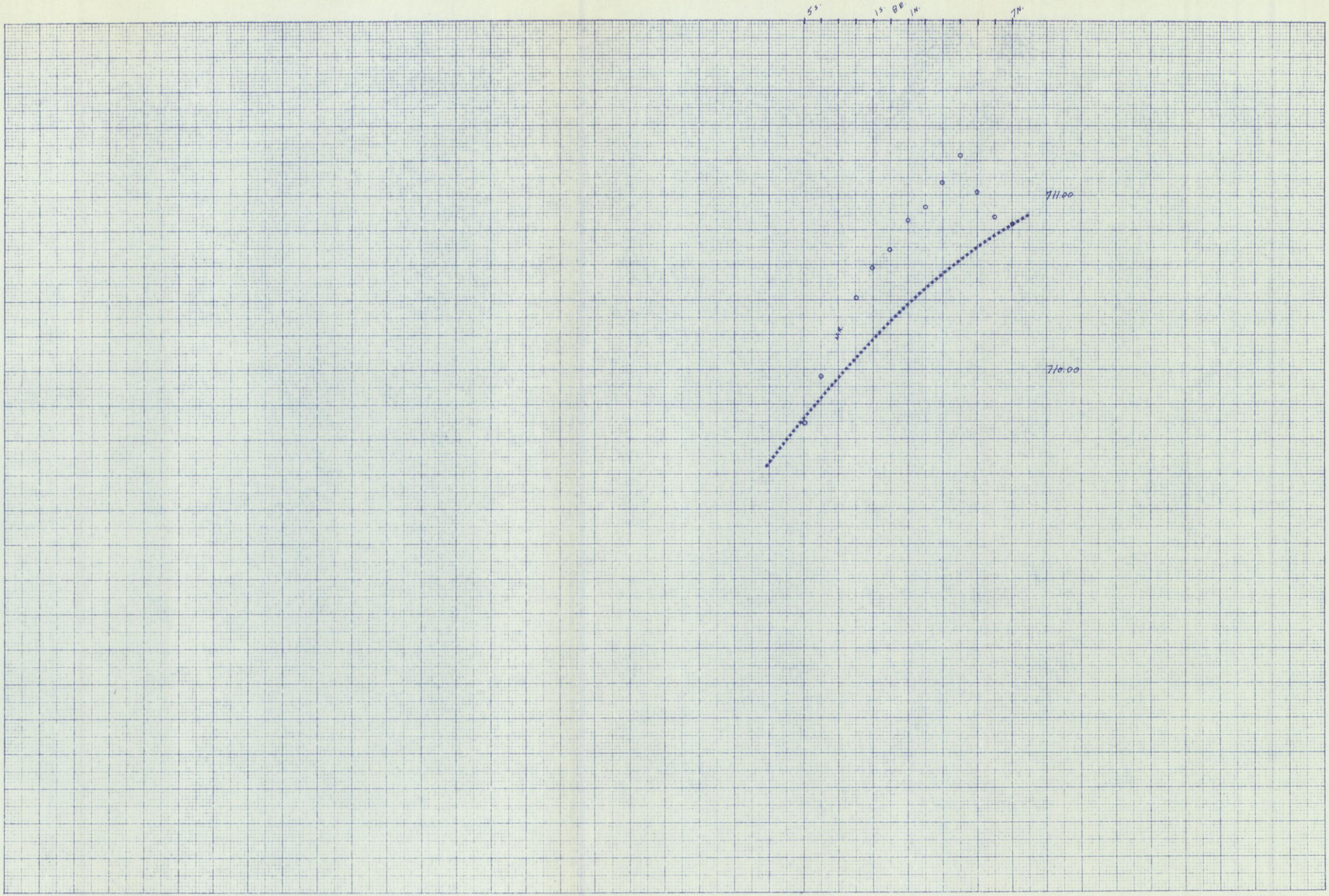


LINE 12E



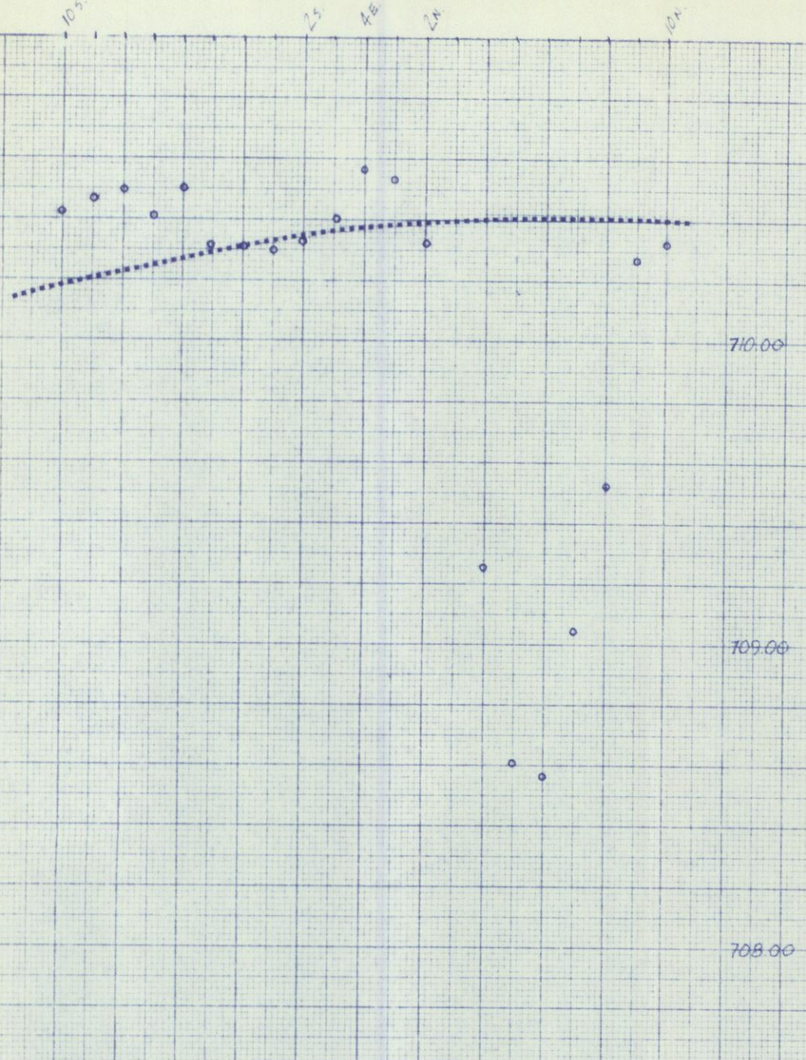
70-164 ATLAS
OWL GROUP

LINE 8E



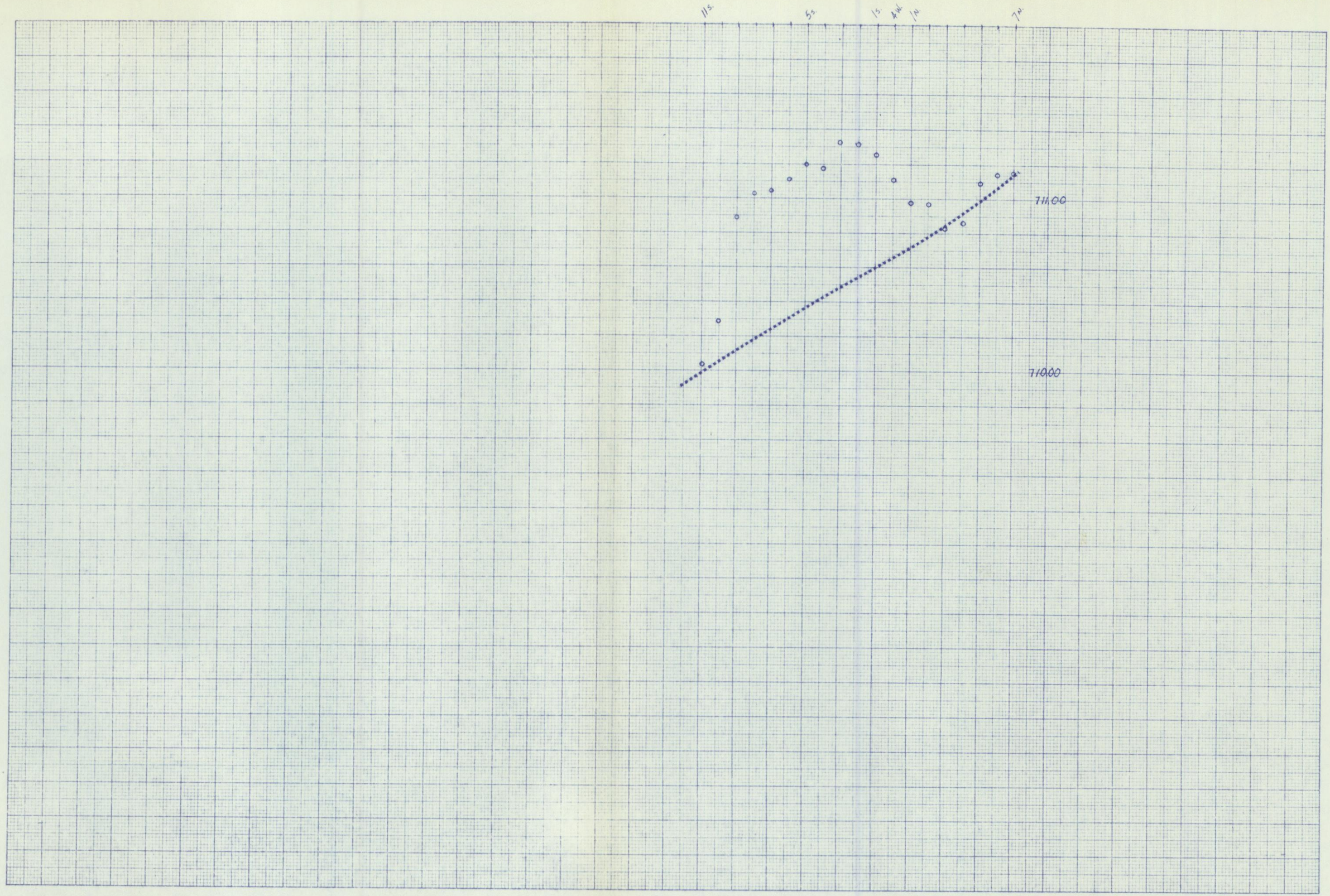
70-164 ATLAS
OWL GROUP

LINE 4 E.



70-164
ATLAS. OWL GROUP

LINE 4 W.



70-164
ATLAS-OWL

LINE 8W

22.5 20.5 18.5 12.5 2.5 0.2 S.W. 2.5 5.5

715.00

712.00

711.00

710.00

70-164

ATLAS-YUKON

LINE 12 W.

21 20 10 25 BL. 12 W. 1N. 11N.

4000'

3900'

3800'

3700'

3600'

3500'

3400'

710.00

709.00

708.00

70-164

ATLAS - YUKON

LINE 16W.

9S 5 1S 16W 1N 5 12N

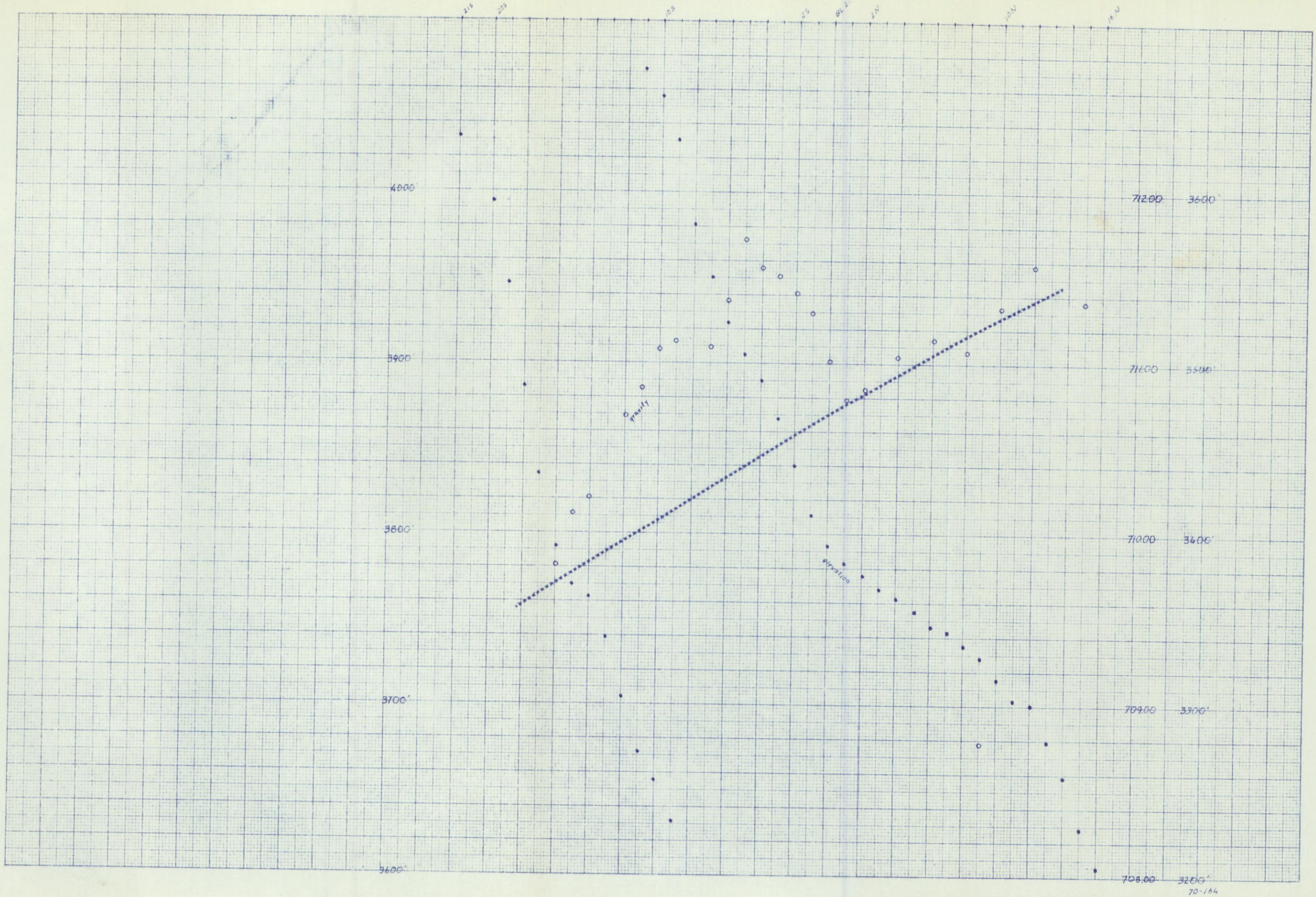
7H00

7H00

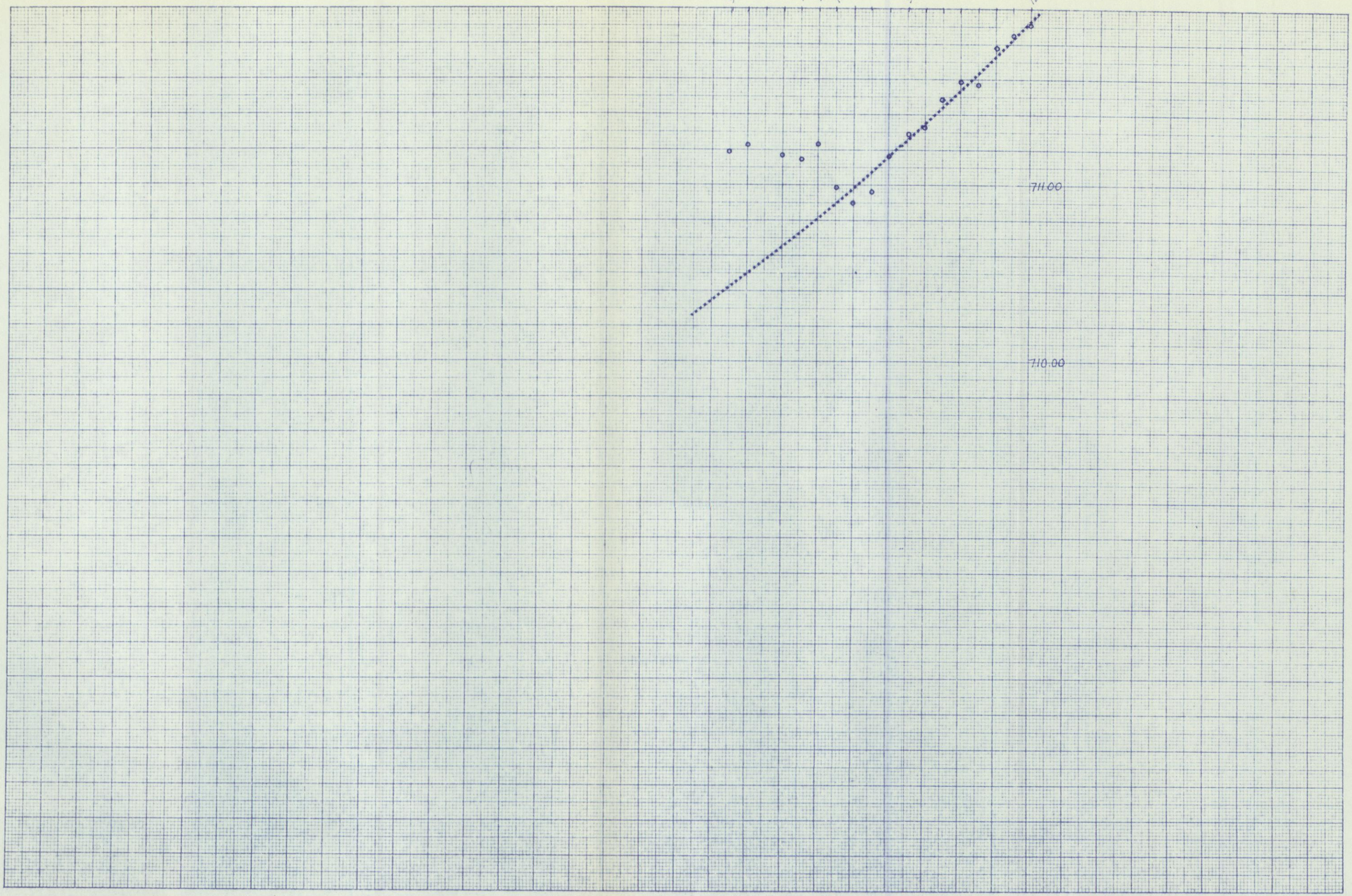
10 X 10 TO THE CENTIMETER 47 1512
25 X 25 CM.
KEUFFEL & ESSER CO.

70-164
ATLAS - OWL GROUP

LINE 20W

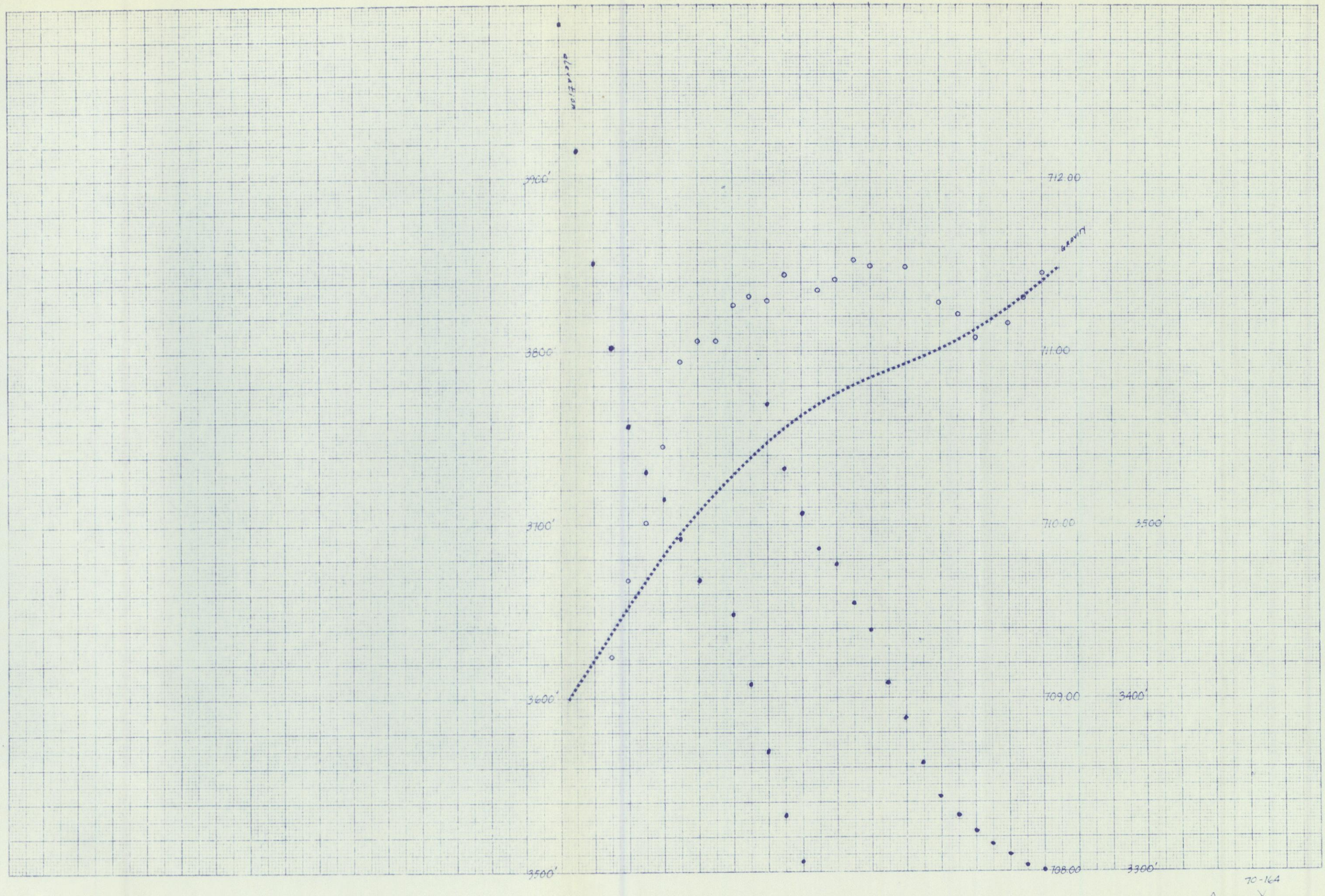


LINE 24W.



70-164
ATLAS - OWL GROUP

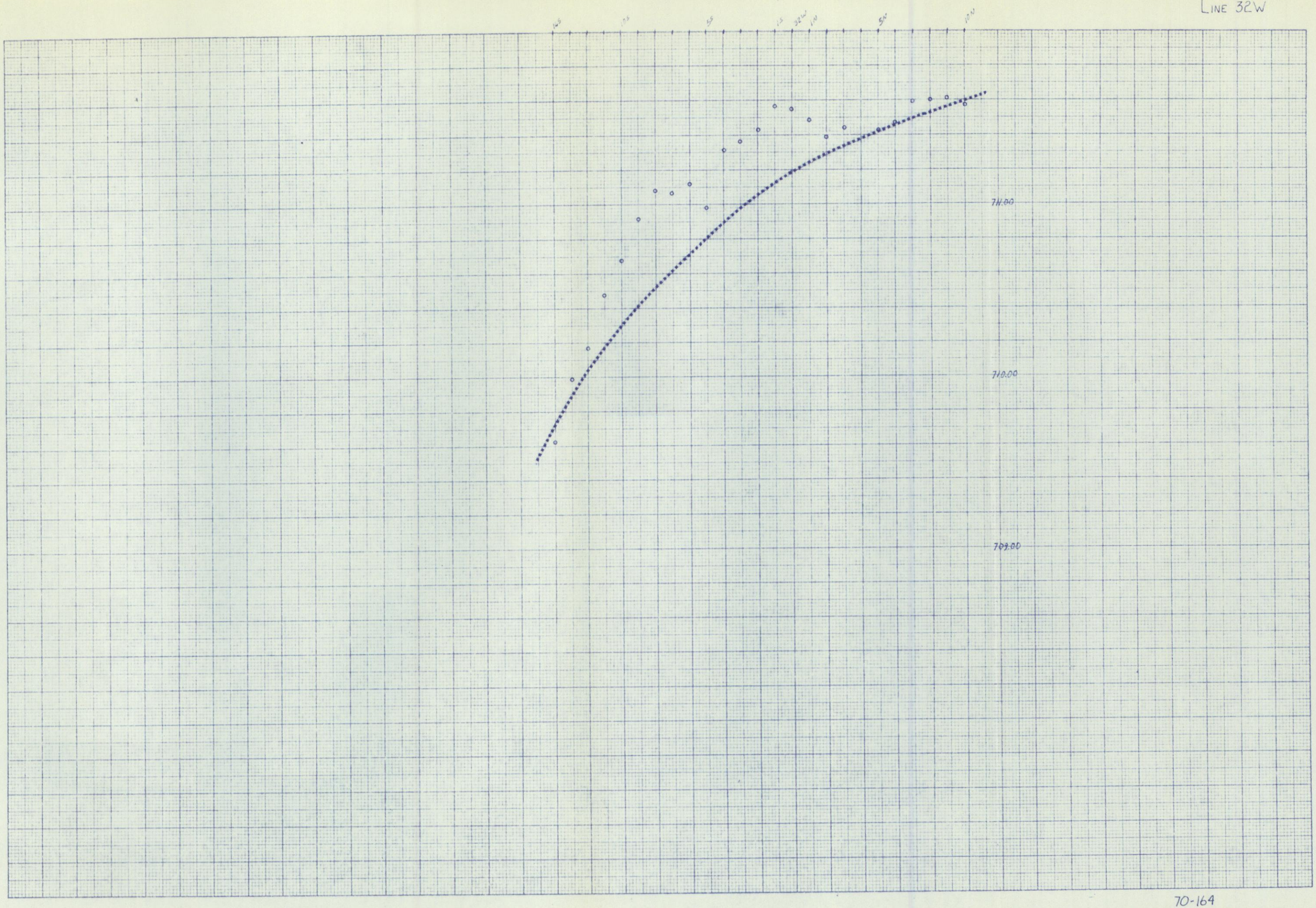
LINE 28 W.



70-164

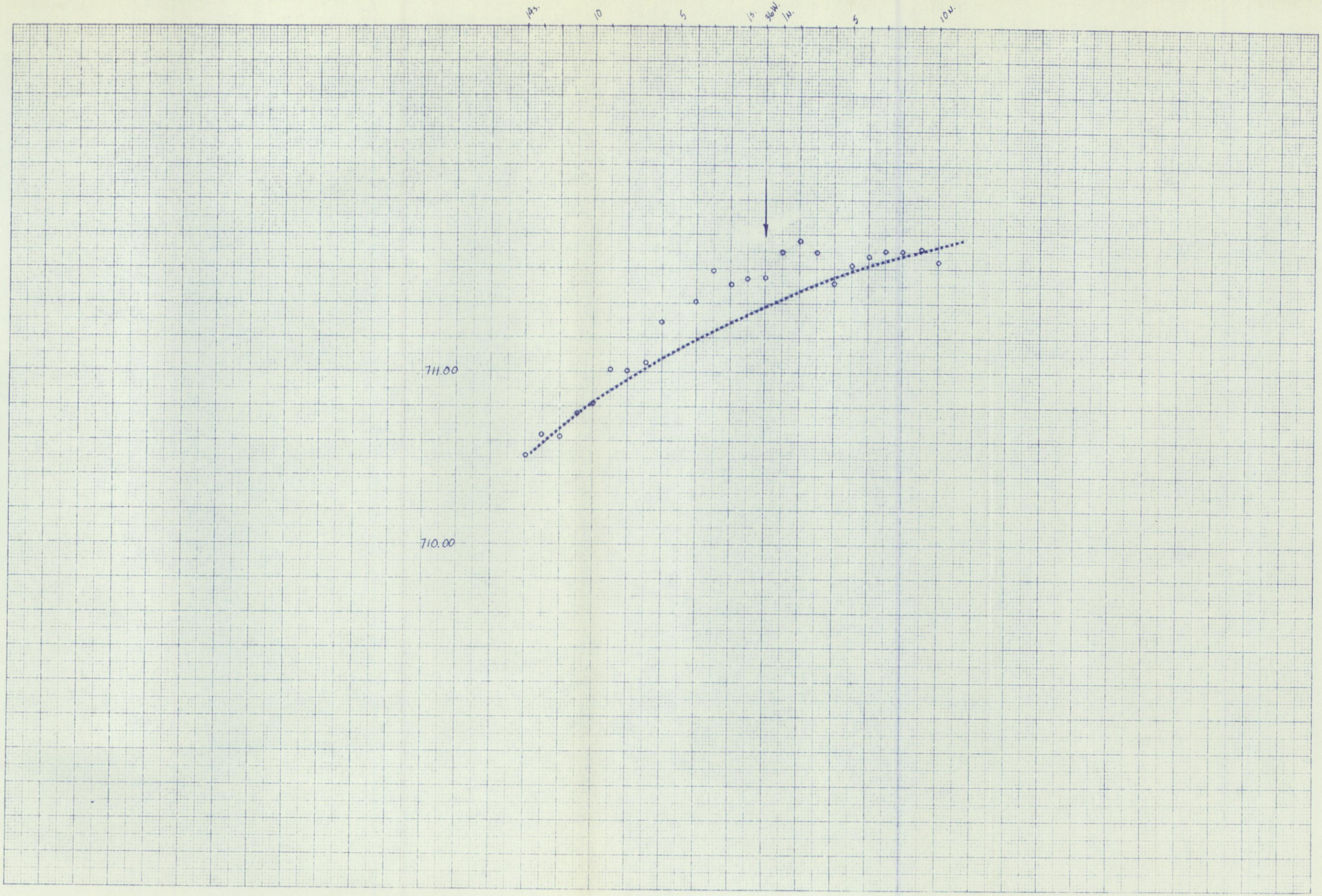
ATLAS - YUKON

LINE 32W



70-164
ATLAS-OWL GROUP

LINE 36W.



L-36W
L-32W
L-28W
L-24W
L-20W
L-16W
L-12W
L-8W
L-4W
L-4E
L-8E
L-12E
L-16E
L-20E
L-24E
L-28E
L-32E
711.5
711.0
710.5
710.0
709.5
709.5
709.0

N

OES

OVERLAND
EXPLORATION SERVICES (1969) LTD.

Appendix XVIII

FOR

ATLAS EXPLORATIONS . LIMITED

OWL CLAIM BLOCK

REGIONAL GRAVITY

R.B. GALESKI CONSULTING SEPTEMBER, 1970

Scale 1" = 400 ft C.I. 0.5 mgal