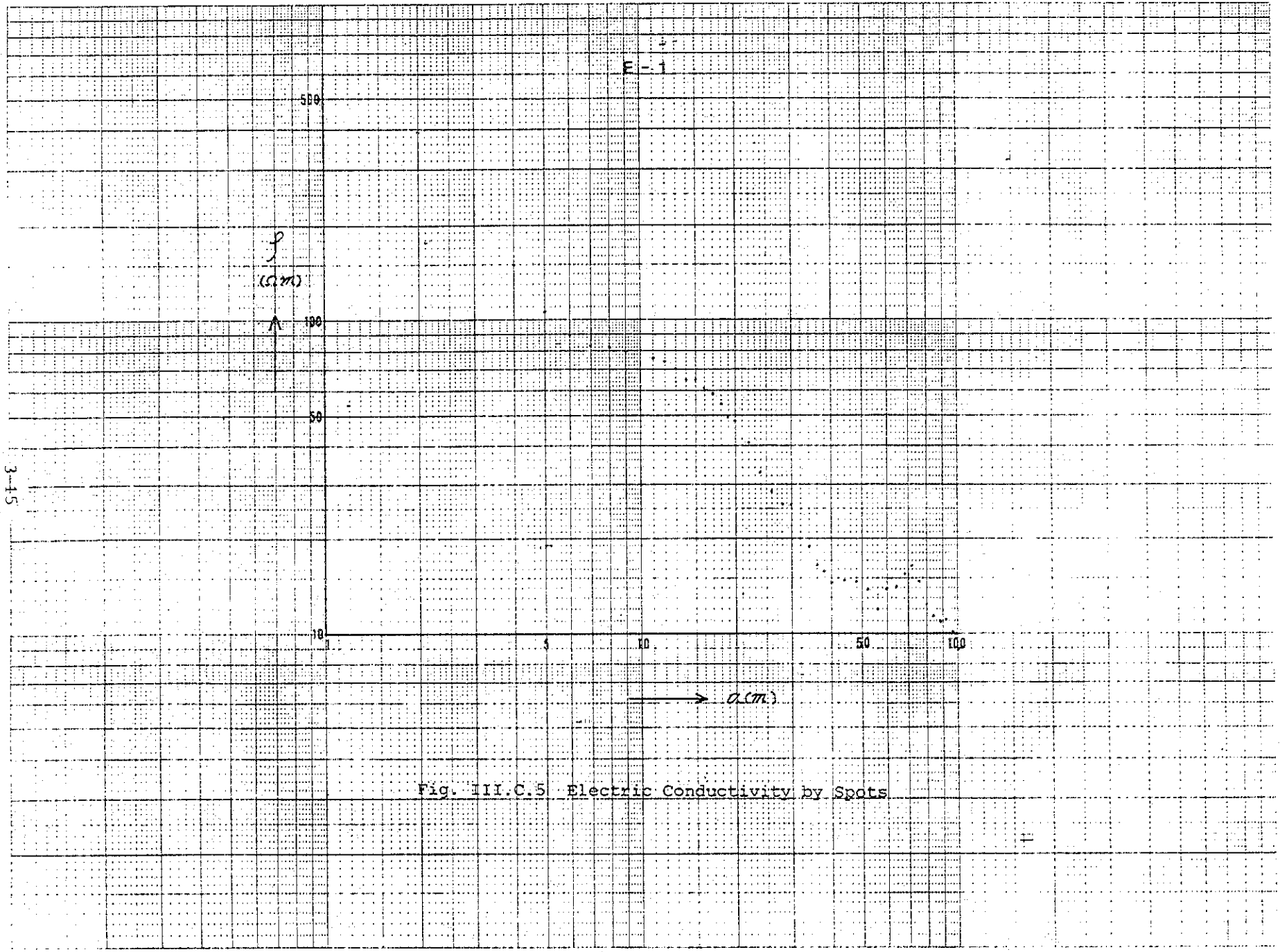
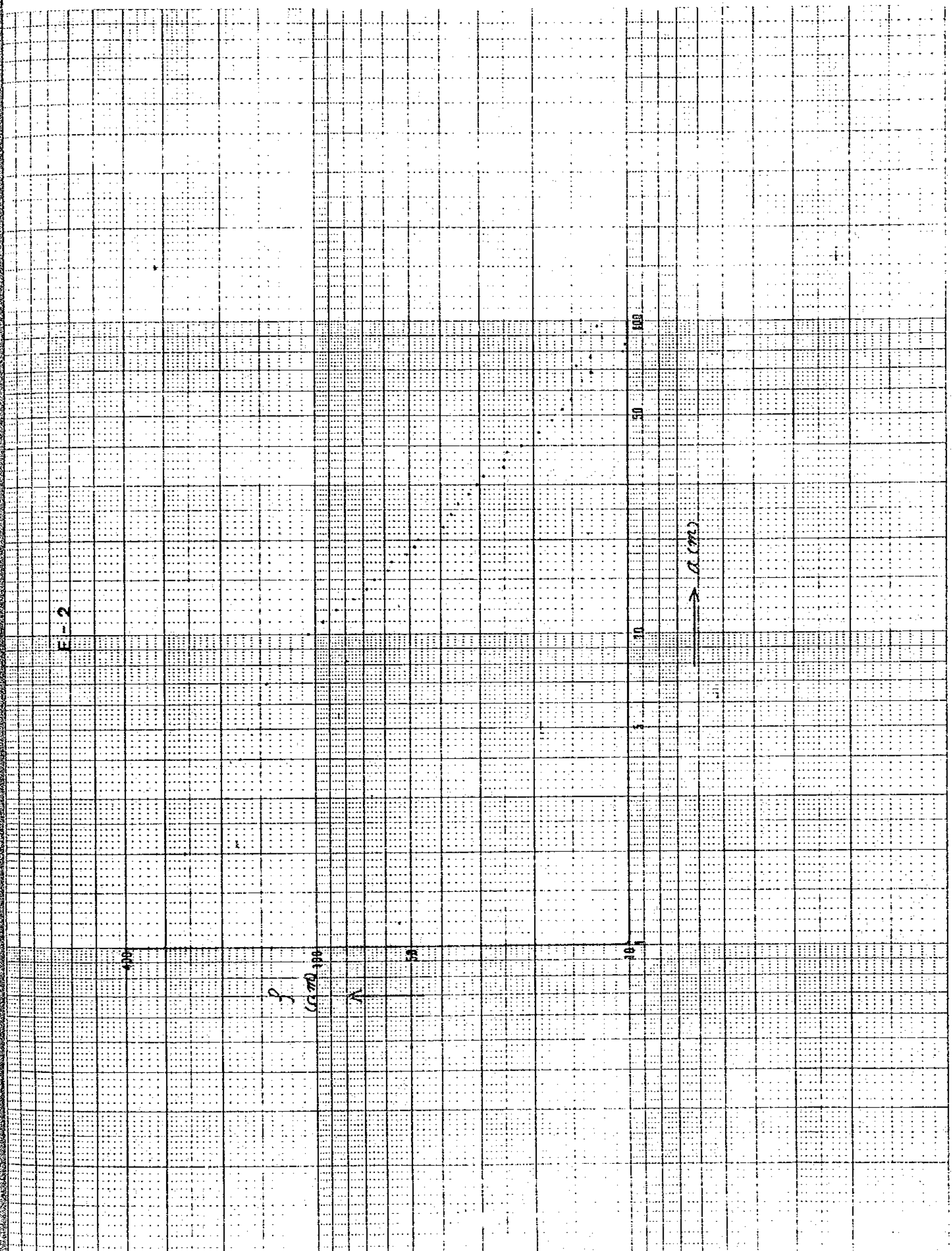
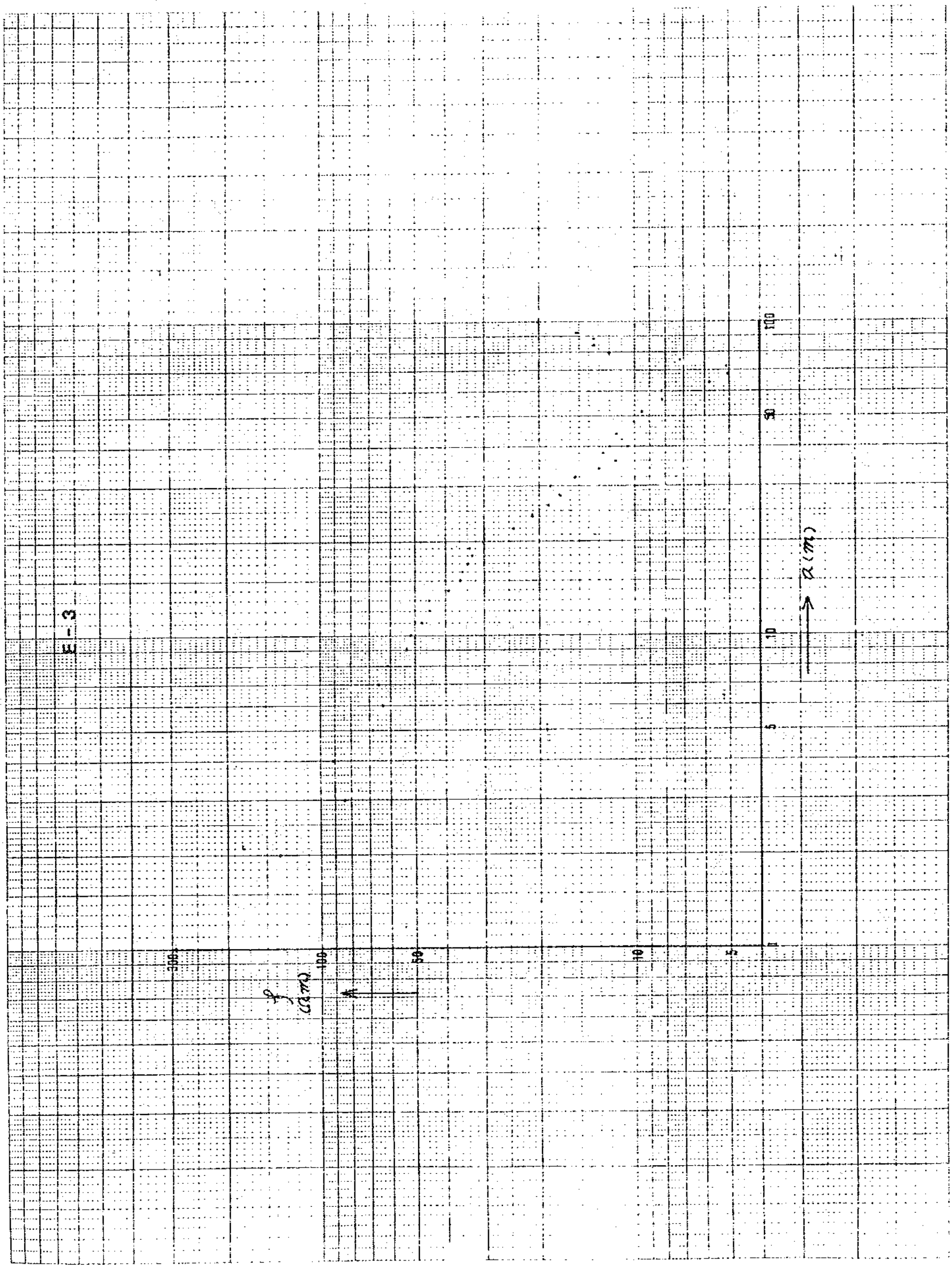
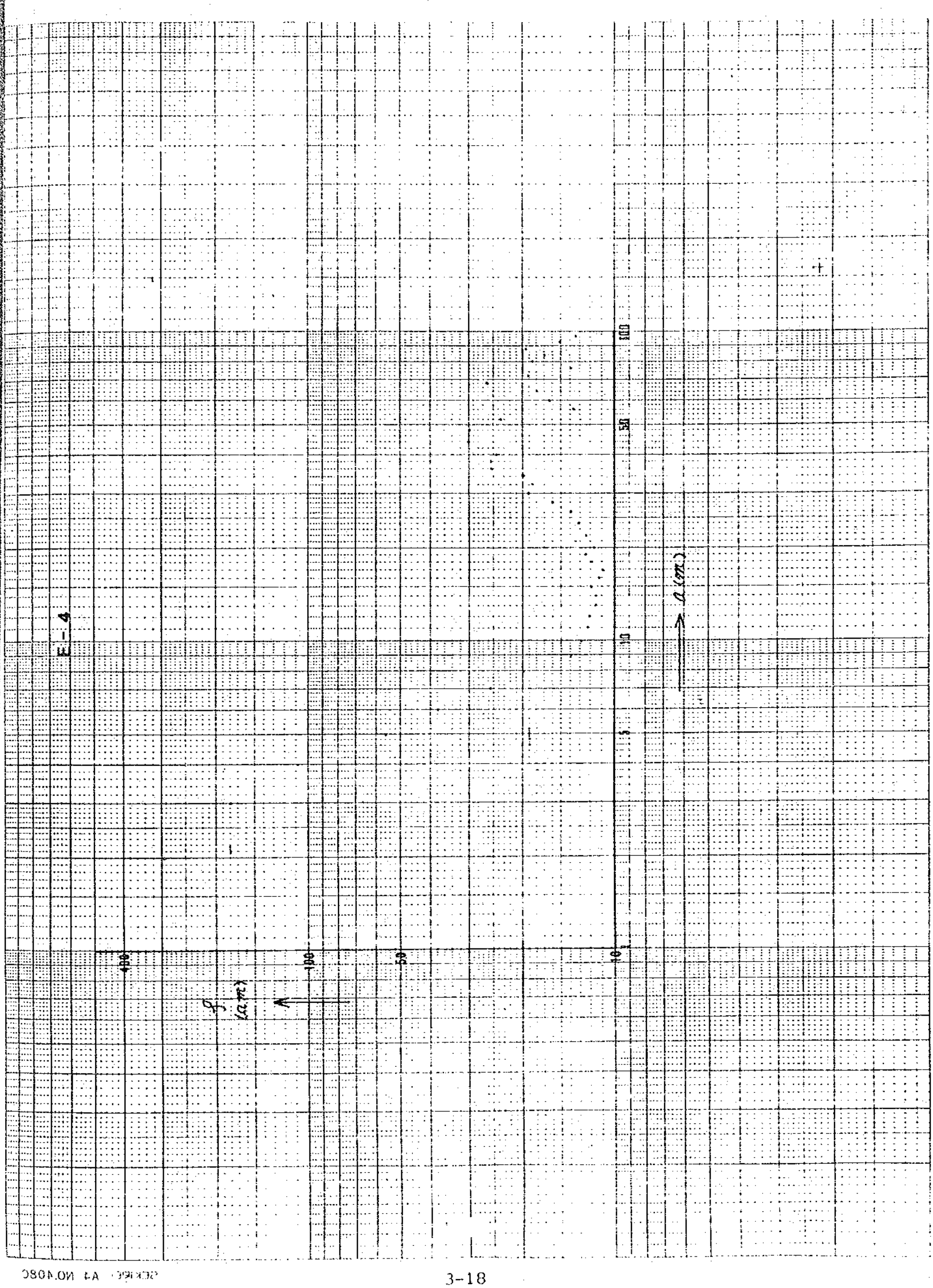
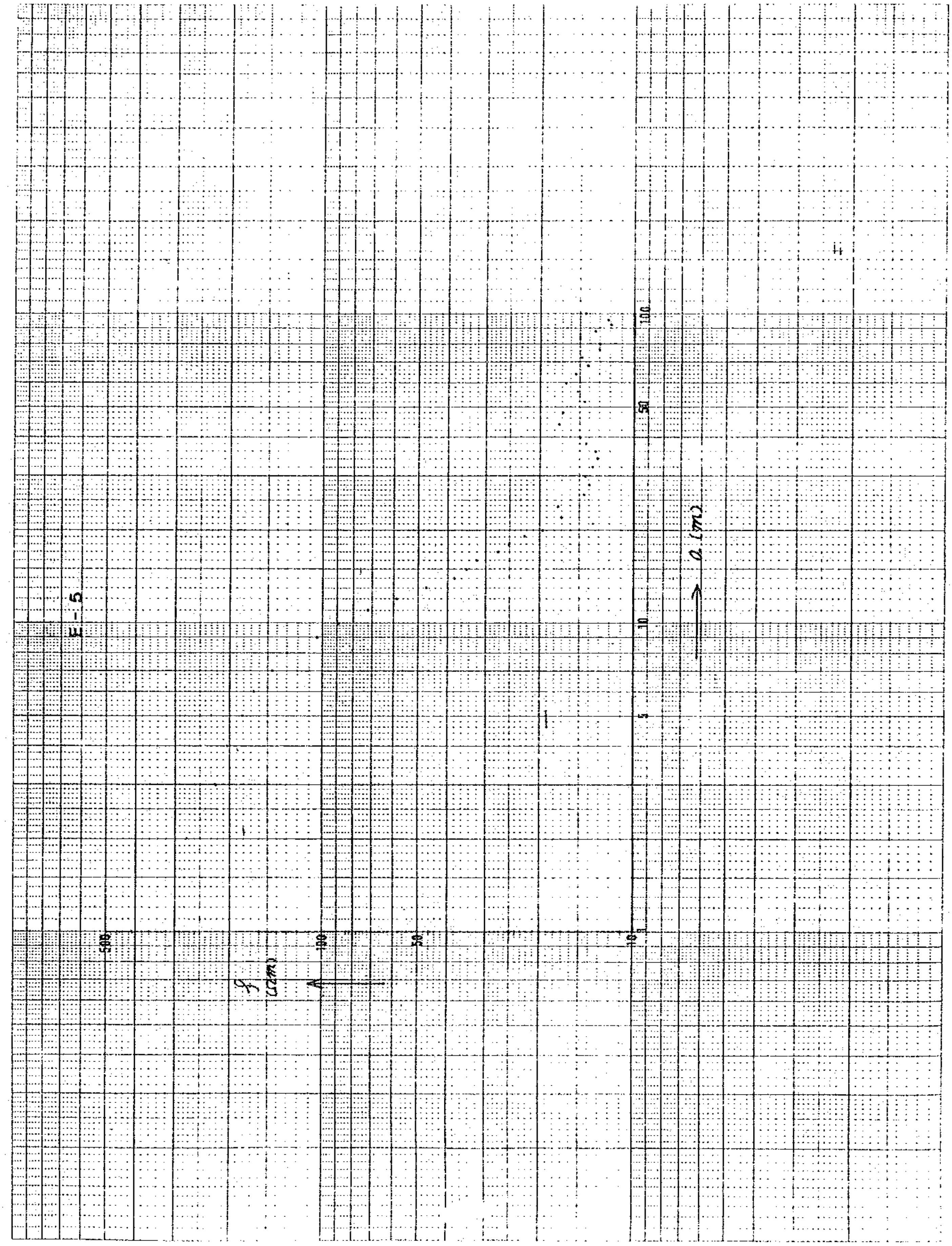


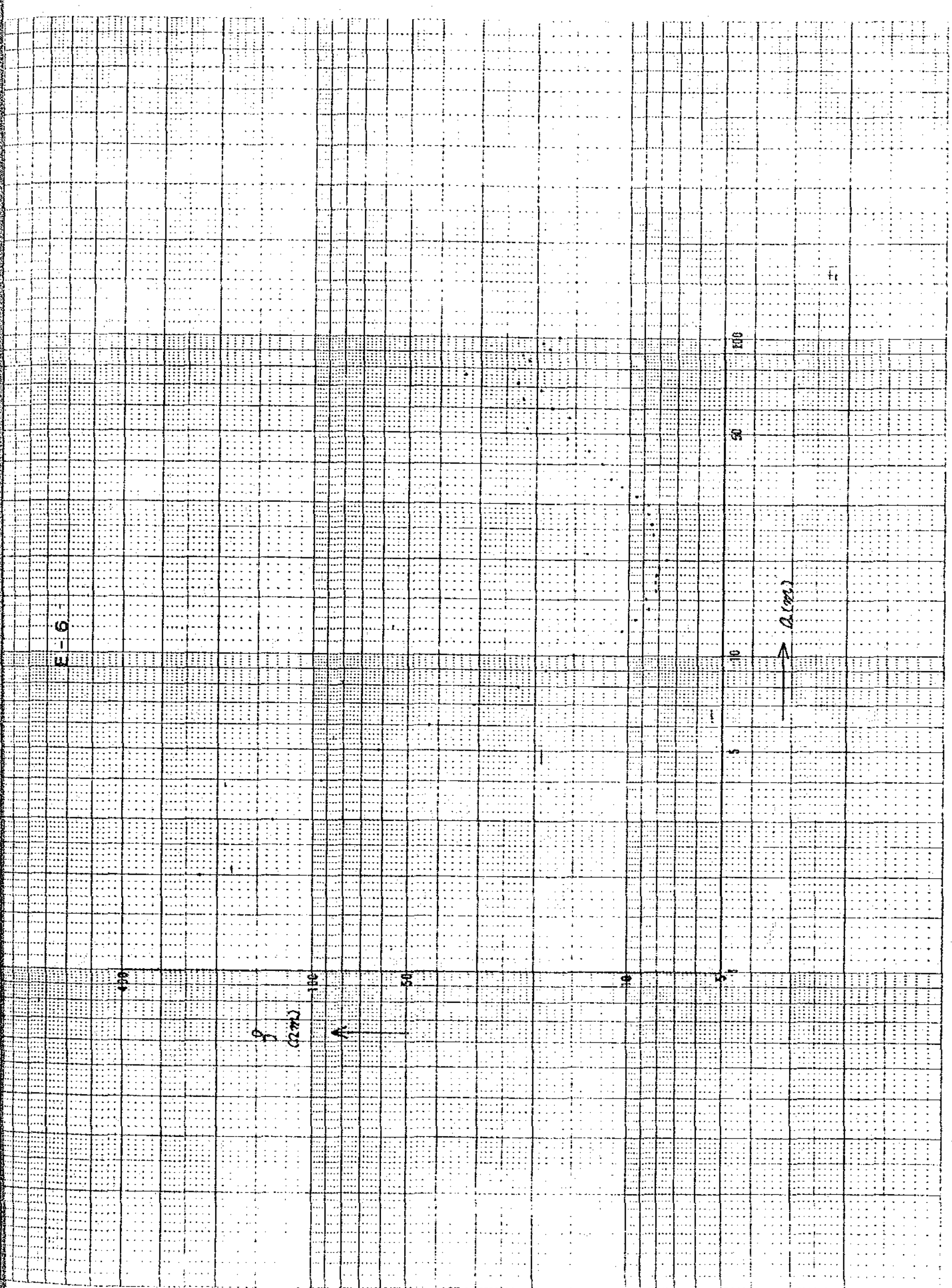
Fig. III.C.5 Electric Conductivity by Spots

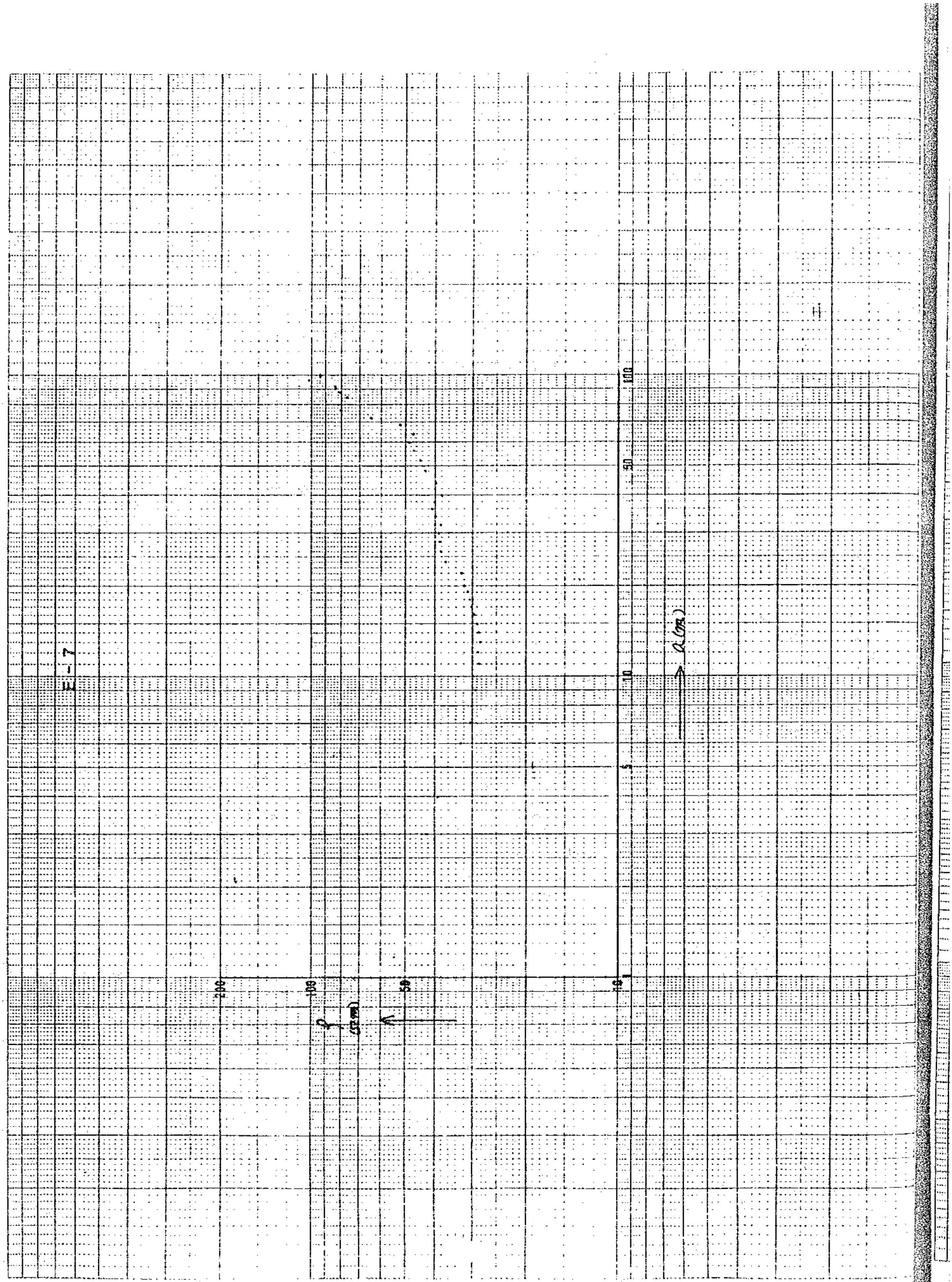

E-2
a (m)
ρ (Ωm)

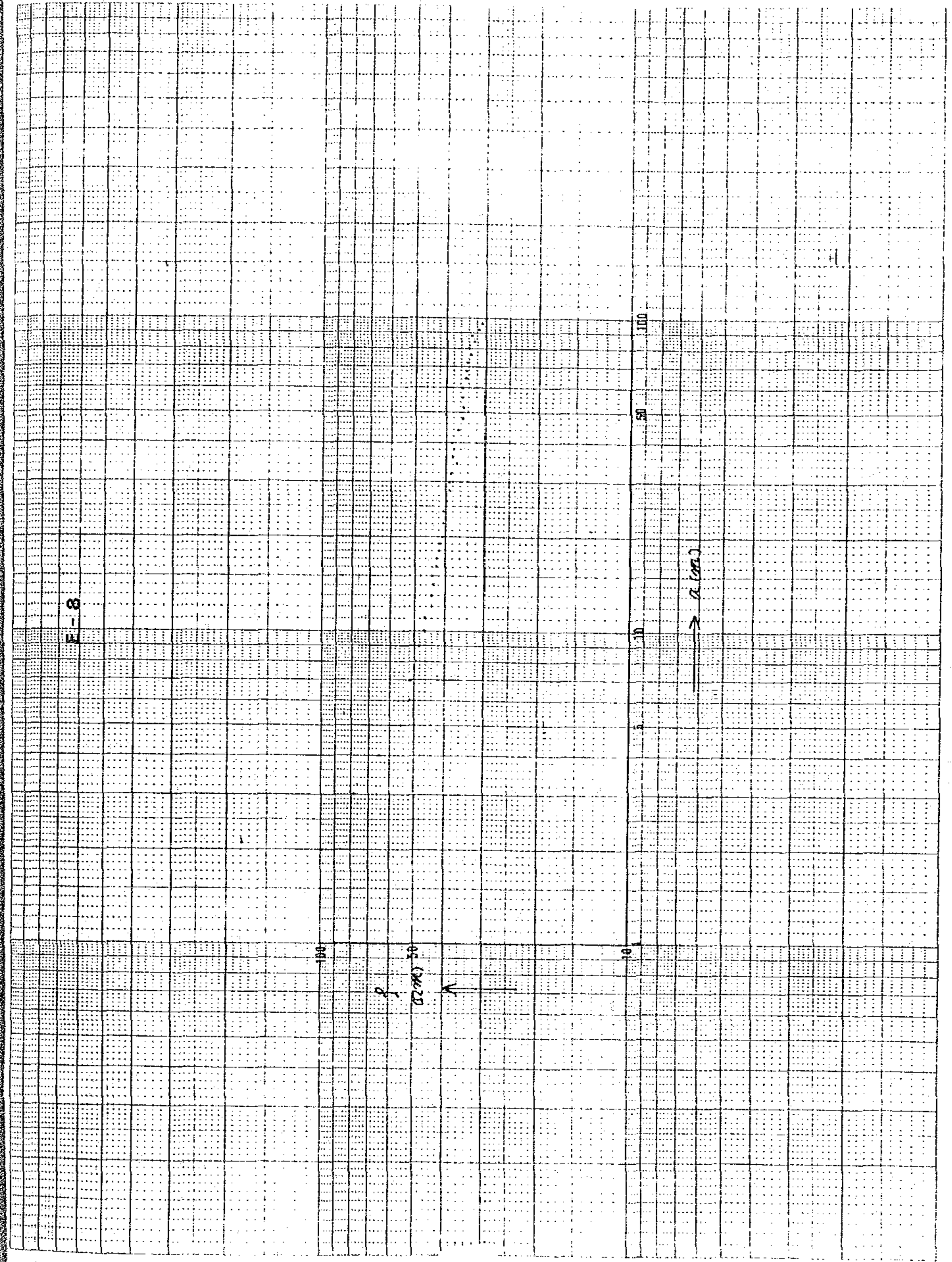

E-3
ρ (Ωm)
a (m)
100
50
10
5
1

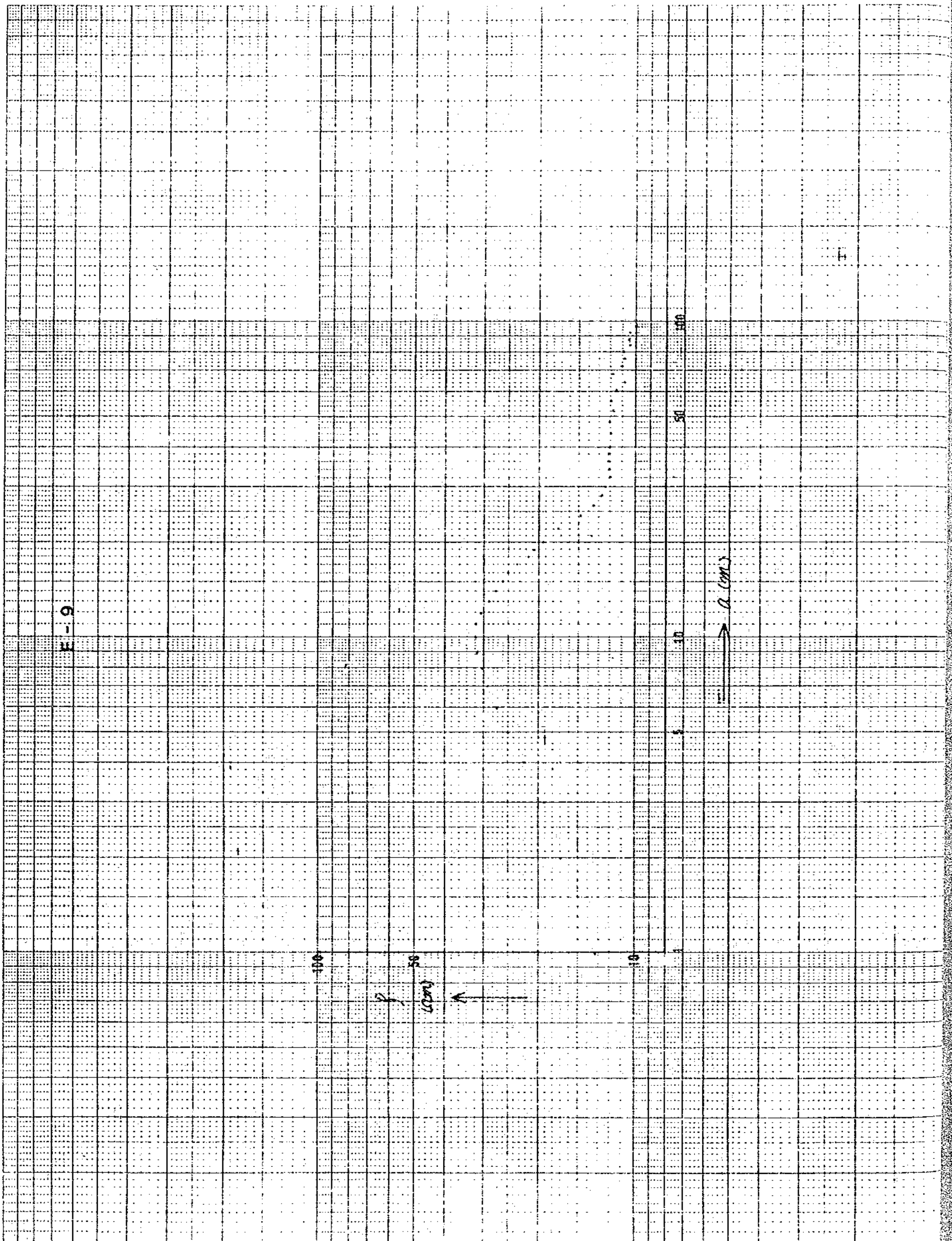

E-4
f (cm)
a (m)
10
50
100
1
5
10
50
100

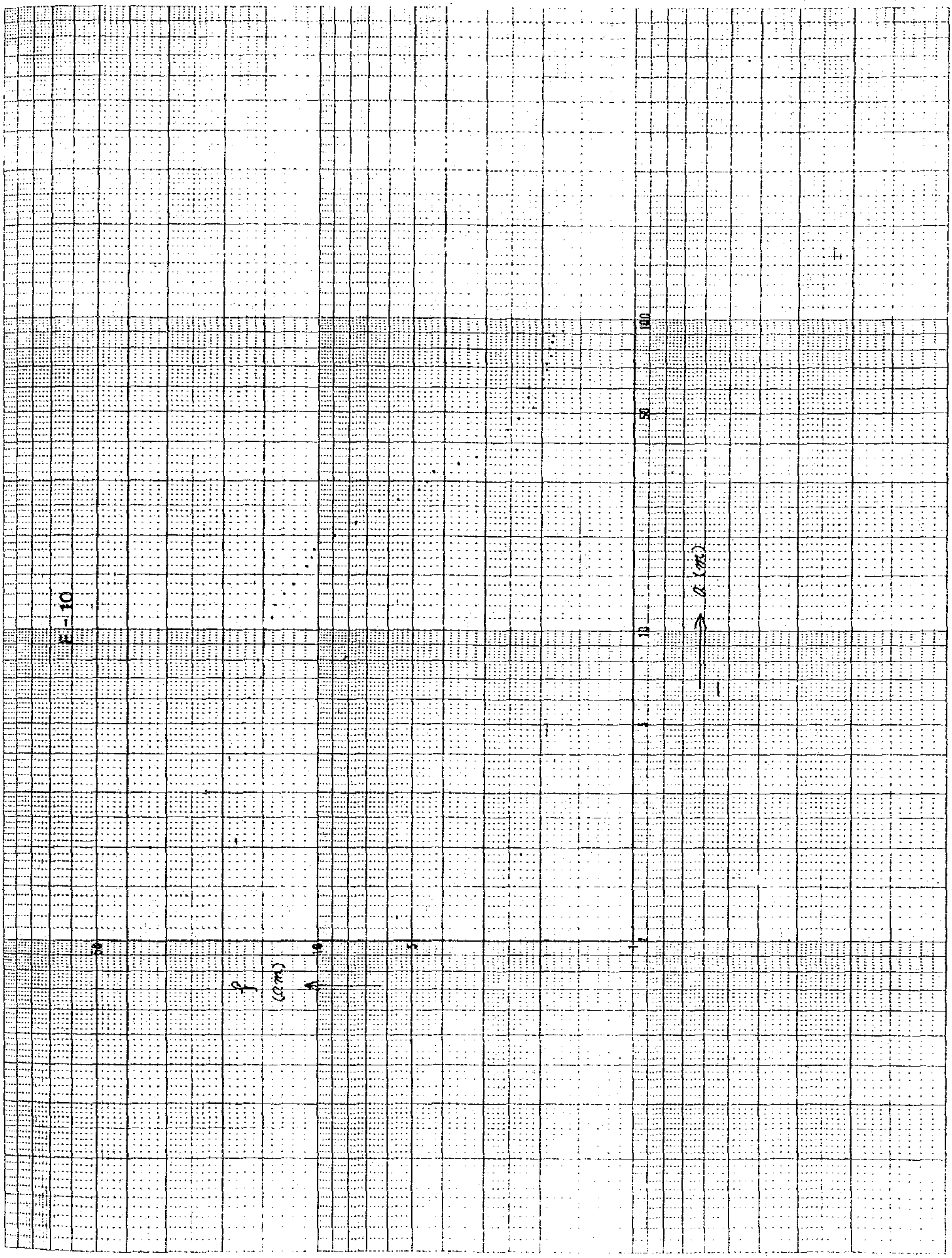

E-5

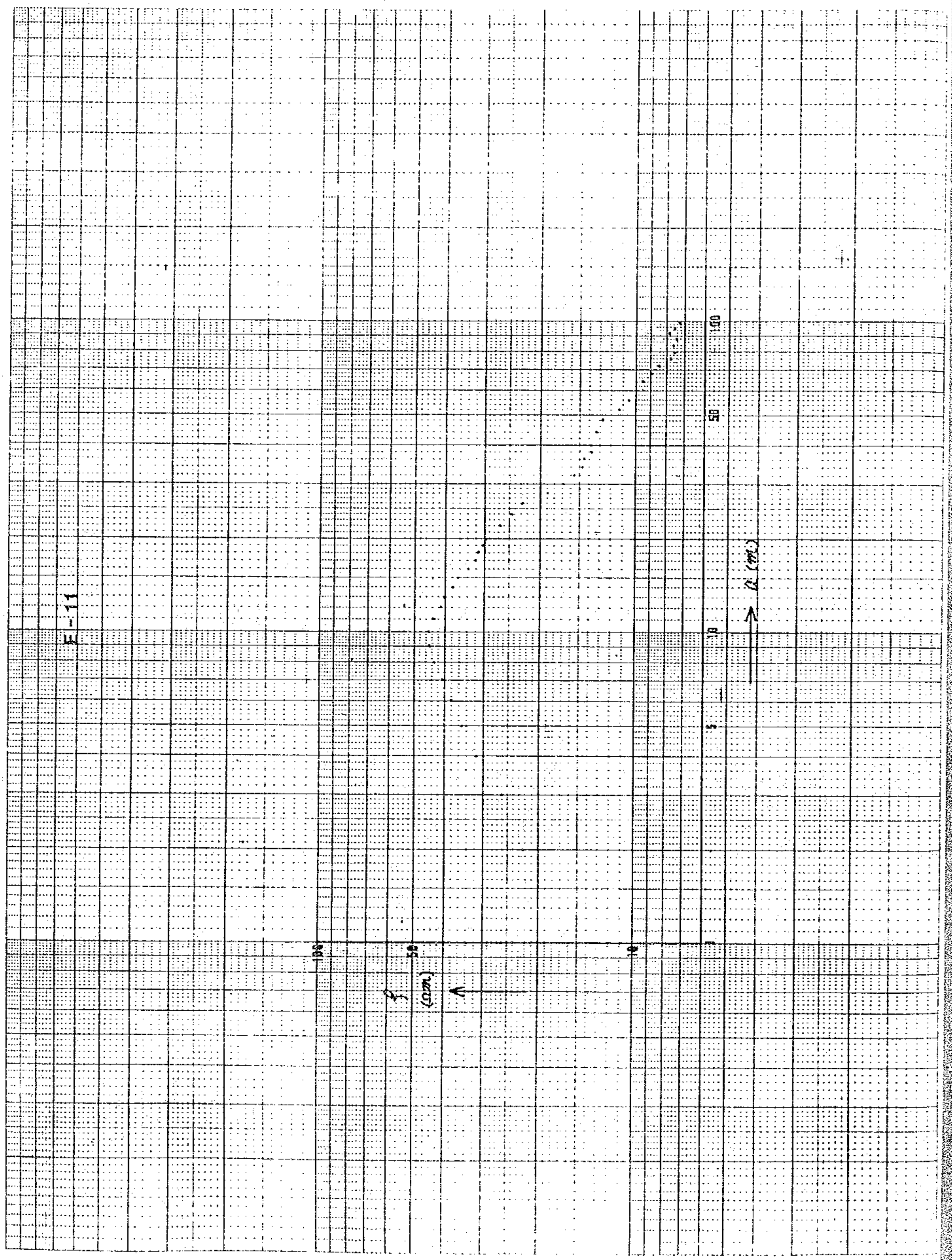

E-6

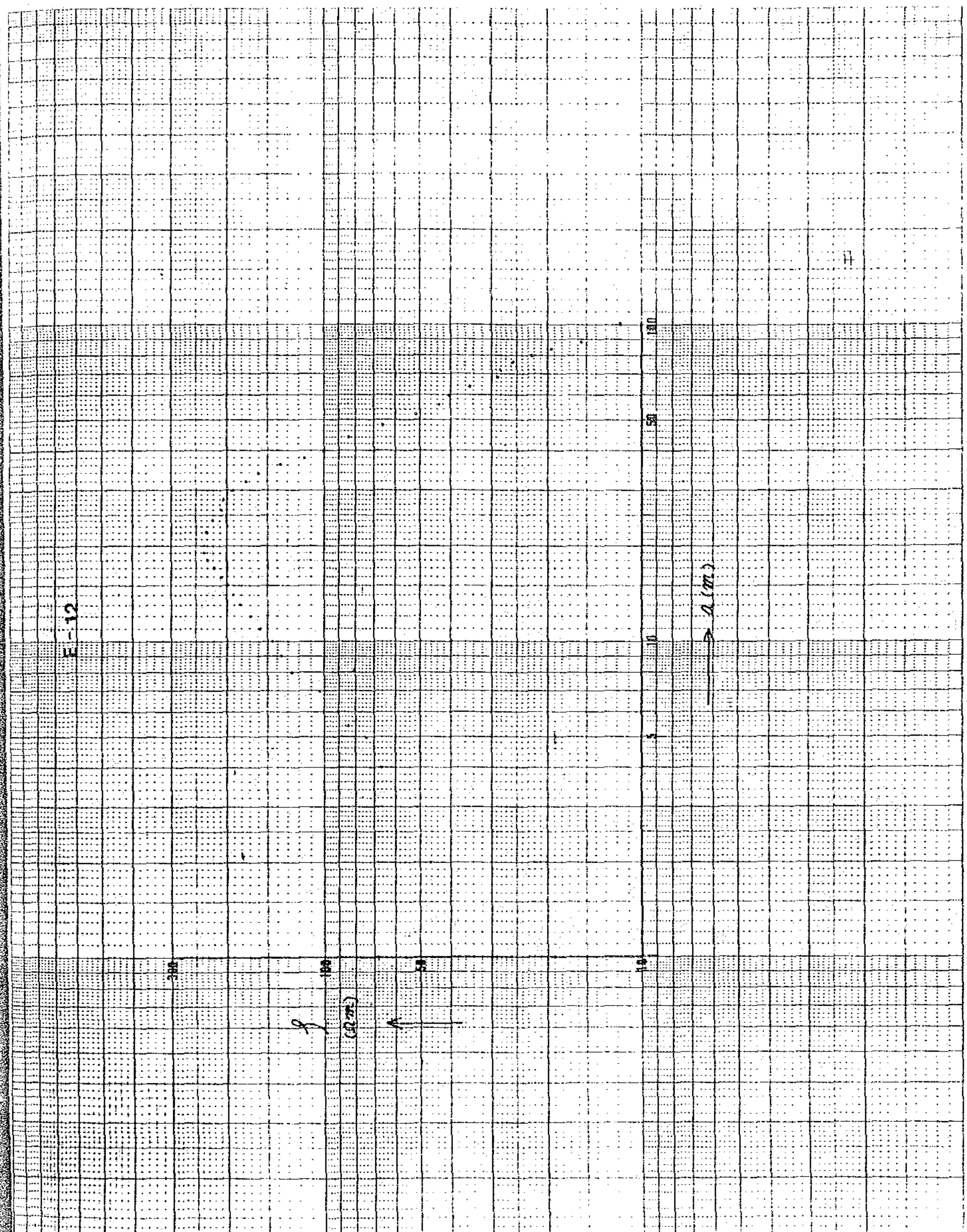

E-7
1
5
10
50
100
200

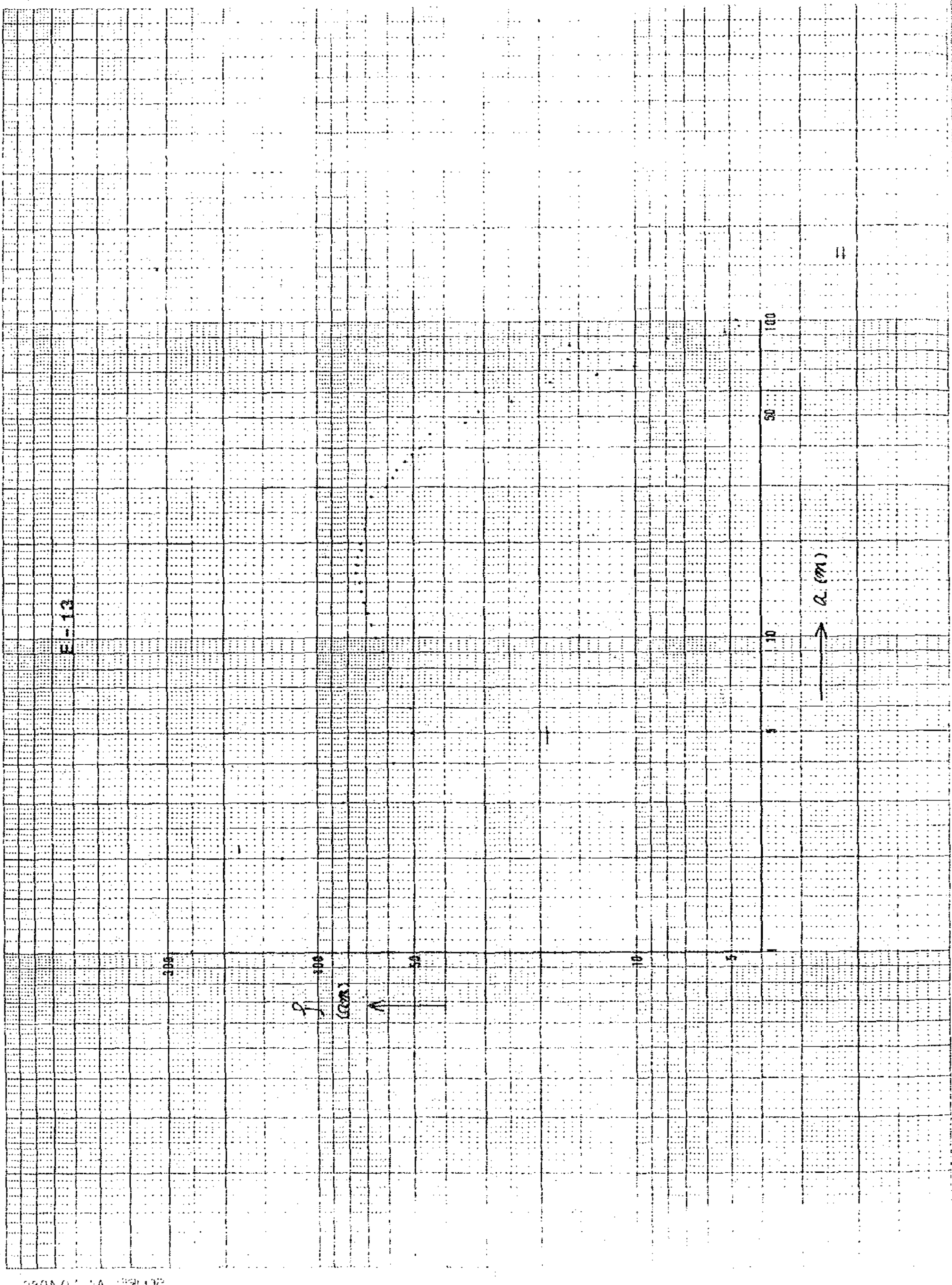


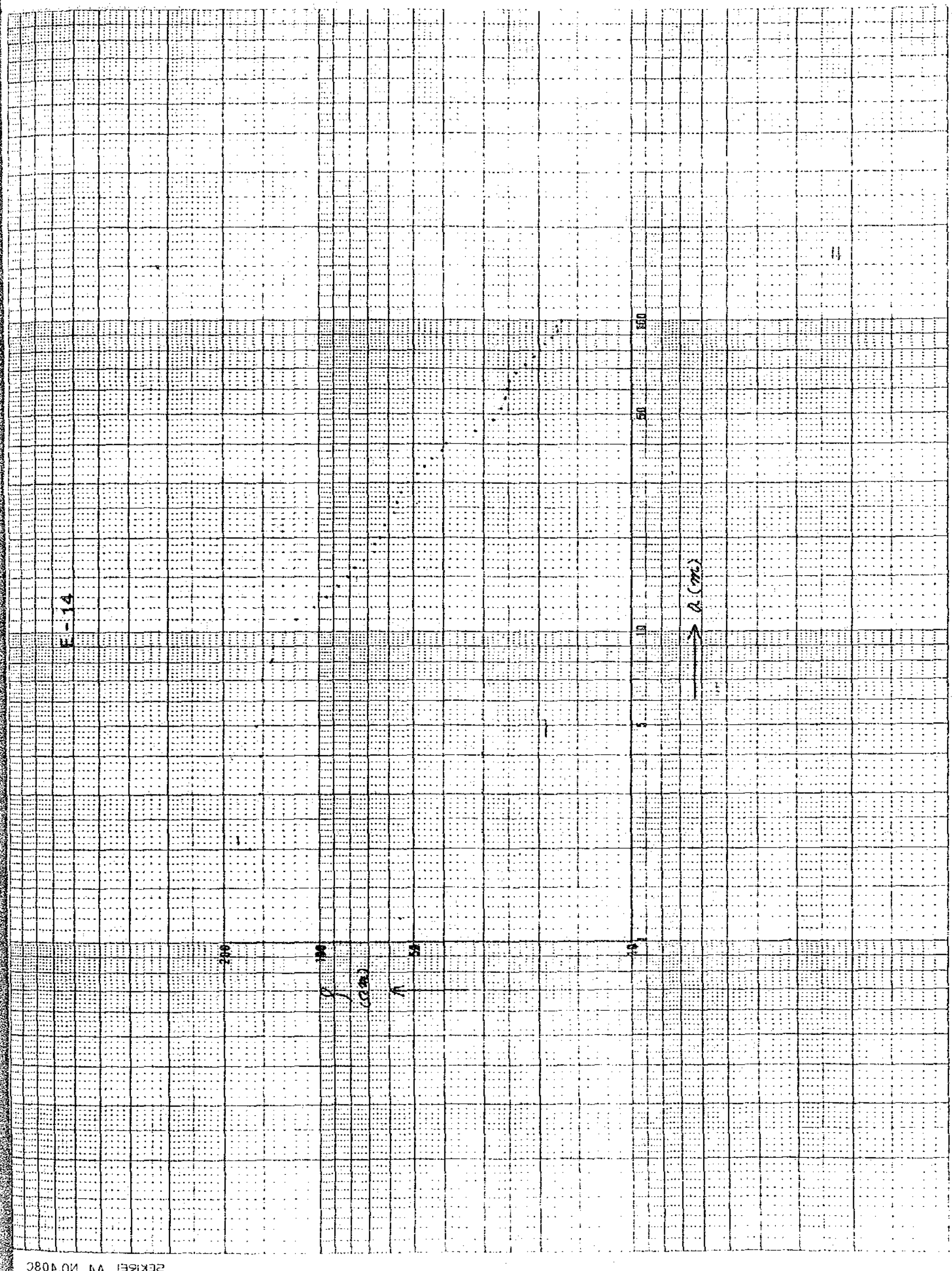

E-9
100
50
10
5
1
a (m)


E-10
ρ (Ωm)
a (m)
1
5
10
50
100

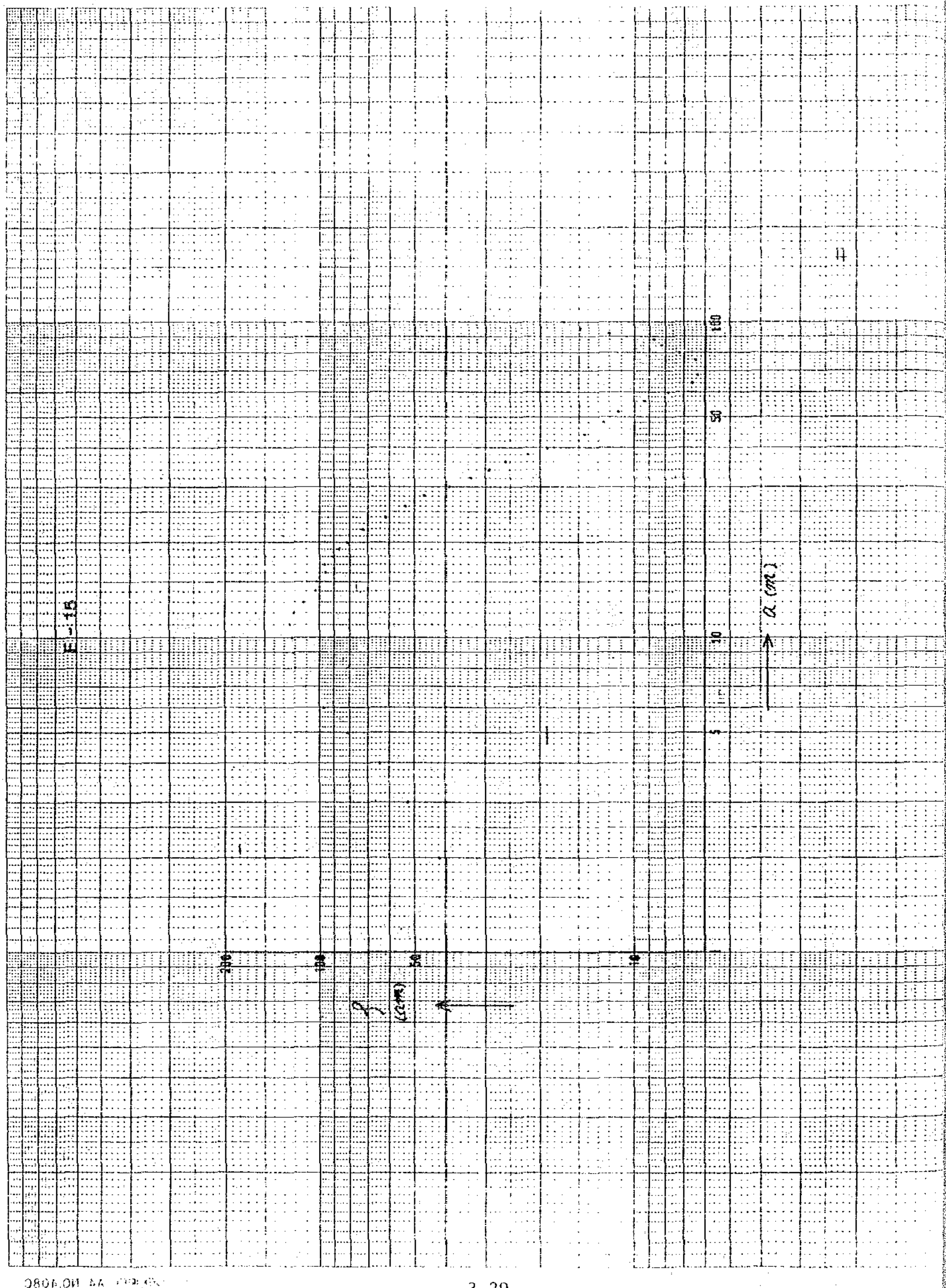

E-11

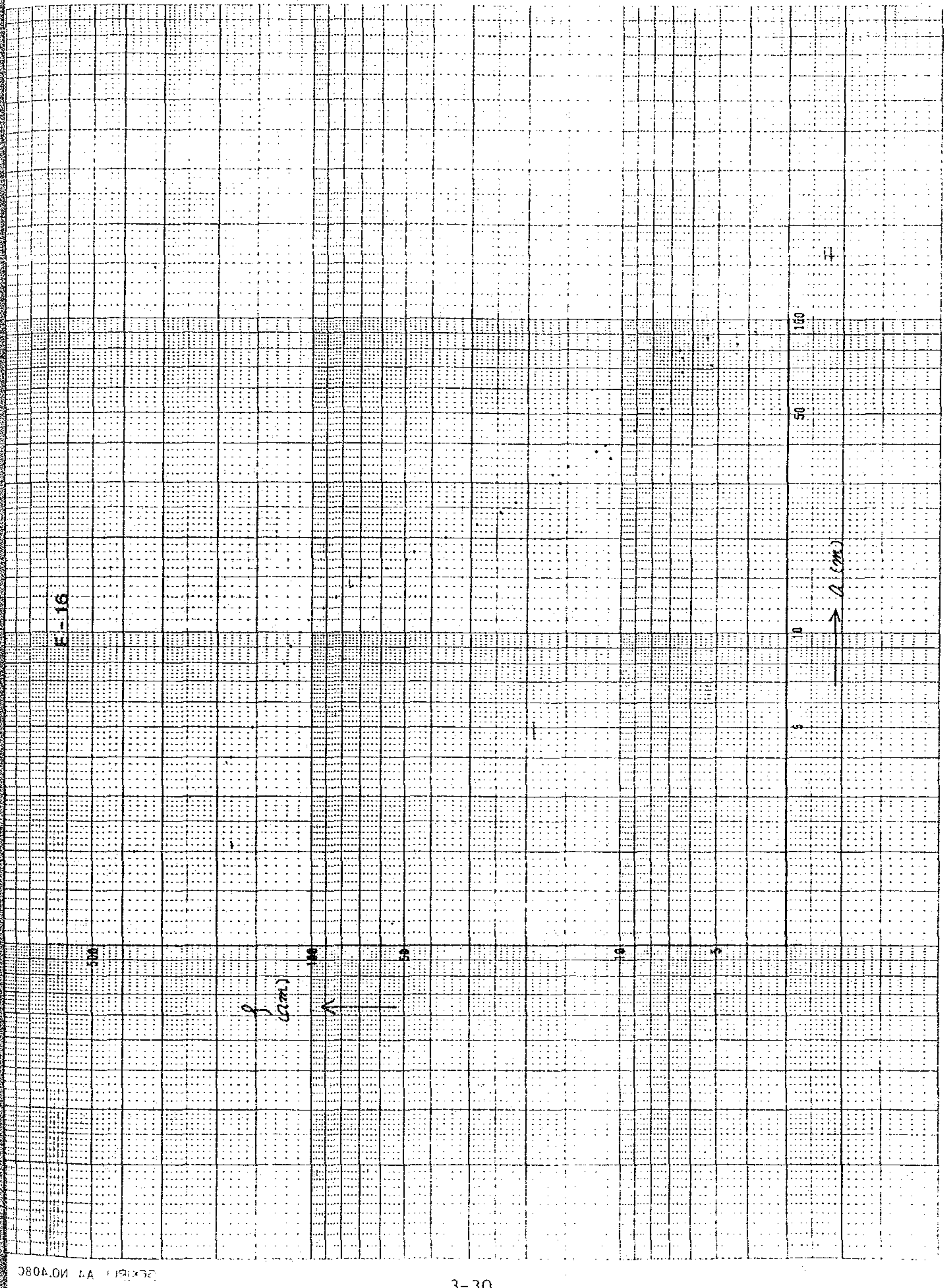

E-12
ρ (Ωm)
a (m)

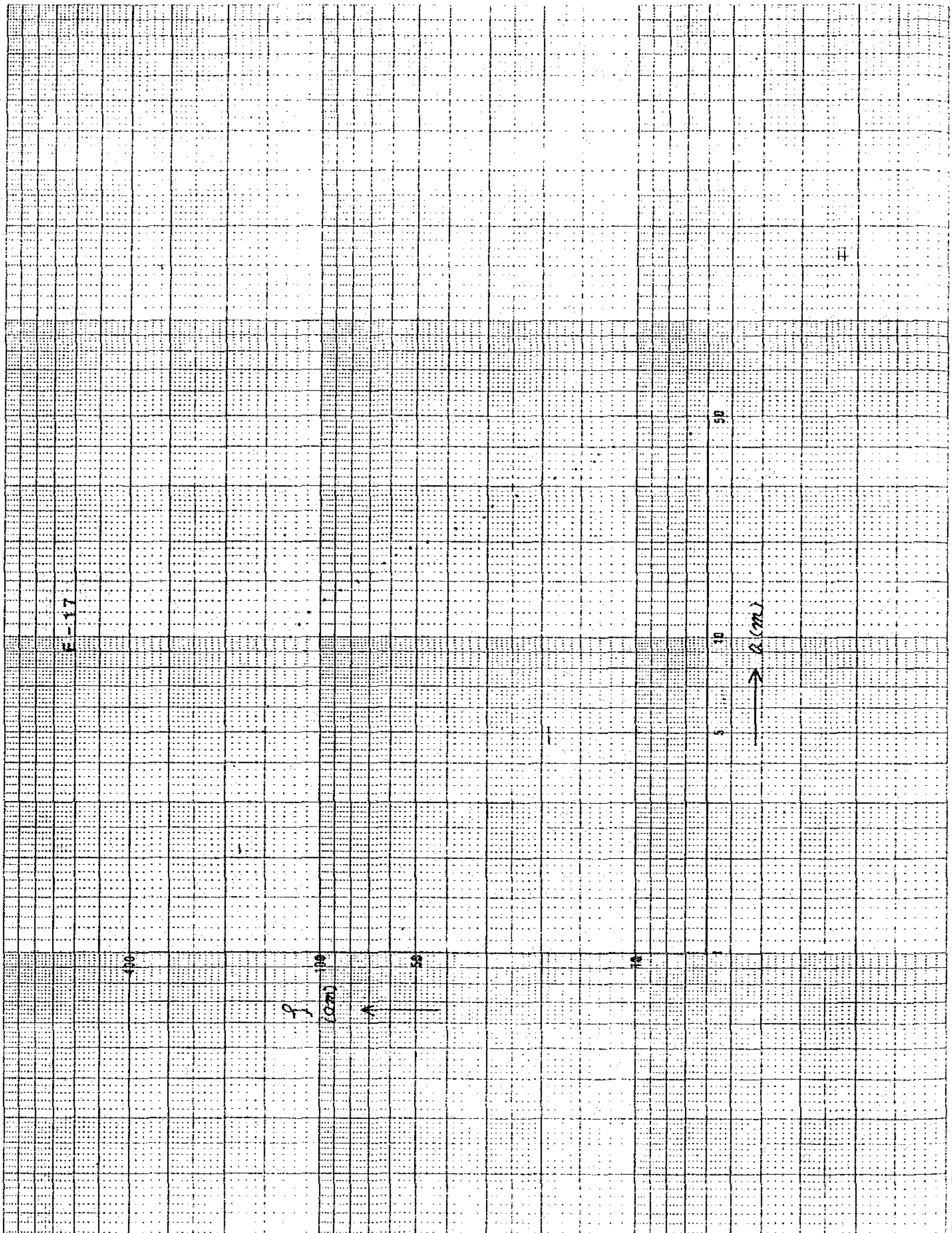

F-13
1
5
10
50
100
300

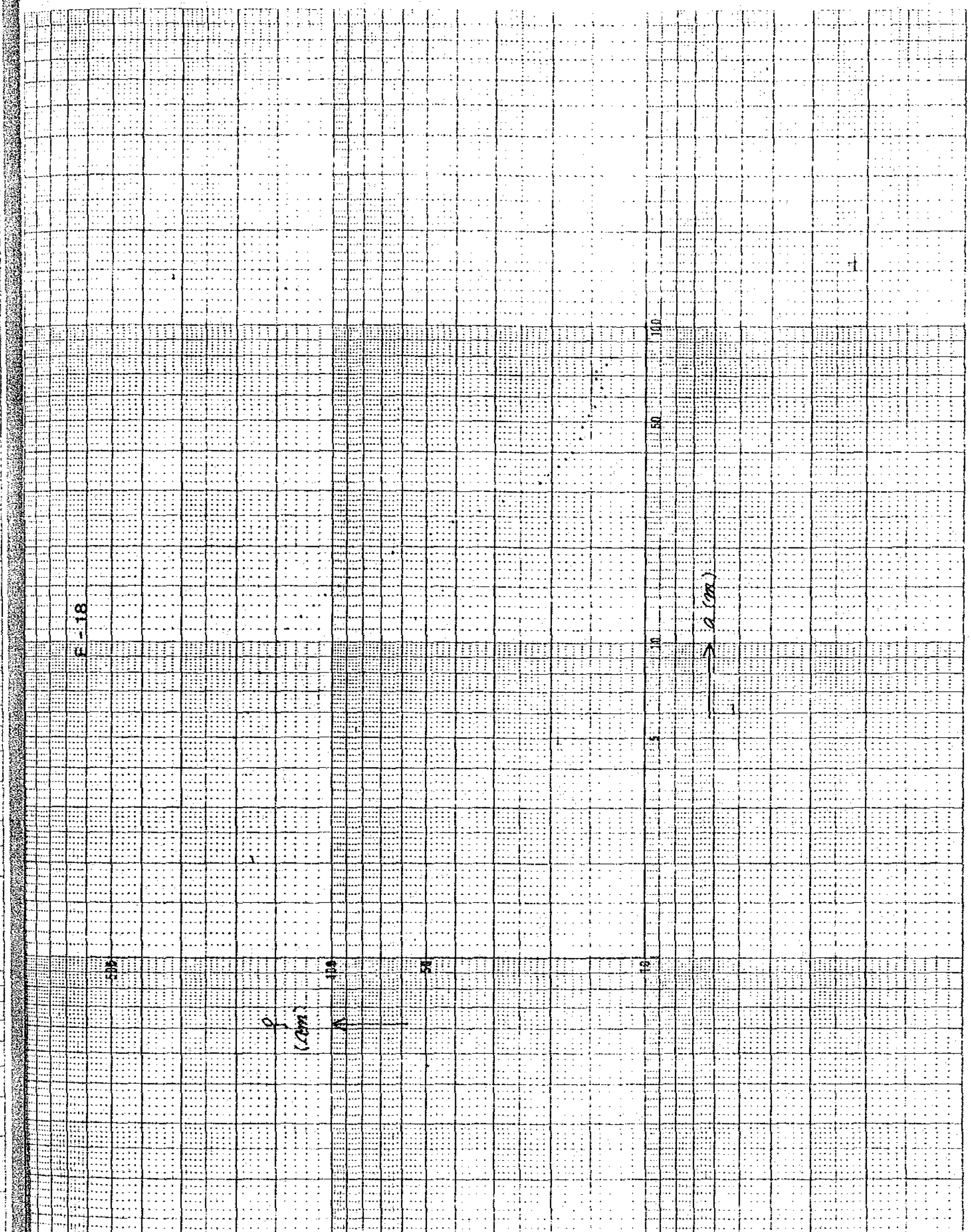


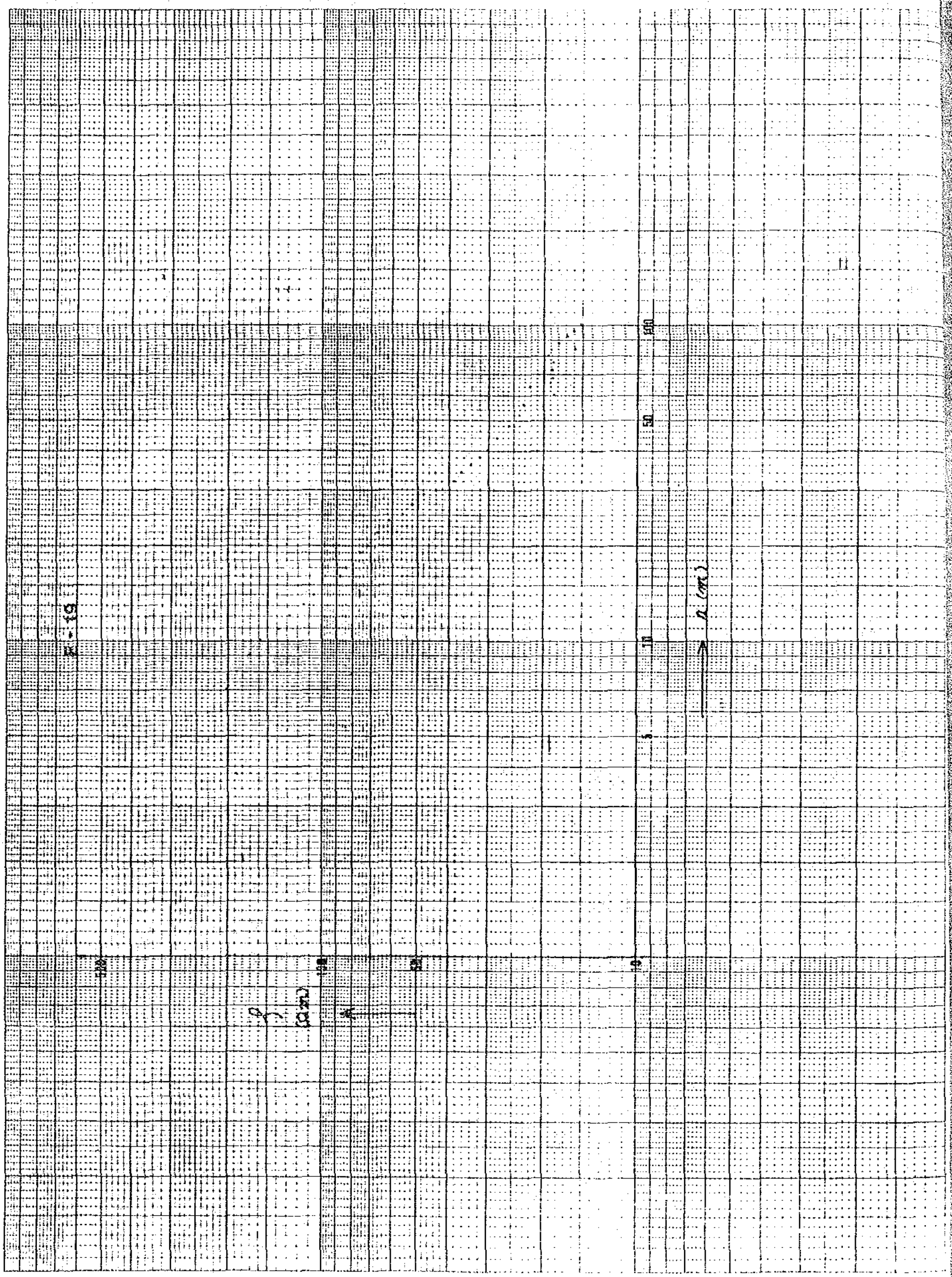
E-14
200
100
50

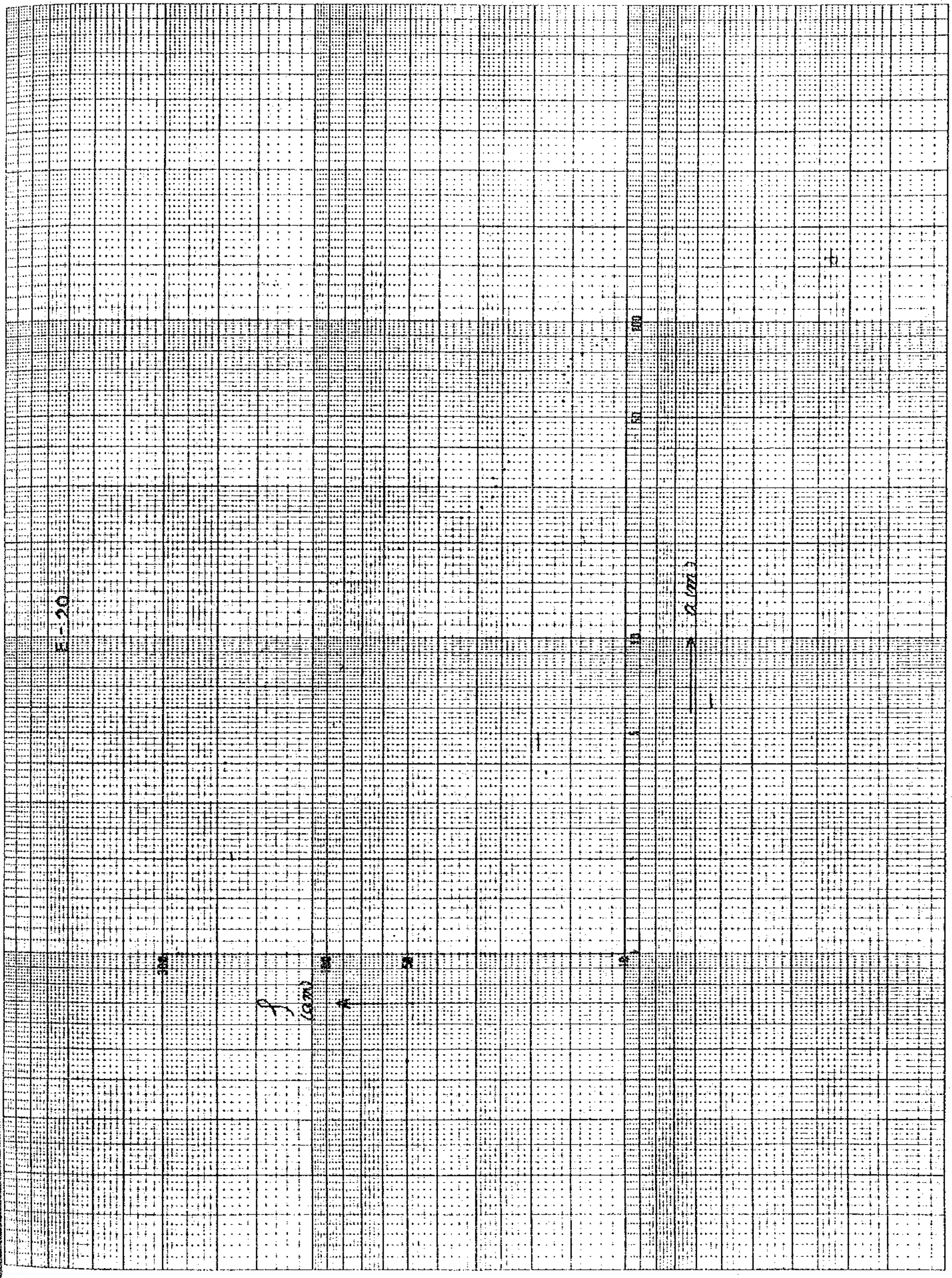

E-15
200
100
50
10
ρ (Ω-m)
100
50
10
5
a (m)


E-16
500
100
50
10
5
ρ (Ωm)
a (m)
100
50
10
5


F-17
a (m)
ρ (Ωm)
1
5
10
50
100


E-18
ρ (Ωm)
a (m)
1.0
5
10
50
100
500




F-20
300
100
50
10
1
5
10
50
100

C-2 Soil

(1) Determination of the Soil Classification Factors

Soil classification was carried out by using level of the soil phase. The standard classifications except for soil units were based on the survey results. The following investigations were carried out.

(a) Depth of the available soil horizon

The depth of the available soil horizon for Regosols is above 100 cm. The distribution areas of Regosols are all organized by their deep sandy phase and a change in soil phase is not found in this horizon.

Yermosols are gravelly soils containing from fine to small round gravels and the depth of the available soil horizon is approximately 100 cm or more in the greater part of the distribution area. Only a small area in the northern part of the Project area close to the boundary consisting of low land which is below 8 m above sea level has less than a 100 cm depth of available soil horizon.

The depth of the available soil horizon is between 55cm and 100cm from the ground surface in this area, the basic rock is weakly consolidated sandstone and has little permeability. Therefore, the depth of the available soil horizon of the Project area is more than satisfactory for cultivation.

(b) Gravel content

As already mentioned previously, Regosols have practically no gravel content. Therefore, gravel content cannot be used in the subclassification of Regosols.

Yermosols contain some varieties of fine to small round gravels which can be used as a soil subclassification factor. However, the size and shape of gravels are mainly fine to small gravels and the standard soil classification can make use only of the gravel content.

(c) Soil texture

According to the results of the soils survey, soil of the Project area obviously belongs to the coarse textured soil group. Basic characters of the particle size distribution all agree with these three soil units. For instance, coarse sand - the particle size is between 1.0mm and 0.2 mm - forms a large ratio. The ratio of silt and clay show little difference in soil classification. Therefore, it is not deemed necessary that soil texture be considered as a factor of soil classification.

(d) Soil salinity

The problem of salt accumulation must be considered when farming desert land. According to the results of the soil survey, salt accumulation in the solam and available soil horizon, is caused by capillary rise of groundwater. This was found in a small area near the northern boundary. There is groundwater about 100 cm below the ground surface in this low land. Therefore, there is a possibility of salt accumulation in the available soil horizon from saline groundwater. As already mention above, the particle size of the soil in the Project area is coarse sand of 0.2 to 1.0 mm diameter. Therefore, the capillary rise in the Project area can be obtained theoretically by formula as follows:

The soil terms suppose that, mean weight diameter is 0.5 mm of rhombohedral packing of coarse sand where the diameter of the soil pore is 15% of coarse sand then,

$$h = 2T \cos \alpha / \gamma \cdot \rho w \cdot g$$

h : Height of capillary rise (cm)
T : surface tension 72.44 dyne/cm·22°C
α : angle of contact = 1.0 g/cm^3
ρw: density = 1
γ : radius of soil pore diameter
g : gravitational acceleration 980 cm/sec^2

therefore, the height of capillary rise is calculated at less than 50 cm.

The groundwater level of the Project area except for low land is more than 150 cm below the ground surface. Consequently, there is no influence from salt accumlation in the Project area, theoretically speaking. According to the measured value of ECe, soil units with a value over 4.0 mmhos/cm 25°C are Haplic Yermosols in profile No. 29, Calcic Yermosols in 1 horizon of profile No. 33 and 2 horizons of profile No. 48, but none in Dystric Regosols. In profile No. 48 in the low land area, there is a possibility of salt accumulation from saline groundwater through capillary rise. Therefore, it is not necessary that soil salinity be a factor of soil classification in the Project area.

(e) Topography

From the results of the field survey, topography in the Regosols area is nearly flat, gently undulating and gently rolling. This variation of topography influences land use and farming works. Topography in the Regosols area is needed as a factor of land classification.

The Yermosols area which is distributed in riverine terrace is not necessary to be classified by topography as a factor of land classification.

(2) Basis of soil classification

The basis for soil classification is obtained as a result of the previous mentioned factors.

(a) Classification by Topography

Symbol

f :	land form ;	flat to nearly flat
	soil slope;	0 to 3%
u :	land form ;	gently undulating to undulating
	soil slope;	3 to 8%
r :	land form ;	gently rolling to rolling
	soil slope;	8 to 10%

(b) Gravel content

C : Common phase

C_1; gravel contents ratio is less than 10% of soil horizon from ground surface to 60cm depth.

C_2; gravel content ratio is greater than 10% and thickness is less than 20 cm.

g : Gravelly phase

Gravel content ratio is greater than 10% and the thickness is greater than over 20 cm is soil horizon from ground surface to 60 cm depth.

g_1 ; gravel content ratio - 10~20%

g_2 ; " - 20~50%

(c) Deep sandy phase, (ds) which is distributed in shifting sand dunes is established to indicate the characteristics of Regosols. Places where the gravel content ratio is over 50%, are called Gravel Land (G).

(3) Soil classification

The results of the soil classification are obtained as follows:

Project Area	21,524 fed	9,044 ha	100%
Dystric Regosols (Rd) (deep sandy phase)	13,741	5,771	63.9
nearby flat (f)	1,281	538	5.9
gently undulating (u)	4,450	1,869	20.7
gently rolling (r)	8,010	3,364	37.2
Haplic Yermosols (Yh)	2,871	1,206	13.3
Common phase (c)	476	200	2.2
Gravelly phase (g)	2,395	1,006	11.1
Calcic Yermosols (Yk)	4,614	1,938	21.4
Common phase (c)	298	125	1.4
Gravelly phase (g)	4,316	1,813	20.0
Gravel Land (G)	298	125	1.4