JOE CLAIMS 105 K-5
105 K-6

D-6 (W. Ext. of Hill-Rust)
015944 GRAVITY SURVEY
JOE. CLAIMS
Hecla Mining 105K5 - 105K6
Sept 69
ANVIL'S COPY

Maps Missing
(West of Hill Rust)
not compiled

GRAVITY SURVEY

of the

JOE CLAIMS
ROSE CREEK AREA, YUKON TERRITORY

for

HECLA MINING COMPANY
of
CANADA LTD.

by

OVERLAND EXPLORATION
SERVICES LTD.

Sept '69

INDEX

INTRODUCTION

A gravity survey was conducted on the Joe Claims Group by Overland Exploration Services Ltd., in July, 1969. This survey was a westward continuation of the survey which covered the Hill-Rust Group. Overland conducted the survey, gravity metering, line cutting, and interpretation, while Hecla Mining Company of Canada provided the necessary helicopter time involved in transport, camp moves, supply trips etc. A total of 11.0 miles of gravity survey was run on the Joe Claims with stations every 100-feet along grid lines spaced at 800 feet. The grid lines were connected by a Base Line which also was metered with 100-feet station spacing.

SURVEY & FIELD PROCEDURE

The horizontal and vertical survey was conducted with a TI-A theodolite. The Base Line was located as to its relationship to north by a series of sun shots, the average of which was used for north. Elevations were run down the Base Line with three individual surveys. The extreme divergence of these surveys was 2.5 feet and an averaged mean elevation was then used for stations along this line. All cross lines were double surveyed.

The gravity readings were taken with a Worden Master meter and stations were metered on two and one-half hour runs from base stations. The base stations 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 and maintain repeatability of the gravity meter. The repeats were

all within a 0.00 to 0.05 milligal range.

All gravity readings are corrected for:

- Diurnal Tidal Drift
- Bouguer Free-Air-Correction
- Latitude Correction
- Terrain Correction

A density factor of 0.060 for a surface density of 2.65 has been used in this interpretation.

INTERPRETATION

The main body of this interpretation is derived from gravity profiles of the surveyed lines. From these profiles a regional gradient has been determined which forms the basis for defining local positive and negative anomalies. These gravity anomalies show as density highs and lows relative to the regional gradient and are mapped on the Residual Gravity Map. All model studies of the positive anomalies which could relate to sulphide bodies together with (depth and magnitude calculations) have assumed a density contrast of 0.9 to exist between native rock and the anomaly source. This contrast supports the majority of our calculations and it is to be construed that the source of the major anomalies are either dense sulphides or extremely dense basic rock intrusions.

We do not feel that thickening and thinning of surface till within the Joe Claims Group is the entire

source of any of the density highs. Of course, only drilling will positively prove this assumption. There appears to be several northeast-southwest minor faults trending across the Base Line on the Joe Claims Block and the density highs are associated with the faulting.

BOUGUER MAP

The total gravity field exhibited on the Bouguer Map shows a total differential of approximately 8.5 milligals on this Claim Block. The highly disturbed Bouguer Gravity in this area is indicative of a very complex mass distribution and it is our feeling that the gravity pattern is disturbed by northeast-southwest faulting across the Base Line. This faulting follows the same pattern that has been detected to the east of the Joe Claims Group. The only difference here is that the faulting pattern becomes more frequent and more complex towards the west end of the Base Line. Superimposed on the faulted blocks are density highs and lows which probably relate to accompanying mineralization and thickening surface till.

RESIDUAL MAP

Residual gravity highs and lows have been extracted from the total gravitational field by constructing a regional gravity datum from the Bouguer profiles. The relationship of the total field to the regional datum results in residual gravity data. The gravity highs are what we primarily investigated in this report because the areas of suspected base metal content will have a positive gravitational relationship to the surrounding native rocks.

Mapping the residual gravity on the Joe Claims Group is more of a complex problem than the work previously performed to the east on the Hill-Rust Claims Group. On the Joe Claims Group we have a regional that is involved with faulting as well as local density highs and shallow mass deficient areas. The latter must be attributed to thickening in the depth of surface till. We have attempted (on the Residual Map) to incorporate the majority of the faulting effects

into the regional gradient thereby isolating the more
interesting dense masses that appear on the map.

DISCUSSION of ANOMALIES

We have lettered the positive anomalies on the Residual Map and the following is a discussion of them.

ANOMALY "A"

The "A" anomaly lies to the west of a northeast-northwest fault and exhibits a dense mass of considerable size. We feel this anomaly to be a prime target for the exploration of massive sulphides. The depth to top of this dense mass is 250 feet to 350 feet. The tonnage is difficult to calculate because of the flanking lows, however, the source material must be in excess of 10,000,000 tons. We feel that the grid should be extended to the north and that a 400-foot grid pattern should be used from Line 276 to Line 332.

This added coverage would enable us to be positive that the density high is one unit rather than several separate highs which are indistinguishable because of the present loose coverage. The combination of magnitude and the sharp flank gradient of this anomaly leads us to confidently say that this gravity positive could not be duplicated by a native rock to surface till infill situation. However, if a basic rock intrusion was present along this faulted area then a similar sized anomaly could be expected.

ANOMALY "B"

- "B" is a trend of sharp gravity highs broken by areas of mass deficiency giving a pattern of individual highs and lows. The "B" trend is a northeast-southwest feature and has the greatest interest centered at

stations 7 + 00 N. and 6 + 00 S. on Line 292 along with station 23 + 00 S. on Line 308. Line 300 should be continued south and two cross lines run parallel to the Base Line at stations 18 + 00 S. and 28 + 00 S. This detailling would define the exact areal extend of the anomaly as shown on Line 308.

ANOMALY "C"

- "C" is another pattern of gravity highs trending northeast-southwest. These highs reach their greatest magnitude at the junction of Line 276 and the Base Line and at station 30 + 00 S. on Line 284. Again we suggest more detailling especially on the southern most portion of the anomaly.

ANOMALY "D"

- The "D" anomay is an interesting feature which also extends on to the Hill-Rust Group. This 1.00 milligal gravity high is shown by model studies to have perameters that are favourable to it having a sulphide sourced causative mass.

ANOMALY "E"

- The two anomalies which we here discuss together as "E" are probably the least attractive of the anomalies on the Joe Claims Group. A thinning of 70 feet in the surface till would reproduce this anomaly. However, we cannot overlook that a horizontal slab of massive sulphide 500 feet deep would also give this low relief density high. Further work

should be done here before dismissing the "E" anomalies as mere thinning in the overburden..

Respectfully submitted by:

OVERLAND EXPLORATION SERVICES LTD.

W.T. Salt

William G. Crook
P. Geol.

Assisted by:

David K.Y. Chen, P. Geoph.

WTS/jp

CERTIFICATE OF PROFESSIONAL QUALIFICATIONS

1. I, William G. Crook, reside at 3404-8A Street, S.W., Calgary 6, Alberta.

2. I have a B.Sc. in Geology from the University of Alberta, Edmonton (1955).

3. I am a Professional Geologist registered with the Alberta Association of Professional Engineers.

4. I possess experience in the following fields of Geology: Surface Geology, Sub-Surface Geology, Geomorphology, Mineralogy, Structural and Stratigraphic Geology, Photogeology, Geophysics, Engineering Geology and Investigations, Economic Geology, Sub-Surface Mining and Petroleum Exploration.

5. I have worked on a great variety of exploration projects in the plains and mountainous regions of western and northern Canada, and South America.

6. I belong to the following professional societies: Alberta Association of Professional Engineers, Alberta Society of Professional Geologists.

7. I have not, directly or indirectly received, nor do I expect to receive any interest, direct or indirect, in the property of the Company (Hecla Mining Company of Canada Ltd.) or any affiliate, nor do I beneficially own, directly or indirectly, any securities of the Company or any affiliate.

Respectfully submitted:

William G. Crook

William G. Crook, P. Geol.

DATED: September, 1969.

CERTIFICATE OF QUALIFICATIONS

I, DAVID K.Y. CHEN, Geophysicist, of 6405 Center Street North, Calgary 47, Alberta, Canada. hereby certify that:

1. I am a professional geophysicist associated with Overland Exploration Services Ltd., 1347 - 12th Avenue S.W., Calgary, 3, Alberta, Canada.

2. I have no direct or indirect interest in, nor do I expect to receive any direct or indirect interest in any properties or securities of New North Minerals Ltd.

3. I have attended the National Hunan University of Changsha Hunan, China, 1947, receiving a Bachelor of Science Degree in Mining Engineering; that I hold a Master's Degree in Earth Sciences (geophysics major) from New Mexico Institute of Mining Technology. at Socorro, New Mexico, U.S.A. During the period of 1964-67 I undertook part-time graduate studies in geophysics at Washington University, St. Louis, Missouri, U.S.A. I have completed all requirements of the graduate courses for my Ph. Degree work in geophysics except the thesis.

4. Since 1957, I have been intensively engaged in seismic, gravity and magnetic surveys and interpretations for oil/ore exploration in the U.S.A. and Far East with several Chinese, U.S. and Canadian oil and geophysical companies. In 1947, I was engaged

.....(Cont'd).....

as a Petroleum [illegible] supervising oil well drilling and production. In 1952 I became involved in the geophysical oil/ore exploration field. I have held the following positions;

- Geophysicist
- Research Geophysicist
- Assistant Professor in Geophysics.

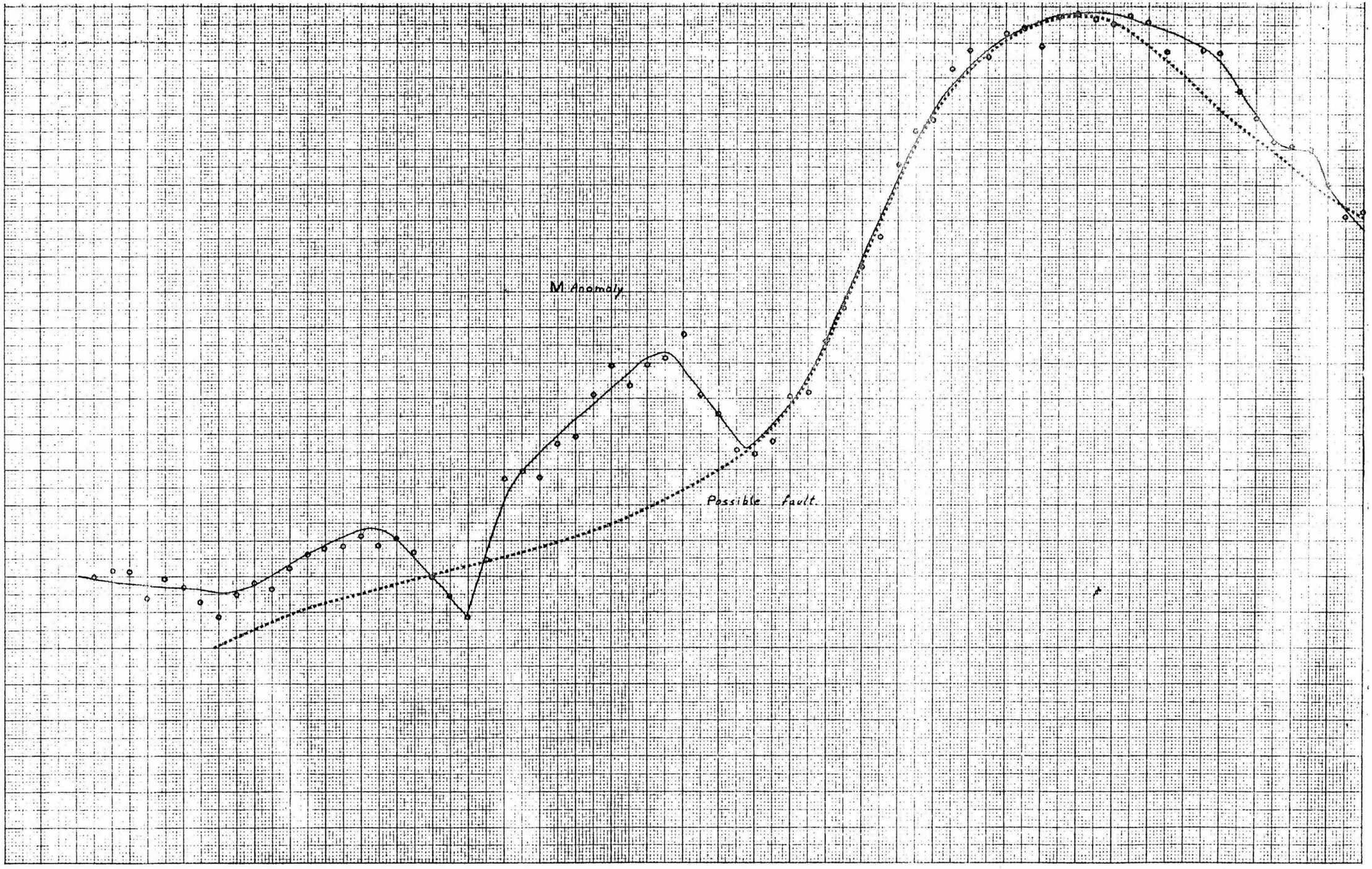
5. I am a member of the following academic and professional societies;

- Society of Exploration Geophysicists
- American Geophysical Union
- European Association of Exploration Geophysicists
- Association of Professional Engineers of Alberta
- Geological Society of Republic of China
- Chinese Petroleum Institute
- Chinese Institution of Mining and Metallurgical Engineers

6. I have published several papers (in both China and the United States, together with periodicals.

DAVID K.Y. CHEN
Professional Geophysicist

DKY[illegible]



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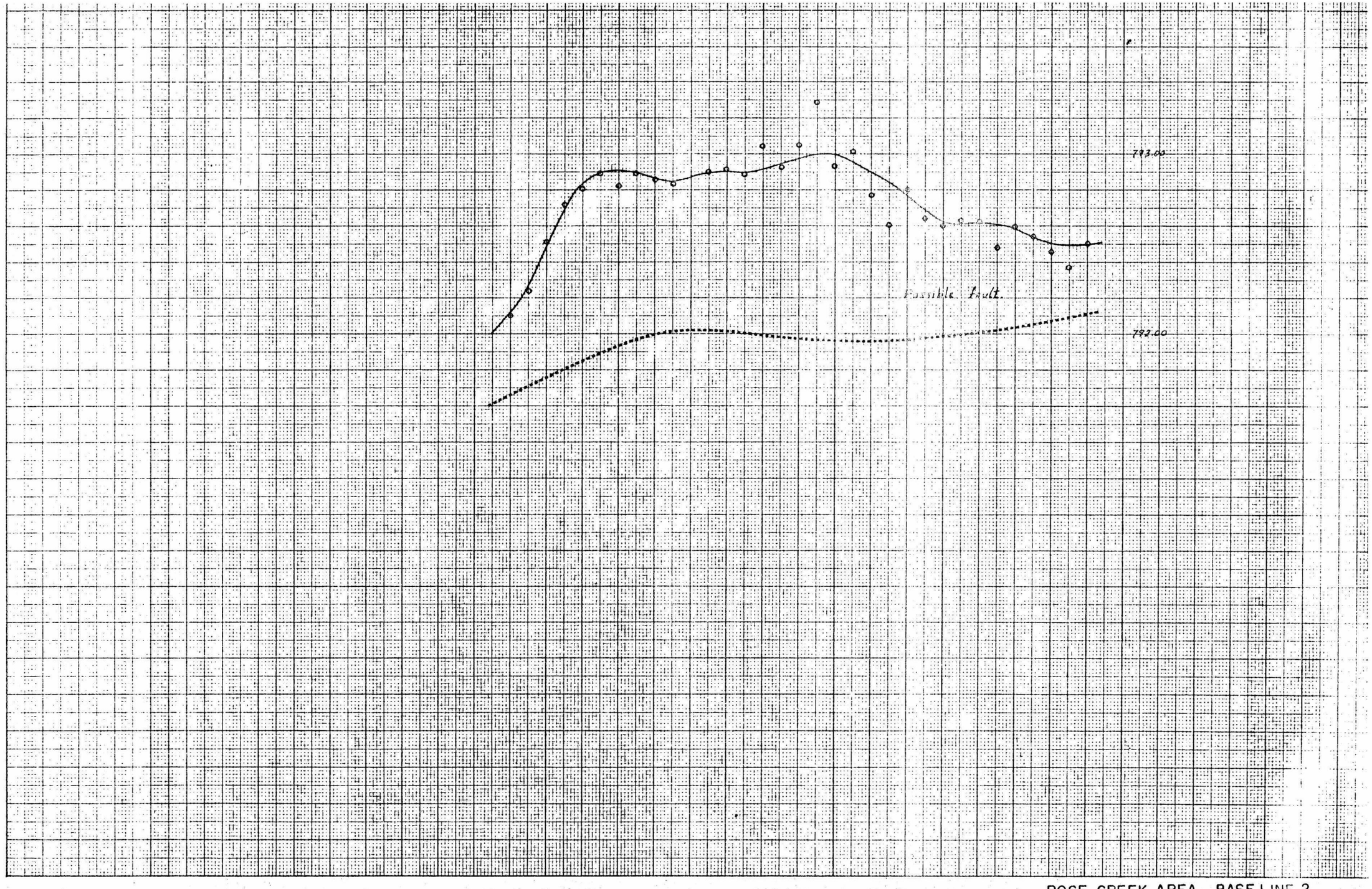
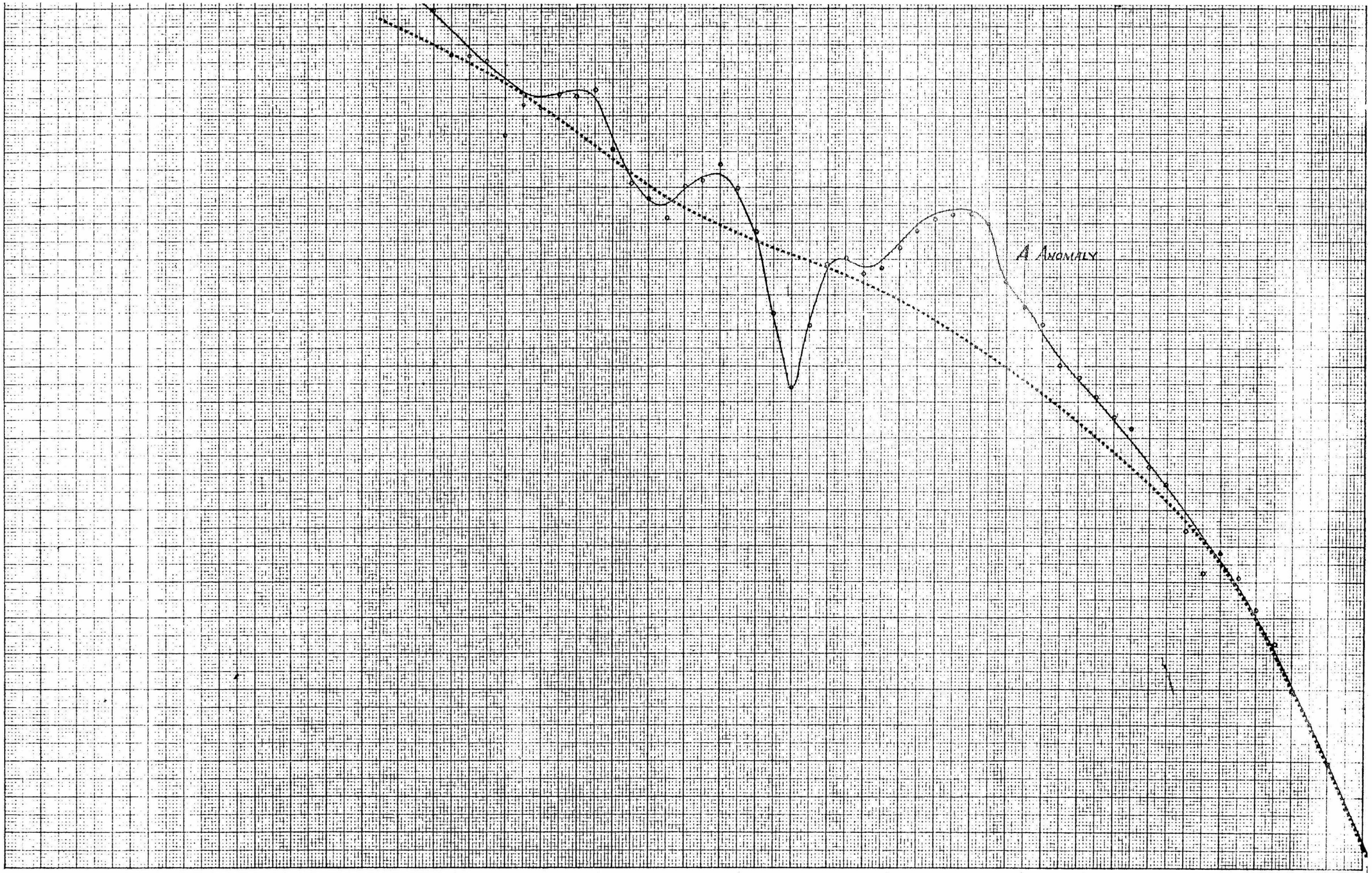


ROSE CREEK AREA BASE LINE 2



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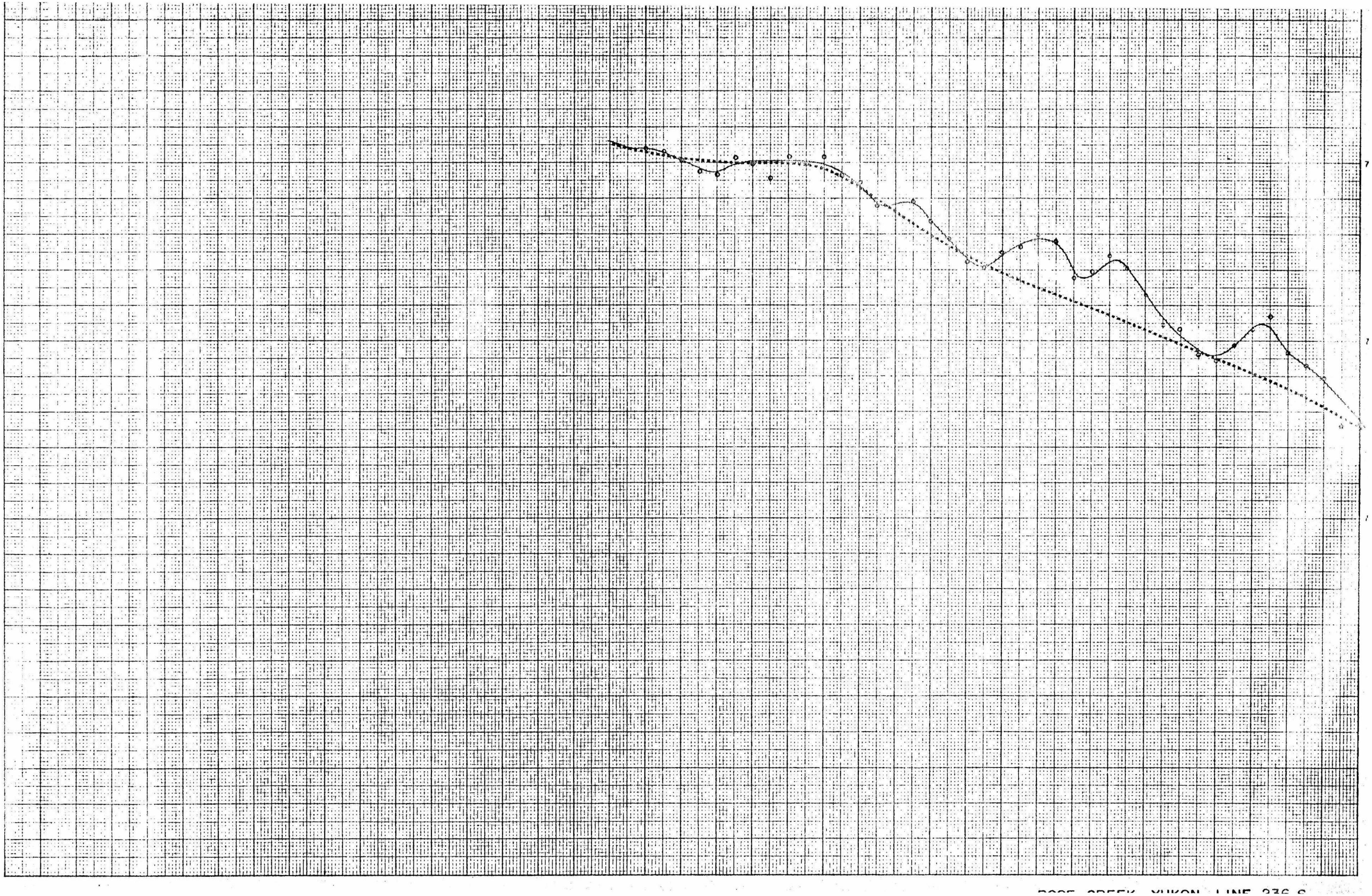

ROSE CREEK, YUKON LINE 236 S

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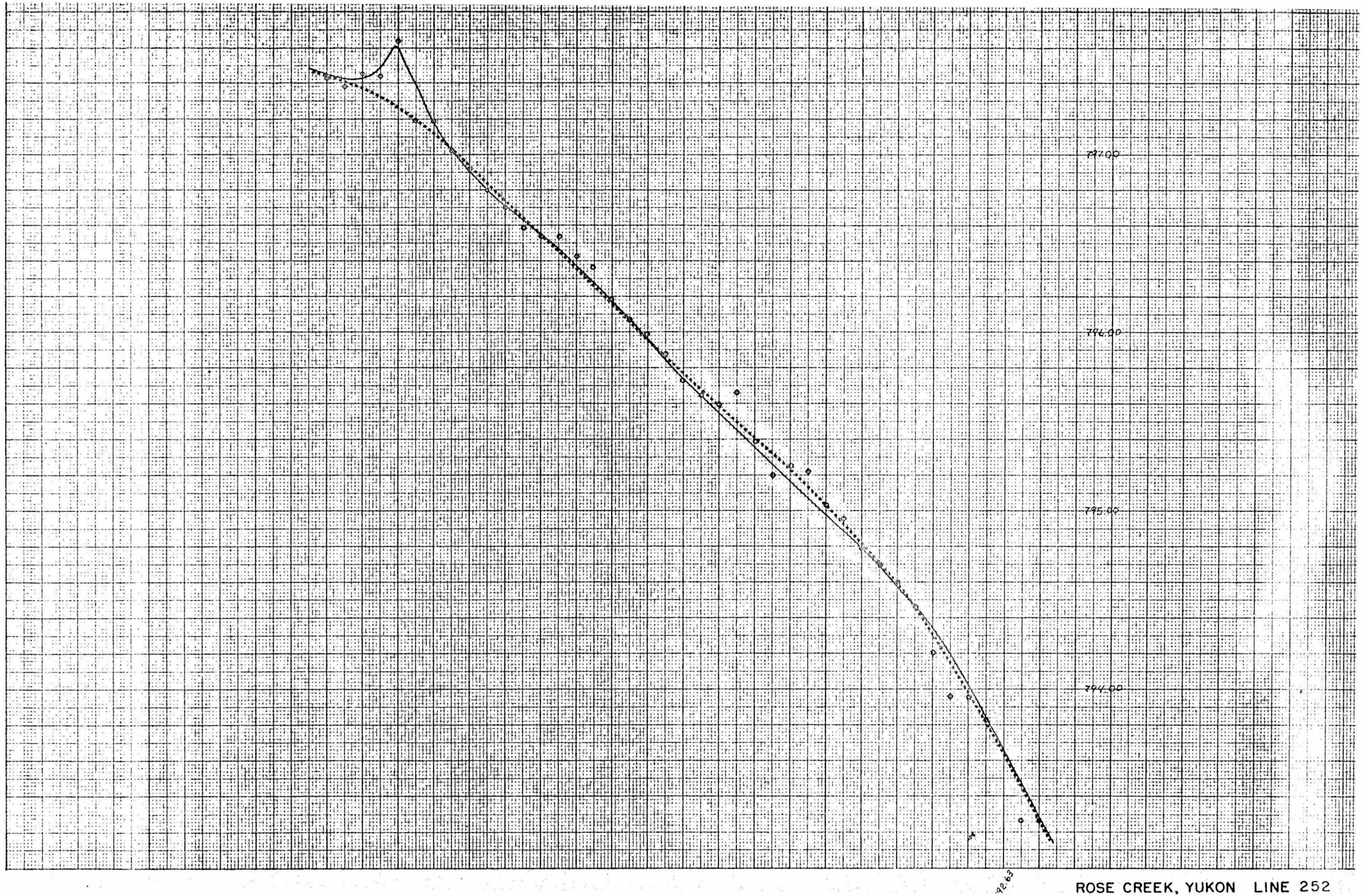
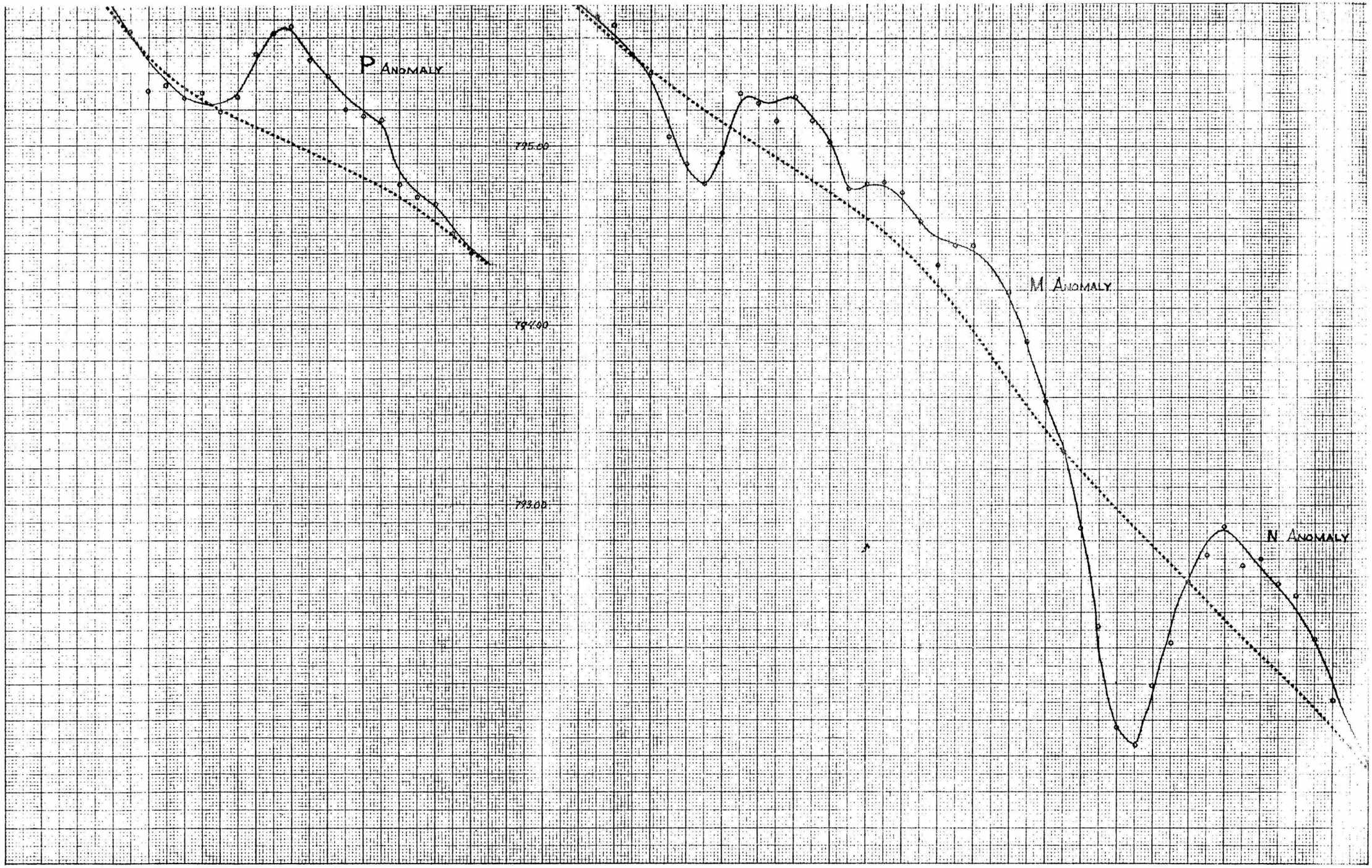


ROSE CREEK, YUKON LINE 252

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

ROSE CREEK, YUKON LINE 268

ROSE CREEK, YUKON, LINE 276



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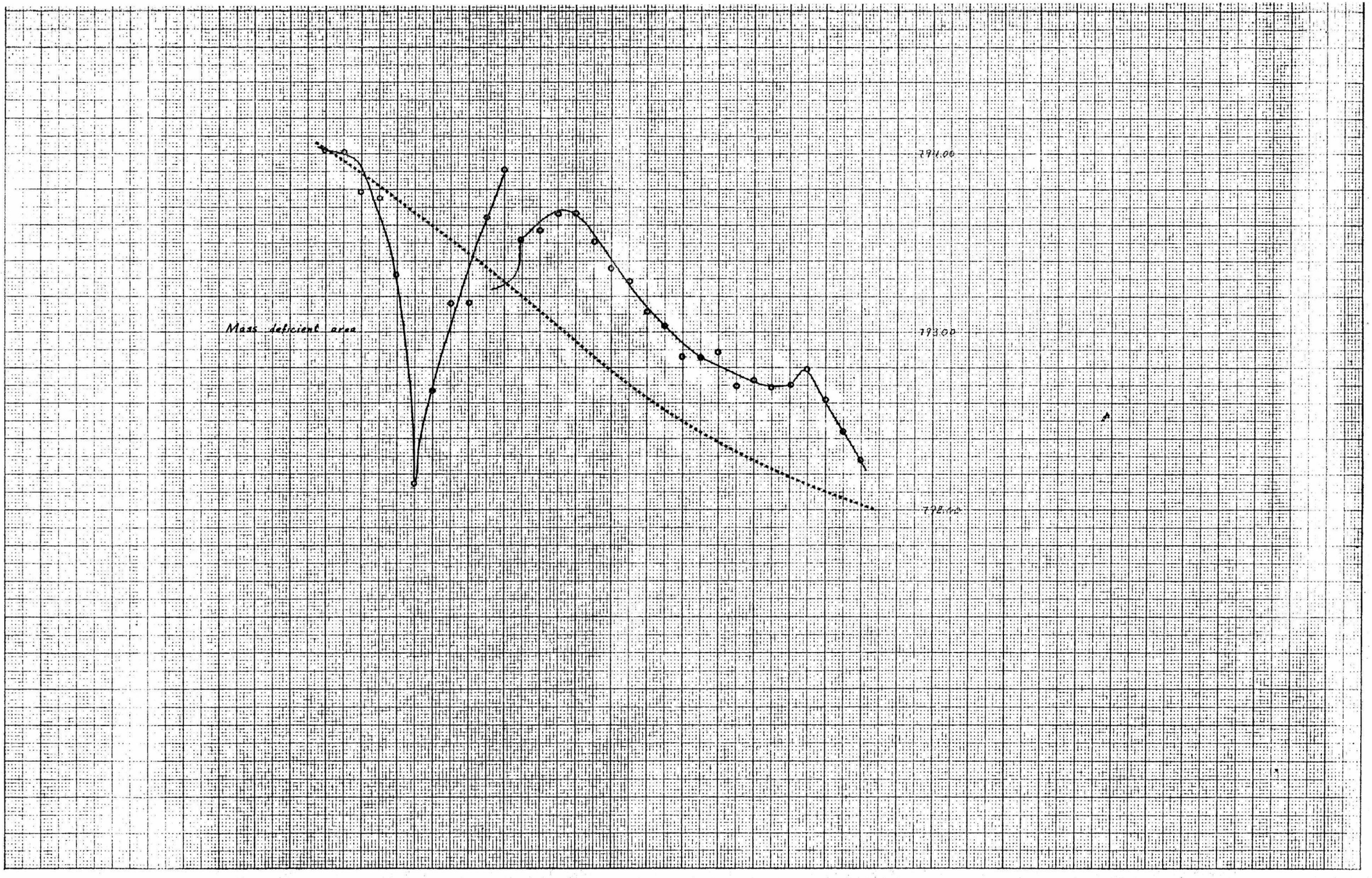


ROSE CREEK AREA LINE 292

794.00

798.00

Possible faulting

792.00

796.00

790.00

ROSE CREEK AREA LINE 300

795.00

794.00

793.00

792.00

791.00

Possible faulting.

ROSE CREEK AREA LINE 308

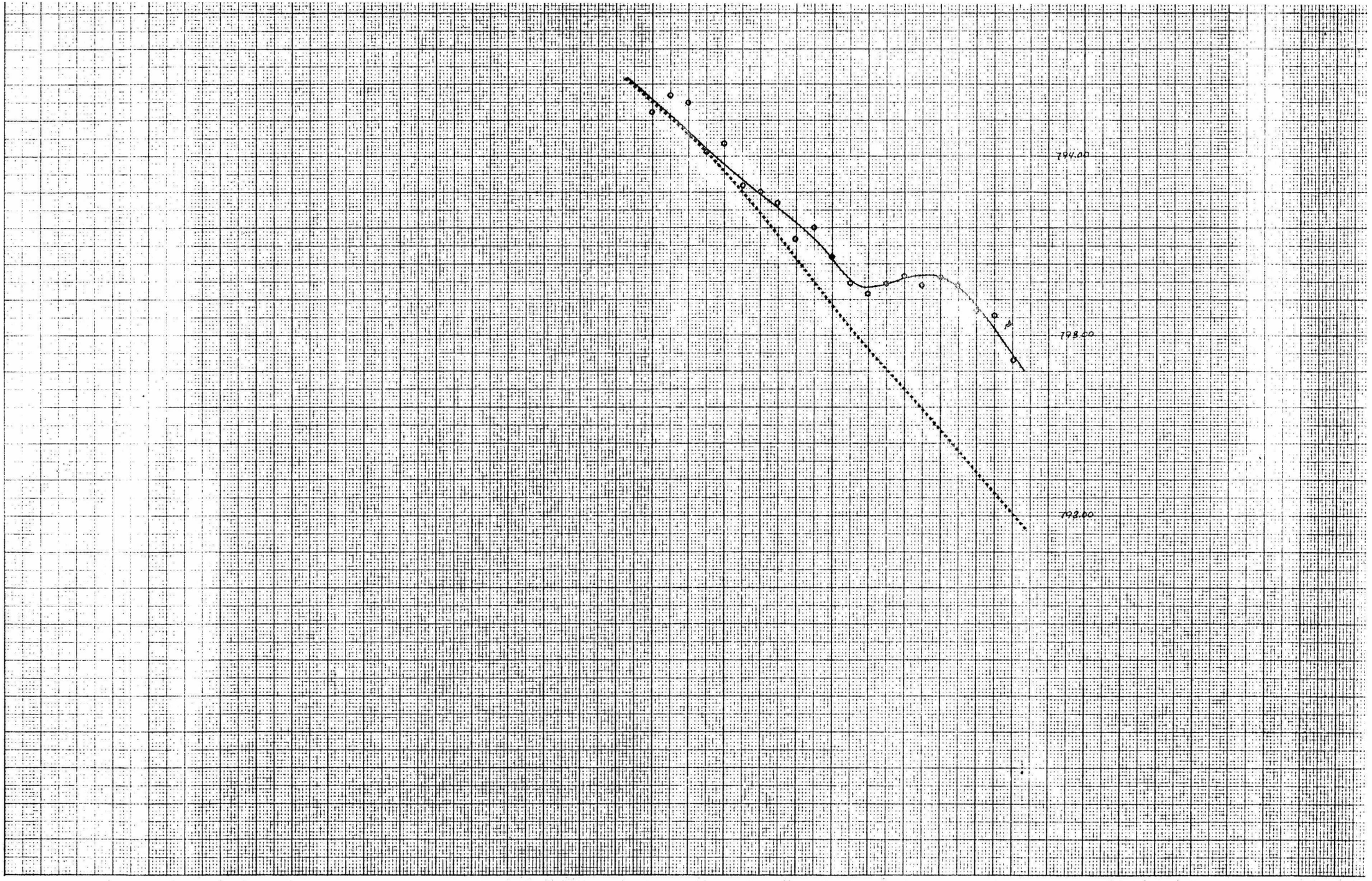
794.00

793.00

792.00

791.00

ROSE CREEK AREA LINE 316



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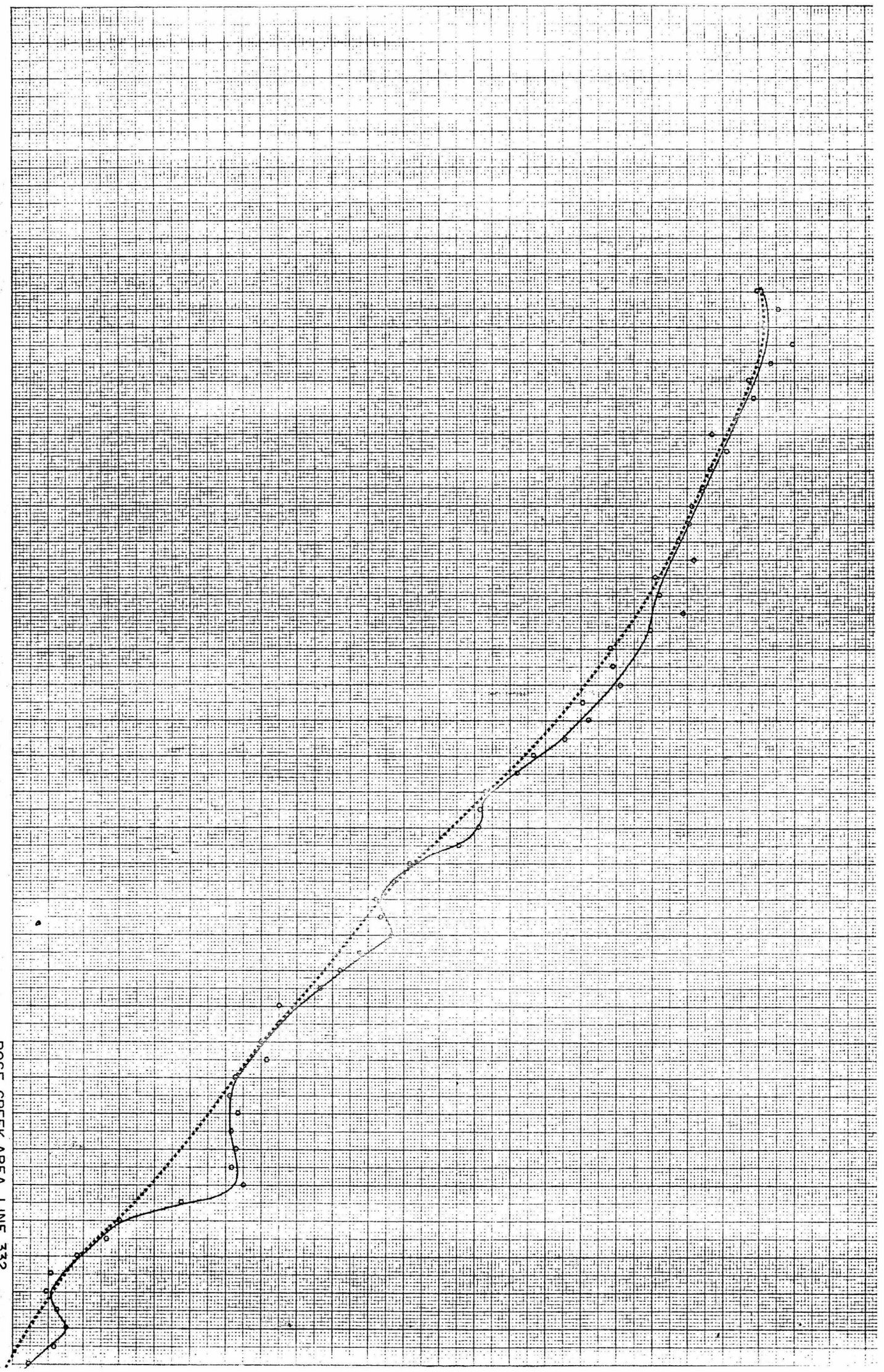

ROSE CREEK AREA LINE 332