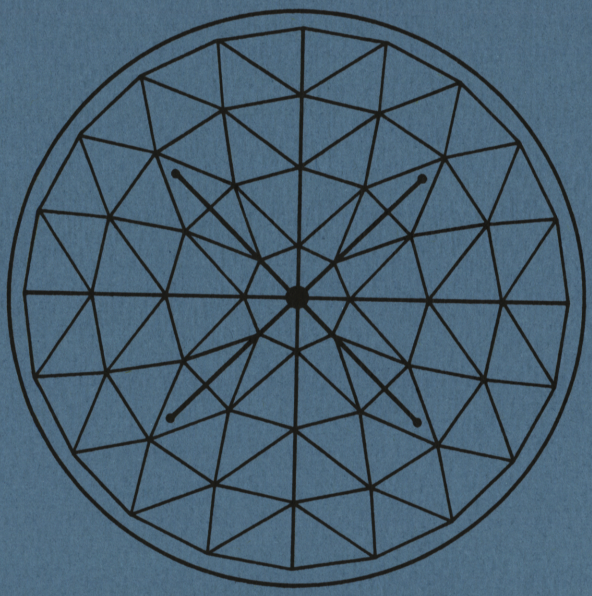

REPORT 21

Report 21

January 10, 1969

Final Data for Telescope Design

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To this date, the results of a 300-foot telescope design had come to a point that it fulfilled all the desired requirements. This report is primarily for the publication of all physical data of the telescope for the convenience of the structural detail design, whereas deformations, stresses, stability and dynamic of the structure will be presented in a separate report following this.

I. Design Constants

Focus length	128.00	ft.
Diameter of telescope	300.00	ft.
No. of surface points	57	
No. of structural points	149	
No. of structural members	644	
Weight of telescope	994	tons
Wind load during observation	1.29	lb./sq. ft.
Survival load	20.00	lb./sq. ft.
Surface point load	3428.60	lb./sq. ft.
Modulus of elasticity	29000.00	ksi
Specified yield stress	33.00	ksi
Density of material	.358	lb./cu. in.

II. Coordinates of Structural Points

Due to the symmetry of the telescope, only one quadrant of the structure is considered. Weight factors are introduced and are listed in the last column of the following tables. They are defined as follows:

MU=0	It is a fictitious point which is located in the middle of a member. The member is perpendicular to either X-Z plan or Y-Z plan.
MU=1	The point is located on Z-axis. This is a unique point without a counterpart.
MU=2	The point is located either on X-Z plan or Y-Z plan. It has one counterpart.
MU=4	The point is located in space and it has three counterparts.

Table I contains the coordinates of the structural point in one quadrant. A complete structure will be the mirror image of this quadrant.

III. Member

Weight factor NU are also introduced in the table of members.

NU=1	The member is located along the Z-axis. The area appearing in the table is only one-quarter of the whole member.
NU=2	The member is located perpendicular to either X-Z plan or Y-Z plan. The length of this member is only one-half of its whole length. It has one counterpart.
NU=3	The member is located along either X-Z plan or Y-Z plan. The area of the member is only one-half of the whole member. It has one counterpart.
NU=4	The member is located in the space. The length and the area appearing in the table is as it is. It has three counterparts.

Table II contains the incidents, the cross-sectional area and the weight factors. The unit of the length and area are in inches and square inches, respectively. A complete telescope will be the mirror images of the quadrant.

IV. Graphical Presentations

The drawings in the following pages are presented with a scale of 1 cm = 100 inches. They can be studied as a reference in conjunction with Table I and Table II listed above.

V. Table for Built-up Member

Detail descriptions of built-up member are to be found in Report No. 19. Please note that the density given above is an equivalent density for the built-up member.

ρ	b_c/L	A_p/A	A_c/A	A_b/A	A_d/A	A_t/A
.358	.0557	.354	.250	.0613	.0650	.0175

POINT	COORDINATES X	Y	Z	POINT LOADS	MU
1	325.000	0.0	-17.192	1714.30	2
2	229.810	229.810	-17.192	3428.60	4
3	0.0	325.000	-17.192	1714.30	2
4	800.000	0.0	-104.167	1714.30	2
5	692.820	400.000	-104.167	3428.60	4
6	400.000	692.820	-104.167	3428.60	4
7	0.0	800.000	-104.167	1714.30	2
8	1275.000	0.0	-264.587	1714.30	2
9	1177.946	487.921	-264.587	3428.60	4
10	901.561	901.561	-264.587	3428.60	4
11	487.921	1177.946	-264.587	3428.60	4
12	0.0	1275.000	-264.587	1714.30	2
13	1700.000	0.0	-470.377	1714.30	2
14	1616.796	525.329	-470.377	3428.60	4
15	1375.329	999.235	-470.377	3428.60	4
16	999.235	1375.329	-470.377	3428.60	4
17	525.329	1616.796	-470.377	3428.60	4
18	0.0	1700.000	-470.377	1714.30	2
19	0.0	0.0	-0.0	857.15	1
20	390.000	0.0	260.000	0.0	0
21	390.000	200.000	260.000	0.0	4
22	200.000	390.000	260.000	0.0	4
23	0.0	390.000	260.000	0.0	0
24	917.630	0.0	123.670	0.0	0
25	917.630	245.878	123.670	0.0	4
26	630.000	630.000	352.000	0.0	4
27	245.878	917.630	123.670	0.0	4
28	0.0	917.630	123.670	0.0	0
29	1471.178	0.0	35.050	0.0	2
30	1432.000	285.000	-64.950	0.0	4
31	1321.148	547.237	35.050	0.0	4
32	1139.113	761.131	-64.950	0.0	4
33	948.193	948.193	35.050	0.0	4
34	761.131	1139.113	-64.950	0.0	4
35	547.237	1321.148	35.050	0.0	4
36	285.000	1432.000	-64.950	0.0	4
37	0.0	1471.178	35.050	0.0	2
38	0.0	0.0	600.000	0.0	1
39	434.223	0.0	650.000	0.0	0
40	434.223	179.861	650.000	0.0	4
41	179.861	434.223	650.000	0.0	4
42	0.0	434.223	650.000	0.0	0
43	1071.820	0.0	450.000	0.0	2
44	914.856	378.946	450.000	0.0	4
45	757.891	757.891	450.000	0.0	4
46	378.946	878.946	450.000	0.0	4
47	0.0	1000.000	450.000	0.0	2
48	757.891	0.0	450.000	0.0	0
49	0.0	757.891	450.000	0.0	0
50	0.0	0.0	-1536.000	0.0	1

51	350.000	200.000	870.000	0.0	4
52	350.000	0.0	870.000	0.0	1
53	996.382	0.0	866.692	0.0	2
54	765.474	0.0	1221.664	0.0	2
55	415.124	0.0	1459.526	0.0	2
56	0.0	0.0	250.000	0.0	1
57	0.0	0.0	1543.164	0.0	1
58	0.0	1200.000	471.136	0.0	2

BAR	PUINT	N U	L	AREA
1	1- 2	4	248.74	5.00
2	1- 4	3	482.90	2.50
3	1- 5	4	550.32	5.00
4	1-21	4	347.94	3.85
5	1-56	3	420.73	2.36
6	2- 3	4	248.74	5.00
7	2- 5	4	500.91	5.00
8	2- 6	4	500.91	5.00
9	2-19	4	325.45	5.00
10	2-21	4	321.53	1.92
11	2-22	4	321.53	2.71
12	2-56	4	420.73	6.62
13	3- 6	4	550.32	5.00
14	3- 7	3	482.90	2.50
15	3-22	4	347.94	2.36
16	3-56	3	420.73	1.42
17	4- 5	4	414.11	5.00
18	4- 8	3	501.36	2.50
19	4- 9	4	637.69	5.00
20	4-21	4	583.71	3.65
21	4-25	4	355.25	3.70
22	5- 6	4	414.11	5.00
23	5- 9	4	518.47	5.00
24	5-10	4	566.45	5.00
25	5-21	4	514.12	2.51
26	5-25	4	355.25	2.52
27	5-26	4	514.72	12.88
28	6- 7	4	414.11	5.00
29	6-10	4	566.45	5.00
30	6-11	4	518.47	5.00
31	6-22	4	514.12	2.90
32	6-26	4	514.72	13.82
33	6-27	4	355.25	4.09
34	7-11	4	637.69	5.00
35	7-12	3	501.36	2.50
36	7-22	4	583.71	4.19
37	7-27	4	355.25	11.87
38	8- 9	4	497.48	5.00
39	8-13	3	472.20	2.50
40	8-14	4	659.65	5.00
41	8-25	4	582.16	11.78
42	8-29	3	358.15	1.09
43	9-10	4	497.48	5.00
44	9-14	4	486.15	5.00
45	9-15	4	585.45	5.00
46	9-25	4	526.40	14.52
47	9-26	4	837.02	4.18
48	9-30	4	381.54	2.46
49	9-32	4	340.60	2.67
50	10-11	4	497.48	5.00

51	10-15	4	525.69	5.00
52	10-16	4	525.69	5.00
53	10-25	4	762.18	6.30
54	10-27	4	762.18	7.60
55	10-33	4	306.81	2.12
56	11-12	4	497.48	5.00
57	11-16	4	585.45	5.00
58	11-17	4	486.15	5.00
59	11-26	4	837.02	3.82
60	11-27	4	526.40	18.11
61	11-34	4	340.60	3.19
62	11-36	4	381.54	3.17
63	12-17	4	659.65	5.00
64	12-18	3	472.20	2.50
65	12-27	4	582.16	7.96
66	12-37	3	358.15	1.16
67	13-14	4	531.88	5.00
68	13-29	3	554.81	2.24
69	13-30	4	563.40	2.69
70	14-15	4	531.88	5.00
71	14-30	4	506.24	4.49
72	14-31	4	585.96	1.83
73	14-32	4	669.44	5.35
74	15-16	4	531.88	5.00
75	15-31	4	680.22	2.28
76	15-32	4	526.18	4.40
77	15-33	4	663.71	2.28
78	16-17	4	531.88	5.00
79	16-33	4	663.71	2.56
80	16-34	4	526.18	5.22
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82	17-18	4	531.88	5.00
83	17-34	4	669.44	3.93
84	17-35	4	585.96	2.45
85	17-36	4	506.24	3.46
86	18-36	4	563.40	3.23
87	18-37	3	554.81	2.07
88	19-21	4	509.61	1.76
89	19-22	4	509.61	2.61
90	19-56	1	250.00	4.25
91	20-21	2	200.00	3.09
92	21-22	4	268.70	1.77
93	21-26	4	500.96	1.81
94	21-38	4	554.71	4.35
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96	21-43	4	735.51	5.39
97	22-23	2	200.00	4.38
98	22-26	4	500.96	1.92
99	22-38	4	554.71	10.70
100	22-41	4	393.02	7.05

101	22-47	4	669.48	4.64
102	24-25	2	245.88	5.77
103	25-26	4	531.43	5.57
104	25-29	4	612.15	2.99
105	25-30	4	549.26	8.28
106	25-32	4	591.71	3.19
107	25-40	4	717.68	2.70
108	25-43	4	436.72	10.41
109	25-44	4	352.43	2.95
110	25-45	4	627.83	11.92
111	26-27	4	531.43	3.87
112	26-40	4	574.25	2.39
113	26-41	4	574.25	2.29
114	26-44	4	392.14	3.65
115	26-46	4	366.89	5.18
116	27-28	2	245.88	9.81
117	27-34	4	591.71	3.03
118	27-36	4	549.26	4.89
119	27-37	4	612.15	3.88
120	27-41	4	717.68	4.24
121	27-45	4	627.83	16.32
122	27-46	4	354.53	5.30
123	27-47	4	416.81	24.96
124	29-30	4	304.56	1.53
125	29-45	3	575.91	2.93
126	30-31	4	301.76	1.85
127	30-43	4	693.02	9.89
128	30-44	4	735.82	4.07
129	31-32	4	298.14	1.82
130	31-44	4	604.63	2.41
131	32-33	4	285.38	4.43
132	32-44	4	679.36	5.45
133	32-45	4	640.71	11.66
134	33-34	4	285.38	4.27
135	34-35	4	298.14	2.26
136	34-45	4	640.71	15.01
137	34-46	4	692.04	17.87
138	35-36	4	301.76	1.48
139	35-46	4	629.32	2.15
140	36-37	4	304.56	1.85
141	36-46	4	761.49	10.26
142	36-47	4	730.08	13.37
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144	38-40	4	472.65	24.22
145	38-41	4	472.65	21.72
146	38-51	4	485.18	5.54
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149	39-40	2	179.86	6.65
150	40-41	4	359.72	7.20

151	40-43	4	692.01	15.50
152	40-45	4	692.01	7.71
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155	41-47	4	626.46	6.46
156	43-44	4	410.17	49.47
157	43-51	4	858.73	22.76
158	43-53	3	423.47	15.67
159	44-45	4	410.17	31.88
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173	53-54	3	423.47	25.10
174	54-55	3	423.47	33.89
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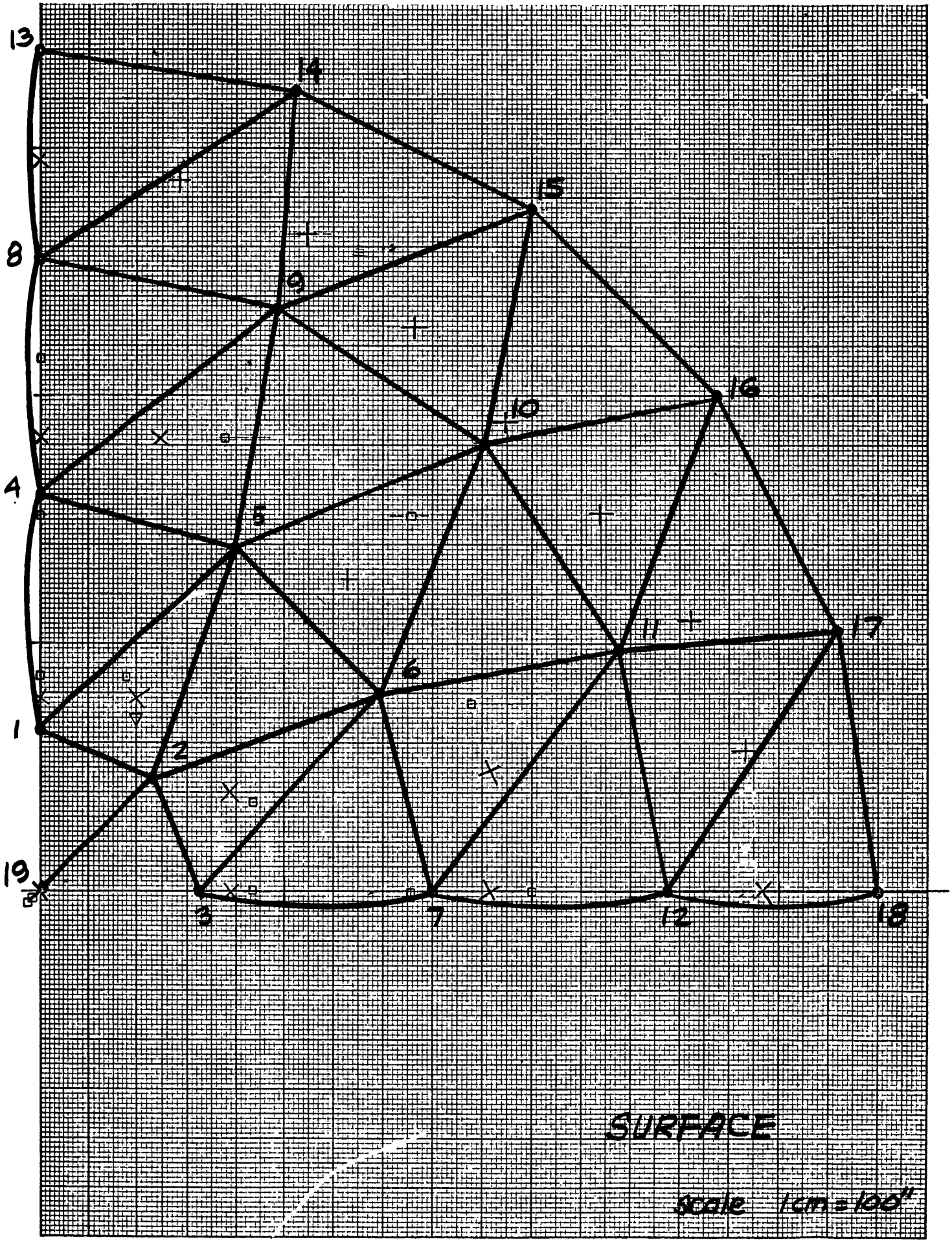

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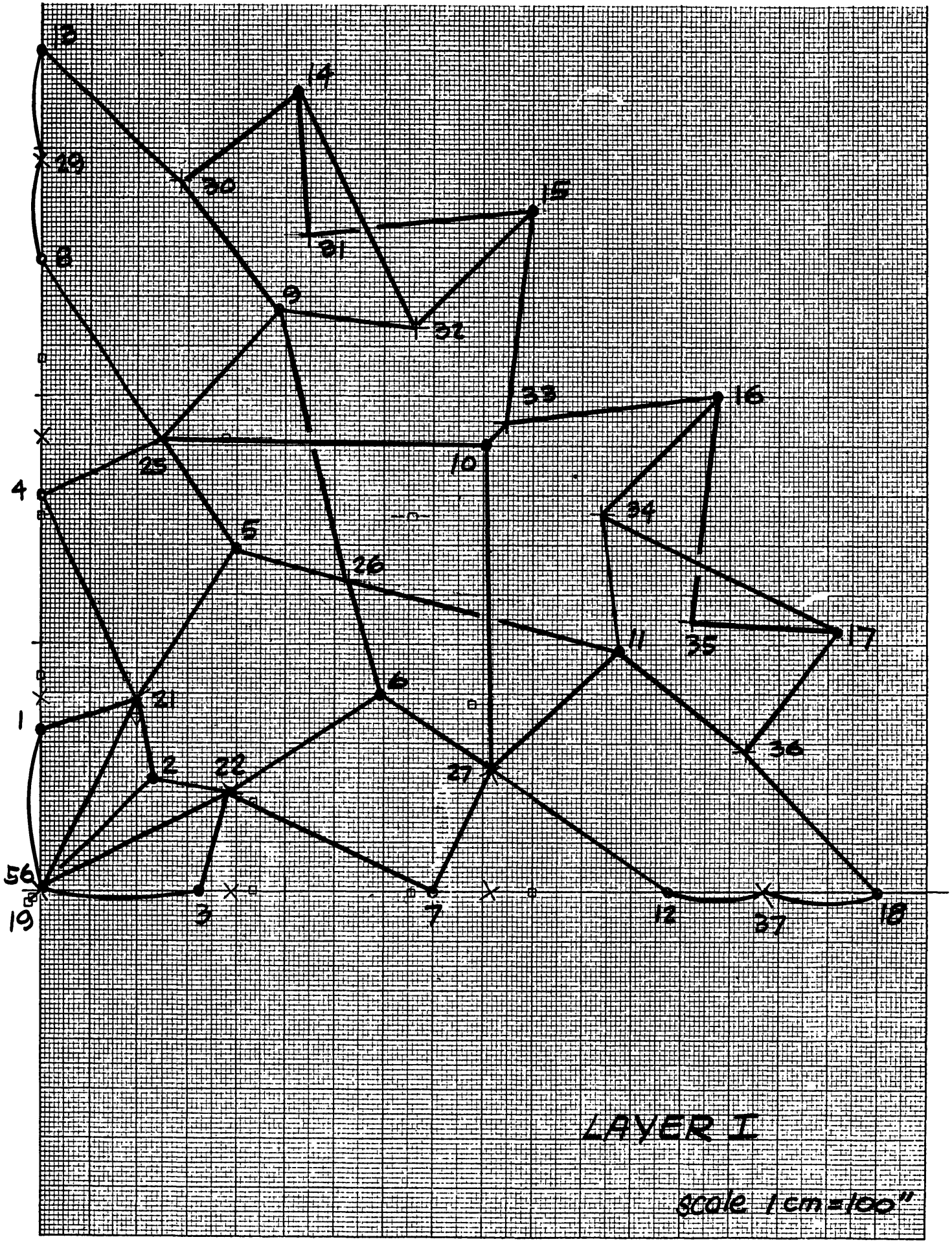
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LAYER I
scale 1 cm = 100"

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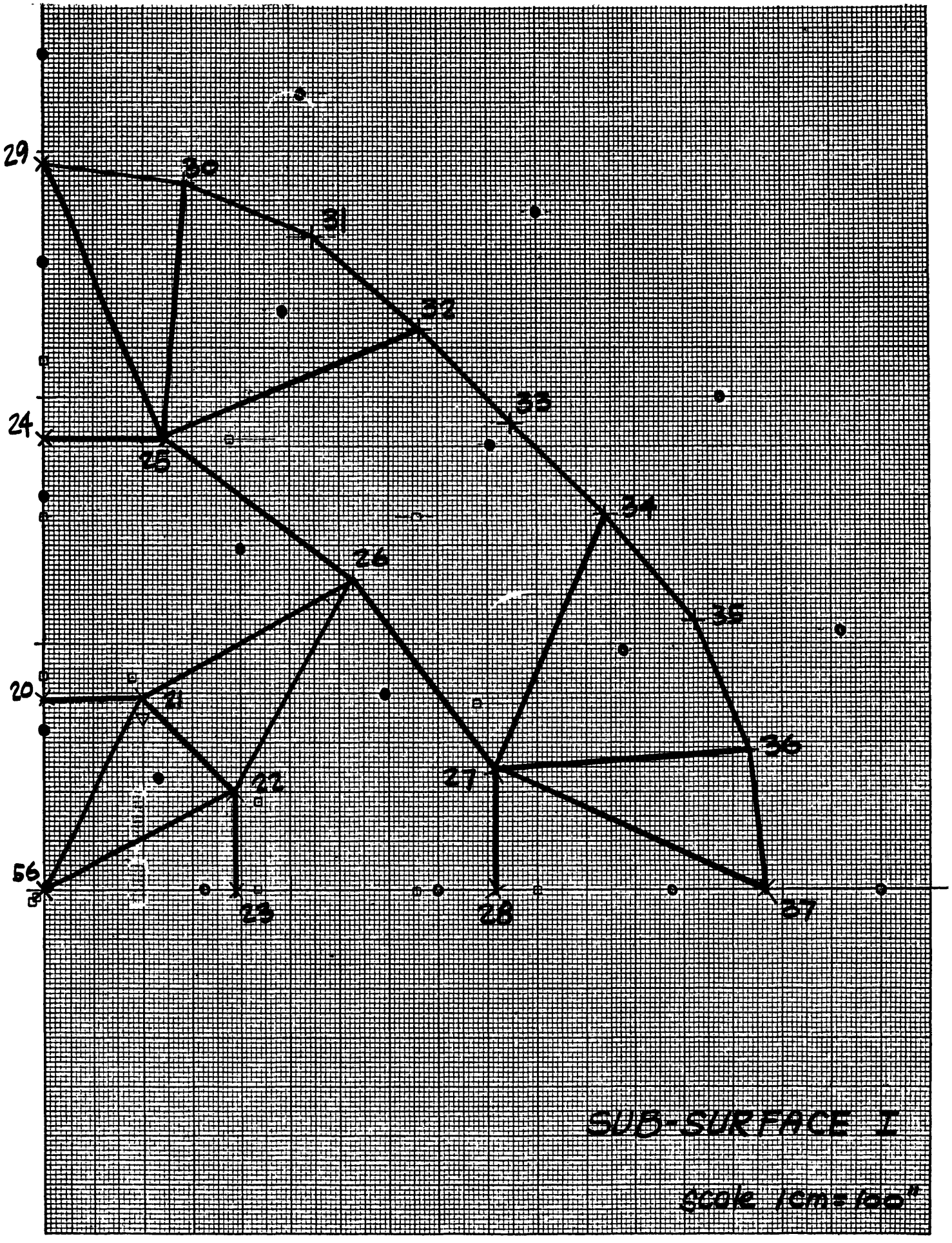

SUB-SURFACE I

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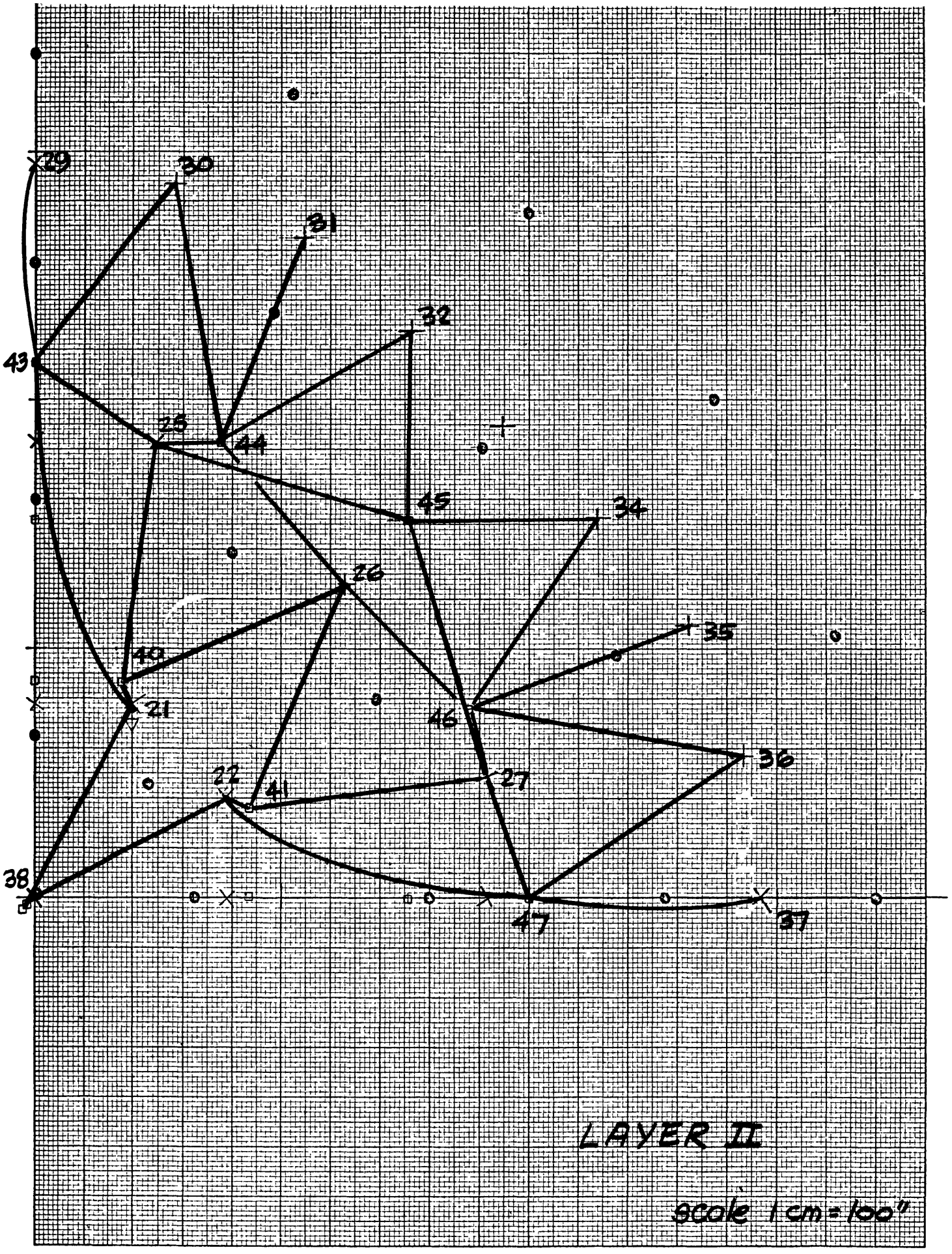

LAYER II

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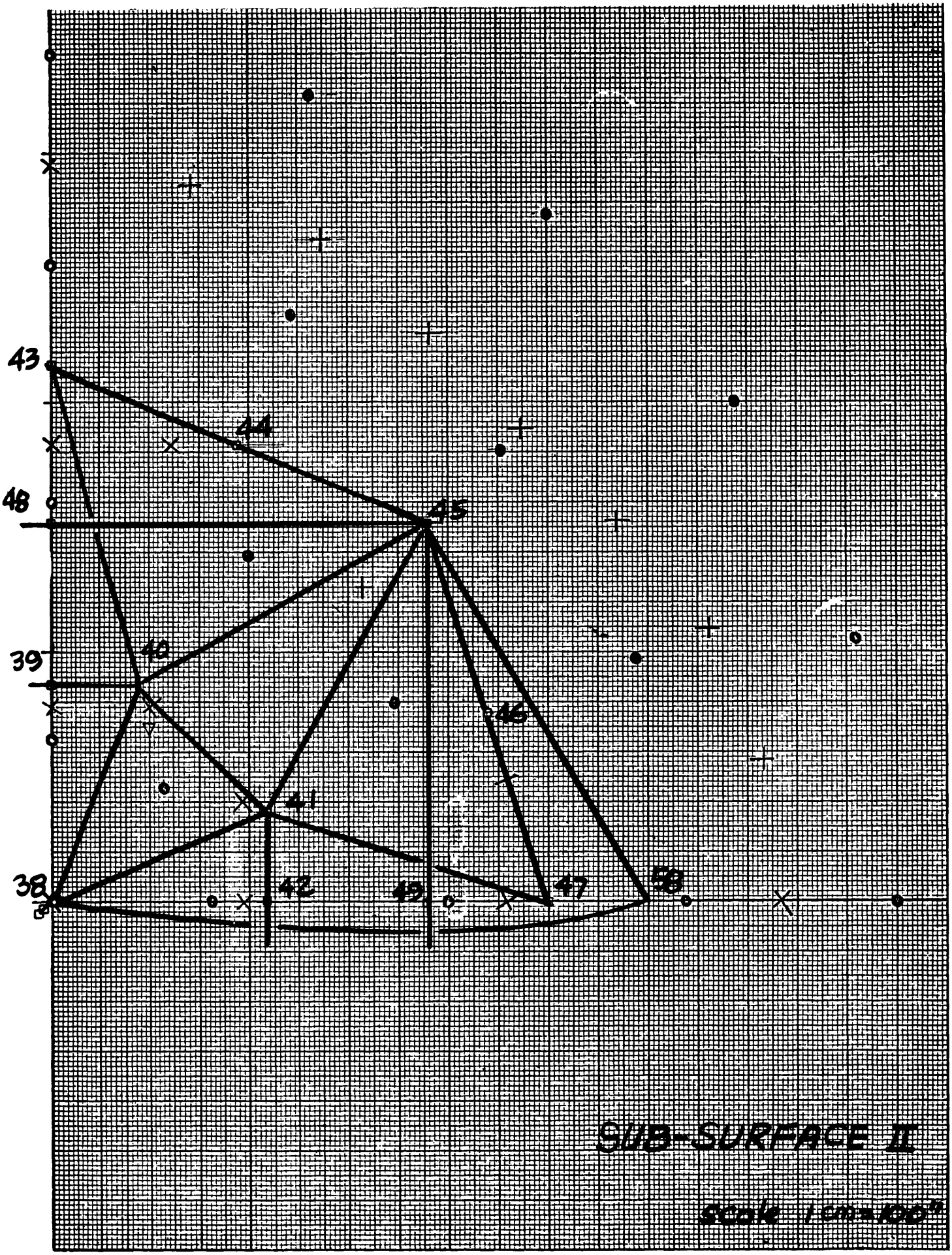

SUB-SURFACE II

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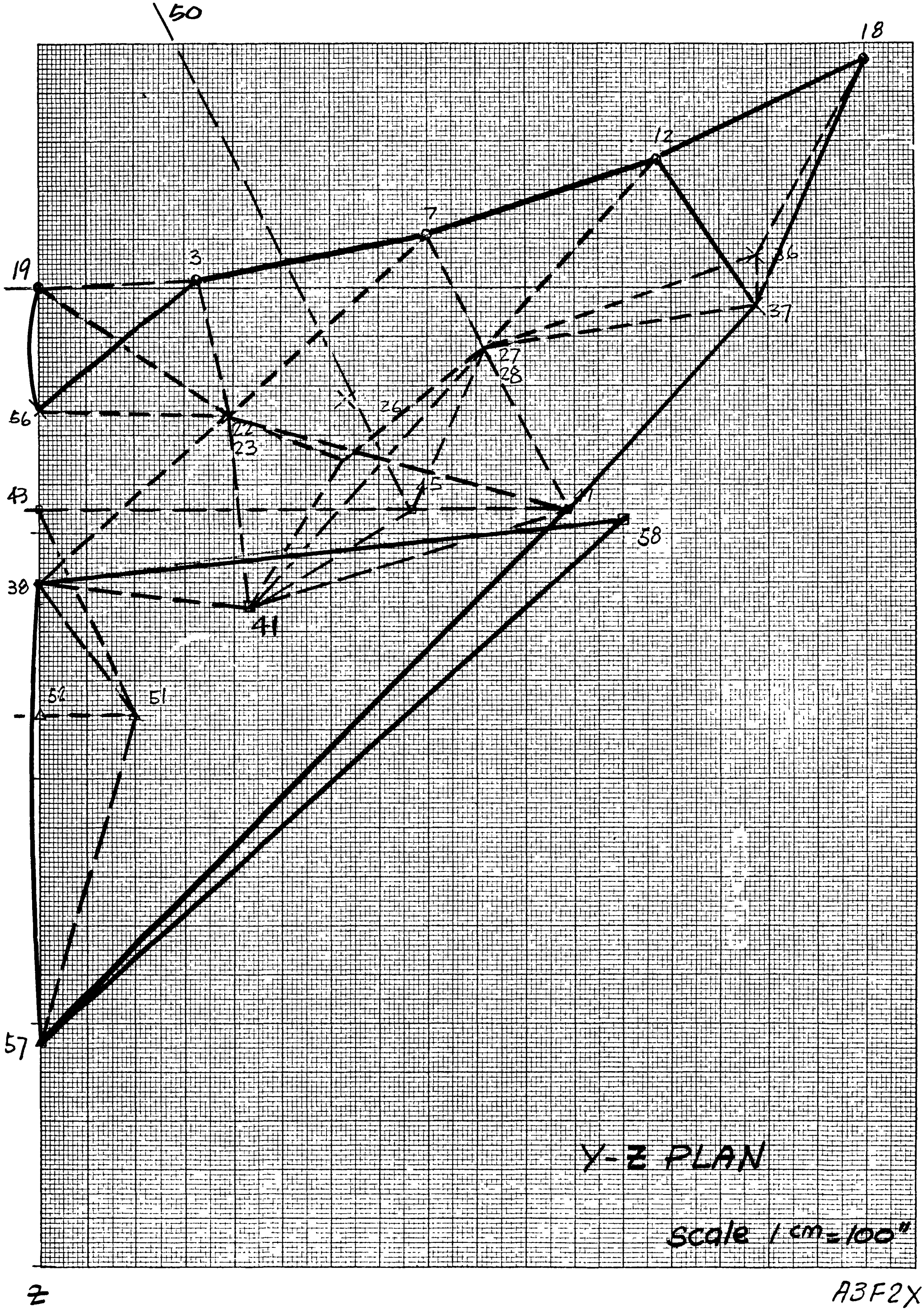
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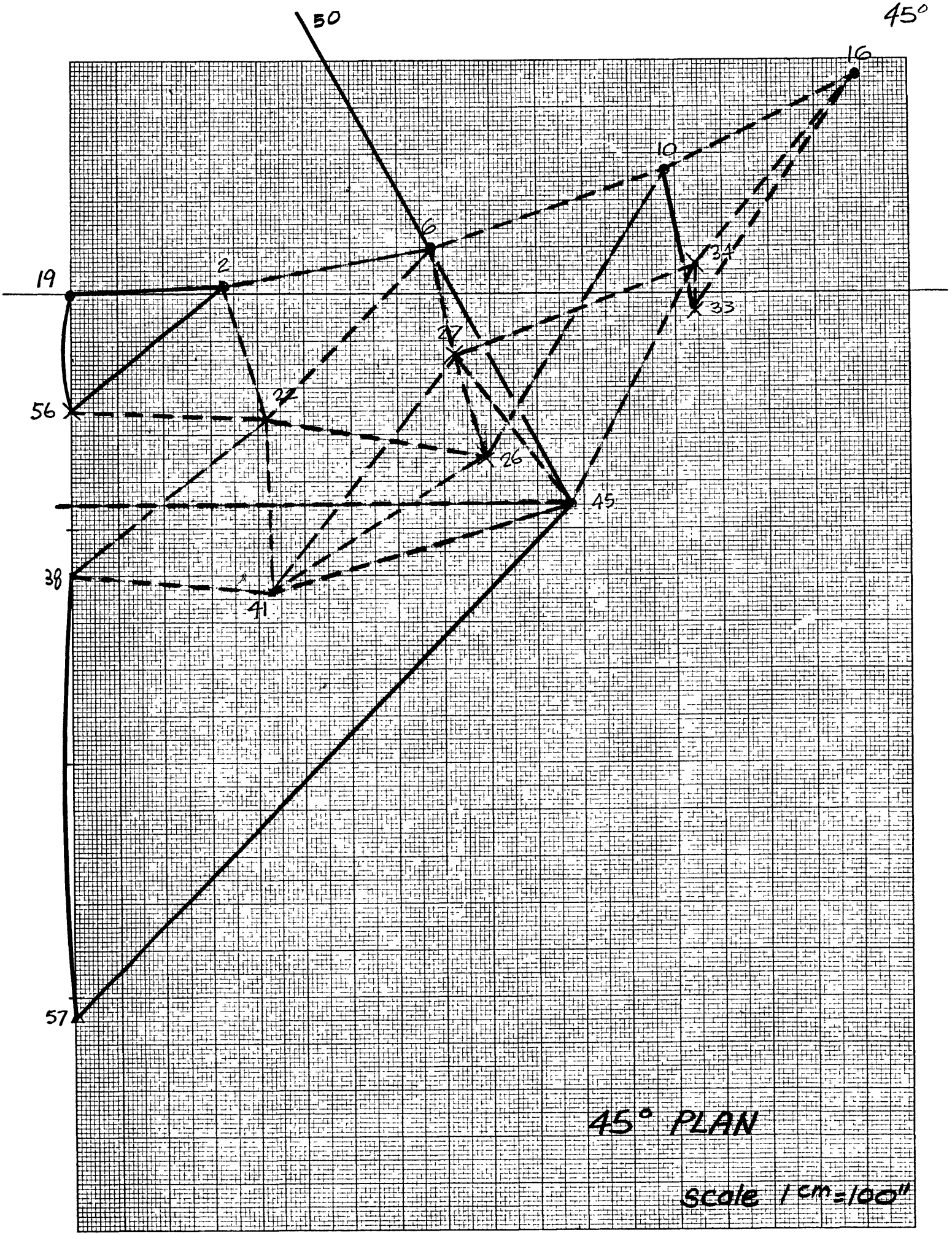
Y-Z PLAN
scale 1 cm=100"
Z

A3F2X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45°
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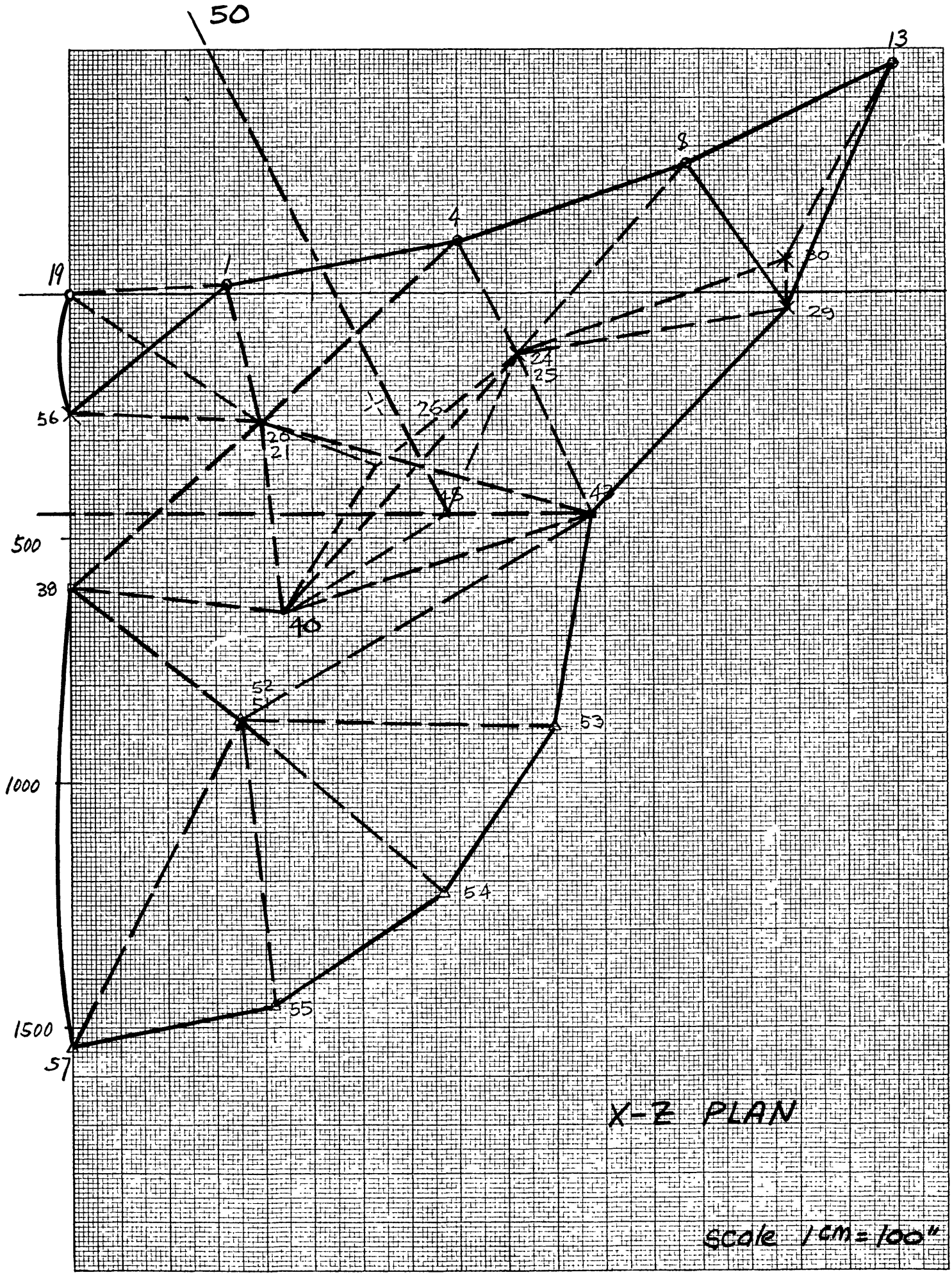
45° PLAN
scale 1 cm = 100"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500
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1000
54
55
1500
57
X-Z PLAN
scale 1 cm = 100"