

Report on a Resistivity Survey at Manor Lodge

I. Introduction

This report describes a resistivity survey over the Outer Court of the Manor Lodge. The purpose of the survey was to delineate any subsurface features which might prove worthy of further investigation by excavation.

The recording equipment was a NASH & THOMPSON Geophysical Tellohm meter, and the relevant basic principles of geoelectric surveying are briefly given in the Appendix.

II. Interpretation of Results

A total of 22 traverses, with a constant 2 feet electrode separation, were made along the lines shown in Plan A, and the recorded variations in apparent resistivity are presented in profile form. Interpretation of these profiles is on the basis of inspection for anomalous behaviour, (i.e. marked irregularities in excess of normal scatter), and the observed profile anomalies are transposed to Plan A to indicate their insitu position. Where anomalies have a similar form, then these may be grouped together in a bounded area, and on the basis that like sub-surface features produce like resistivity behaviour, then this bounded area enfolds a single subsurface feature. The observed results are reproduced in the form of a group -anomaly plot in Plan B, and 13 individual features are recognised, of which two are of major proportions.

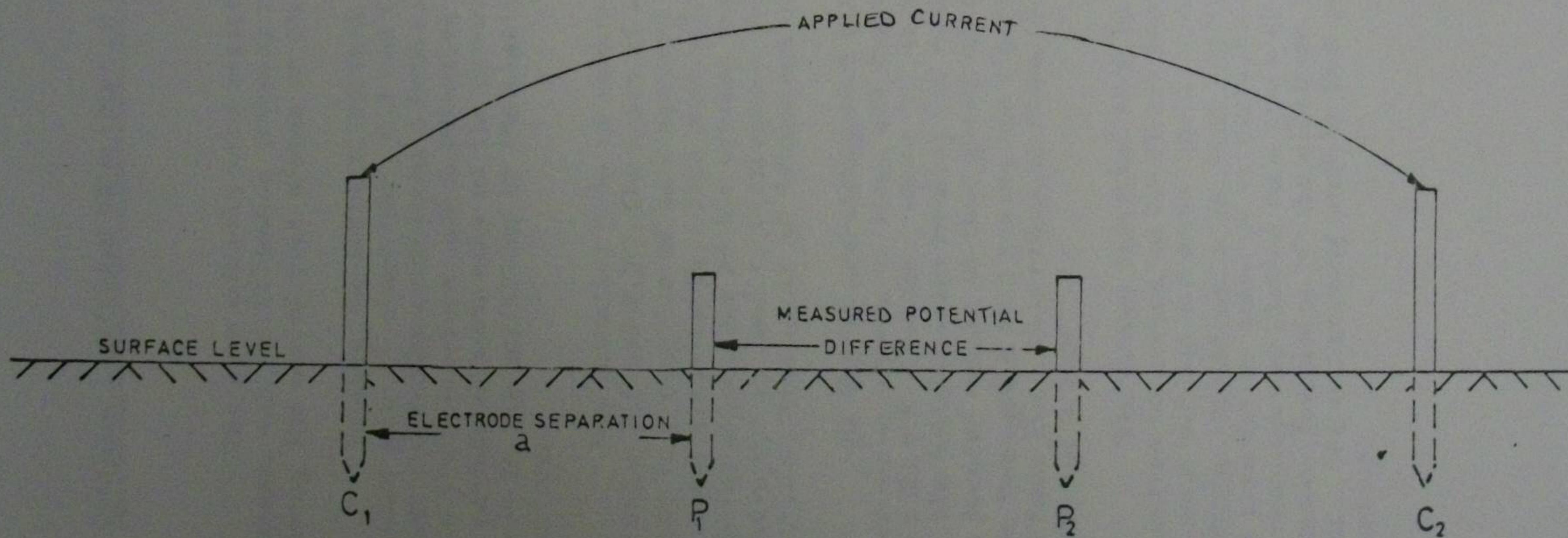
III. Conclusions

The resistivity survey has indicated several subsurface features, although no attempt is made at establishing the precise nature of these features. It is recommended that preliminary excavations be made within the areas delineated in Plan B.

January, 1972

Fig. A1.

ELECTRODE ARRANGEMENT FOR WENNER CONFIGURATION



## APPENDIX - RELEVANT PRINCIPLES OF RESISTIVITY SURVEYING

The more commonly used resistivity techniques are due to F. Wenner, and the following comments relate to the Wenner configurations involving the use of four probes or electrodes, see fig. A.1.

Briefly, an electric current is induced in the ground through the outer pair of electrodes, C.1 and C.2. The earth, with these two current electrodes constitute a form of three-dimensional potentiometer within the subsurface and a potential pattern develops at the surface. This pattern depends only on the current distribution, which in turn depends on the variations of the electrical resistivity throughout the subsurface.

The potential drop is recorded at the surface across the inner electrodes P.1 and P.2. The ratio of measured potential drop to current flowing is a function of some mean and localised value of the earth's electrical resistivity. This mean value depends on the ground through which the major part of the current passes, and the term 'apparent resistivity' is used to distinguish this mean value from the absolute resistivity that would be determined under laboratory conditions.

In the Wenner arrangement here, the four electrodes are equally spaced along a traverse line, and the apparent resistivity,  $\rho$ , is given as  $\rho = 2\pi a^2 R$ . Ohmfeet., where 'a' is the electrode spacing in feet, and R is the Tellohmmeter reading (at null balance). The apparent resistivity thus deduced refers to that ground at depths somewhere between  $\frac{a}{2}$  and  $2a$ ; since throughout this survey the electrode spacing is maintained constant at 2 feet then the effective depth of probing lies somewhere between 1 foot and 4 feet.

The survey described here is restricted to a series of constant separation traverses, in which all four electrodes are moved forward between readings a distance equal to the station interval,  $s$ , whilst the electrode separation 'a' is kept constant. The electrodes may be set up in a line either parallel or perpendicular to the traverse direction. The readings are plotted as a graph of apparent resistivity against traverse distance, the centre of the electrode spread being used as the reference point. The resistivity profile thus produced is then examined for anomalous behaviour.

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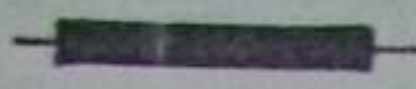
A total of 22 traverses, with a constant 2 feet electrode separation, were made along the lines shown in Plan A, and the recorded variations in apparent resistivity are presented in profile form. Interpretation of these profiles is on the basis of inspection for anomalous behaviour, (i.e. marked irregularities in excess of normal scatter), and the observed profile anomalies are transposed to Plan A to indicate their insitu position. Where anomalies have a similar form, then these may be grouped together in a bounded area, and on the basis that like sub-surface features produce like resistivity behaviour, then this bounded area enfolds a single subsurface feature. The observed results are reproduced in the form of a group -anomaly plot in Plan B, and 13 individual features are recognised, of which two are of major proportions.

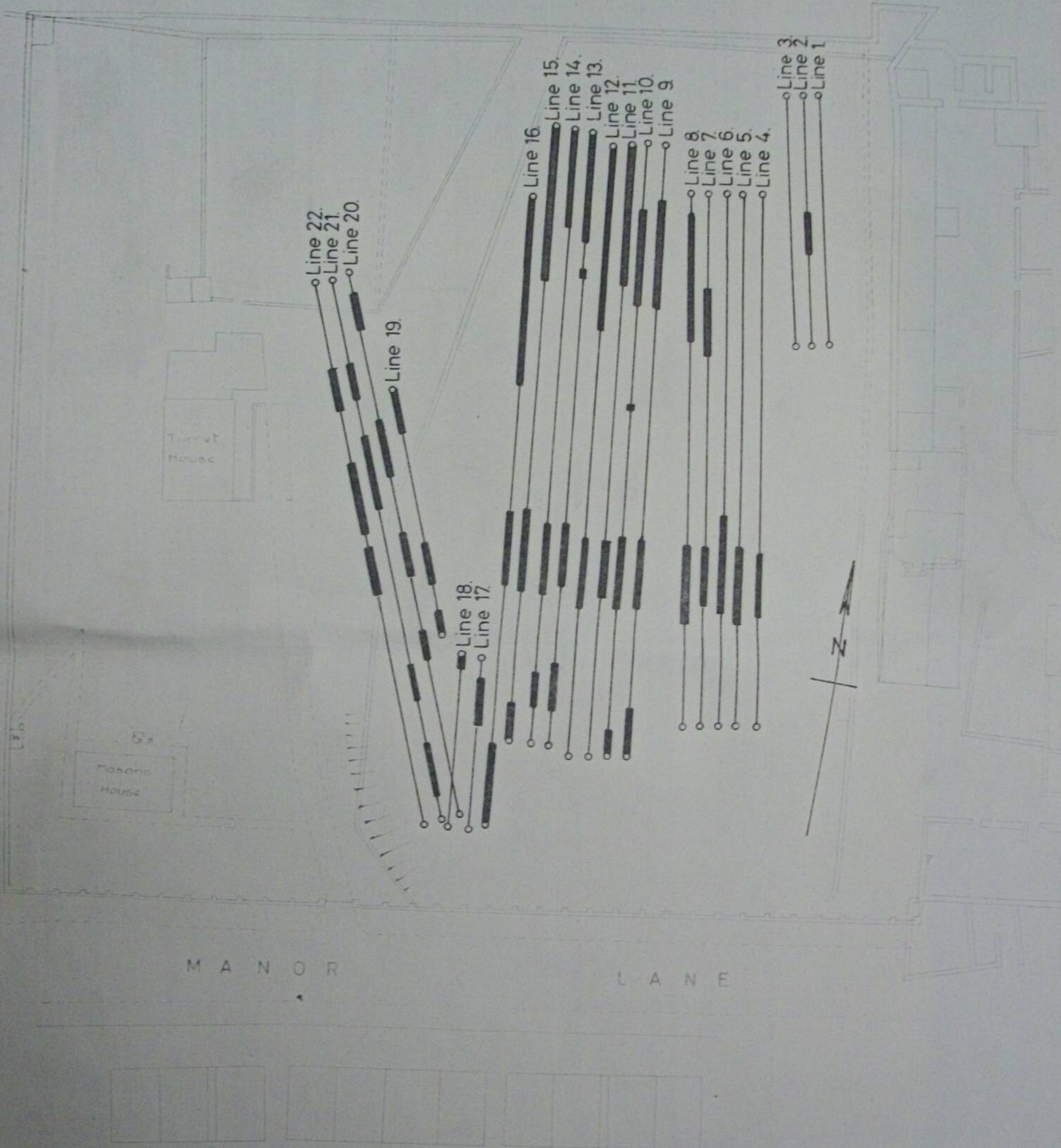
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KEY

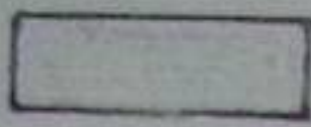
 ANOMALOUS BEHAVIOUR

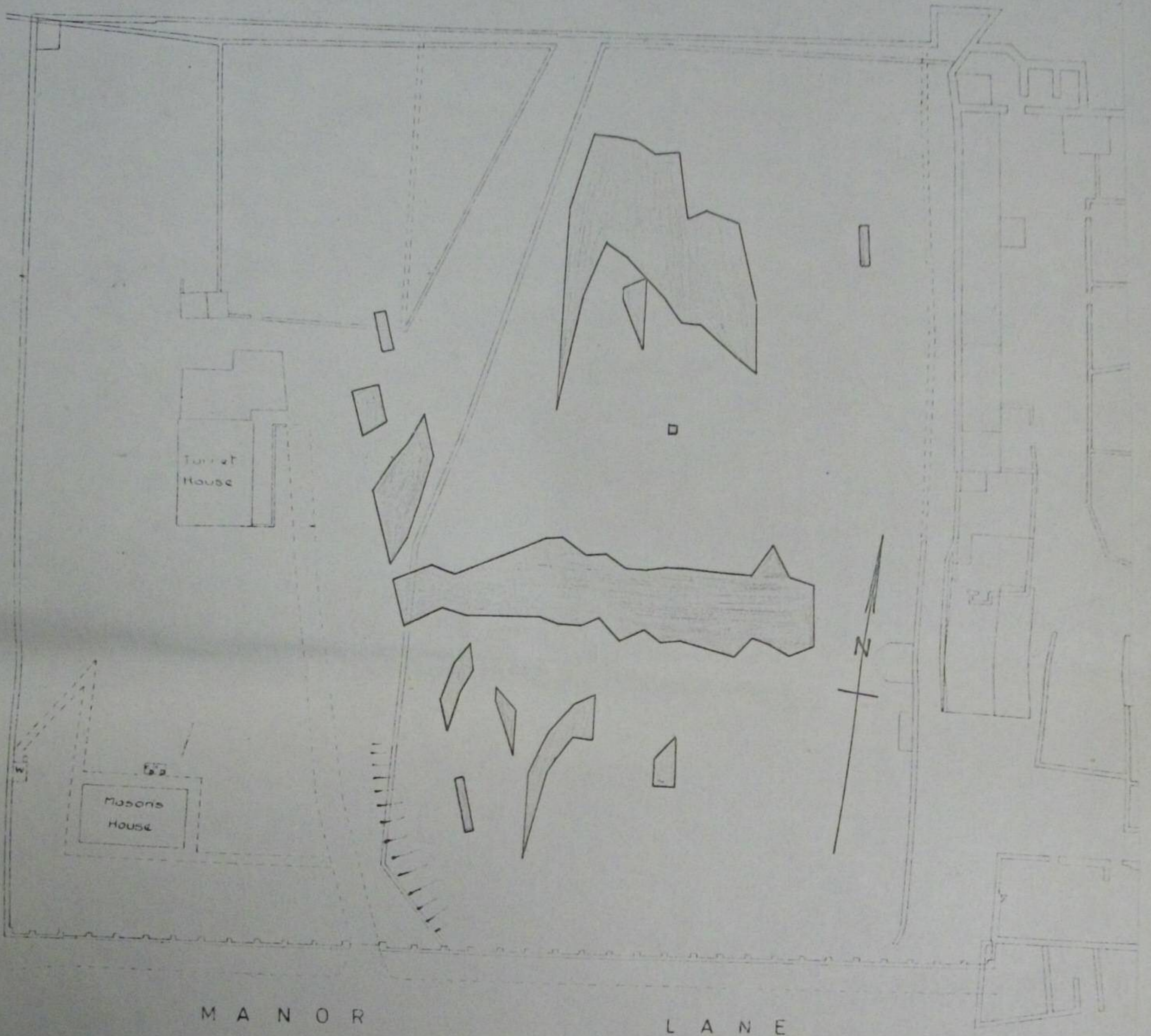


D. J. B. GEORGE, A.R.I.C.S.  
 ESTATES SURVEYOR  
 SHEFFIELD

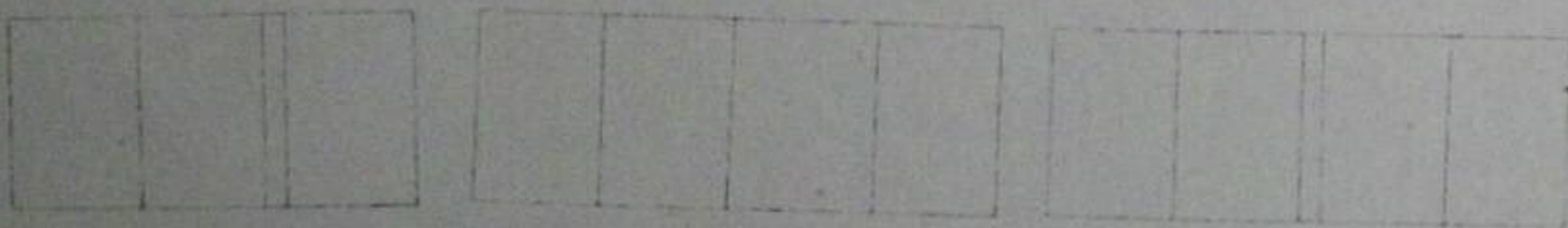
Scale :- 1:500

KEY

 ANOMALOUS BEHAVIOUR



M A N O R L A N E

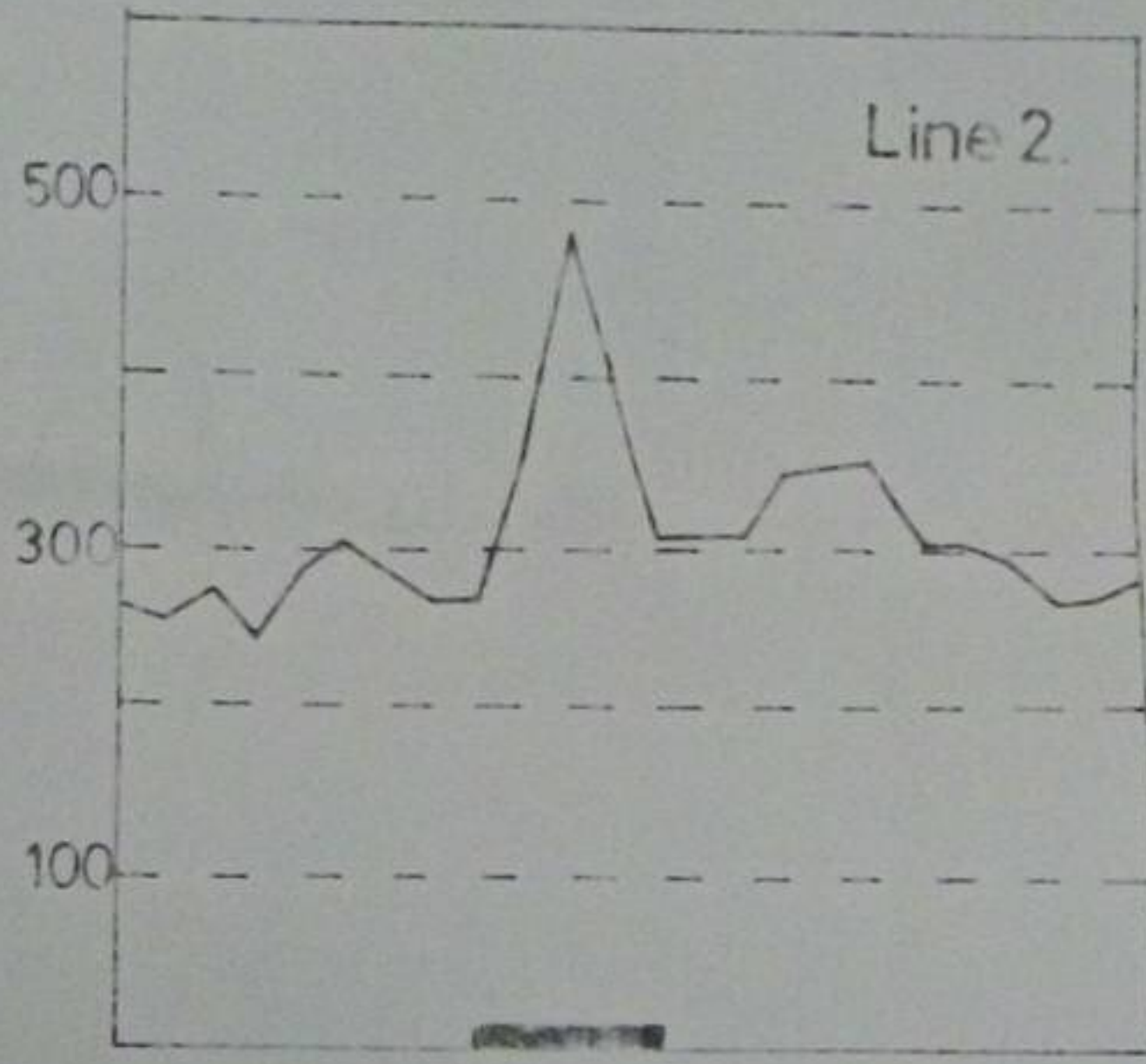
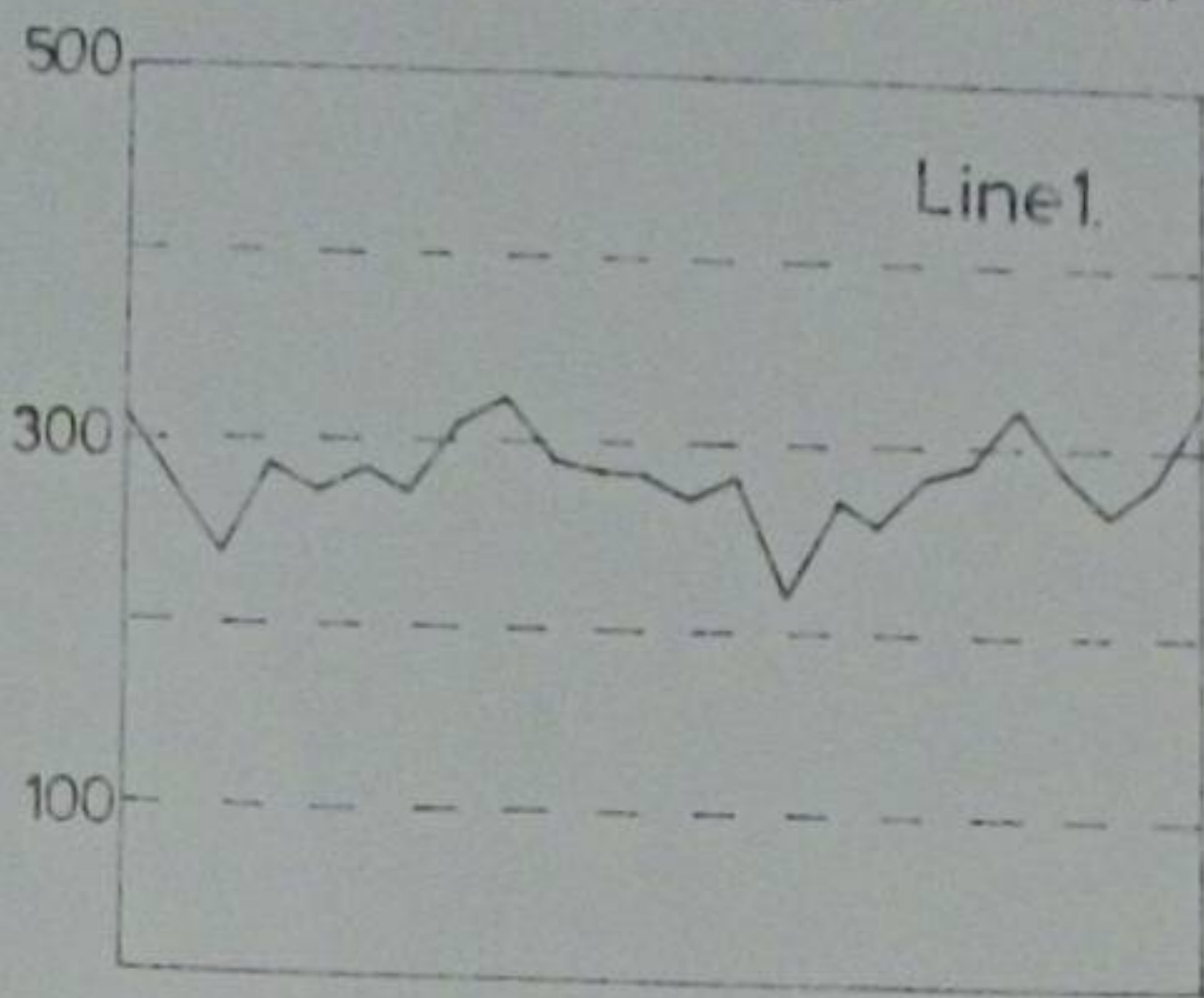


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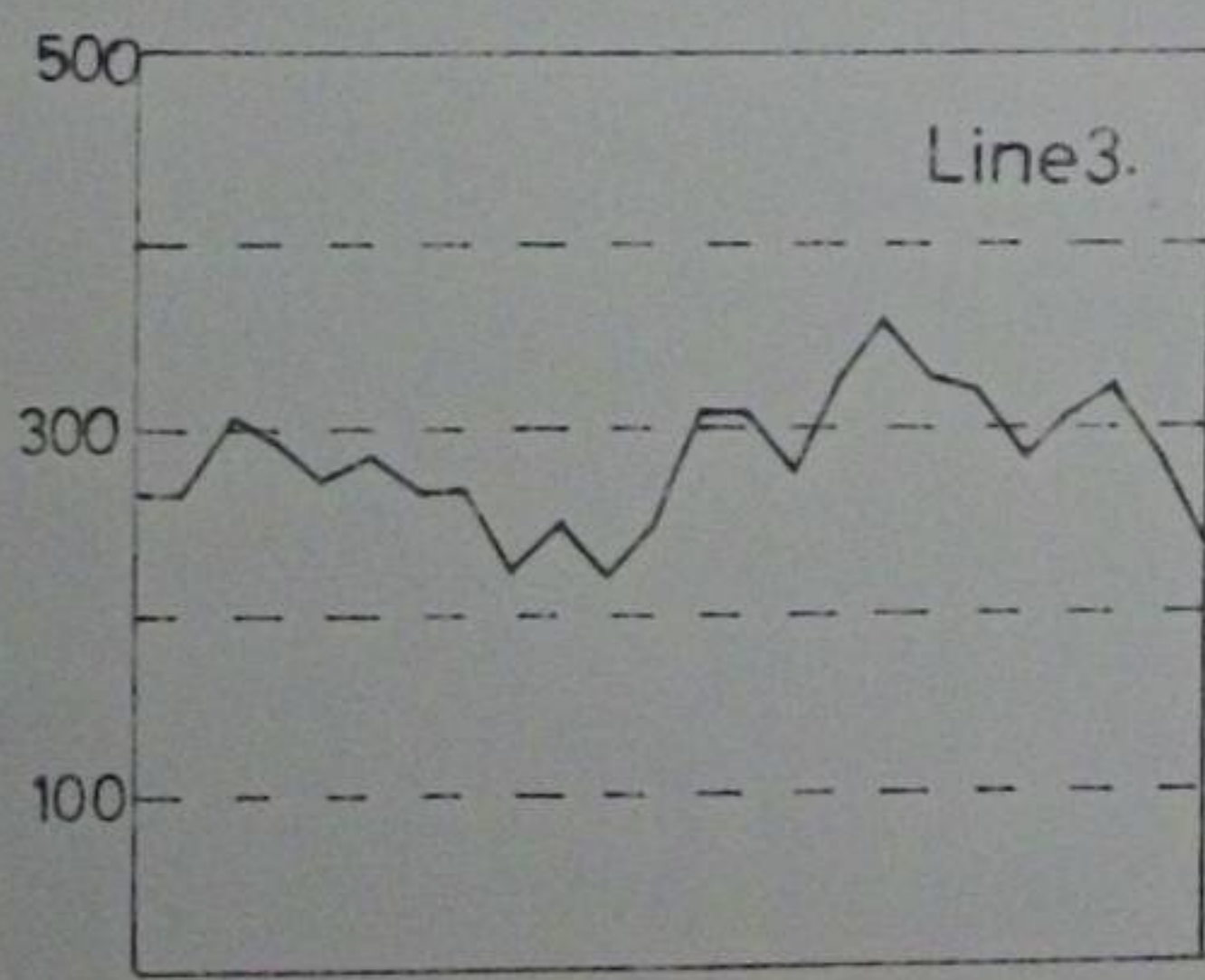
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MANOR LODGE SURVEY.

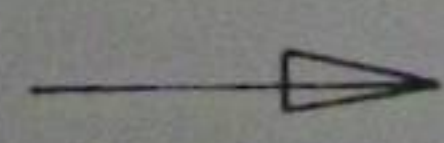
Resistivity Profiles - Wenner Configuration,  $a = 2\text{ft.}$ ,  
 $s = 4\text{ft.}$



Apparent Resistivity Ohm Feet.

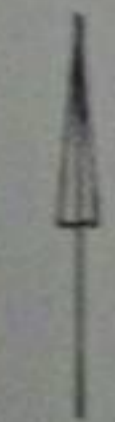
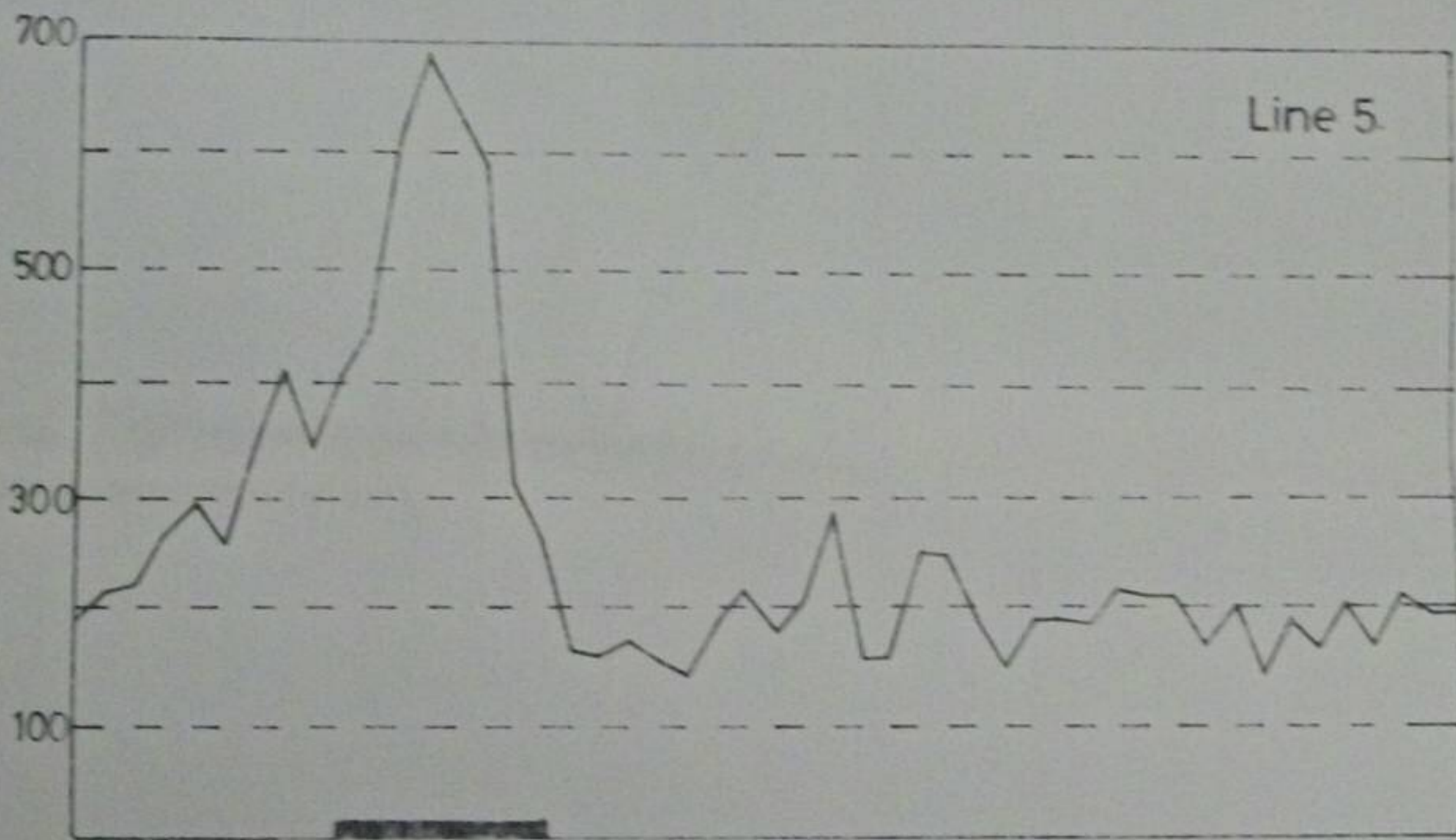
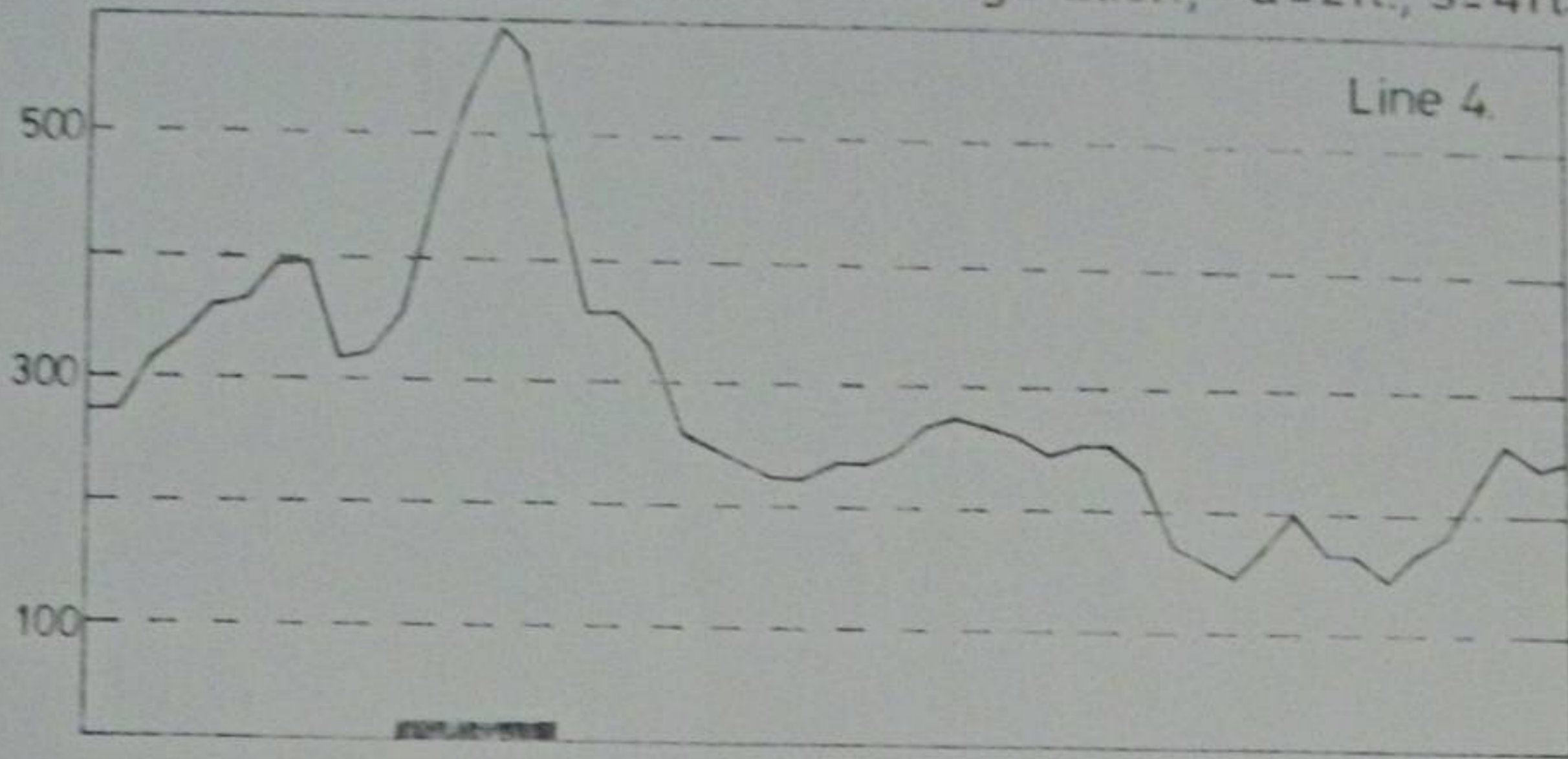


Traverse Distance, Feet. | 20ft. |

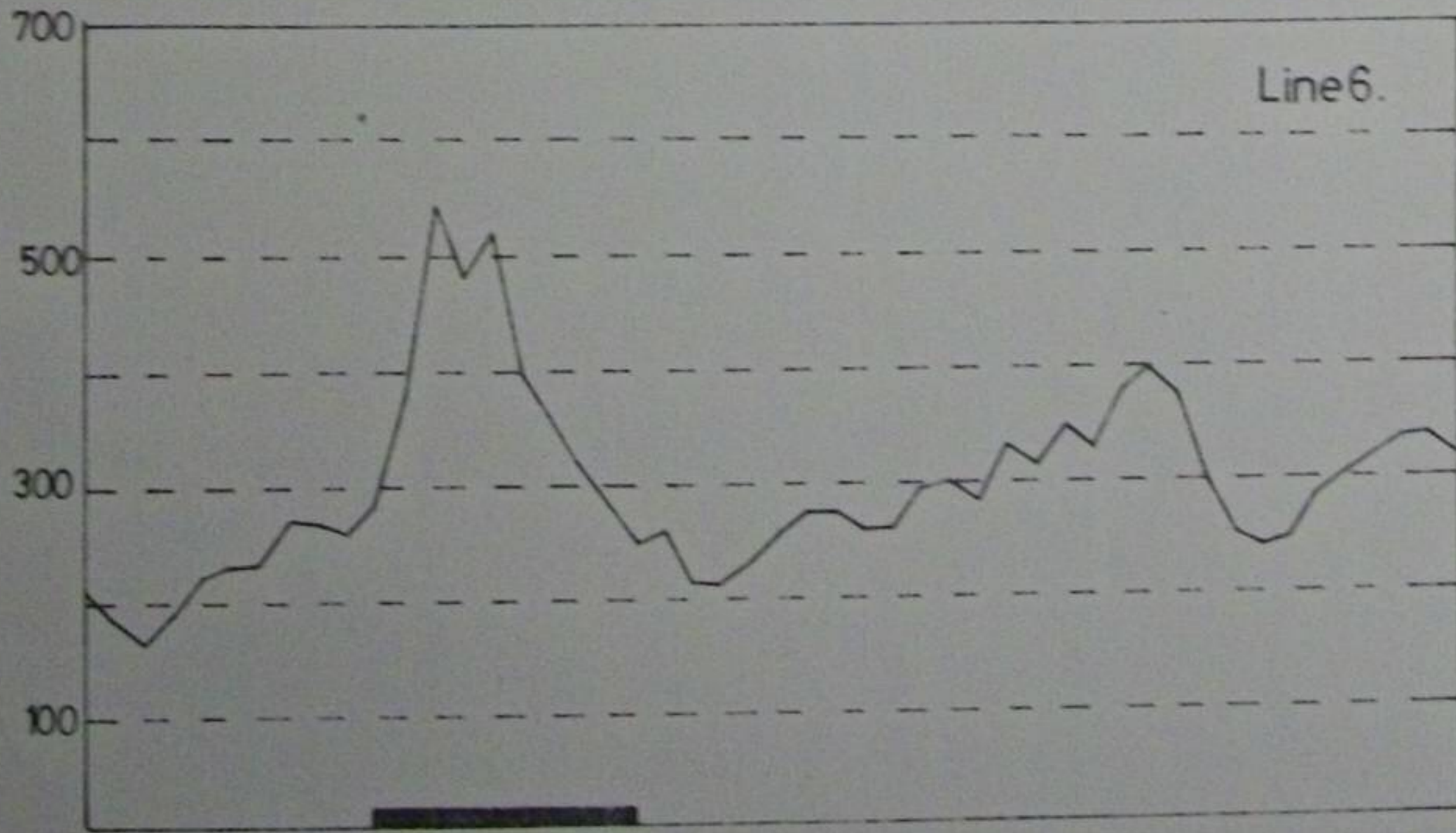


MANOR LODGE SURVEY.

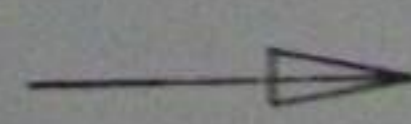
Resistivity Profiles - Wenner Configuration, a=2ft., s=4ft.



Apparent Resistivity, Ohm Feet.



Traverse Distance, Feet.



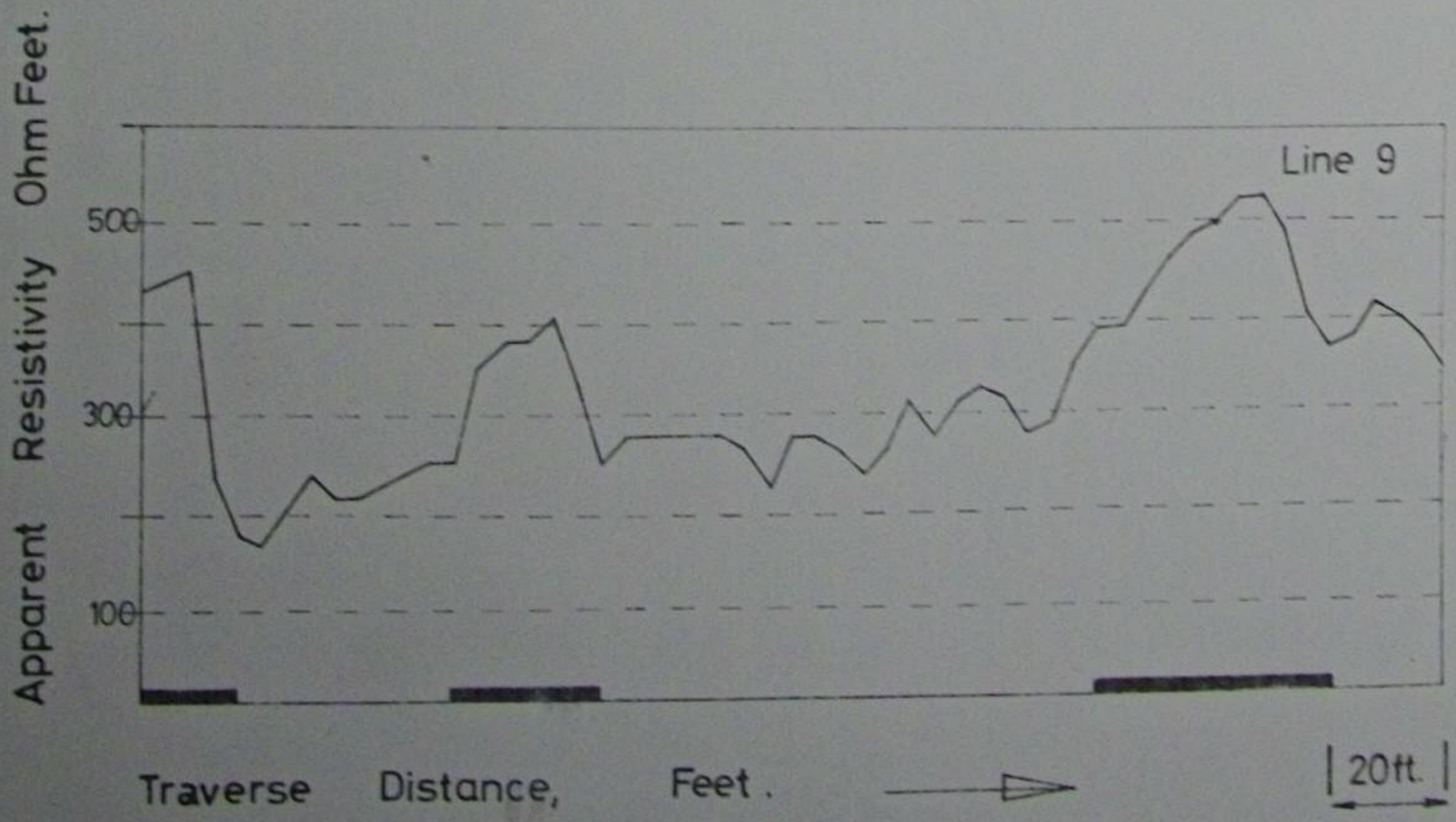
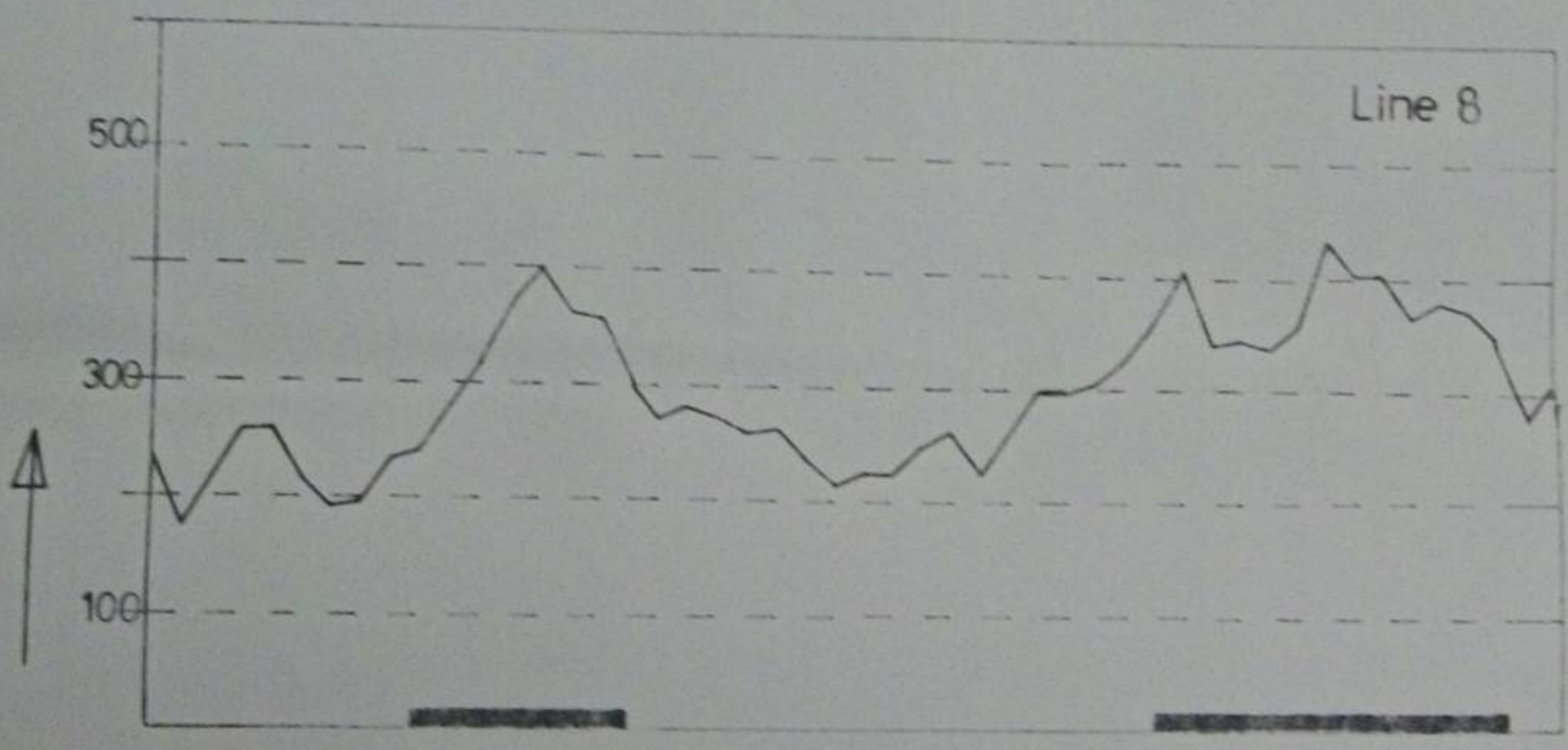
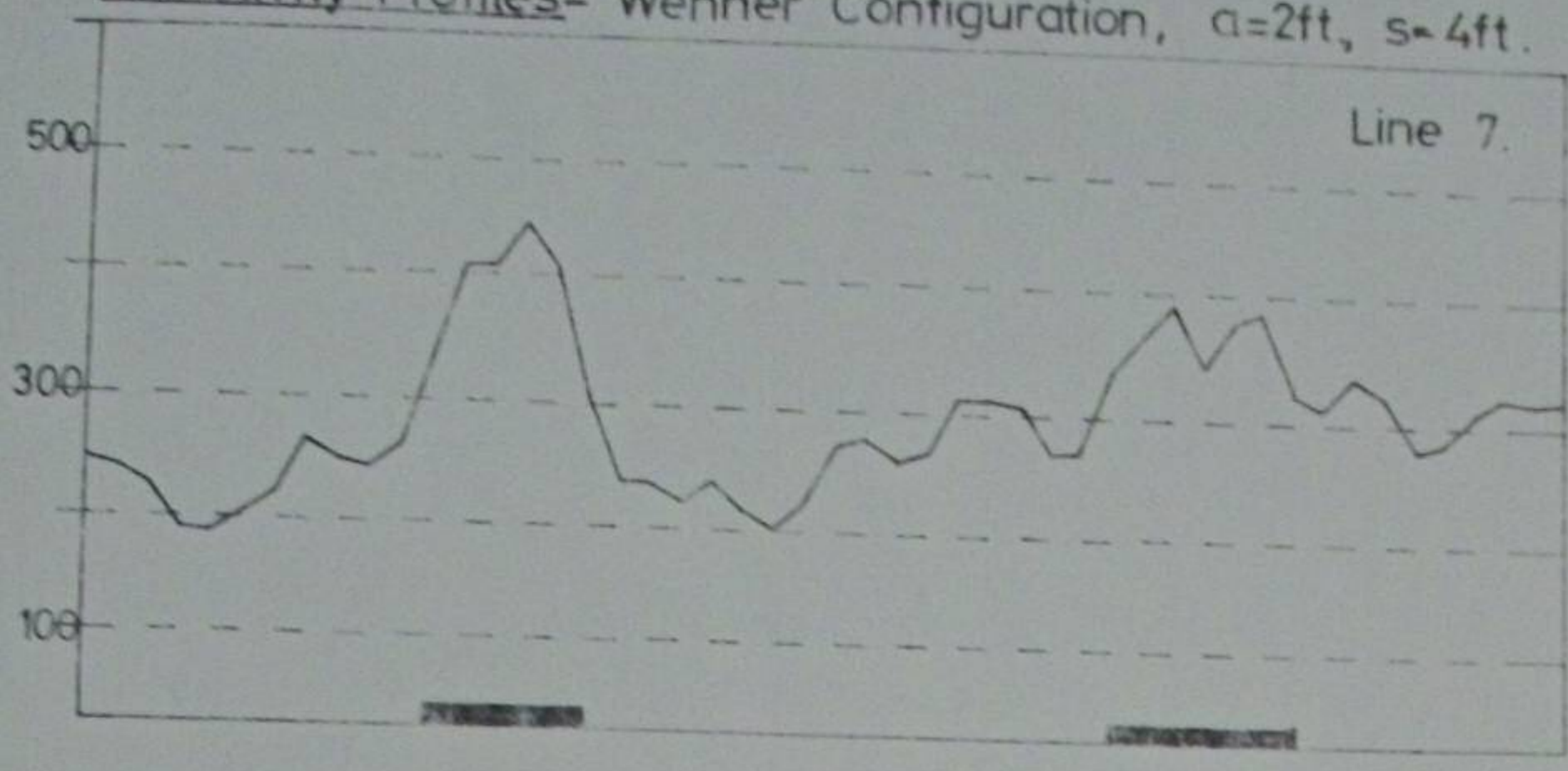
| 20ft. |





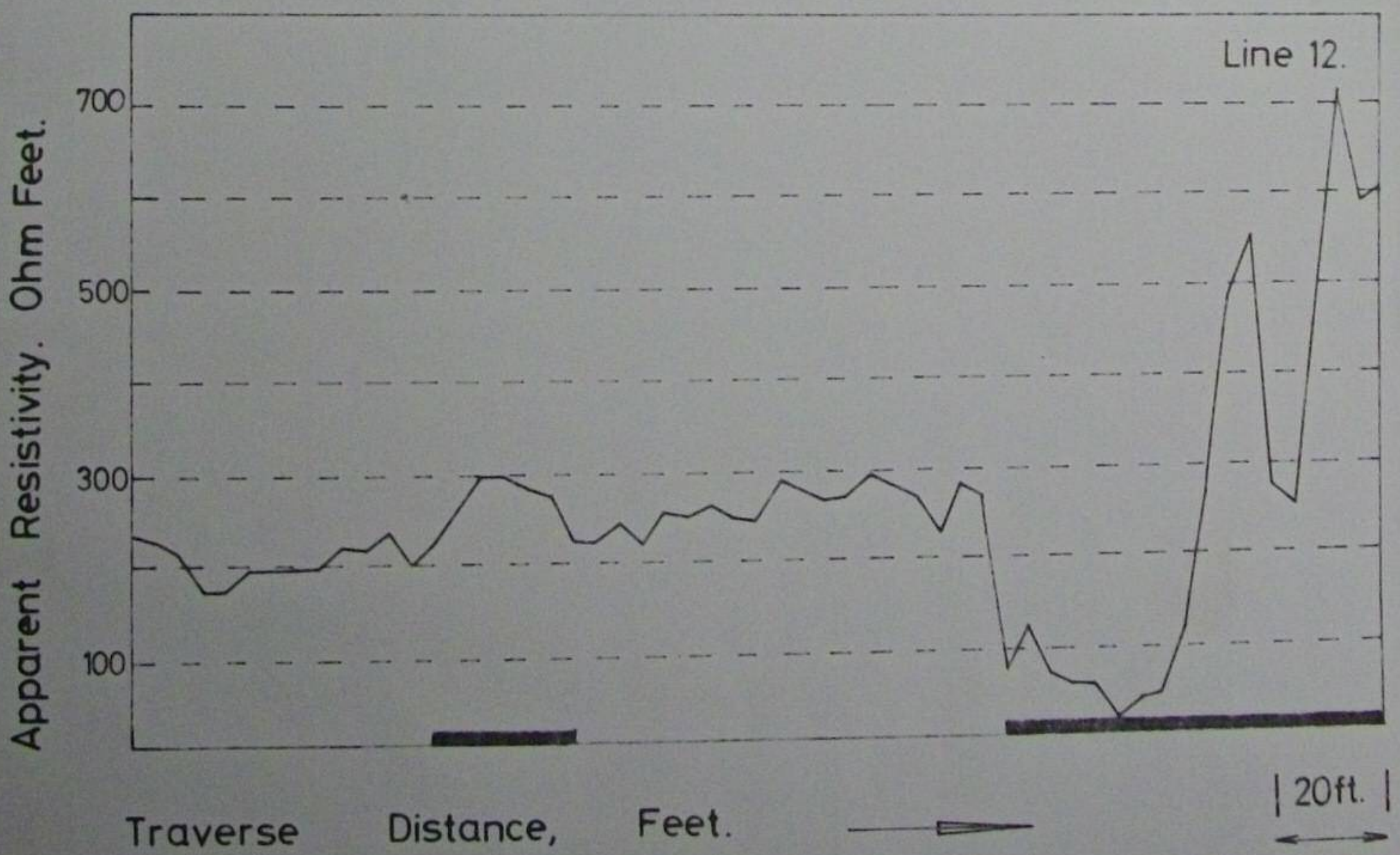
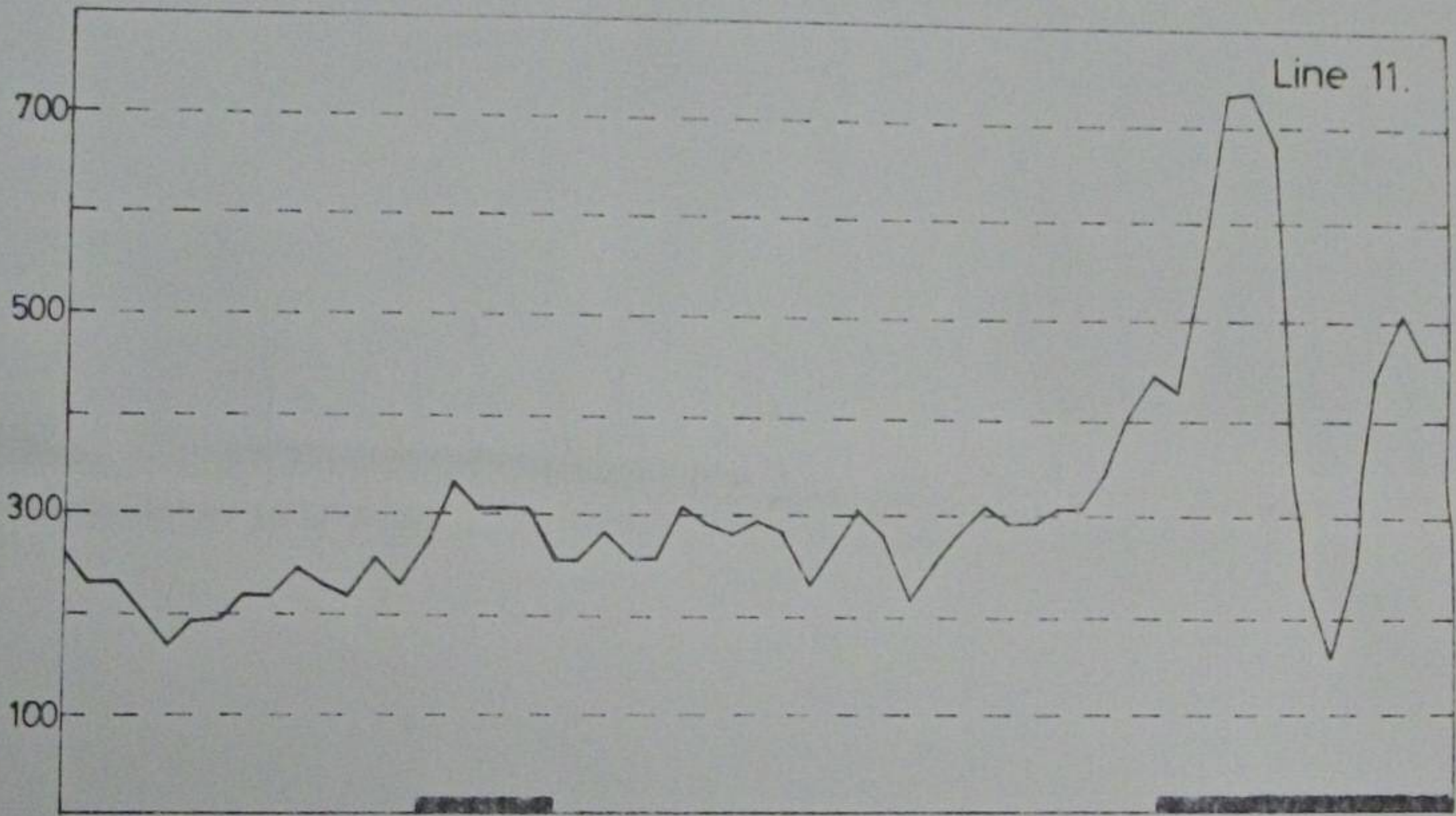
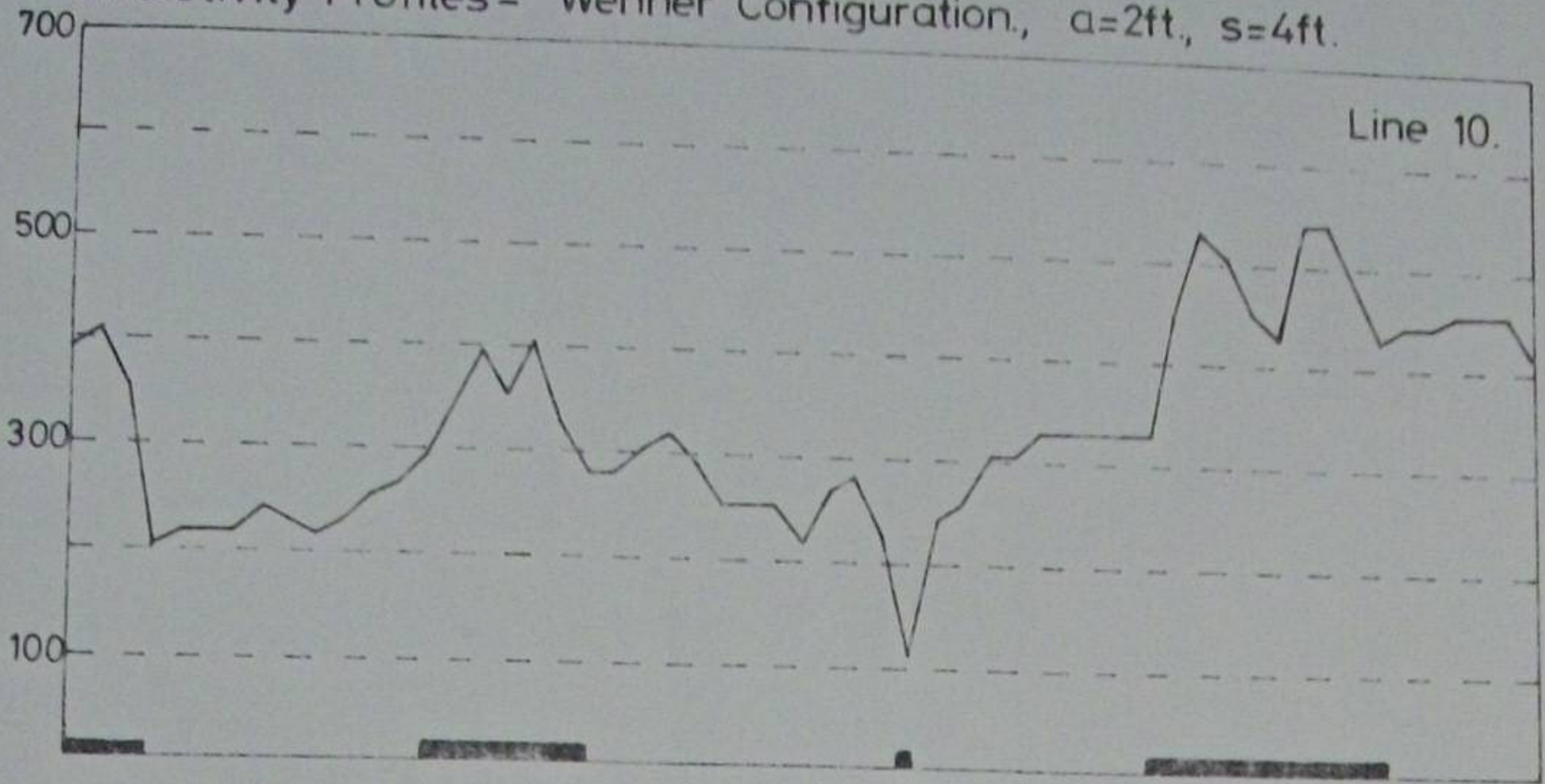
MANOR LODGE SURVEY.

Resistivity Profiles- Wenner Configuration,  $a=2ft$ ,  $s=4ft$ .



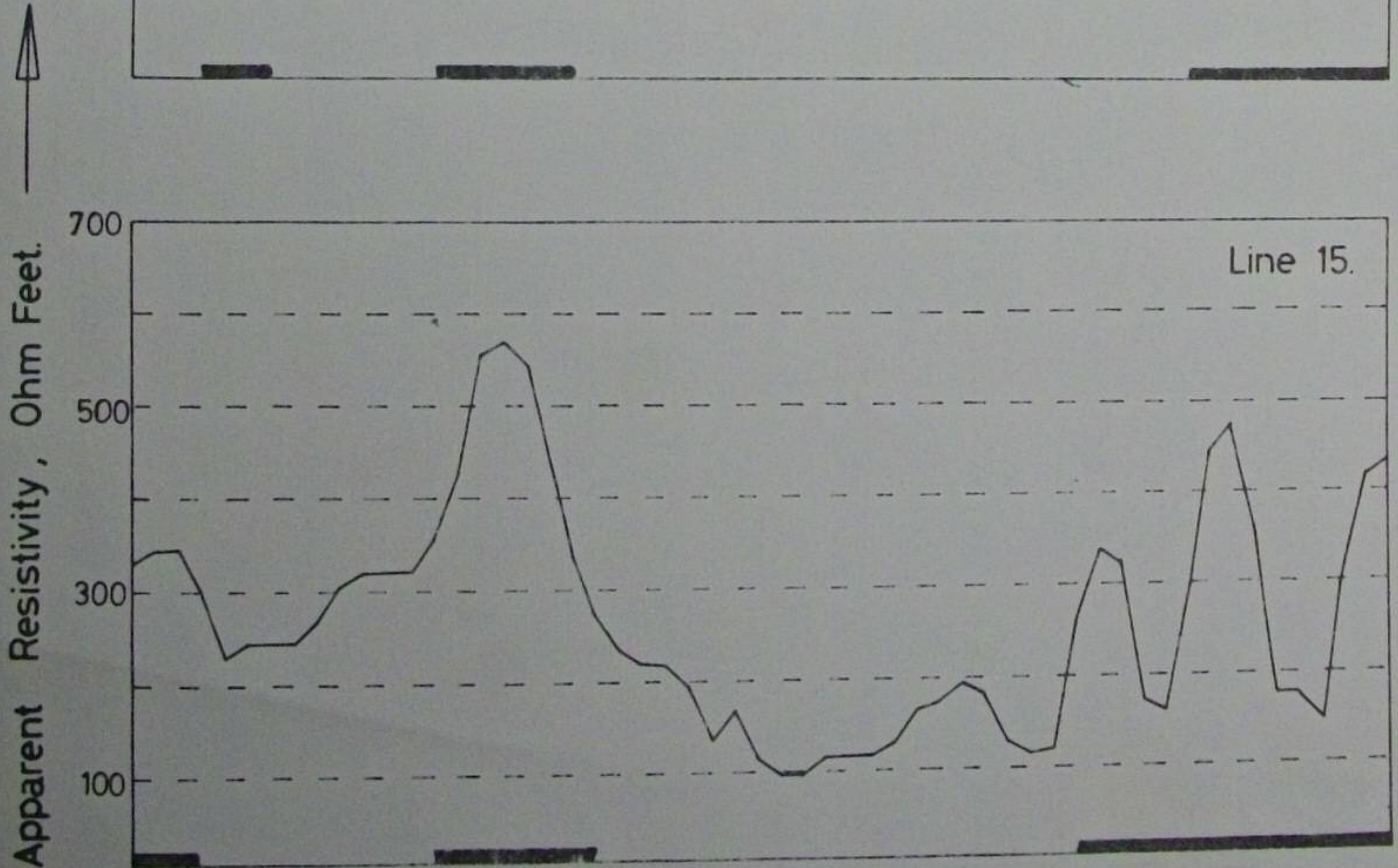
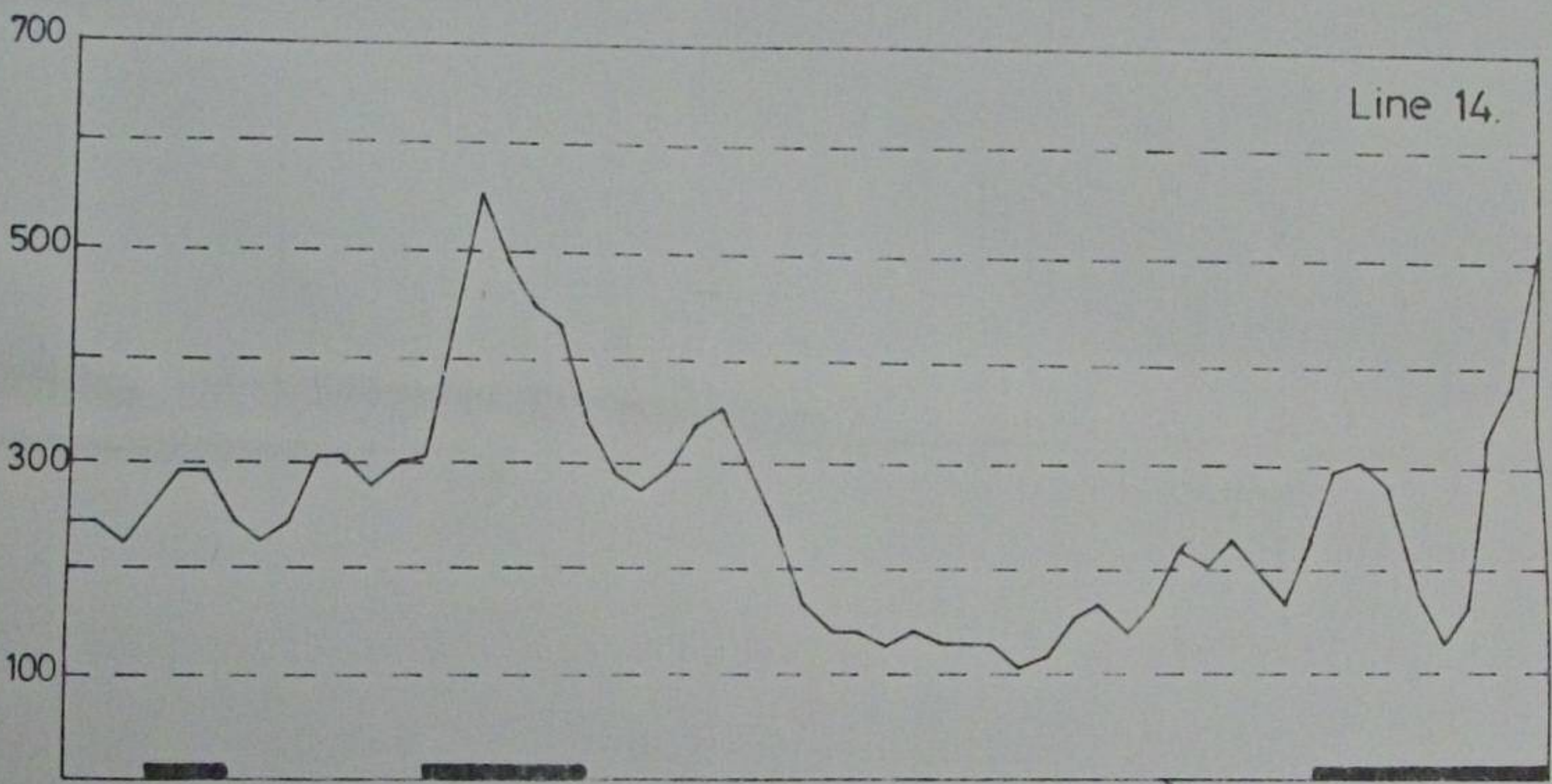
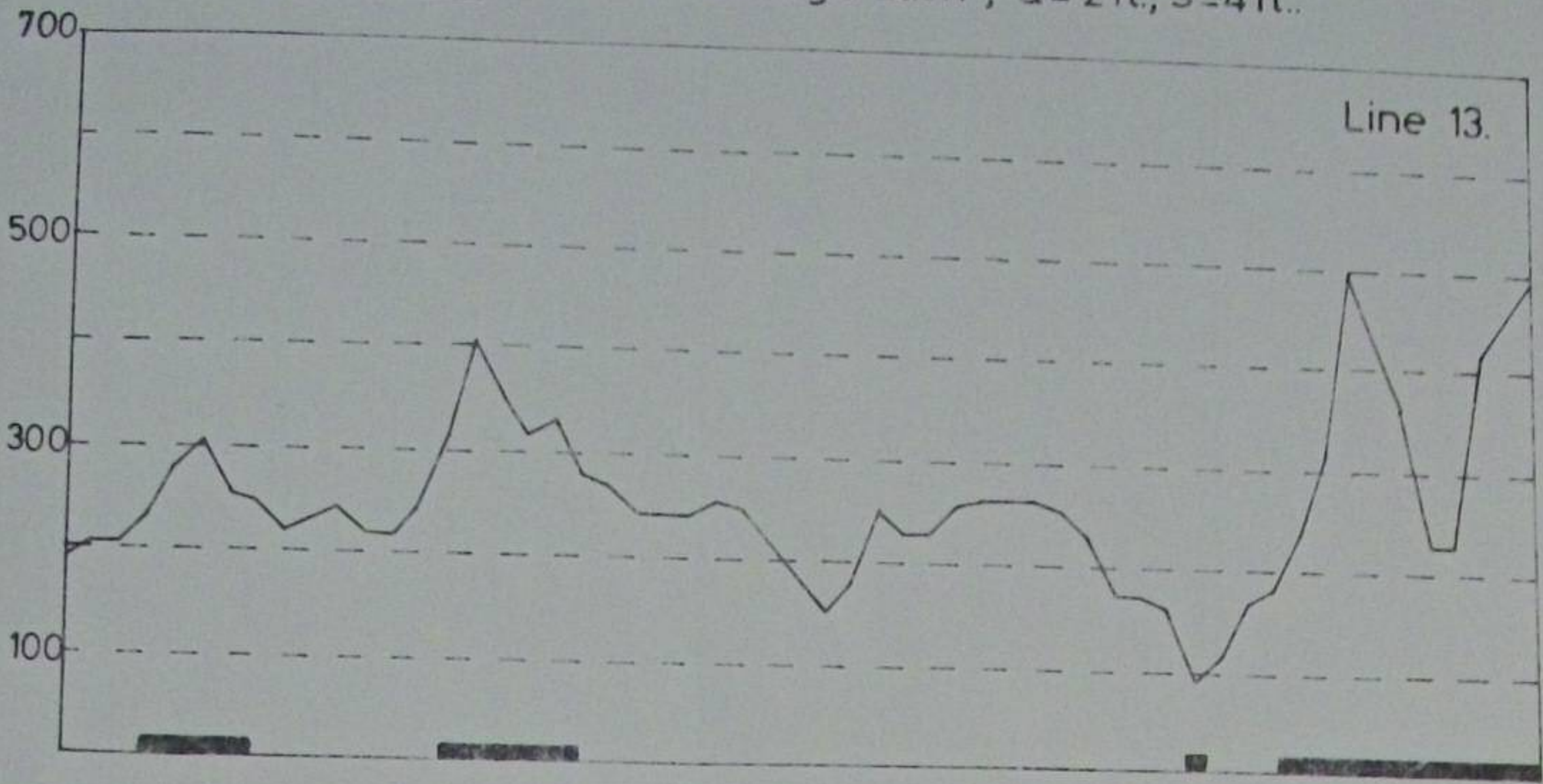
# MANOR LODGE SURVEY

Resistivity Profiles - Wenner Configuration,  $a=2ft.$ ,  $s=4ft.$



MANOR LODGE SURVEY.

Resistivity Profiles - Wenner Configuration,  $a=2\text{ft.}$ ,  $s=4\text{ft.}$



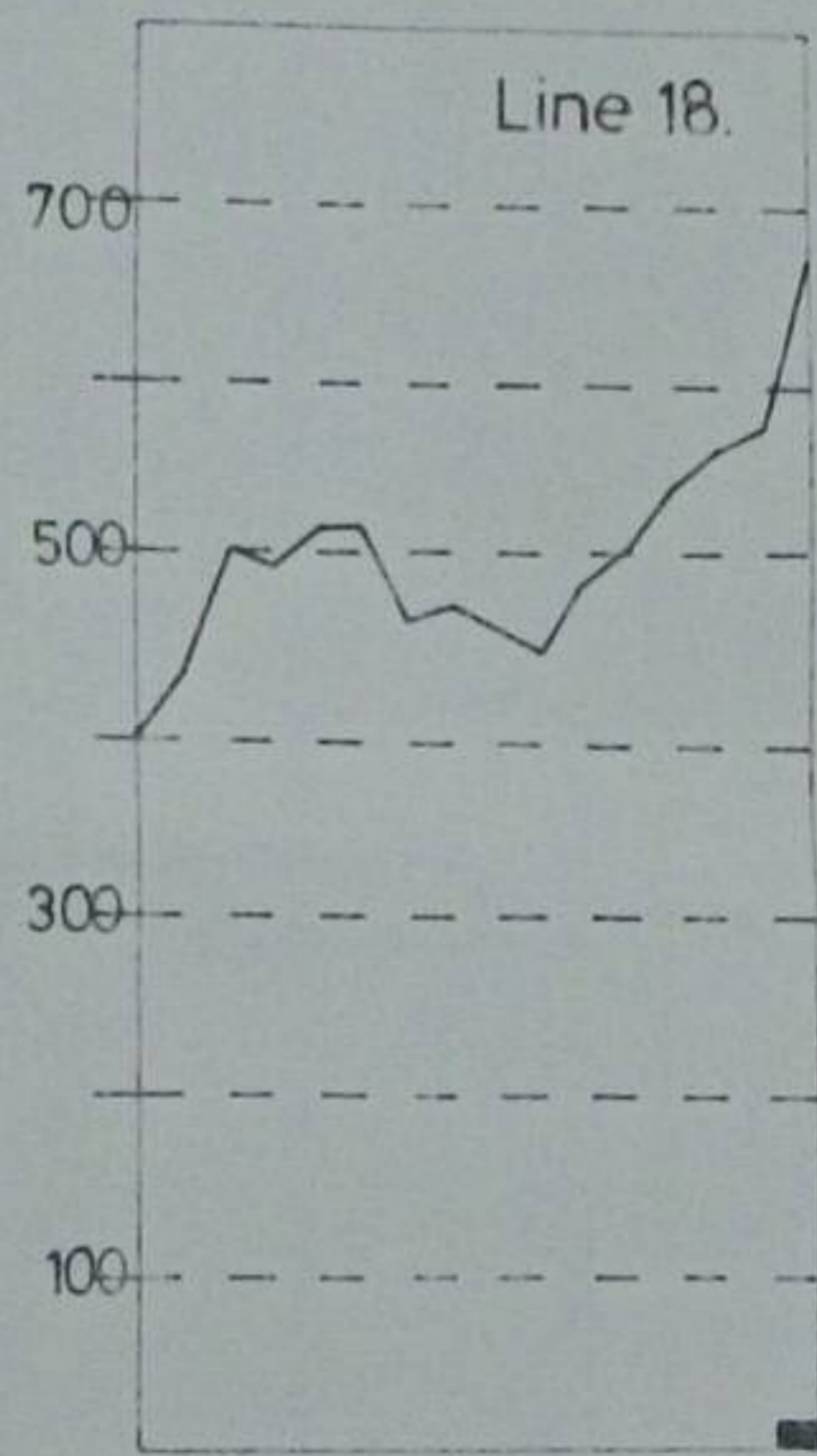
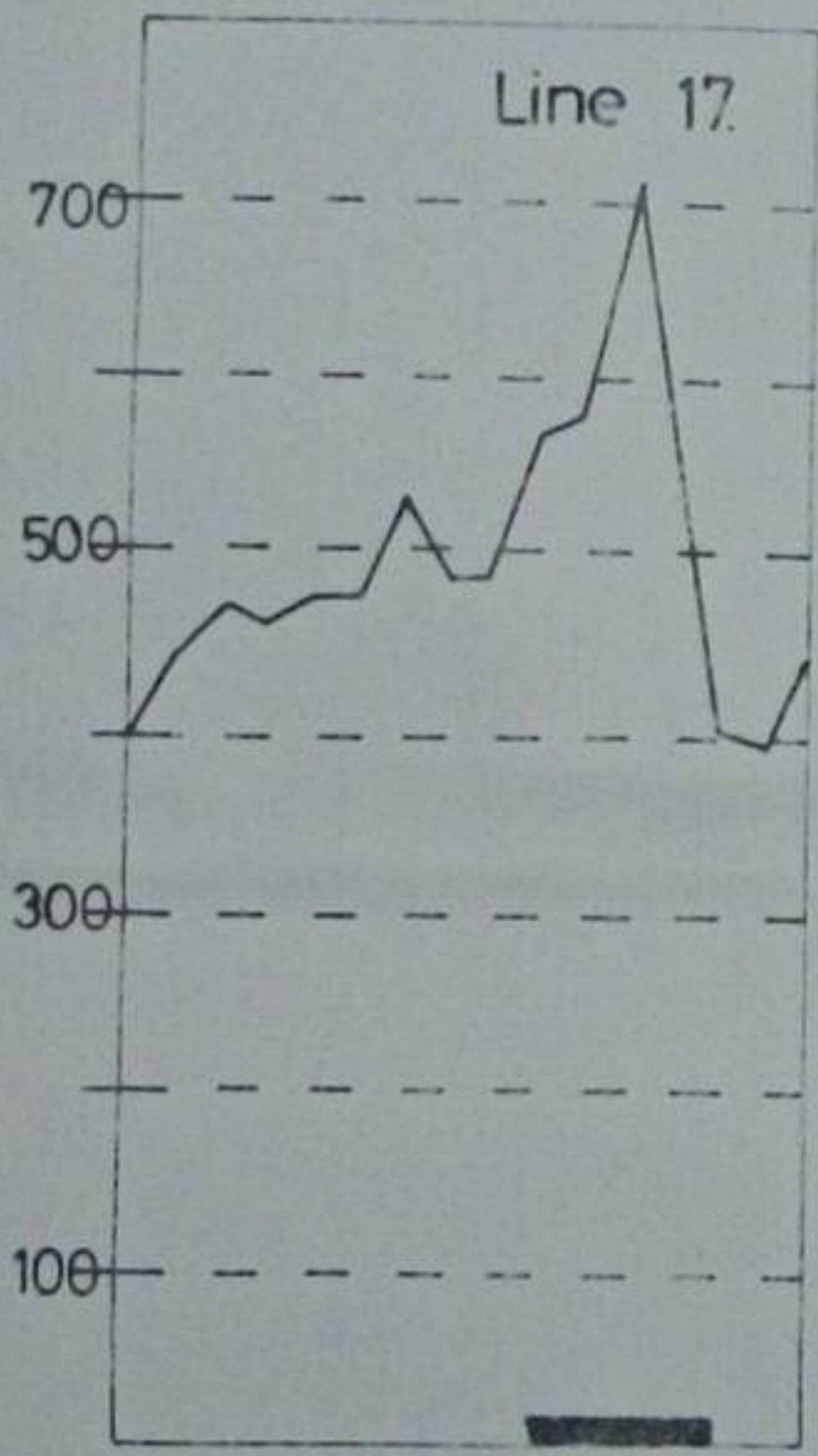
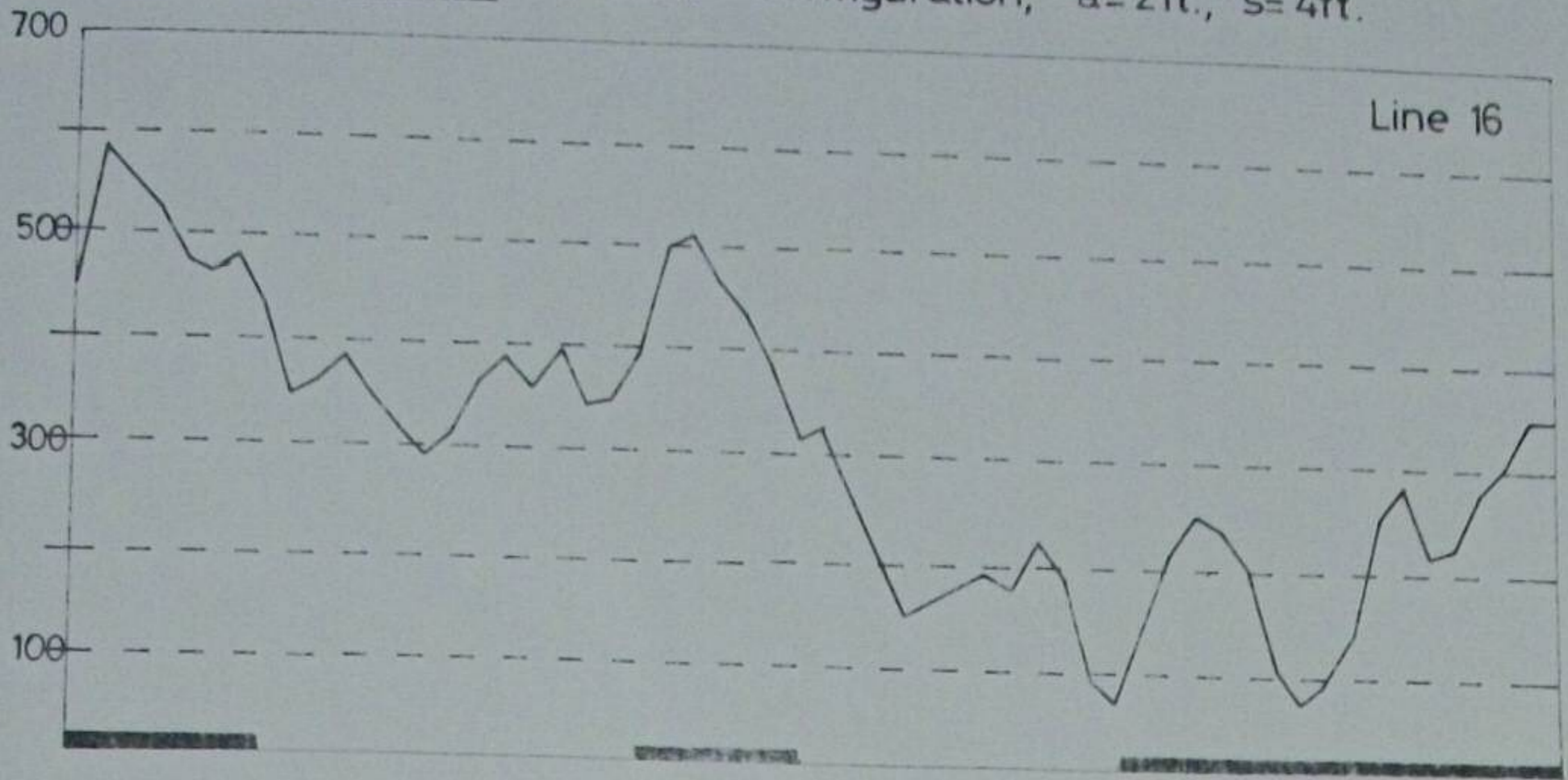
Apparent Resistivity, Ohm Feet.

Traverse Distance, Feet. →

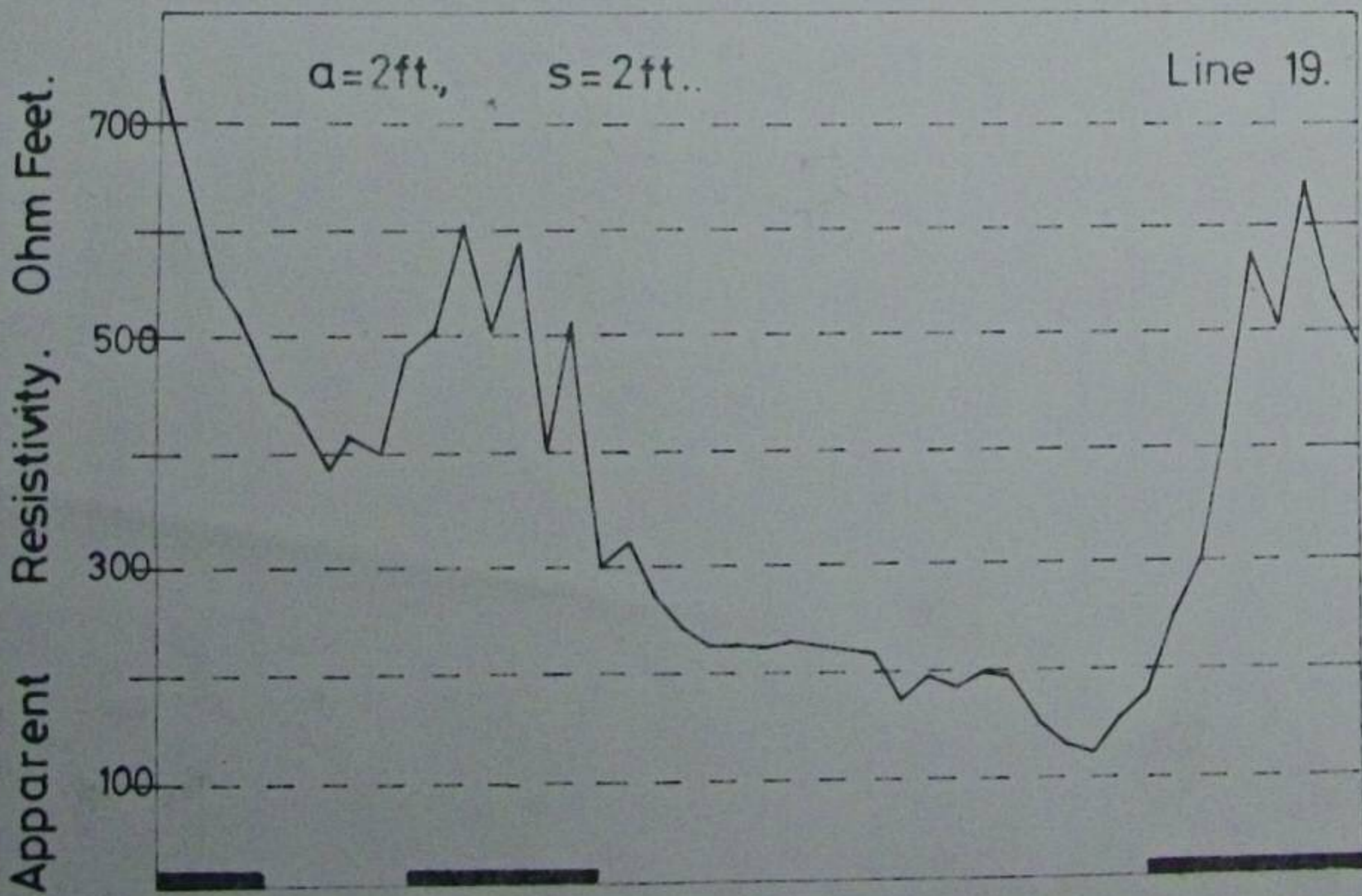
20ft.

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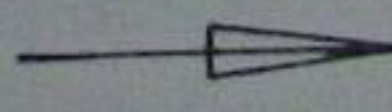
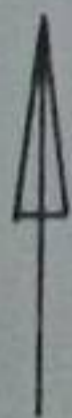
| 20ft. |



| 10ft. |

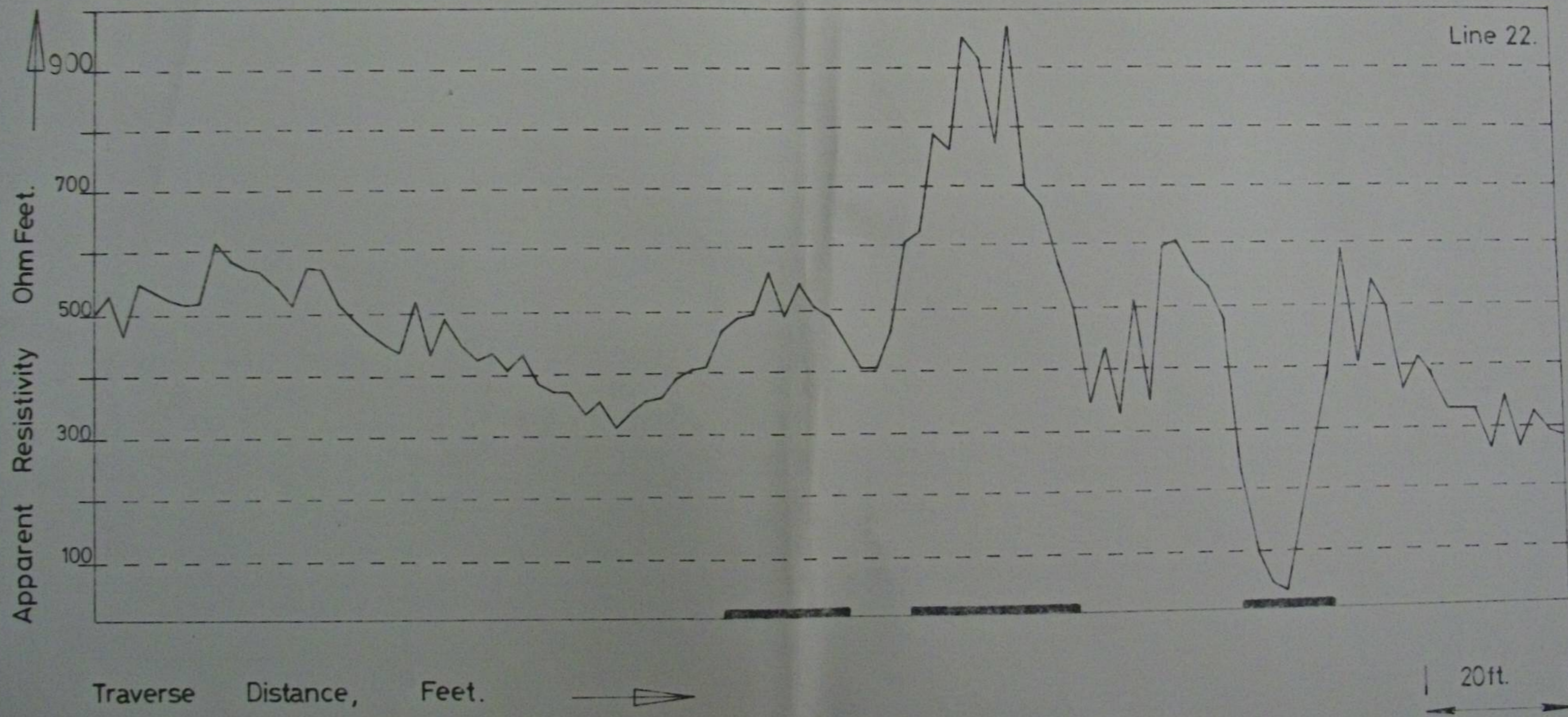
Apparent Resistivity, Ohm Feet.

Traverse Distance, Feet.



MANOR LODGE SURVEY.

Resistivity Profiles - Wenner Configuration,  $a=2\text{ft.}$ ,  $s=2\text{ft.}$



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Resistivity Profiles - Wenner Configuration,  $a=2\text{ft.}$ ,  $s=2\text{ft.}$

